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An Chomhairle Oidhreachta
The Heritage Council



Sallins



HABITAT SURVEY AND GREEN

INFRASTRUCTURE MAPPING

KILDARE COUNTY COUNCIL

February 2015



SALLINS

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**Prepared for
KILDARE COUNTY COUNCIL**

February 2015

Rev.	Status	Author	Reviewed By	Approved By	Issue Date
R01	Final	RN	PS	PS	26/02/2015

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Habitat Survey and Green Infrastructure Mapping

Table of Contents

INTRODUCTION	4
1.1 Background.....	4
1.2 Objectives.....	5
1.3 The Study Area.....	5
2 METHODOLOGY	7
2.1 Desk Study and Consultation.....	7
2.2 Evaluation of Habitats and Designated Sites	8
2.3 Notable Flora	10
2.4 Field Surveys.....	10
2.4.1 <i>Habitats and Flora</i>	10
2.4.2 <i>Fauna</i>	10
2.5 Green Infrastructure	11
2.6 Limitations.....	11
3 RESULTS.....	12
3.1 Desktop Study Records.....	12
3.1.1 <i>Notable Habitats and Flora</i>	12
3.1.2 <i>Notable Fauna</i>	12
3.1.3 <i>Invasive Species</i>	14
3.2 Habitat Categories	14
3.2.1 <i>Woodland and scrub</i>	14
3.2.2 <i>Grasslands</i>	17
3.2.3 <i>Disturbed Ground</i>	19
3.2.4 <i>Cultivated and Built Land</i>	19
3.2.5 <i>Freshwater</i>	19
3.3 Fauna.....	20
3.3.1 <i>Badgers</i>	20
3.3.2 <i>Bats</i>	20
3.3.3 <i>Other mammal species</i>	20
3.3.4 <i>Birds</i>	21
3.3.5 <i>Amphibians</i>	21
3.3.6 <i>Fish/Crustacean</i>	21
3.4 Target Notes	22
4 DISCUSSION	24
4.1 Habitats and their potential for protected species in Sallins.....	24
4.2 Green Infrastructure in Sallins.....	27
5 RECOMMENDATIONS	28
5.1 Policy Guidance.....	28
5.2 General Recommendations for Sallins.....	30

APPENDIX A: RECORDS FOR PROTECTED, RARE OR NOTABLE SPECIES	33
APPENDIX B: SPECIES RECORDED DURING THE SURVEY	38
APPENDIX C: CRITERIA FOR ECOLOGICAL EVALUATION FROM:	41
APPENDIX D: HEDGEROW EVALUATION CRITERIA	45
APPENDIX E: HABITAT AND GREEN INFRASTRUCTURE MAPS	46

INTRODUCTION

1.1 Background

Kildare County Council, in partnership with the County Kildare Heritage Forum and the Heritage Council commissioned a series of Habitat Survey and Mapping projects for a number of towns in Kildare. An action of both the County Kildare Heritage and Biodiversity Plans are to identify local important biodiversity areas. Such habitats are essential for preserving the biodiversity of an area and supporting its wildlife. In addition, there are a wide range of benefits to maintaining biodiversity areas such as provision of recreation and amenity areas, protection of soil and water quality, sustainable food and fuel production, flood alleviation and carbon sequestration. As a result, the importance of these habitats in Ireland is widely recognised and their significance should be fully appreciated

In recognition of the importance of these habitats Kildare County Council prepared objectives for the County Kildare Biodiversity Action Plan (Kildare County Council 2009a). These objectives are the same as those that were adopted in the County Kildare Heritage Plan (Kildare County Council 2005). These plans are distinct in that the main focus of the biodiversity plan is natural heritage. The objectives are as follows:

1. To facilitate the collection and dissemination of heritage information;
2. To raise public awareness, understanding and appreciation of County Kildare's heritage;
3. To promote best practice in heritage conservation and management; and,
4. To inform policy and provide advice to Kildare local authorities.

The Kildare County Development Plan 2011-2017 (Kildare County Council 2011) sets out a strategic approach to the management of development in the county. One of the strategies within this plan is to protect local assets by preserving the quality of the landscape, open space, natural, architectural, archaeological and cultural heritage and material assets of the county. Part of the core strategy of this plan is to balance the environment with sustainable and appropriate development. As such, within this plan, it is the policy of the Council to:

- Protect and conserve the natural environment;
- Protect and conserve nationally important and EU designated sites;
- Promote and enhance biodiversity throughout the county; and,
- Ensure that the built heritage is appropriately protected through the Record of Protected Structures with policies to support the sensitive reuse and integration of such structures into new development works.

Protecting the environment by implementing an environmental protection policy which recognises the various environmentally sensitive zones within the county but not to mutually exclude appropriate and otherwise acceptable uses and development is one of the items which the preferred development strategy aims to achieve.

1.2 Objectives

The purpose of this study was to:

- Survey, map and assess habitats within the development boundary of the town;
- Identify green infrastructure;
- To liaise with Kildare County Council staff in the development of policies and objectives to protect and conserve the green infrastructure; and,
- To raise awareness about the biodiversity of the towns.

It is the intention of the Kildare County Council that the results of this study will:

- Inform future strategic planning;
- Identify green infrastructure;
- Assist the appropriate management of biodiversity;
- Provide information for the general public and relevant community groups; and,
- Raise awareness about the biodiversity resources that the towns support.

In order to efficiently conserve and sustainably manage the natural heritage of towns in Kildare a high level of understanding of the county's habitats and landscapes is required. One of the main aims of this study was to carry this out so that the safeguarding and sustainable management of habitats and green infrastructure within these towns can be fully integrated within the planning process.

1.3 The Study Area

This report focuses on the habitat survey and green infrastructure mapping for the Sallins study area (Grid Ref: N 89050 23263). This is a small town located on the Grand Canal pNHA (proposed Natural Heritage Area), c.32km from Dublin and c. 5km north of Naas. According to the Central Statistics Office Ireland, Sallins has a population of c. 5,200 people (2011 census, www.CSO.ie). The town is separated from Naas by the M7 motorway. The railway also runs through the southern and eastern areas of this town, and the River Liffey flows in a south to north direction to the west of the town. The majority of development has occurred to the east and south of the town.

Areas of undeveloped, open space have been measured and mapped in Kildare as part of the Open Space Strategy (Kildare County Council 2008). This study included: public parks and gardens; private gardens or grounds; amenity green-space; play-spaces for children and teenagers; sports areas; green corridors; natural / semi-natural green-spaces; other green spaces (such as allotments, churchyards and cemeteries); and, civic space (such as squares). The Council estimated a total of c. 22ha of open space and amenity land (where this data was available during the study) that is located within the Sallins settlement (Kildare County Council 2008). This included land that is Council owned, areas of land-use zoning, privately owned land and areas owned by Waterways Ireland. As part of the objectives within the Kildare County Development Plan (Kildare County Council 2011) and Local Area Plan's (such as Sallins LAP, Kildare County Council 2009b) there is a push to explore potential areas for enhancement of open space while identifying and protecting the core areas of Green Infrastructure in Sallins. The survey area for this town can be seen in Figure 1 below.



Legend

- LAP_TownBoundaries
- River Liffey
- Grand Canal pNHA

Drawing No:		140090/01A	
Project Title: Study Area, Sallins - FIGURE 1			
Client: Kildare County Council			
Project No.: 140090		Scale: 1:15,000 @ A4	
Drawn: RNF	Approved: PS	Rev. No.: 01A	Date: 25/02/2015

2 METHODOLOGY

2.1 Desk Study and Consultation

A desk study was carried out to collect any available information on the local ecological environment within the town. The following resources and organisations were consulted:

- Ordnance Survey of Ireland mapping and aerial photography available from www.osi.ie;
- Online data available on European Sites (Natura 2000 Sites) and protected species as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie;
- National Biodiversity Data Centre (NBDC) records available from <http://maps.biodiversityireland.ie/#/Map>;
- Environmental Protection Agency map view <http://gis.epa.ie/Envision>;
- Kildare County Council Heritage Officer;
- Bat Conservation Ireland <http://www.Batconservationireland.org/>;
- Inland Fisheries Ireland <http://www.fisheriesireland.ie/>;
- Waterways Ireland <http://www.waterwaysireland.org/>;
- Control of Aquatic Invasive Species in Ireland (CAISIE) <http://caisie.ie/>;
- Kildare County Development Plan 2011 – 2017;
- Kildare Open Space Strategy 2008;
- Kildare Biodiversity Action Plan 2009 - 2014; and,
- County Kildare Hedgerow Survey Report 2006.

In addition, the following guidance was followed during these surveys:

- *Best Practice Guidance for Habitat Survey and Mapping* (Smith *et al.* 2011); and,
- *A Guide to Habitats in Ireland* (Fossitt, J. A. 2000)

Organisations that were contacted directly in order to obtain additional information for this study were:

The NPWS provided a subset of their habitat data for the designated sites within the study area. Aspects of these data sets may be incomplete and this information did not substitute for up-to-date field surveys.

Waterways Ireland was contacted in order to obtain any additional or updated information regarding habitat mapping and species records that are not already available on their website.

Inland Fisheries Ireland (IFI) were contacted in the same capacity as the above.

Where received, all additional relevant data has been included in the species lists in Appendix A.

2.2 Evaluation of Habitats and Designated Sites

One of the main aims of a habitat survey is to identify its ecological value. Criteria for such evaluation may include noting its rarity, the abundance and diversity of its species, the level of human interference/modification and/or management of an area, their connectivity to other natural habitats and their size. Through gathering such information it is possible to identify habitats of conservation importance which should be offered greater protection than those of less value. The habitats in this study were evaluated according to the NRA Guidelines provided in Appendix D. This is discussed further in Section 4.

The European Commission has identified the prime habitats of conservation importance across Europe. Of these habitat types, 59 exist in Ireland and a number of these are qualifying features for designated sites here.

Special Areas of Conservation (SAC) are designated under the Habitats Directive (92/43/EEC). This Directive enables the protection, conservation and restoration of certain habitats and/or species (habitats listed on Annex I, and species listed on Annex II/IV of the Habitats Directive). Designated SACs are compiled within a framework of protected areas known as Natura 2000 or European Sites. In Ireland candidate SAC's are afforded the same level of protection as SACs. Legislation that will regularise the list of cSACs is likely to commence in 2015.

Special Protection Areas (SPAs) are designated under the Birds Directive (79/409/EEC). SPAs are designated to protect birds listed on Annex I of the Birds Directive, as well as for populations of regularly occurring migratory species. The Birds Directive obliges member states to conserve wetlands, especially those of international importance.

The Birds and Habitats Directives are principally transposed into Irish law by the European Communities Birds and Natural Habitats Regulations 2011 (SI 477/2011) (as amended).

Natural Heritage Areas are designated and protected under the Wildlife Act 1976 (as amended), while proposed Natural Heritage Areas (pNHAs) are offered some level of protection until such time as they are fully designated, under development plans.

The designated sites within this town are described within Table 1 below.

Table 1 – Designated Sites that lie within the town’s development boundary (or immediately adjacent).

Designated sites (Special Areas of Conservation, Special Protection Areas and proposed Natural Heritage Areas) within the town boundary				
Code	Site Name	Designation	Qualifying Interests (i.e. reasons for designation)	Site Vulnerability
Sallins				
002104	Grand Canal	pNHA	<p>The Grand Canal proposed Natural Heritage Area (pNHA) comprises the canal channel and the banks on either side of it. Otter <i>Lutra lutra</i> and the rare and legally protected Opposite-leaved Pondweed (<i>Groenlandia densa</i>) (Flora Protection Order 1987) is present at a number of sites in the eastern section of the Main Line, between Lowtown and Ringsend Basin in Dublin. This is a linear habitat, providing connectivity between habitats and supporting a diverse range of species.</p> <p><u>Other protected species include:</u></p> <p>Inland Fisheries Ireland also hold records for White-clawed Crayfish (<i>Austropotamobius pallipes</i>) in the Grand Canal.</p> <p>A report by BEC in Sallins (Brophy <i>et. al.</i> 2012) recorded both Otter and White-clawed Crayfish on the Grand Canal.</p> <p>Kingfisher (<i>Alcedo atthis</i>) have also been recorded here.</p> <p>NBDC hold records for Desmoulin’s Whorl Snail (<i>Vertigo moulinsiana</i>) and Narrow-mouthed Whorl Snail (<i>Vertigo angustior</i>) on the Grand Canal. Marsh Whorl Snail (<i>Vertigo antivertigo</i>) has also been recorded here, which is another European and Nationally protected species due to its rarity and recent declines in its population numbers.</p>	<p>Habitats and species within this pNHA may be threatened by impacts such as:</p> <ul style="list-style-type: none"> ▪ Water pollution. ▪ Over fishing. ▪ Litter. ▪ Disturbance.

The River Liffey also traverses the north-west of this town, however this section of the river does not lie within a designated site.

2.3 Notable Flora

NPWS and NBDC species lists can be seen in Appendix A. Plants that are of particular note which were recorded during the survey are discussed below (refer to Appendix B for a list of the flora and fauna recorded during the field survey).

Two Flora Protection Order (FPO) species were noted within the desk study search for this study area, this is discussed further in Section 3.1 below. No FPO species were noted during the surveys, however, it is important to note that the findings are based on surveys that were conducted towards the end of the optimal survey season for many habitats and species. Records should be sought from the Vice County recorder to ensure that no Flora Protection Order 1999 species are missed when drafting policies and objectives for this town.

2.4 Field Surveys

The assessments comprised of a walkover of the town within the study area boundary during August and September 2014. A summary of the results is presented below. Desktop records are listed in Appendix A and species recorded during the field survey are provided in Appendix B. It should be noted that due to the limitations outlined in Section 2.5 below, these lists do not constitute a full and complete species list for the study area, but instead provide a 'snapshot' of species that were recorded during the surveys at that time of year.

2.4.1 Habitats and Flora

The aim of the walkover was to identify habitats and flora that are either protected or of conservation importance. The study area was surveyed using methodology outlined in the Heritage Council's *Best Practice Guidance for Habitat Survey and Mapping* (Smith *et al.* 2011). All habitat types were identified and classified using the Heritage Council's *A Guide to Habitats in Ireland* (Fossitt, 2000). Within each habitat the dominant plant species and/or any notable species were recorded.

A summary description of each of the habitats identified within this town has been provided in this report. A list of all flora and fauna species recorded during the field surveys is appended in Appendix B. This list also includes all Latin/scientific names for these species.

Hedgerows were individually surveyed and their value assessed according to the hedgerow evaluation form in Appendix E.

2.4.2 Fauna

The habitats within the towns were considered for their potential to support protected flora and fauna. Where definitive evidence of this was found during the survey (such as tracks, habitats, markings, feeding signs, droppings and by direct observation), this was recorded as 'Target Notes' which have been incorporated into the mapping data. These are discussed further in Section 3.4. Likewise, *ad hoc* observations of notable bird species within the study area were recorded. These are included in the species list in Appendix B.

2.5 Green Infrastructure

Green infrastructure is broadly defined as *“an interconnected network of green space that conserves natural ecosystem values and functions and provides associated benefits to human populations. Green Infrastructure is the ecological framework needed for environmental, social and economic sustainability – in short it is a nation’s natural life sustaining system”* (Benedict *et al.* 2002).

There is no standard definition for Green Infrastructure. As such, Comhar have conducted studies in Ireland using the following definition; *“Green Infrastructure is a strategically planned and managed network featuring areas with high quality biodiversity (uplands, wetlands, peatlands, rivers and coast), farmed and wooded lands and other green spaces that conserve ecosystem values which provide essential services to society.”* (Pg. 11, Comhar 2010)

The Green Infrastructure within the towns was mapped by paying regard to the two definitions above. The field surveys and desktop research identified areas of high local importance and where appropriate, included other habitats that provided important ecosystem services or acted as ecological corridors or stepping stones for wildlife, these included habitats such as unmanaged grassland or scrub, and low intensity farmland. These areas were recorded as ‘Key Green Infrastructure’ and is illustrated on the maps (refer to Map 2 in Appendix E) and within Section 4.2 of this report.

Areas which are of lower ecological value, but which may provide useful stepping stones for wildlife, included amenity areas and parks. Generally these were not included in the ‘Key Green Infrastructure’ unless they consisted of significant areas of woodland, hedgerow or scrub. However, these areas are noted for their ability to support certain flora and fauna and to encourage wildlife into more urbanised areas. Consequently, they contributed in part to the connectivity of the wider green infrastructure.

2.6 Limitations

Interpretation of the results of this study took account of seasonal limitations. These surveys provide a snap-shot of the ecology of the towns within a specific time during the survey season. These assessments were undertaken towards the end of the optimum survey period for a number of habitats, and outside of the optimal period for surveying habitats such as woodland and species-rich grasslands. As such, species could not always be accurately identified.

Many of the fields on site were heavily grazed, mown or cut which may lead to certain flora being overlooked that could be present in the sward before such interventions.

As it was still possible to identify flora that had not yet senesced, the surveys undertaken were sufficient for identifying and evaluating the habitats and ecological features of value within the towns.

The data for species records held by the National Biodiversity Data Centre and statutory bodies (such as National Parks and Wildlife Service) is often provided on an *ad hoc* basis by recorders. These records can provide an indication of what species might be found in an area, however, they do not constitute full and complete species lists. Absence of certain species from these sources does not confirm absence of species in the area.

3 RESULTS

3.1 Desktop Study Records

The desktop study results give an indication of what notable species might be found within 2km of this town (10km for Bat roost records). These details can be found in Appendix A of this report.

3.1.1 Notable Habitats and Flora

Flora Protection Order 1999 (FPO) Species

Two records for FPO species have been noted within the study area (NPWS Map Viewer). These include:

- Opposite-leaved Pondweed (*Groenlandia densa*) which can be found occurring in lakes, rivers, canals and ditches with clear base-rich water (and is more recently known to occur in the Grand Canal in Dublin)¹. This species typically occurs in rivers, canals and estuarine muds (Parnell & Curtis 2012); and,
- Red Hemp Nettle (*Galeopsis angustifolia*) has been recorded within Grid Square N92 in which Sallins is partially situated (exact location and date are unknown). This plant favours arable land within open areas on calcareous soil and can also be found in sandy or shingle areas.²

It is possible that these FPO species could occur within the boundaries of Monasterevin. No rare plant species were recorded during the field survey.

3.1.2 Notable Fauna

Birds

A number of Birds of Conservation Concern (Red and Amber listed birds according to Colhoun *et al.* 2013) have been highlighted within the desktop search. Both red and amber listed species have occurred within 2km of Sallins. A mosaic of habitats such as river, canal and arable land makes Sallins a suitable site for various breeding birds as well as overwintering and foraging wildfowl. For example, arable fields can be important feeding grounds for farmland birds such as Yellowhammer (*Emberiza citrinella*) and may provide breeding sites for ground nesting species such as Skylark, although these species were not noted during the field survey. In addition, species such as Grey Wagtail (*Motacilla cinerea*) and Kingfisher (*Alcedo atthis*) may use habitats along the River Liffey and the Grand Canal pNHA. There are no Special Protection Areas (SPA's are sites that have been specifically designated for the bird species that they support) within close proximity to Sallins. Notable red listed birds which have been recorded close to this town are Lapwing (*Vanellus vanellus*) and Yellowhammer.

Kingfisher which is protected under the Wildlife Acts and the European Communities (Birds and Natural Habitats) Regulations 2011 has also been recorded within the study area (within the 10km Grid Square N82).

¹ <http://www.botanicalevironmental.com/projects/rare-threatened-species/plants/monitoring-populations-of-opposite-leaved-pondweed-groenlandia-densa-in-the-royal-and-grand-canal-co-dublin/>

² Stace, C.A. (2010). *New Flora of the British Isles*. 3rd Edition. Cambridge University Press, Cambridge

Bats

Of the Bat Conservation Ireland (BCI) records that were obtained (confidential), three different species of Bat were listed as roosting within a 10km grid square of Sallins (additional Bat roosts were recorded for unidentified species). The species identified were Common Pipistrelle (*Pipistrellus pipistrellus*) and Soprano Pipistrelle (*Pipistrellus pygmaeus*) and Brown Long-eared Bats (*Plecotus auritus*). These records are listed in Appendix A of this report. All Bats are protected under the Wildlife Acts and the Habitats Directive. According to the NBDC records, additional species that exist within 2km of the study area include Daubenton's Bat (*Myotis daubentonii*) and Leisler's Bat (*Nyctalus leisleri*).

Other Mammals

Otter (*Lutra lutra*), which is protected under the Wildlife Acts and Annex II and IV of the EC Habitats Directive (92/43/EEC) are known to use the Grand Canal and the River Liffey. Other protected mammal species recorded within the study area include Badger (*Meles meles*). Hedgehog (*Erinaceus europaeus*) have been recorded within the last two years in Sallins. This species is protected under Appendix III of The Berne Convention and under the Wildlife Act (1976) and Wildlife (Amendment) Act 2000.

Fish/Crustacean

Sallins is located on the Grand Canal pNHA. A description of this designated site can be seen in Table 1 in Section 2.2 and details of species recorded here are also presented in Appendix A. The Grand Canal and its associated habitats provides an overall high level of biodiversity. Its waters and habitats allow aquatic and terrestrial species to migrate or commute through rural and urban environments. This canal also represents a biologically valuable fishery, supporting significant populations of coarse fish such as Pike (*Esox lucius*), Perch (*Perca fluviatilis*), Roach (*Rutilus rutilus*), Rudd (*Scardinius erythrophthalmus*), Bream (*Abramis brama*) and Tench (*Tinca tinca*) (*Pers. Comm. Senior Fisheries Environmental Officer, Inland Fisheries Ireland*). Gudgeon (*Gobio gobio*) are also known to exist within the canal (King *et al.* 2011).

The River Liffey dissects the study area to the north-west (although, this section of the river does not lie within a designated site). This River, and several of its tributaries are exceptional in supporting Atlantic salmon (*Salmo salar*), Lamprey species (*Lampetra sp.*) and the White-clawed Crayfish (*Austropotamobius pallipes*) which are all listed under Annex II of the Habitats Directive. This river also is also inhabited by Sea Trout (*Salmo trutta*), resident Brown Trout (*Salmo trutta*) and a number of other fish populations (*Pers. Comm. Senior Fisheries Environmental Officer, Inland Fisheries Ireland*). The Liffey is also known to support Roach and Gudgeon (King *et al.* 2011).

Vertigo (Whorl Snail)

There are records of the protected Desmoulin's Whorl Snail (*Vertigo moulinsiana*) which is endangered in Ireland and Narrow-mouthed Whorl Snail (*Vertigo angustior*) which is considered Vulnerable (on the Irish Red List, Byrne *et al.* 2009). These records are located on the Grand Canal. The former species mainly inhabits calcareous lowland, wetland areas with tall vegetation, and are declining mainly due to a decline in habitat quality. The latter's main habitats comprise fixed dunes along the west and north coasts of Ireland and

hydrogeologically stable marshes in the central plain. The Irish population is of global importance. Marsh Whorl Snail (*Vertigo antivertigo*) has also been recorded within rough wet grassland habitats along the Grand Canal in Sallins. It is listed as Vulnerable on the Red List.

3.1.3 Invasive Species

Cotoneaster (*Cotoneaster sp.*) is an invasive flora species which was noted within central and urban areas of Sallins during the field surveys. Cotoneaster was found within *Flower Beds and Borders (BC4)* in the town centre. This plant can be particularly detrimental in rocky and cliff habitats where it quickly outcompetes other species. In addition, Common Ragwort (*Senecio jacobaea*) was also recorded. This plant is invasive, but is not listed on Schedule three of the 2011 European Communities (Birds and Natural Habitats) Regulations (S.I. 477). A number of invasive flora and fauna have been highlighted within 2km of this town. These species are listed in Appendix A and include high impact species such as Nuttall's pondweed (*Elodea nuttallii*), Canadian Waterweed (*Elodea canadensis*) (both of which are known to occur on the Grand Canal) and Japanese knotweed (*Fallopia japonica*). None of these species were noted during the surveys, however, it is anticipated that they are likely to occur within this town.

3.2 Habitat Categories

Map 1 in Appendix E illustrates the extent of all habitat types present within Sallins. A list of all flora and fauna species recorded during the field survey is shown in Appendix B which includes scientific (Latin) names according to *New Flora of the British Isles*, 3rd Edition (Stace 2010).

Overall, the main habitats that this town comprised of were improved and semi-improved grasslands, arable crops, scrub, hedgerows and trees. Improved grassland was by far the most commonly occurring habitat in this town covering approximately half of the open space on the western half of the study area. There were areas of recolonising bare ground and spoil, where construction activities had (or were currently) taking place. Woodland habitats consisted of small patches and were mainly confined to linear stretches within Sallins such as along the northern section of the River Liffey (where it meandered within the study area) or connecting the Liffey to the Grand Canal (within the centre of the study area).

3.2.1 Woodland and scrub

Woodland cover in Sallins is low in comparison to other habitats within the town. Four different woodland categories were identified according to Fossitt 2000, these are discussed below.

(Mixed) Broadleaved Woodland (WD1)

This woodland was not a commonly occurring habitat within Sallins. It was identified in linear stretches along the Grand Canal and a small patch existed within an urban setting to the north of the study area. Dominant species included Ash (*Fraxinus excelsior*), Sycamore (*Acer pseudoplatanus*), Scot's Pine (*Pinus sylvestris*) and Spruce species (*Picea sp.*) which were planted in more or less equal abundance. Ground flora included species such as Ivy (*Hedera helix*), Bramble aggregate (*Rubus fruticosus agg.*) and Lords and Ladies (*Arum maculatum*).

This habitat could also be found in small areas along the railway line in the southern half of Sallins. Dominant trees included Ash and Sycamore and the understory was dominated by Hawthorn (*Crataegus monogyna*) and bramble. Due to its location along the railway line verge, this habitat was relatively inaccessible during the surveys and was surveyed from adjacent land.

Oak-Ash-Hazel Woodland (WN2)

This woodland category was found along a narrow strip which connects the habitats along the River Liffey to the Grand Canal in the centre of Sallins (this section of woodland lies within the extents of the Grand Canal pNHA). A small patch also exists to the south of the study area. Ash was the dominant tree species within these woodlands, along with occasional Elder (*Sambucus nigra*). The understory was mainly comprised of Ivy (*Hedera helix*) and Bramble aggregate.

Oak-Ash-Hazel woodland was also noted along the tow path of Grand Canal in the east of the town and within a patch adjacent to Oberstown Cottages in the south. The dominant species included Ash and Sycamore. Occasional species found included Hawthorn, Beech (*Fagus sylvatica*) and Blackthorn (*Prunus spinosa*). The ground flora supported species such as Hogweed (*Heracleum sphondylium*), Ivy, Common Ragwort and an understory which included Bramble aggregate.

Riparian Woodland (WN5)

This habitat category was found along a stretch of the River Liffey in the north west of the town. Species included those that are more tolerant of wetter habitats such as Grey Willow (*Salix cinerea*) and Crack Willow (*Salix fragilis*), which formed dominant stands of woodland in this area. Occasional species noted here were Alder (*Alnus glutinosa*), Osier (*Salix viminalis*), Ash, Sycamore and Beech. The ground flora included Nettle (*Urtica dioica*), Meadowsweet (*Filipendula ulmaria*), Creeping Buttercup (*Ranunculus repens*) and Wild Angelica (*Angelica sylvestris*).

Wet Willow-Alder-Ash Woodland (WN6)

This is a broad category of woodland, and where it was found in Sallins, along the South of the Grand Canal, it constituted mature trees growing on damp ground which graded into wider woodland habitat. This was dominated by Ash and Alder, with occasional Grey Willow (as such it was classified accordingly). The understory included Elder and Bramble aggregate. Species such as Butterbur (*Petasites hybridus*), Creeping Buttercup and Willowherb (*Epilobium sp.*) species can be found in the ground flora here.

Scrub (WS1)

Scrub habitat was identified in small patches that were scattered around Sallins, but mainly occurring within the eastern half of the study area. Dominant species included Bramble aggregate, with occasional Creeping Thistle (*Cirsium arvense*) and Butterfly Bush (*Buddleja davidii*). It was typically found growing in areas impacted by human disturbance.

Where dense scrub was noted, this was mainly along the railway line that dissects the southern half of the study area. Along this linear corridor, the scrub was dominated by Bramble aggregate and Hawthorn, occasional species included Grey Willow.

Hedgerow (WL1)

In total 50 hedgerows were surveyed across the town of Sallins. They occurred mainly in the east of the study area, with a number of them arising in the north and south, mostly outside of the urban areas. Hedgerows also exist along the railway line and Grand Canal. Some hedgerows connect directly to the River Liffey, creating good habitat connectivity to this important wildlife corridor.

These hedgerows varied both in size and the species they supported; however it was noted that the majority of hedgerows in Sallins are unmanaged and becoming overgrown and losing their structure. Dominant species within the hedgerows across the town were Hawthorn, Ash, Elder, Ivy and Bramble aggregate. Occasional species included Blackthorn, Dog Rose (*Rosa canina*), Osier, Grey Willow and Crab Apple (*Malus sylvestris*). Ground flora noted within the hedgerows included; Nettle, Red Fescue (*Festuca rubra*), Bird's-foot Trefoil (*Lotus corniculatus*), Creeping Cinquefoil (*Potentilla reptans*), Cocksfoot (*Dactylus glomerata*), Spear Thistle (*Cirsium vulgare*), False Brome (*Brachypodium sylvaticum*), Herb Robert (*Geranium robertianum*) and Wood Avens (*Geum urbanum*). 13 of these hedgerows had associated drains that held seasonal water, while one was considered to hold water permanently. Ground flora included Lords-and-Ladies, Bramble aggregate, Cleavers (*Galium aparine*), Traveller's Joy (*Clematis vitalba*) and Hard Fern (*Blechnum spicant*).

Approximately 30% of the hedgerows surveyed were deemed to be of high ecological value (according to the criteria outlined in Appendix D). These hedgerows mainly occurred in the South and some in the centre, of the Sallins study area. Roughly 60% of hedgerows were classified as being of moderate ecological value, these occurred throughout the study area. The remaining 10% were deemed to be of low ecological value and also occurred throughout the town.

A typical hedgerow in Sallins can be seen below in Figure 2.



Figure 2: Typical hedgerow (WL1) habitat found in Sallins.

Treelines (WL2)

This habitat mainly occurred along linear habitats such as the Railway Line in the south of the study area, and along the Grand Canal in places, particularly within the east and south. Dominant trees included Ash, Sycamore and Alder – some mature planted treelines consisted of Beech (e.g. adjacent to Sallins Wood). In the north, treelines were present within arable land and improved grassland. Some of the treelines within Sallins were unmanaged and reverting to a more woodland like ground flora assemblage.

Within the arable land, treelines were dominated by Ash, Sycamore and Beech. It was noted that particularly mature Ash trees were present within the Bodenstown area.

Within housing estates, treelines were found to be young to semi-mature in age and were generally associated with Amenity Grassland (GA2). These had dominant species such as Silver Birch (*Betula pendula*), Ash, Field Maple (*Acer campestre*), Beech (and Copper Beech), Whitebeam (*Sorbus hibernica*), Rowan (*Sorbus aucuparia*) and the occasional Pedunculate Oak (*Quercus robur*) tree.

There were treelines identified in the south that bordered the amenity grassland playing field. This included a line of mature Beech.

Understory/ground flora included Lords-and-Ladies, Bramble agg., Cleavers, Traveller's Joy and Hard Fern (similar species were found within Hedgerow habitats of the town).

3.2.2 Grasslands

By far the most common habitat in the Sallins study area was Improved Grassland, which made up c. 50% of the open space areas on the western half of the town.

Improved Agricultural Grassland (GA1)

This habitat can be described as formerly improved agricultural grassland. Many of these fields were grazed and had been fertilised. In general, species richness and diversity was low. The dominant species identified were those typical of intensively managed agricultural grasslands. For instance, there was a high abundance of Perennial Rye (*Lolium perenne*), Creeping Buttercup and White Clover (*Trifolium repens*). Other dominant species included typical 'agricultural' herbs such as Dandelion (*Taraxacum*), Nettle, Broadleaved Dock (*Rumex obtusifolius*), Ribwort Plantain (*Plantago lanceolata*) and Spear Thistle. Occasionally occurring species identified included Cleavers, Ragwort, Common Mouse-ear (*Cerastium fontanum*), Yorkshire Fog (*Holcus lanatus*) and Timothy-grass (*Phleum pratense*).

Amenity Grassland (GA2)

In general, this habitat was found within the residential and urban areas of Sallins, to the south, east and within the centre of the study area. The dominant species included Cocksfoot grass with White Clover, Daisy (*Bellis perennis*), Dandelion and occasional flora included Creeping Buttercup. Species that were frequently noted included Meadow Buttercup (*Ranunculus acris*) and Common Mouse-ear.

Dry Calcareous and Neutral Grassland (GS1)

This habitat was rare in comparison to other grassland types found within the Sallins study area. It supported a more diverse assemblage of species than the other grassland types found within the town. It was mainly noted within patches, adjacent to urbanised areas. One of these sites, in the north (adjacent to the railway line), was within land that had been disturbed. Typical dominant species included Timothy-grass, Red Fescue, Yorkshire Fog, Cocksfoot grass, Creeping Buttercup, Ribwort Plantain, Creeping Bent (*Agrostis stolonifera*), Creeping Thistle and Nettle. Occasional species noted were Tufted Vetch (*Vicia cracca*), Hairy Sedge (*Carex hirta*), Silverweed (*Potentilla anserina*), Hard rush (*Juncus inflexus*), Meadow Vetchling (*Lathyrus pratensis*) and Common Sedge (*Carex nigra*). Species such as Cat's-ear (*Hypochaeris radicata*) and Common Mouse-ear were also noted.

Dry Meadows and Grassy Verges (GS2)

This habitat was not common throughout the study area and was mainly found within the centre of the town within urbanised areas. There were also small patches of this grassland scattered in the south (and one small patch in the north within Arable land). The dominant species identified included Cock's-foot, Yorkshire Fog, Hogweed, Common Knapweed (*Centaurea nigra*), White and Red Clover (*Trifolium pratense*). Figure 3 below illustrates this habitat. Willow scrub was encroaching the grassland in this location.



Figure 3: Dry Meadows and Grassy Verges (GS2) in the centre of Sallins.

Wet Grassland (GS4)

This habitat was uncommon within Sallins in comparison to other grassland categories within the study area. It was identified along the towpath of the Grand Canal, where it existed in very narrow strips along the embankments. These were generally well maintained grasslands where the dominant species consisted of Yorkshire Fog, Creeping Buttercup and Nettle. Hard Rush was also present in some sections. This habitat was found alongside overgrown hedgerows and treelines which bordered the canal.

3.2.3 Disturbed Ground

A small number of sites around the study area were undergoing (or had previously undergone) disturbance for construction or other work practices. Habitats such as *Exposed Sand, Gravel or Till (ED1)* existed within one area in the east and *Spoil and Bare Ground (ED2)* was noted in an urban patch in the south east of the study area adjacent to the railway line. *Recolonising Bare Ground (ED3)* was also recorded in the east of the town. Due to their recently disturbed state, these habitats offered little in the way of biodiversity. Where vegetation was present, Butterfly-bush, Hogweed, Common Ragwort, Rosebay Willowherb (*Chamerion angustifolium*), Creeping Thistle and Nettles were common.

3.2.4 Cultivated and Built Land

Arable Crops (BC1)

This habitat occurred to the far north of the study area and consisted of land that was heavily managed for agriculture. These fields were surrounded by mature treelines of Ash and Sycamore (particularly mature Ash trees were noted in the Bodenstown area) and hedgerows which were dominated by Hawthorn. Although there was little natural herbaceous vegetation, the dominant flora present within the crops included Nettle, Common Sorrel (*Rumex acetosa*) and Creeping Buttercup.

Buildings and Artificial Surfaces (BL3) and Stone Walls and other Stone Work (BL1)

Buildings and Artificial Surfaces are present across the town and, for the most part, were noted to support little or no ecologically valuable flora. There was an old stone farm building adjacent to Millbank and Leinster Aqueduct along the Grand Canal. This did not support any notable flora.

3.2.5 Freshwater

Depositing Lowland Rivers (FW2)

The River Liffey flows in a northerly direction in the north-west of the study area. According to the EPA Envision Map Viewer, under the Water Framework Directive's Risk Scores (EPA Envision Maps) the River Liffey is 'at Risk of Not Achieving Good Status' in Sallins. This section of the river was generally slow to medium flowing with a silt-rich substrate. It was predominantly bordered by agricultural fields of improved grassland. In some areas the river was bordered by woodland (e.g. riparian woodland that was subject to frequent flooding) or mature treelines of Alder and occasional Willow species. The river was generally noted to be c. 6-7m wide and c. 1m deep. There were no notable species or in river vegetation recorded during the survey.

A drainage ditch (*FW4*) runs along a hedgerow in the west of Sallins, Common Reed (*Phragmites australis*) was dominant in parts of the ditch.

Canal (FW3)

The Grand Canal pNHA was found to be slow flowing with a silt-rich substrate (the water had a high sediment content which made it difficult to see the canal base in places). Dominant flora included Iris (*Iris pseudacorus*), Meadowsweet and Common Reed which were present along the narrow verges/banks. Occasional species noted were Bulrush (*Typha latifolia*), Water Mint (*Mentha aquatica*), Wild Angelica, Marsh Horsetail (*Equisetum palustre*), grasses included Creeping Bent and Yorkshire Fog.

3.3 Fauna

The potential of the habitats within Sallins to support fauna is summarised below. All species records that were identified in the desk study are listed in Appendix A and species noted during the field surveys are listed in Appendix B.

3.3.1 Badgers

There was no definitive evidence of Badgers (*Meles meles*) noted in Sallins. There are records for this species within the Bodenstown Area (2012) and there is suitable habitat across the town such as woodland, scrub, hedgerows, arable fields and grasslands where badgers are likely to forage. These habitats are likely to provide good foraging areas for Badgers, with abundant food sources such as Earthworms, Insects and berries. Examples of good quality Badger habitat include Bodenstown agricultural fields and farmland at Leinster Aqueduct.

3.3.2 Bats

Some of the very mature Ash trees noted in the Bodenstown area to the north of Sallins (within the Arable fields) were recorded as being of suitable condition to support roosting Bat species. Features such as frost cracks and branch splits (i.e. hazard beams), among others, can provide suitable roosting sites for a number of Bat species.

Mature trees in the area of Milltown and Leinster Aqueduct (along the Grand Canal) were deemed to provide the potential for roosting Bats. As well as valuable foraging and commuting areas for Bat species, for example, species such as Daubenton's Bat may forage over the Canal.

Bats may use derelict and/or more modern buildings in which to roost. There are a number of records for Bat roosts within 10 km of Sallins town (the closest known record is of a pipistrelle roost within 1km to the north of the town centre). These records are presented in Appendix A.

The expansive network of well-connected hedgerows and treelines across the study area may be used by Bats as linear cues in the landscape while commuting to known feeding sites. These habitats are also be associated with various insect species that the Bats can feed on (including Moths).

3.3.3 Other mammal species

Otters (*Lutra lutra*) are known to use both the River Liffey and the Grand Canal. This species has been recorded within 700m of the study area. A study undertaken in Sallins in 2012 (Brophy *et. al.* 2012) observed Otter spraint along the Grand Canal. Species such as

Hedgehog (*Erinaceus europaeus*) (protected under the Wildlife Acts), Grey Squirrel (*Sciurus carolinensis*) and Rabbit (*Oryctolagus cuniculus*).

3.3.4 Birds

There is extensive Bird breeding habitat across this town such as woodland, scrub, trees and hedgerows. A number of common Bird species such as Wren (*Troglodytes troglodytes*), Robin (*Erithacus rubecula*) and House Sparrow (*Passer domesticus*) were noted during the surveys. A full list of these species can be seen in Appendix B.

As discussed in Section 3.1.2, a number of red and amber listed birds occurring within 2km and 10km grid squares of Sallins have been listed in Appendix A. Other important areas for birds include the River Liffey and the Grand Canal (e.g. both are known to support Kingfisher).

3.3.5 Amphibians

Common Frog (*Rana temporaria*) has been recorded in Sallins and is likely to occur within many of the habitat categories discussed above, particularly in damp or wet areas with suitable vegetation, such as drainage ditches. The Grand Canal and its associated habitats are likely to support this species as is marginal woodland, hedgerow banks etc. where Common Frog might hibernate. The Smooth Newt (*Lissotriton vulgaris*) might also be found in such habitats.

3.3.6 Fish/Crustacean

The River Liffey and the Grand Canal pNHA both support important fisheries. Although Fish species were not noted during this survey, this river and several of its tributaries are known to provide excellent habitats for Atlantic salmon, Lamprey species and the White-clawed Crayfish (all listed under Annex II of the EU Habitats Directive). In addition species such as Sea trout, resident Brown trout and many other fish populations exist here. This was discussed in Section 3.1.2.

In addition, as previously discussed, the Grand Canal represents a biologically valuable fishery (and overall biodiversity) resource. The canals in Kildare are known to support significant populations of Coarse Fish (including Pike, Perch, Roach, Rudd, Bream and Tench) not to mention a range of other freshwater aquatic species, plus all associated floral and faunal components in adjacent habitats. The presence of these Fish populations highlights the sensitivity of the County's aquatic systems in general (*Pers. Comm. Senior Fisheries Environmental Officer, Inland Fisheries Ireland*).

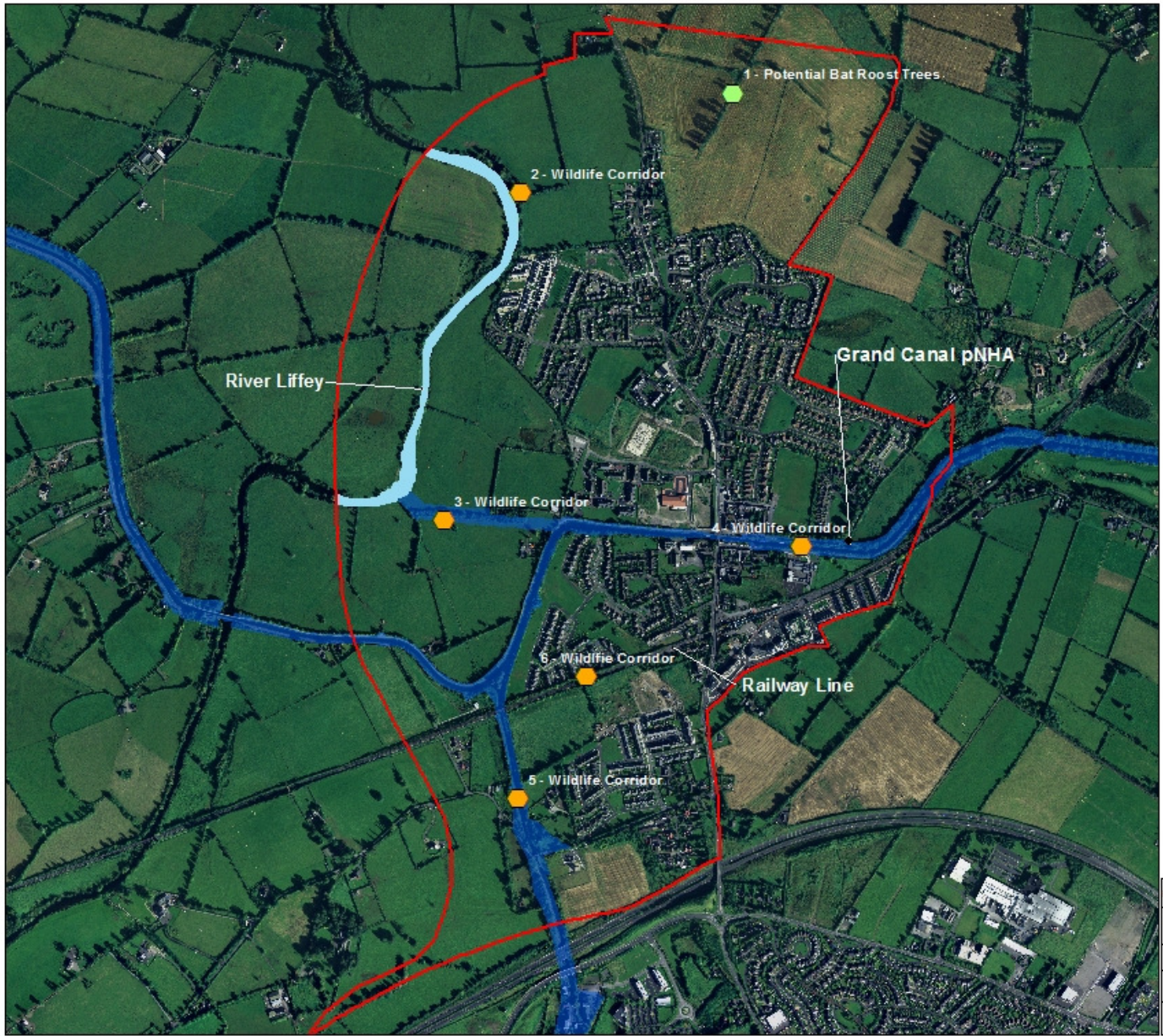
Although they were not noted during the survey, both of these watercourses provide suitable habitat for White-clawed Crayfish (this was also discussed in Section 3.1.2).

3.4 Target Notes

Areas which were noted to be particularly important habitats (including those with a high potential to support protected species) have been Target Noted (TN) for Sallins. These are discussed further below. The location of these 'Target Notes' can be seen in Figure 4 below.

The Target Notes are as follows:

- 1 – A particularly mature Ash treeline was noted within the arable lands at Bodenstown. This was assessed as having the potential to provide foraging areas for Bats, as well as potential tree roosting sites due to the maturity of the vegetation.
- 2 – The riparian woodland stretching alongside the eastern bank of the River Liffey (in the north west of the study area) provides an area of mature Green Infrastructure that can act as an important wildlife corridor. This area provides terrestrial and aquatic habitats for species such as Bats and Otters, which may use this habitat for commuting, foraging and for resting sites. It also provides suitable habitat for breeding Birds.
- 3 – Farmland at Leinster Aqueduct that is not intensively managed, with unmanaged hedgerows which are progressing into mature treelines. There is also an old stone farm building and a small patch of mixed broadleaved woodland. These habitats are of ecological value and provide foraging, commuting and resting sites for species such as Bats, Badgers and breeding birds. Due to its close proximity to the Grand Canal pNHA, this habitat may also support Otter.
- 4 – East Grand Canal: The canopy of a mature beech treeline along Sallins Wood connects to an area of overgrown treelines and a stand of Oak-Ash-Hazel woodland that is dominated by Ash along the canal. This is an area of Green Infrastructure. It provides potential foraging, resting and commuting habitat for a number of species such as breeding Birds, Bats and Otter.
- 5 – South Grand Canal: A mature treeline, dominated by Ash and Alder along the canal to the south of the study area provides further terrestrial Green Infrastructure, with the potential to support breeding birds, Bats and Otter for foraging, commuting and possibly resting sites.
- 6 – Railway Line: An area of mature treelines, hedgerows, scrub and occasional woodland, with good connectivity to other terrestrial and aquatic habitats in the town, suitable habitat for species such as breeding Birds, Bats and potentially Badgers.



Legend

Target Notes

- ⬡ 1 - Potential Bat Roost Trees
- ⬡ 2 - Wildlife Corridor
- ⬡ 3 - Wildlife Corridor
- ⬡ 4 - Wildlife Corridor
- ⬡ 5 - Wildlife Corridor
- ⬡ 6 - Wildlife Corridor
- LAP_TownBoundaries
- River Liffey
- Grand Canal pNHA

Drawing No:		140090/01A	
Project Title: Target Notes, Sallins - FIGURE 4			
Client: Kildare County Council			
Project No.: 140090		Scale: 1:15,000 @ A4	
Drawn: RNF	Approved: PS	Rev. No.: 01A	Date: 25/02/2015

4 DISCUSSION

4.1 Habitats and their potential for protected species in Sallins

The habitats of ecological importance present within the study area are discussed below. Their potential to support protected species is considered. These habitats have then been evaluated according to the NRA 2009 criteria.

Woodland and Scrub Habitats

Many woodlands in Ireland have been modified in some way. A large number occur within old or current estates (demesne woodlands) or forestry plantations. The National Survey of Native Woodlands (BEC 2008) found that of the woodlands that were surveyed across Ireland, Kildare registered the highest proportion of sites with old conifer planting (54%), followed by Dublin (53%) and then Wexford (50%). This indicates the high level of woodland that is associated with habitats that have been influenced by man.

“The most notable feature of the data is that the majority of woodlands were associated with man-made habitats... This reflects the high number of woodlands which occur within the agricultural landscape, but also the number of sites which occur in conjunction with commercial forestry plantations or as part of large demesnes.” (BEC 2008, pg. 34 & 35)

Of the woodlands that were surveyed in Kildare within BEC’s study, >15% were primarily associated with flat river floodplains and lowland riversides. This was a relatively rare association in the rest of the country.

Woodland was not an extensive habitat in Sallins. The main areas were those that have been protected as they border river and canal habitats. Oak-Ash-Hazel Woodland (WN2), which was recorded along the canal, is not Annex I habitat, however according to Fossitt 2000 it is limited in extent in Ireland and should be conserved. This habitat is also found within the extents of the Grand Canal pNHA in the centre of Sallins and directly connects this Key Green Infrastructure corridor to another, the River Liffey. It is considered that all of the woodland habitats within this town are worth conserving, and potentially extending, as they provide some of the main areas of bio-diverse habitat and significant vegetation connectivity across Sallins. Where woodland grades into scrub habitats, this can often indicate an area where the woodland is expanding and where possible, should be managed as such.

The conservation of broadleaved (particularly native) woodland is essential for maintaining the biodiversity and ecological value of our landscapes. Woodland habitats are important for a variety of flora and fauna. This habitat provides essential foraging and resting sites for species such as Bats, Badgers, breeding Birds, Otters, Red Squirrel and Pine Marten (*Martes martes*) – all of which are protected to varying degrees and have been recorded in Co. Kildare. Other species which are supported within marginal habitats within woodlands are Reptiles, such as Ireland’s only native reptile, Common Lizard (*Zootoca vivipara*) and amphibians (e.g. Common Frog and Smooth Newt) which may hibernate and forage in such areas, as well as breed within ponds or wet ditches etc.

All woodland habitat types located within the study area have been classified as Local Importance (Higher Value) according to the NRA guidance provided in Appendix C. Woodland habitats, in general, have also been identified as an important habitat in the Kildare Biodiversity Action Plan (Kildare County Council 2009). These habitats should be

conserved, particularly to help in ensuring the future of the habitats and species that rely upon them.

Hedgerow and Treeline Habitats

These linear habitats provide essential foraging and commuting areas for a wide variety of species such as breeding birds, Badgers and Bats. According to the County Kildare Hedgerow Survey Report (Foulkes 2006), hedgerows in Kildare typically show a higher level of fragmentation compared to those found in other counties. This is due, in part, to increased development and the intensification of agriculture that has occurred in this county. Considering the low percentage cover of native woodland within Kildare, hedgerows are of particular conservation importance. In areas where intensive farming dominates the landscape, hedgerows may be the only significant wildlife habitat remaining. This includes hedgerows ranked as low value.

The vast majority of hedgerows in Sallins were considered to be of Moderate or High value (according to the criteria listed in Appendix D). They formed part of an extensive wildlife network across the study area and as such, they contribute to the maintenance of habitat links across the town. This is particularly so for Sallins, where c. >50% of the open space included improved and arable fields. Treelines are also integral features in the wildlife network across Sallins. They also provide important foraging and resting sites for a range of protected species. As a result, these habitats are considered to be important linkages into the Key Green Infrastructure of this town, and have been evaluated as being of 'Local Importance' (Higher Value).

Grassland and Associated Habitats

There was a very limited number of dry calcareous and neutral grasslands identified within the study area. These grasslands can be described as semi-natural as the level of management that they have undergone is lower and the plant species present were those not typical of improved grassland (including Bird's-foot Trefoil, Cat's-ear and Timothy-grass). This type of habitat is highlighted as an important habitat in Kildare (Kildare County Council 2009) and as such is considered to be of Local Importance (Higher Value).

Wet grassland was not a commonly occurring habitat in Sallins. This was identified within narrow stretches alongside the Grand Canal pNHA. In this location, the grassland was managed and regularly mown, as such, it did not offer a high diversity of species. This habitat also interlinked with areas of canal vegetation such as Iris, Bullrush and Common Reed, which are uncommon in the study area (NRA 2009). As such, the maintenance and enhancement of wet grasslands in Sallins should be encouraged and this habitat is considered to be of Local Importance (Higher Value).

Watercourses – Rivers, Canals and Associated Habitats

The presence of both the River Liffey and Grand Canal pNHA adds greatly to the diversity of habitats found within Sallins. There are a number of habitats associated with these water courses that contain riparian species that are not locally abundant, such as Arrowhead (*Sagittaria sagittifolia*) and a Water-milfoil species (possibly Spiked Water-milfoil (*Myriophyllum spicatum*)). These habitats have been identified as important in Co. Kildare (Kildare County Council, 2009) and are known to support protected species, such as White-clawed Crayfish, Otter, breeding birds (including Kingfisher which is listed on Schedule I of

the EC Birds Directive) and potentially the FPO species Opposite-leaved Pondweed. For these reasons, these habitats are considered to be of Local Importance (Higher Value).

4.2 Green Infrastructure in Sallins

“Green Infrastructure is a strategically planned and managed network featuring areas of high quality biodiversity (uplands, wetlands, peatlands, rivers and coast), farmed and wooded lands and other green spaces that conserve ecosystem values which provide essential services to society”(Comhar 2010, Pg. 11).

In general, the dominant environments within the Sallins study area are improved grasslands (for agriculture) and urban, built land. For this reason, the green infrastructure here is extremely important to ensure that biodiversity levels are maintained, and that species are conserved and given the opportunity to increase their distribution within the town. There are a number of key Green Infrastructure areas in Sallins. These are discussed below.

The River Liffey runs through the north-western section of the study area, this then connects into the Grand Canal pNHA mainly via a narrow strip of woodland in the centre of Sallins. These habitats provide important areas through which dispersal of various aquatic and terrestrial species can occur, as discussed throughout this report. An important network of hedgerows connects these habitats together, some of these hedgerows have drainage ditches at their base. All of these habitats form important lines of connectivity from the north to the south of the town.

The Grand Canal crosses over the Railway Line in the southern half of Sallins, with these two habitats intersecting allows a connectivity of both terrestrial and aquatic habitat. Hedgerow connectivity in this area is also particularly good (with high and moderate value hedgerows). The railway line itself acts as an important key Green Infrastructure habitat which provides relatively undisturbed areas of mature trees, scrub and hedgerows. There are also small areas of woodland where the verge is wider. These habitats also runs parallel to the Grand Canal in the east of the town. Both of these linear corridors form important habitat networks from the east to west of Sallins.

These were considered to be the most important or ‘key’ Green Infrastructure areas (as well as their associated habitats). They allow movement of both aquatic and terrestrial flora and fauna across the town. The expansive network of hedgerows and treelines, as well as numerous patches of scrub, are all other essential habitats that form part of the Green Infrastructure of this town.

There are numerous ‘Stepping Stone’ habitats identified across both networks of Green Infrastructure that enhance the connectivity of habitats, and in turn, promote biodiversity across Sallins. These include habitats such as a wide expanse of scrub near the Iarnróid Offices and the railway line, in addition to a substantial area of scrub near the Woodland at Oberstown Cottages.

5 RECOMMENDATIONS

It is an aim of this project that all relevant information will be used by the planning department of Kildare County Council in the development of policies and objectives to protect and conserve the key Green Infrastructure and to raise awareness about the biodiversity of these towns. As such, recommendations to help in achieving this goal have been outlined below. This advice should inform discussion, and feed into the policies and objectives for the Sallins Local Area Plan. In addition, the current draft text for the Sallins LAP is appended in Appendix F. This text is currently being updated based on information gathered and consultation undertaken as part of this study.

5.1 Policy Guidance

Habitat and Green Infrastructure Protection and Enhancement

Consideration should be given when drafting planning policy and objectives to the ecological, social and economic benefits that can be reached by conserving and improving habitats and green spaces. In Sallins, the following strategic planning recommendations could help in this regard:

- All habitats should be protected appropriately according to their ecological value;
- Developers should be asked to demonstrate how they are making efforts to protect, enhance and appropriately manage the habitats and land in which they develop;
- Ensuring that all developments are shown to pay due consideration to the flood risk and that they include Sustainable Urban Drainage Systems (SUDS); and
- Planting of riparian buffer zones (to be confirmed with more detailed, site specific research and guidance from organisations such as EPA and IFI) adjacent to the River Liffey and the Grand Canal pNHA (further specific advice can be sought in relation to this from the Inland Fisheries Ireland Senior Fisheries Environmental Officer).

“Invasive species, particularly invasive shrubs and trees, are a major threat to native woodland. They are characterised by being highly competitive, typically quick growing and highly fecund, and are often unpalatable to browsing animals. Invasive shrubs can dominate the understorey, outcompeting native herbs and impacting on the natural regeneration of native trees... Many of the sites where invasive shrubs were recorded were woodlands associated with demesnes and estate” (BEC 2008, Pg. 36).

Those responsible for managing Green Infrastructure and ecologically-valuable habitats should undertake best practice in conservation management. The following actions could be taken:

- Manage woodlands, grasslands and riparian habitats in an appropriate manner that will increase their biodiversity and habitat connectivity. Areas where this could occur in Sallins include those habitats along the River Liffey, Grand Canal pNHA, in addition to small woodland patches and semi-natural grasslands that were identified around the town;
- Consideration should be given to the appropriate land use of semi-natural grasslands and woodland within Sallins, and for their potential to provide ecologically valuable areas. Where appropriate, these could be used to increase the public amenity sites within the town – this is particularly important for Sallins which only has one small area of ‘Council Owned Amenity/Greenspace’ within the east of the town (Kildare County Council 2008); and,

- All identified key Green Infrastructure and 'Stepping Stone' habitats should be appropriately protected (according to their value) and enhanced where possible.

5.2 General Recommendations for Sallins

Education and Public Engagement

The potential for increasing the level of public awareness of habitats and green spaces within Sallins could be enhanced by the following recommendations:

- A 'Bio-Blitz' event could be organised to take place within the Sallins area. This event could coincide with Ireland's national Bio-Blitz, which takes place every summer. It would involve members of the general public recording flora and fauna species across the town in an attempt to estimate how bio-diverse Sallins is. Such an event would raise awareness of the town's flora and fauna, increase public engagement in nature conservation and provide valuable field records. These records could then be shared with the NBDC and the Tidy Towns committee;
- Participation by the general public in wildlife surveys organised by various wildlife organisations could be promoted in order to increase public engagement. Examples of such surveys include; Daubenton's Bat Waterways Survey (Bat Conservation Ireland), Garden Bird Survey (Birdwatch Ireland) and Ladybird Survey (Irish Wildlife Trust);
- Participation by the general public in conservation activities across the town, such as invasive species removal would enhance the biodiversity and ecological value of Sallins (advice from Invasive Species Ireland and the EPA should be followed);
- Where appropriate, and where it has not already been undertaken, educational signs and posters highlighting Sallin's wildlife could be put up in locations of ecological interest in the town (e.g. along the Grand Canal or within amenity areas) to inform the general public;
- Engagement with local farmers regarding hedgerow management and planting of native trees promotes a greater understanding of wildlife conservation; and,
- Planting woodland areas for amenity use would greatly benefit this town, particularly as this habitat is not commonplace here. Grants can be sought by public authorities from such organisations as Teagasc for this purpose.
(http://www.teagasc.ie/forestry/grants/neighbourwood_scheme.asp)

Further Research and Evaluation

The following steps could be undertaken to add further valuable information to the research, which has been carried out to date:

- In order to determine the ecological value of the mature trees, as well as building structures, it is recommended that detailed Bat activity and building inspection surveys are carried out across the town. Such surveys would help to establish whether or not there are sites of 'County Importance' in terms of Bat species and population densities found there. This would support efforts to protect biodiversity;
- An invasive species survey could be conducted at a suitable time of year to identify such flora or fauna and to devise appropriate mitigation to prevent their further spread. This action would help to increase biodiversity in areas where invasive species are problematic. All collected records in this town could then be submitted to the Invasive Species Ireland Database and NBDC; and,
- A large number of bridges and culverts in Kildare represent significant barriers to fish passage. An ecological survey of a selection of bridges and culverts in Sallins would be beneficial. Such as survey would identify problem areas, identify the measures necessary to remove the obstacle and in doing so would help in providing options for habitat connectivity and overall biodiversity enhancement.

REFERENCES

Bat Conservation Trust (2009) *Bats and Lighting in the UK* – Bats and the built environment series.

Benedict, M.A. and McMahon, E.T. (2002) *Green Infrastructure: Smart conservation for the 21st Century*. Renewable Resources Journal 20(3): 12-17.

BEC (2008) Perrin, P., Martin, J., Barron, S., O'Neill, F., McNutt, K. & Delaney, A. *National Survey of Native Woodlands 2003-2008*. Botanical, Environmental & Conservation Consultants Ltd. – A report submitted to the National Parks and Wildlife Service.

BEC (2013) O'Neill, F.H., Martin, J.R., Devaney, F.M. & Perrin, P.M. *The Irish semi-natural grasslands survey 2007-2012*. Irish Wildlife Manuals, No. 78. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland.

BSBI (2007). *Checklist of the Flora of Britain & Ireland*. The Botanical Society of the British Isles, London.

Brophy, J. and Barron, S. (2012) Ecological Assessment of Proposed jetties and pump-out station on the Grand Canal at Sallins, Co. Kildare. (Permission to use records information from Waterways Ireland)

Curtis T.G.F. & McGough H.N. (1988) *The Irish Red Data Book. 1. Vascular Plants*. The Stationery Office, Dublin.

Comhar (2010) *Creating Green Infrastructure for Ireland – Enhancing Natural Capital for Human Wellbeing*.

Colhoun, K & Cummins, S. (2013) Birds of Conservation Concern in Ireland. Irish Birds 9: 523-544

Corney, P.M., Smithers, R.J., Kirby, J.S., Peterken, G.F., Le Duc, M.G. & Marrs, R.H. (2008) *Impacts of near development on the ecology of Ancient Woodland*. Woodland Trust.

Crushell, P., Foss, P., O'Loughlin, B. & Wilson, F. (2012) *County Kildare Wetland Survey*. Kildare County Council and The Heritage Council.

Curtis, T.G.F. & McGough, H.N. (1988, updated 2005). *Irish Red Data Book: 1. Vascular Plants*. Wildlife Service Ireland, Stationery Office, Dublin.

Foulkes, N. (2006) *County Kildare Hedgerow Survey Report*. Kildare County Council and the Heritage Council.

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

Gilbert, G., Gibbons, D.W., & Evans, J. (1998). *Bird Monitoring Methods: A manual of techniques for key species*. RSPB/BTO/JNCC/WWT/ITE/The Seabird Group RSPB/BTO, Sandy.

Kildare County Council (2011) *Kildare County Development Plan* – Kildare County Council.

Kildare County Council (2009a) *County Kildare Biodiversity Action Plan* – Kildare County Council and The Heritage Council.

Kildare County Council (2009b) *Sallins Local Area Plan* – Kildare County Council

Kildare County Council (2008) *Kildare Open Space Strategy* – Draft Final Report. ERM.

Kildare County Council (2005) *County Kildare Heritage Plan* – A Partnership Plan Prepared by the County Council Heritage Forum.

King, J.L., Marnell, F., Kingston, N., Rosell, R., Boylan, P., Caffrey, J.M., FitzPatrick, Ú., Gargan, P.G., Kelly, F.L., O’Grady, M.F., Poole, R., Roche, W.K. & Cassidy, D. (2011) *Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish*. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

NPWS (2011) King, J.L., Marnell, F., Kingston, N., Rosell, R., Boylan, P., Caffrey, J.M., FitzPatrick, Ú., Gargan, P.G., Kelly, F.L., O’Grady, M.F., Poole, R., Roche, W.K. & Cassidy, D. *Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish*. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

NRA (2004). *Ecological Surveying Techniques for Protected Flora and Fauna During the Planning of National Road Schemes*. National Roads Authority.

Parnell, J. & Curtis, T. (2012) *Webb’s An Irish Flora*. Cork University Press.

Smith, G. F., O’Donoghue, P., O’Hora, K. & Delaney, E. (2011) *Best Practice Guidance for Habitat Survey and Mapping*. The Heritage Council.

Stace, C.A. (2010). *New Flora of the British Isles*. 3rd Edition. Cambridge University Press, Cambridge

APPENDIX A: RECORDS FOR PROTECTED, RARE OR NOTABLE SPECIES

Records of Protected, Rare and other Notable Flora and Fauna Species				
Common Name	Scientific Name	Protection ³	Red-Listing Status ⁴	Number of Records, Approximate location and Date
Flora				
Opposite-leaved Pondweed	<i>Groenlandia densa</i>	FPO	Vulnerable	1, Grand Canal Sallins (yr. 1992, within LAP area)
Red Hemp Nettle	<i>Galeopsis angustifolia</i>	FPO	Vulnerable	1, Kildare (yr. unknown, exact location unknown)
Fauna				
Amphibian				
Common frog	<i>Rana temporaria</i>	HDV, WA	Least concern	1, Sallins (yr. 2004, within LAP area)
Birds (Red and Amber only)				
Swallow	<i>Hirundo rustica</i>	WA	Amber	2, Sallins (yr. 1988-1991, within LAP area, Atlas 2km ² resolution)
Coot	<i>Fulica atra</i>	BDII, BDIII	Amber	1, Sallins (yr. 1988-1991, within LAP area, Atlas 10km ² resolution)
Goldcrest	<i>Regulus regulus</i>	WA	Amber	1, Sallins (yr. 1988-1991, within LAP area, Atlas 2km ² resolution)
Greenfinch	<i>Carduelis chloris</i>	WA	Amber	1, Sallins (yr. 1988-1991, within LAP area, Atlas 2km ² resolution)
House martin	<i>Delichon urbicum</i>	WA	Amber	2, Sallins (yr. 1988-1991, within LAP area, Atlas 2km ² and 10km ² resolution)
House sparrow	<i>Passer domesticus</i>	WA	Amber	2, Sallins (yr. 1988-1991, within LAP area, Atlas 2km ² and 10km ² resolution)
Kestrel	<i>Falco tinnunculus</i>	WA	Amber	1, Sallins (yr. 1988-1991, within LAP area, Atlas 2km ² resolution)
Kingfisher	<i>Alcedo atthis</i>	WA	Amber	3, Sallins (yr. 1988-1991, within LAP area, Atlas 10km ² resolution)
Linnet	<i>Carduelis cannabina</i>	WA	Amber	1, Sallins (yr. 1981-1984, within LAP area, Atlas 10km ² resolution)
Little Grebe	<i>Tachybaptus ruficollis</i>	WA	Amber	2, Sallins (yr. 1988-1991, within LAP area, Atlas 10km ² resolution) and Naas (yr. 2011, c. 220m to the south of the LAP area)
Mistle Thrush	<i>Turdus viscivorus</i>	WA	Amber	2, Sallins (yr. 1981-1984 and yr. 1988-1991, within LAP area, Atlas 2km ² and 10km ² resolution)
Mute Swan	<i>Cygnus olor</i>	WA	Amber	1, Sallins (yr. 1981-1984, within LAP area, Atlas 10km ² resolution)

³ HDII/IV/V = Habitats Directive Annexes II/IV/V; FPO = Flora Protection Order; WA = Wildlife Acts; BD I/II/III = Birds Directive Annex I/II/III

⁴ Mammal Red-list from Marnell et al., 2009. Birds from Birds of Conservation Concern in Ireland (Colhoun *et al.* 2013); Vascular Flora from the Irish Red Data Book 1 Vascular Plants (Curtis & McGough 2005); Fish and Amphibians from King et al., 2011; Non-Marine Molluscs from Byrne et.al, 2009.

Records of Protected, Rare and other Notable Flora and Fauna Species				
Common Name	Scientific Name	Protection ³	Red-Listing Status ⁴	Number of Records, Approximate location and Date
Lapwing	<i>Vanellus vanellus</i>	WA	Red	1, Sallins (yr. 1988-1991, within LAP area, Atlas 10km ² resolution)
Robin	<i>Erithacus rubecula</i>	WA	Amber	2, Sallins (yr. 1988-1991, within LAP area, Atlas 2km ² and 10km ² resolution)
Sparrowhawk	<i>Accipiter nisus granti</i>	BDI, WA	Amber	2, Sallins (yr. 1988-1991, within LAP area, Atlas 10km ² resolution)
Spotted Flycatcher	<i>Muscicapa striata</i>	WA	Amber	1, Sallins (yr. 1988-1991, within LAP area, Atlas 2km ² resolution)
Starling	<i>Sturnus vulgaris</i>	WA	Amber	2, Sallins (yr. 1981-1984 and yr. 1988-1991, within LAP area, Atlas 2km ² and 10km ² resolution)
Swift	<i>Apus apus</i>	WA	Amber	2, Sallins (yr. 1981-1984 and yr. 1988-1991, within LAP area, Atlas 2km ² and 10km ² resolution)
Yellowhammer	<i>Emberiza citrinella</i>	WA	Red	2, Sallins (yr. 1988-1991, within LAP area, Atlas 2km ² and 10km ² resolution)
Mammal				
Brown Long-eared Bat	<i>Plecotus auritus</i>	HDIV, WA	Least concern	2, Sallins (yr. 2004 and 1998, within LAP area)
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	HDIV, WA	Least concern	3, Aghpaudeen (yr. 2008, c. 1.5km to the west of LAP area), Sallins (yr. 2008, within LAP area) and Kill (yr. 2008, c. 1.4km to the east of LAP area)
Daubenton's Bat	<i>Myotis daubentonii</i>	HDIV, WA	Least concern	1, Carragh (yr. 2008, c. 1.5km to the west of LAP Area)
Eurasian Badger	<i>Meles meles</i>	WA	Least concern	3, Clane Road and Bodenstown, Sallins (yr. 2013, within LAP Area and yr. 2010 c. 550m to the north of LAP area)
European Otter	<i>Lutra lutra</i>	HDII, HDIV, WA	Near threatened	1, Kildare (yr. 1992, c. 700m to east of LAP area, 10km ² resolution)
Leisler's Bat	<i>Nyctalus leisleri</i>	HDIV, WA	Least concern	3, Aghpaudeen (yr. 2008, c. 1.5km to the west of LAP area), Sallins (yr. 2008, within LAP area) and Kill (yr. 2008, c. 1.4km to the east of LAP area)
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	HDIV, WA	Least concern	3, Aghpaudeen (yr. 2008, c. 1.5km to the west of LAP area), Sallins (yr. 2008, within LAP area) and Kill (yr. 2008, c. 1.4km to the east of LAP area)
West European hedgehog	<i>Erinaceus europaeus</i>	WA	Least concern	3, Sallins (yr. 2013, within LAP area) and Castlesize (yr. 2010, c. 1.7km to the north-west of LAP area)
Snails				
Desmoulin's Whorl Snail	<i>Vertigo moulinsiana</i>	HDII, HDV, WA	Endangered	1, Digby Bridge, Sallins (yr. 1971, c. 300m to the west of LAP area)
Narrow-mouthed Whorl Snail	<i>Vertigo angustior</i>	HDII, HDV, WA	Vulnerable	1, Digby Bridge, Sallins (yr. 1971, c. 300m to the west of LAP area)
Marsh Whorl Snail	<i>Vertigo antivertigo</i>	HDII, HDV, WA	Vulnerable	1, Digby Bridge, Sallins (yr. 1995, c. 300m to the west of LAP area)

Records of Protected, Rare and other Notable Flora and Fauna Species				
Common Name	Scientific Name	Protection ³	Red-Listing Status ⁴	Number of Records, Approximate location and Date
Crustacean				
White-Clawed Crayfish	<i>Austropotamobius pallipes</i>	HD II; V & WA	-	1, Victoria Bridge, Liffey (2007) *Note this record is outside of 2km from Sallins but the Liffey runs through Sallins so this record has been included. River Liffey & Tributaries, IFI (<i>Pers. Comm.</i> 2014) Grand Canal, Waterways Ireland
Fish				
Atlantic Salmon	<i>Salmo salar</i>	HD II	Vulnerable	River Liffey & Tributaries, IFI (<i>Pers. Comm.</i> 2014)
Lamprey Species	<i>Lampetra species</i>	HD II	Vulnerable	River Liffey & Tributaries, IFI (<i>Pers. Comm.</i> 2014)
Trout	<i>Salmo trutta</i>	-	Least Concern	River Liffey & Tributaries, IFI (<i>Pers. Comm.</i> 2014)
Pike	<i>Esox lucius</i>	-	Non-native non-benign	Grand Canal, IFI (<i>Pers. Comm.</i> 2014)
Perch	<i>Perca fluviatilis</i>	-	Non-native non-benign	Grand Canal, IFI (<i>Pers. Comm.</i> 2014)
Roach	<i>Rutilus rutilus</i>	-	Non-native non-benign	Grand Canal, IFI (<i>Pers. Comm.</i> 2014)
Rudd	<i>Scardinius erythrophthalmus</i>	-	Non-native benign	Grand Canal, IFI (<i>Pers. Comm.</i> 2014)
Bream	<i>Abramis brama</i>	-	Non-native non-benign	Grand Canal, IFI (<i>Pers. Comm.</i> 2014)
Tench	<i>Tinca tinca</i>	-	Non-native benign	Grand Canal, IFI (<i>Pers. Comm.</i> 2014)
Gudgeon	<i>Gobio gobio</i>	-	Non-native benign	NPWS 2011

*It should be noted that the above species records are based on ad hoc information submitted to the data centres and as a result this list does not necessarily represent a full and complete species list of the area.

Records of Invasive Species in the Sallins area				
Common Name	Scientific Name	Status ⁵	Number of Records; Date	Source
Canadian Waterweed	<i>Elodea canadensis</i>	High Impact Invasive Species	2; 2010	NBDC
Common Garden Snail	<i>Cornu aspersum</i>	Medium Impact Invasive Species	1; 2006	NBDC
Japanese and hybrid knotweeds	<i>Fallopia japonica x bohemica</i>	High Impact Invasive Species	N/A	CAISIE ⁶
Jenkins' Spire Snail	<i>Potamopyrgus antipodarum</i>	Medium Impact Invasive Species	1; 2003	NBDC
Nuttall's pondweed	<i>Elodea nuttallii</i>	High Impact Invasive Species	2; 2010	NBDC & CAISIE
Acute Bladder Snail	<i>Physella acuta</i>	Medium Impact Invasive Species	1; 2006	NBDC

⁵ According to NBDC online data

⁶ CAISIE Final Report (2013) Accessed at <http://caisie.ie/wp-content/uploads/2013/09/CAISIE-Final-Report-LIFE-07-NAT-IRL-0003411.pdf>

Bat Conservation Ireland records for species roosting within a 10km² boundary from the following town centroid: Sallins – N 89050 23263

Latin Name	Common Name	Location(s)	Distance (s) to site ¹	Protection Status ²	Red Data Book Category
<i>Pipistrellus pipistrellus</i>	Pipistrelle Bat	Naas, Clane, Celbridge and Blessington	c. 2 km to SW c. 6 km to N c.10 km to NE c. 10 km to SE	HDIV, WA	Least Concern
<i>Pipistrellus pygmaeus</i>	Soprano Pipistrelle Bat	Leixlip, Blessington and Celbridge	c. 7 km to N c. 10 km to SE c. 10 km to NE	HDIV, WA	Least Concern
<i>Pipistrelle spp. (Unidentified)</i>	Pipistrelle species	Sallins, Naas, Kiltel and Blessington,	c. 1 km to N c. 2.5 km to E c. 9 km to E c. 10 km to SE	HDIV, WA	Least Concern
<i>Plecotus auritus</i>	Brown Long-eared Bat	Clane, Naas, Robertstown and Donadea	c. 2.4 km to NW c. 2.4 km to E c. 9.5 km to W c. 10 km to NW	HDIV, WA	Least Concern
<i>Unidentified sp.</i>	-	Naas, Kiltel and Blessington areas.	c. 8 km to E c. 6.4 km to N c. 8.6 km to NE c. 6.7 km to N c. 10km to SE	HDIV, WA	-

¹Distance to site is approximate as full grid references not available for these records.

²HDII/IV/V = Habitats Directive Annexes II/IV/V; WA = Wildlife Acts

APPENDIX B: SPECIES RECORDED DURING THE SURVEY

<i>Latin/Scientific Name</i>	Common Name
Flora	
<i>Acer campestre</i>	Field Maple
<i>Acer pseudoplatanus</i>	Sycamore
<i>Achillia millefolium</i>	Yarrow
<i>Agrostis capillaris</i>	Common Bent
<i>Agrostis stolonifera</i>	Creeping Bent
<i>Alnus glutinosa</i>	Alder
<i>Angelica sylvestris</i>	Wild Angelica
<i>Anthoxanthum odoratum</i>	Sweet Vernal Grass
<i>Arrhenatherum elatius</i>	Oat Grass
<i>Arum maculatum</i>	Lords-and-Ladies
<i>Bellis perennis</i>	Common Daisy
<i>Betula pendula</i>	Silver Birch
<i>Blechnum spicant</i>	Hard Fern
<i>Brachypodium sylvaticum</i>	False Brome
<i>Buddleja davidii</i>	Buddlia
<i>Carex hirta</i>	Hairy Sedge
<i>Carex nigra</i>	Common Sedge
<i>Centaurea nigra</i>	Knapweed
<i>Cerastium fontanum</i>	Common Mouse-ear
<i>Chamerion angustifolium</i>	Rosebay Willowherb
<i>Cirsium arvense</i>	Creeping Thistle
<i>Cirsium vulgare</i>	Spear Thistle
<i>Clematis vitalba</i>	Traveller's-Joys
<i>Cotoneaster</i>	Cotoneaster sp. - Invasive Species
<i>Crataegus monogyna</i>	Hawthorn
<i>Dactylis glomerata</i>	Cocksfoot
<i>Equisetum palustre</i>	Marsh Horsetail
<i>Euphrasia sp.</i>	Eyebright sp.
<i>Fagus sylvatica</i>	Beech
<i>Fagus sylvatica 'Purpurea'</i>	Copper Beech
<i>Festuca rubra</i>	Red Fescue
<i>Filipendula ulmaria</i>	Meadowsweet
<i>Fraxinus excelsior</i>	Ash
<i>Galium aparine</i>	Cleavers / Goose Grass
<i>Geranium robertianum</i>	Herb Robert
<i>Geranium molle</i>	Dove's-foot Crane's-bill
<i>Geum urbanum</i>	Wood Avens
<i>Hedera helix</i>	Ivy
<i>Heracleum sphondylium</i>	Hogweed
<i>Holcus lanatus</i>	Yorkshire Fog
<i>Hypochaeris radicata</i>	Cat's-ear
<i>Ilex aquifolium</i>	Holly
<i>Iris pseudacorus</i>	Yellow Iris

<i>Juncus inflexus</i>	Hard Rush
<i>Lapsana communis</i>	Nipplewort
<i>Lathyrus pratensis</i>	Meadow Vetchling
<i>Lolium perenne</i>	Perennial Rye-grass
<i>Lotus corniculatus</i>	Bird's-foot Trefoil
<i>Luzula sylvatica</i>	Great Woodrush
<i>Mentha aquatica</i>	Water mint
<i>Myriophyllum sp.</i>	Water-milfoil Species
<i>Persicaria sp.</i>	Persicaria / Bistort species
<i>Phleum pratense</i>	Timothy-grass
<i>Phragmites australis</i>	Common Reed
<i>Picea sp.</i>	Spruce species
<i>Picea sitchensis</i>	Sitka Spruce
<i>Pinus sylvestris</i>	Scots Pine
<i>Plantago lanceolata</i>	Ribwort Plantain
<i>Poa trivialis</i>	Rough Meadow-grass
<i>Potentilla anserina</i>	Silverweed
<i>Potentilla reptans</i>	Creeping Cinquefoil
<i>Prunus spinosa</i>	Blackthorn
<i>Quercus robur</i>	Pedunculate Oak
<i>Ranunculus acris</i>	Meadow Buttercup
<i>Ranunculus repens</i>	Creeping Buttercup
<i>Rosa canina</i>	Dog Rose
<i>Rubus fruticosus agg.</i>	Bramble agg.
<i>Rumex acetosa</i>	Sorrel
<i>Sagittaria sagittifolia</i>	Arrowhead
<i>Salix cineria</i>	Grey Willow
<i>Salix fragilis</i>	Crack Willow
<i>Salix viminalis</i>	Osier
<i>Sambucus nigra</i>	Elder
<i>Senecio aquaticus</i>	Marsh Ragwort
<i>Senecio jacobaea</i>	Ragwort - Invasive (but not listed on WCA)
<i>Sorbus aucuparia</i>	Rowan
<i>Sorbus hibernica</i>	Whitebeam
<i>Taraxacum agg.</i>	Dandelion
<i>Tilia sp.</i>	Lime
<i>Trifolium campestre</i>	Hop Trefoil
<i>Trifolium pratense</i>	Red Clover
<i>Trifolium repens</i>	White Clover
<i>Typha latifolia</i>	Bulrush
<i>Ulex europaeus</i>	Gorse
<i>Urtica dioica</i>	Nettle
<i>Viburnum opulus</i>	Guelder-rose
<i>Vicia cracca</i>	Tufted Vetch
<i>Vicia sepium</i>	Bush Vetch
<i>Viola sp.</i>	Violet sp.

<i>Latin/Scientific Name</i>	Common Name
Fauna	
<i>Erithacus rubecula</i>	Robin
<i>Turdus merula</i>	Blackbird
<i>Troglodytes troglodytes</i>	Wren
<i>Passer domesticus</i>	House Sparrow
<i>Corvus cornix</i>	Hooded Crow
<i>Columba palumbus</i>	Woodpigeon
<i>Sturnus vulgaris</i>	Starling
<i>Motacilla alba yarrellii</i>	Pied Wagtail
<i>Sciurus carolinensis</i>	Grey Squirrel
<i>Oryctolagus cuniculus</i>	Rabbit

APPENDIX C: CRITERIA FOR ECOLOGICAL EVALUATION FROM:

Guidelines for assessment of Ecological Impacts of National Road Schemes (NRA, 2009)

Criteria for Ecological Evaluation
<p>International Importance:</p> <ul style="list-style-type: none">• ‘European Site’ including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.• Proposed Special Protection Area (pSPA).• Site that fulfils the criteria for designation as a ‘European Site’ (see Annex III of the Habitats Directive, as amended).• Features essential to maintaining the coherence of the Natura 2000 Network.⁷• Site containing ‘best examples’ of the habitat types listed in Annex I of the Habitats Directive.• Resident or regularly occurring populations (assessed to be important at the national level)⁸ of the following:<ul style="list-style-type: none">○ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and / or○ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.• Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).• World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972).• Biosphere Reserve (UNESCO Man & The Biosphere Programme).• Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).• Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).• Biogenetic Reserve under the Council of Europe.• European Diploma Site under the Council of Europe.• Salmonid water designated pursuant to the European Communities (Quality of Salmonid

⁷ See Articles 3 and 10 of the Habitats Directive.

⁸ It is suggested that, in general, 1% of the national population of such species qualifies as an internationally important population. However, a smaller population may qualify as internationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

Criteria for Ecological Evaluation

Waters) Regulations, 1988, (S.I. No. 293 of 1988).⁹

National Importance:

- Site designated or proposed as a Natural Heritage Area (NHA).
- Statutory Nature Reserve.
- Refuge for Fauna and Flora protected under the Wildlife Acts.
- National Park.
- Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.
- Resident or regularly occurring populations (assessed to be important at the national level)¹⁰ of the following:
 - Species protected under the Wildlife Acts; and/or
 - Species listed on the relevant Red Data list.
- Site containing 'viable areas'¹¹ of the habitat types listed in Annex I of the Habitats Directive.

⁹ Note that such waters are designated based on these waters' capabilities of supporting salmon (*Salmo salar*), trout (*Salmo trutta*), char (*Salvelinus*) and whitefish (*Coregonus*).

¹⁰ It is suggested that, in general, 1% of the national population of such species qualifies as a nationally important population. However, a smaller population may qualify as nationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

¹¹ A 'viable area' is defined as an area of a habitat that, given the particular characteristics of that habitat, was of a sufficient size and shape, such that its integrity (in terms of species composition, and ecological processes and function) would be maintained in the face of stochastic change (for example, as a result of climatic variation).

Criteria for Ecological Evaluation

County Importance:

- Area of Special Amenity.¹²
- Area subject to a Tree Preservation Order.
- Area of High Amenity, or equivalent, designated under the County Development Plan.
- Resident or regularly occurring populations (assessed to be important at the County level)¹³ of the following:
 - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
 - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
 - Species protected under the Wildlife Acts; and/or
 - Species listed on the relevant Red Data list.
- Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.
- County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local Biodiversity Action Plan (BAP) if this has been prepared.
- Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.
- Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.

Local Importance (higher value):

- Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared;
- Resident or regularly occurring populations (assessed to be important at the Local level)¹⁴ of the following:

¹² It should be noted that whilst areas such as Areas of Special Amenity, areas subject to a Tree Preservation Order and Areas of High Amenity are often designated on the basis of their ecological value, they may also be designated for other reasons, such as their amenity or recreational value. Therefore, it should not be automatically assumed that such sites are of County importance from an ecological perspective.

¹³ It is suggested that, in general, 1% of the County population of such species qualifies as a County important population. However, a smaller population may qualify as County importance where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

Criteria for Ecological Evaluation

- Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
- Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
- Species protected under the Wildlife Acts; and/or
- Species listed on the relevant Red Data list.
- Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality;
- Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.

Local Importance (lower value):

- Sites containing small areas of semi-natural habitat that are of some local importance for wildlife;
- Sites or features containing non-native species that are of some importance in maintaining habitat links.

¹⁴ It is suggested that, in general, 1% of the local population of such species qualifies as a locally important population. However, a smaller population may qualify as locally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

APPENDIX D: HEDGEROW EVALUATION CRITERIA

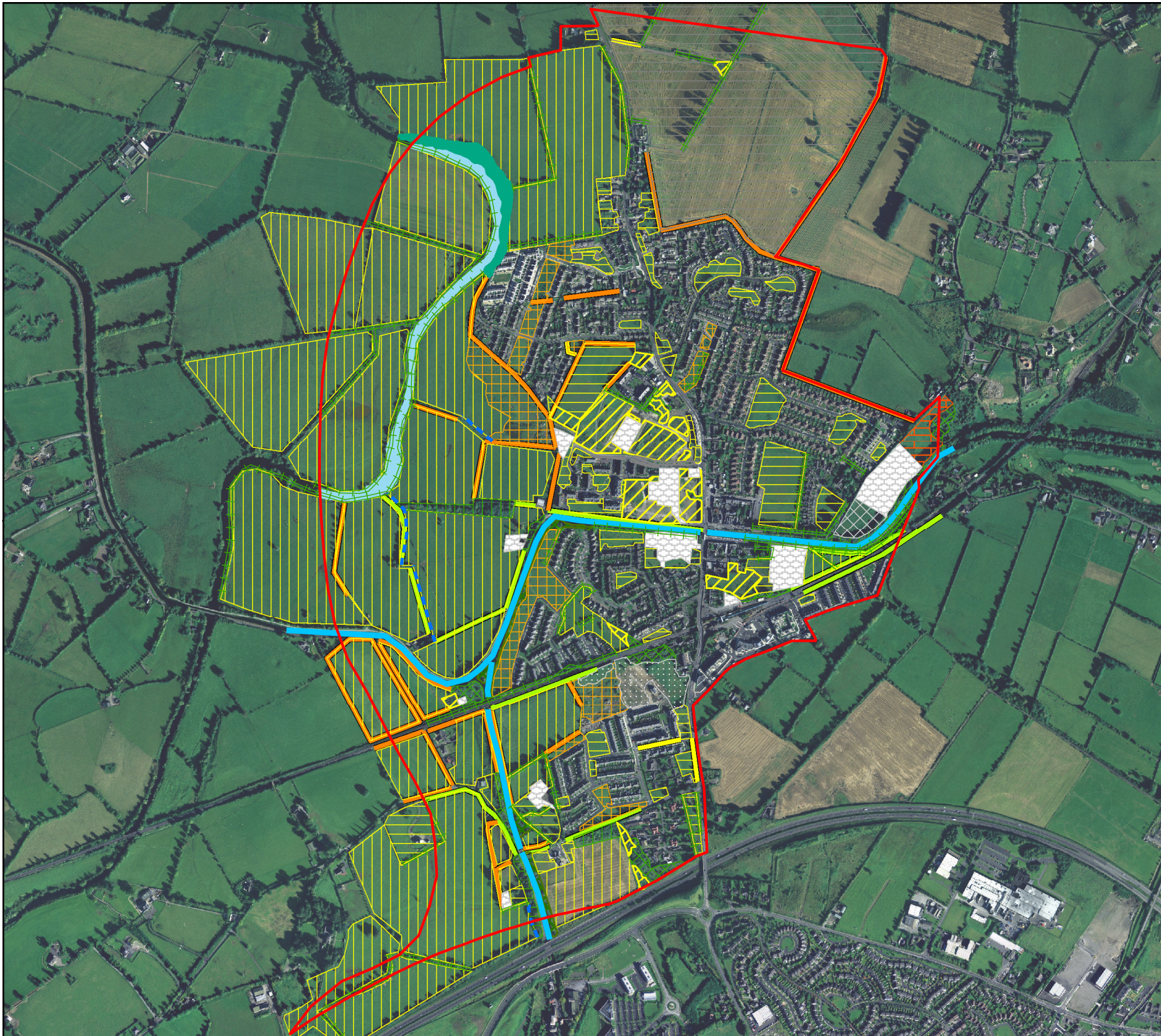
The hedgerow evaluation criteria shown in table below have been adapted from various sources, including the 'Ecological criteria for evaluation of hedgerows' (NRA guidance), UKBAP priority habitat description and the Hedgerow Regulations 1997 (England and Wales). This method was agreed with Kildare County Council for the purpose of this study.

A hedgerow is defined as any boundary line of trees or shrubs over 20m long and less than 5m wide, and where any gaps between the trees or shrub species are less than 20m wide. Any bank, wall, ditch or tree within 2m of the centre of the hedgerow is considered to be part of the hedgerow habitat, as is herbaceous vegetation within 2m of the centre of the hedgerow.

For each hedgerow an assessment is made of the 14 features listed in the table below. The hedgerow is then valued according to the category for which it contains the most features. Mature treelines (or very overgrown hedgerows) were separately recorded as such and these are considered to be of high value.

Hedgerow ecological evaluation criteria			
Feature	High value (County Importance)	Moderate value (Local Importance – higher value)	Low value (Local Importance – lower value)
1. Average shrub canopy height (excluding treelines)	> 5m	2-5m	<2m
2. Average width at ground level	>4m	2-4m	<2m
3. Ground cover	Dense	Patchy	Little or none
4. Mature standard trees per 50m length	> 5	1-5	None
5. Gaps per 50m length	< 10%	10-30%	>30%
6. Connection to other hedges	>4	2-3	<2
7. Dominant tree and shrub species	Mainly native or naturalised* species	Mixed native or naturalised species and non-native species	Mainly non-native species
8. Hedge acting as a wildlife corridor linking adjacent semi-natural habitats that would otherwise be isolated	Yes	Yes	No
9. Diversity of tree or shrub species per 50m length	>7	4-7	<3
10. Ground flora	Typical diverse woodland flora present	Some woodland ground flora present	No woodland ground flora present
11. Epiphytic flora (e.g. bryophytes & lichens)	Diverse epiphytic flora present	Some epiphytic flora present	No epiphytic flora
12. Associated stream or drain	With permanent water	With seasonal water only	No
13. Associated hedge bank height	>1m in height	0.5-1m	None
14. Age	Veteran hedge (approx. >50 yrs) with high landscape value	Mature hedge (approx. 10-50 yrs) with some landscape value	Recent hedge (approx. <10yrs) with little landscape value
Total	/14	/14	/14

APPENDIX E: HABITAT AND GREEN INFRASTRUCTURE MAPS



Legend

— Study Area

Fossitt Title

— FW3 - Canals

- - - FW4 - Drainage Ditches

— WL2 - Treelines

— (Mixed) Broadleaved Woodland (WD1)

— Amenity Grassland (GA2)

— Arable crops (BC1)

— Buildings and Artificial Surfaces (BL3)

— Depositing/Lowland Rivers (FW2)

— Dry calcareous and neutral grassland (GS1)

— Dry meadows and grassy verges (GS2)

— Exposed sand, gravel or till (ED1)

— Flower beds and borders (BC4)

— Improved Grassland (GA1)

— Oak-ash-hazel Woodland (WN2)

— Old Stone Building (BL2)

— Recolonising bare ground (ED3)

— Riparian Woodland (WN5)

— Scrub (WS1)

— Spoil and bare ground (ED2)

— Wet willow-alder-ash woodland (WN6)

Hedgerow Evaluation

— High

— Moderate

— Low

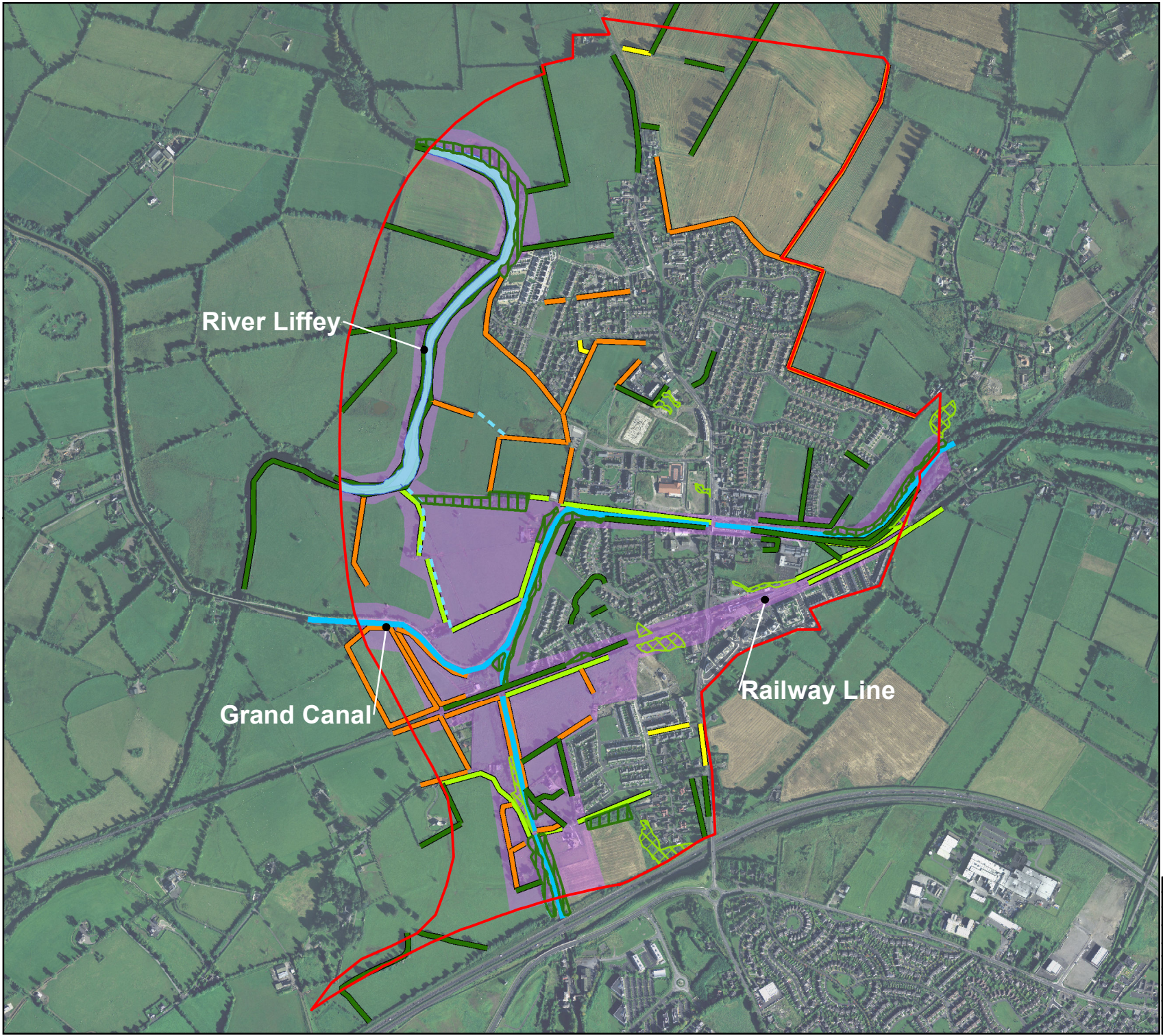
Drawing No: 140090/01A

Project Title: **Habitats, Sallins**

Client: Kildare County Council

Project No.: 140090 Scale: 1:15,000 @ A4

Drawn: RNF	Approved: PS	Rev. No.: 01A	Date: 25/02/2015
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River Liffey

Grand Canal

Railway Line

Legend

- Study Area
- River
- ▨ Scrub
- ▨ Woodland
- Canal
- - - Drainage Ditches
- Treelines
- Hedgerow High Value
- Hedgerow Moderate Value
- Hedgerow Low Value
- Sallins Key Green Infrastructure

Drawing No:		140090/01A	
Project Title: Green Infrastructure, Sallins			
Client: Kildare County Council			
Project No.: 140090		Scale: 1:15,000 @ A4	
Drawn: RNF	Approved: PS	Rev. No.: 01A	Date: 25/02/2015

APPENDIX F: DRAFT GREEN INFRASTRUCTURE TEXT SALLINS LAP

The following text is in DRAFT and is currently being updated for the LAP.

Natural Heritage and Biodiversity

Natural heritage is an important environmental and economic resource and one which requires care and management through the planning process. In recognition of the valuable natural heritage resources a number of designations have been applied to certain areas of the county. These include Special Areas of Conservation and Natural Heritage Areas and Proposed Natural Heritage Areas.

Sallins has a wealth of natural heritage both within and surrounding the town. Whilst there are no SACs or NHAs within the town, there are two Proposed Natural Heritage Areas (pNHA's) including the Grand Canal and the River Liffey at Osberstown.

The Canal is identified by the National Parks and Wildlife Service (NPWS) in its designation as a pNHA, as comprising the canal channel and the banks on either side of it. A number of different habitats are found within the canal boundaries – hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland. The ecological value of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species.

With regard to the River Liffey at Osberstown, (**Note: this is outside of the study area for the habitat and green infrastructure survey**) the NPWS indicates that this site represents a good example of riverside vegetation, with two scarce plants. Although cleared of woodland in 1983, remnants may remain or regeneration may have occurred.

Both these areas should be protected in line with the policies and objectives set out at Chapter 13 of the CDP. In addition, both areas are also identified as Areas of High Amenity at Chapter 14 of the CDP where specific policies and objectives are also applicable.

It is the policy of the Council:

NH 1: To protect the proposed Natural Heritage Areas (pNHAs) within Sallins in accordance with the policies and objectives as set out at Chapter 13 of the Kildare County Development Plan.

Nature Conservation outside of Designated Areas

In addition to the designated sites within Sallins, there are a number of areas within the LAP that are considered to be of heritage value including wildlife habitats, trees, watercourses etc. Habitat and landscape features have an important role to play as ecological corridors as they allow for movement of species and help sustain the habitats, ecological processes and functions necessary to enhance and maintain bio-diversity. It is important that these areas are conserved and well managed.

It is the policy of the Council:

NH 2: To identify, protect, conserve and enhance, wherever possible, wildlife habitats and species of local importance, not otherwise protected by legislation. Such habitats may include woodland, grassland areas and field boundaries (hedges, stone walls, ditches etc). Such features form part of a network of habitats and corridors, which allow wildlife to exist and flourish. Once a locally important habitat has been identified it shall be surveyed to establish its significance and a site specific conservation plan prepared to establish development guidelines for the area.

NH 3: To seek the protection of the trees and groups of trees of special amenity value at the locations outlined in the LAP.

Additional Information

1. Trees along southern boundary of GAA pitch and eastern boundary of Sallins Wood on Sherlockstown Road;
2. Trees to west of school within the curtilage of private dwelling;
3. Trees to east of lands zoned C6 (Willouise) along the canal;
4. Copse of trees (excluding those required under Objective TBC for relief road) southwest of lands zoned C5 on open space and amenity lands;
5. Trees along eastern bank of River Liffey at Castlesize;
6. 2 no. trees to the front (south) of the Railway Station; and,
7. Trees along western side of Clane Road.

NH 4: To prohibit development where it is likely that damage would be caused either to trees protected by a Tree Preservation Order or those that have a particular local amenity or nature conservation value. Development that requires the felling of mature trees of amenity value, conservation value or special interest, including those not specifically listed in this plan, will be discouraged.

NH 5: To conserve and protect the natural habitats in the local river and canal systems. In this regard, relevant planning applications must:

- (a) Identify all ecological habitats and corridors which are present on the proposed development lands (including hedgerows and masonry stone walls) that are likely to be affected by the development proposal;
- (b) Identify any losses to these habitats and corridors which would result if the application was to be granted;
- (c) Show that such losses would be fully offset if the application was to be granted through the replacement of the relevant corridors, with corridors composed of similar species prior to any losses to the existing corridors;
- (d) Show that habitat loss will either be offset should the application be granted or is not locally important to the area.

NH 6: To protect the Grand Canal pNHA including any additions or amendments to the site from any development that would adversely affect its conservation and amenity value.

NH 7: To ensure that any development proposal within the vicinity of or having an effect on the Grand Canal pNHA will provide sufficient detail illustrating how it will limit any possible impact upon the designated site and will include proposals for appropriate amelioration.

NH 8: To require all proposed development within and adjoining the Sallins LAP boundary within a 15km boundary of a Natura site to be screened for Appropriate Assessment of its potential impacts on the Natura 2000 network in accordance with Article 6 of the Habitats Directive. In all such cases, the developer shall consult with the National Parks and Wildlife Service of the DoAHG.

NH 9: To ensure the protection of the groundwater resources in and around the Sallins area and associated habitats and species.

NH 10: To promote opportunities for enhancement of local bio-diversity features where appropriate.

NH 11: To implement measures to control and manage alien/invasive species (e.g. Japanese Knotweed, Giant Hogweed etc.) and noxious weeds.

NH 12: To maintain a suitable buffer zone between all water bodies and any development. The extent of the riparian buffer zone should be determined in consultation with a qualified ecologist and will be applied where there is an existing setback. A minimum of 15 metres of vegetation shall be retained along the riverbank to mitigate against pollution risks, reduce flooding potential and maintain habitats.

NH 13: In situations where lighting is proposed along the banks of watercourses, to require developers to engage specialists to prepare an Ecological Impact Assessment (and where necessary, an Appropriate Assessment) including bat and otter surveys. The recommendations contained in the surveys shall be implemented. No lighting shall be installed without prior consultation with the NPWS.

Green Infrastructure

The provision of green infrastructure is an essential element in delivering a high quality of life for both existing and new communities. It can create a distinctive local built environment ('sense of place') and improve the existing built environment. In developing green infrastructure strategies there is an opportunity to create places that not only function sustainably but also are very attractive places to live and work and foster a strong sense of community. In this regard, the LAP will focus on protecting, enhancing, creating and connecting green infrastructure resources and ensuring that development is planned and managed so that it does not result in undue damage to the surrounding environment and natural assets. Wildlife and natural ecological processes are more likely to be maintained in landscapes that comprise an interconnected system of habitats.

Green Infrastructure (GI) should as far as possible provide an integrated infrastructure for multi-functional uses i.e. wildlife, leisure and cultural experience and deliver environmental services such as sustainable water drainage and flood protection that operates at all spatial scales from the urban neighbourhood to the open countryside. In urban areas such as Sallins, green infrastructure is about putting the environment at the centre of the planning process and producing a network of spaces which benefit both people and wildlife.

The spatial concepts around which the green infrastructure and landscape strategy are as follows:

- The open space network within the plan lands is designed in a series of interconnected zones to manage the natural character and resources of the area and to provide for the needs of biodiversity and the new community.
- A large town park between the Grand Canal and the River Liffey to act as a future green belt.
- A Linear park along the Grand Canal (including the Corbally Branch from Naas) to provide passive and active walks and cycle routes along this man made habitat. There is also potential to create informal play spaces at key nodes along the route.
- A Linear Park along the River Liffey in accordance with the document 'Towards a Liffey Valley Park Strategy'.
- Pocket parks in all new residential and mixed use developments to ensure all dwellings are within a short (100m) walk of usable open space.
- A well-integrated network of green routes that promotes walking and cycling for everyday needs and recreation. These will be principally located along the canal.
- A civic/public space within the town centre.
- Three new pedestrian bridges over the Grand Canal to link communities with key services and facilities in the town and surrounding areas.

It is the policy of the Council:

GI 1: To ensure old stone walls and/or hedgerows are protected where appropriate for the contribution that they make to green infrastructure.

GI 2: To support the development and appropriate management of semi-natural grasslands within new developments and existing amenity grassland areas.

GI 3: To seek the enhancement of existing wetlands and the creation of new wetlands where appropriate, through the provision of Sustainable Urban Drainage Systems (SUDS) and Integrated Constructed Wetlands (ICW).

GI 4: To develop links between larger areas of green infrastructure (such as the River Liffey and Grand Canal, the banks and buffer zones of the railway, motorway and bypass) and the surrounding countryside.

GI 5: To ensure replacement with semi-mature trees in cases where mature trees are removed during development. Semi-mature trees are defined by the BSI as “trees with an overall height in excess of 4 metres and or a stem girth measurement circumference of 20 centimetres or larger”.

GI 6: To avoid development within the root protection area of the trees/hedgerows to be retained within a development.

It is an objective of the Council:

GIO 1: Advance a green infrastructure strategy through the integration of a network of natural habitat and biodiversity supporting spaces, parkland for passive and active recreational uses, heritage features, sustainable surface water and flood risk management measures.

GIO 2: Promote the development of a series of green routes/green linear corridors that connect amenity and open space areas with new and established communities.

GIO 3: Comply with the objectives relating to biodiversity, open space and green infrastructure set out in the current Kildare County Development Plan.

GIO 4: Demonstrate in each planning application, how the Habitat and Green Infrastructure have influenced the layout of development and in particular, how it is reflected in the design and layout of open spaces, linear parks and green routes.

GIO 5: Ensure that the existing topography of the lands is incorporated into the design concept and layout with minimal variations to existing ground levels, in as far as is practicable, in development schemes.

GIO 6: Require measures for the protection and management of local biodiversity features to be submitted in any development proposals. This shall include details of how and where any surplus fill from the plan lands is to be disposed.

GIO 7: Ensure trees, hedgerows and other features which demarcate townland boundaries are preserved and incorporated into the design of developments.

GIO 8: Protect, preserve and ensure the effective management of trees and groups of trees.

GIO 9: Require the use of native planting where appropriate in new developments in consultation with the Council. Indigenous, non-invasive species should be considered to provide habitat for locally occurring fauna ensuring, at a minimum, there should be no net loss of the tree and hedgerow resource.