



## **KILDARE COUNTY COUNCIL**

Screening Statement in Support of  
Appropriate Assessment

## **GRAND CANAL GREENWAY**

Aylmer Bridge to Clonkeen

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## **1. INTRODUCTION**

This Screening Statement has been prepared to an Appropriate Assessment (AA), under Article 6 of the EU Habitats Directive, of a proposal by Kildare County Council to undertake a Part 8 planning application for works relating to the upgrading of the Grand Canal towpath to facilitate a Greenway off-road walking and cycling route between Aylmer Bridge (at Lyons Estate to the south of Celbridge) to Clonkeen (on the border between counties Kildare and Offaly).

The location of the proposed Greenway route is shown on Figures 1.1 and 1.2.

The aim of this assessment is to identify whether this proposal (to be referred to as the “project” throughout) will have the potential to result in likely significant effects to European Sites.

This Screening for Appropriate Assessment forms Stage 1 of the Habitats Directive Assessment process and is being undertaken in order to comply with the requirements of the Habitats Directive Article 6(3). The function of this Screening Exercise is to identify the potential for the project to result in likely significant effects to European Sites and to provide information so that the competent authority can determine whether a Stage 2 Appropriate Assessment is required for the project.

### **1.1 STAGE 1 SCREENING METHOD**

The function of the Screening exercise is to identify whether or not the proposal will have the potential to result in likely significant effect on European Sites. In this context “likely” refers to the presence of doubt with regard to the absence of significant effects (ECJ case C-127/02) and “significant” means not trivial or inconsequential but an effect that has the potential to undermine the site’s conservation objectives (English Nature, 1999; ECJ case C-127/02 &). In other words, any effect that compromises the conservation status of a European Sites and interferes with achieving its conservation objectives would constitute a significant effect.

The nature of the likely interactions between the project and the conservation status of European Sites will depend upon the sensitivity of these sites and their reasons for designation to potential impacts arising from the project; the current conservation status of the features for which European Sites have been designated; and any likely changes to key environmental indicators (e.g. habitat structure; vegetation community) that underpin the conservation status of European Sites, in combination with other plans and projects.

This Screening exercise has been undertaken with reference to respective National and European guidance documents: Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities (DEHLG 2010) and *Assessment of Plans and Projects Significantly Affecting Natura 2000 sites – Methodological Guidance of the Provisions of Article 6(3) and (4) of the Habitats directive 92/43/EEC* and recent European and National case law (ECJ C-258/11 & High Court case ref 2014-320-JR). The following guidance documents were also of relevance during this Screening Assessment:

- ☐ A guide for competent authorities. Environment and Heritage Service, Sept 2002. Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (2010). DEHLG.
- ☐ Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites – Methodological Guidance of the Provisions of Article 6(3) and (4) of the Habitats Directive 92/42/EED. European Commission (2001).
- ☐ Managing Natura 2000 Sites – The provisions of Article 6 of the Habitats directive 92/43/EEC. European commission (2000). (To be referred to as MN 2000).
- ☐ Guidance on Article 6(4) of the Habitats Directive 92/43/EEC – Clarification of the Concepts of: Alternative Solutions, Imperative reasons of Overriding Public Interest, Compensatory Measures, Overall coherence, Opinion of the Commission. European Commission (2007).

The EC (2001) guidelines outline the stages involved in undertaking a Screening exercise of a project that has the potential to have likely significant effects on European Sites. The methodology adopted for this Screening exercise is informed by these guidelines and was undertaken in the following stages:

1. Describe the project and determine whether it is necessary for the conservation management of European Sites;
2. Identify European Sites that could be influenced by the project;
3. Where European Sites are identified as occurring within the sphere of influence of the project identify potential effects arising from the project and screen the potential for such effects to negatively affect European Sites identified under Point 2 above; and
4. Identify other plans or projects that, in combination with the project, have the potential to affect European Sites.

## 2. ECOLOGICAL BASELINE

### 2.1 ECOLOGICAL SURVEY

An ecological survey was commissioned for the Grand Canal co-ordinated by Waterways Ireland in summer 2015 and the results of this survey for the relevant section of the Grand Canal were made available. Appendix A presents the habitat maps for the relevant section of the Grand Canal from Aylmer Bridge to Clonkeen and an overview of the habitats identified are summarised below: More detailed inventories and descriptions can be found in the report – Habitat Survey of Grand Canal, Waterways Ireland 2015. This survey identified a particular mosaic habitat for the canal – Towpath Mosaic described as follows:

**TPM (Tow Path Mosaic):** bespoke habitat category devised between Waterways Ireland and ecologists in consultation with National Parks and Wildlife Service to describe the vegetation along the towpath from the canal edge to either the built/gravel road or the hedgerow/treeline/tree boundary (if there is no built road). The TPM comprises several habitats changing in quick succession moving away from the canal. It includes reedbed, marsh, wet grassland and drier grasslands. This habitat was devised as each of the level 3 habitats occurring within the TPM are linear and grade into each other over such a short distance the habitats cannot be delineated separately on a habitat map.

**Habitats:** The Fossitt habitat categories identified on Site are listed in Table 2.1 and full habitat maps are presented in Appendix A. Overall, the Site largely comprises canal, dry meadows and grassy verges, wet grassland and improved agricultural grassland. Much of the canal boundary consists of scrub, hedgerows or treelines. The dominant classifications found on Site are described below in Table 2.2.

**Table 2.1 Fossitt Habitat Classifications found within the Site.**

Code	Fossitt Habitat Classification
TM	Towpath Mosaic
FRESHWATER HABITATS	
FW2	Depositing/lowland river
FW3	Canal
FW4	Drainage ditch
FS1	Reed and large sedge swamp
FS2	Tall herb swamp
FL8	Other artificial lakes and ponds
GRASSLAND AND MARSH	
GA1	Improved agricultural grassland
GA1/GS4	Improved agricultural grassland/Wet grassland
GA2	Improved amenity grassland

GM1	Marsh
GM1/GS4	Marsh/Wet grassland
GS1	Dry calcareous and neutral grassland
GS1/GA1	Mosaic: Dry calcareous/Improved agricultural grassland
GS1/GA2	Mosaic: Dry calcareous/Improved amenity grassland
GS1/GS4	Mosaic: Dry calcareous/Wet grassland
GS2	Dry meadows and grassy verges
GS2/WS1	Mosaic: Dry meadows/scrub
GS4	Wet grassland
GS4/WS1	Mosaic: Wet grassland/Scrub
HEATH AND DENSE BRACKEN	
HH1	Dry siliceous heath
HH3	Wet Heath
HD1	Dense bracken
PEATLANDS	
PB4	Cutover bog
PF1	Rich fen and flush
WOODLAND AND SCRUB	
WN5	Riparian woodland
WN6	Wet willow-alder-ash woodland
WN7	Bog woodland
WD1	Mixed broadleaved woodland
WD1/WS1	Broadleaved woodland/Scrub
WD2	Mixed broadleaved/conifer woodland
WD4	Conifer plantation
WD5	Scattered trees and parkland
WS1	Scrub
WS1/FS1	Mosaic Scrub / Reed swamp
WS2	Immature woodland
WL1	Hedgerows
WL2	Treelines
WS3	Ornamental/non-native shrub
EXPOSED ROCK AND DISTURBED GROUND	
ED1	Exposed sand, gravel or till
ED2	Spoil & bare ground
ED3	Recolonising bare ground
ED2/ ED3	Spoil and bare ground/Recolonising bare ground
ED4	Active quarries and mines
CULTIVATED AND BUILT LAND	
BC1	Arable crops
BC2	Horticultural land
BC3	Tilled land
BC4	Flower beds and borders
BL1	Stone Walls
BL3	Buildings
BL3/ GA2	Buildings and gardens

## **FAUNA**

### **Mammals**

Physical evidence of Otter and Badger were recorded at several locations along the Canal Mainline (see Maps in Appendix A). Spraints were noted in several sections near the canal and the canal provides extensive habitat for foraging and commuting. Otters are, therefore, likely to be ubiquitous along the canal. In areas of high recreational pressure and site use by dog walkers apparent Otter/Badger trails were difficult to separate from those of dogs. The locations of mammal activity along the canal are presented within the habitat maps (Appendix A). A list of these locations and species is provided in the species lists per canal marker. No Badger setts were located within the canal boundary.

A bat survey was not undertaken within the Site; however five species of Bat were recorded from national datasets (NBDC; Bat Conservation Ireland (BCI)). The Bat species recorded include Common Pipistrelle, Soprano Pipistrelle, Daubenton's, Leisler's and Brown Long-Eared Bat. Bridges and Locks along the canal are well maintained. No physical signs of bat roosts were recorded along the canal or within structures in close proximity. The Grand Canal provides excellent foraging and commuting habitat for bats and deserves further study.

### **Birds**

A total of 55 bird species were recorded within the Site. The high diversity of linear scrub, hedgerow and stands of woodland provide a wide range of opportunities for many bird groups and most common species were represented and detected during the survey. One Red Listed species (Meadow Pipit) and 14 Amber Listed, notably (Goldcrest; Linnet, House Martin, Kestrel, House Sparrow, Kingfisher, Mistle Thrush, Robin, Swallow, Swift, Starling, Sand Martin and Tree Sparrow) were recorded within the Site.

### **Amphibians and Reptiles**

Common Frog (*Rana temporaria*) was recorded frequently throughout the canal verge and boundary and within ditches and wet margins. No reptiles were recorded during the surveys.

### **Fish**

A comprehensive fisheries survey was not undertaken as part of the field survey. Inland Fisheries Ireland provided detailed species information for the Site. The main species found within the Grand Canal are: Roach (*Rutilus rutilus*), Perch (*Perca fluviatilis*); Pike (*Esox lucius*); Tench (*Tinca tinca*); European Eel (*Anguilla anguilla*); Bream (*Abramis brama*); Rudd (*Scardinius erythrophthalmus*). Roach are the dominant species detected within the Grand Canal in terms of biomass and abundance. The Annex II listed River Lamprey (*Lampetra fluviatilis*) have been recorded at two locations on the Grand Canal, at the 11<sup>th</sup> Lock and 6<sup>th</sup> Locks.

### **Invertebrates**

White-clawed Freshwater Crayfish (*Austropotamobius pallipes*) have been recorded historically within the Grand Canal and although no specific survey was undertaken to determine presence and distribution, remains were detected in an Otter spraint at Sallins. Dragonflies and Damselflies are abundant along the canal corridor and several common species were constants through-out the Main Line occurring in high densities, notably Brown Hawker (*Aeshna grandis*), Large Red Damselfly (*Pyrrosoma nymphula*), Common Blue Damselfly (*Ischnura elegans*).

A number of locations along the canal supported a rich terrestrial invertebrate fauna (See Section 2 for descriptions in ESAs). Areas important for invertebrates along the canal included species rich canal verge or embankments of free draining mosaics semi-natural grassland and scrub. A species inventory of invertebrates recorded during the surveys and the canal markers are provided in the accompanying Grand Canal – Main Line Ecological Assessment Report.

### Invasive Species

Publicly available data offered online by NBDC identified the presence of invasive species within 2 km of the site, most recently in 2015. Gunnera was identified on the northern side of the canal close to a residential property west of Allenwood. Also, Himalayan balsam (*Impatiens glandulifera*) was noted growing along the banks of the River Liffey to the south of the Leinster Aqueduct. Butterfly bush (*Buddleia davidii*) was recorded between the 12<sup>th</sup> and 11<sup>th</sup> Locks. The National Biodiversity Data Centre records the following Invasive Fauna Species within 2 km of the Site: Common Garden Snail (*Cornu aspersum*), European Rabbit (*Oryctolagus antipodarum*), American Mink (*Mustela vison*), Eastern Grey Squirrel (*Sciurus carolinensis*), Budapest Slug (*Tandonia budapestensis*), Keeled Slug (*Tandonia sowerbyi*), Brown Rat (*Rattus norvegicus*) and Jenkin's Spire Snail (*Potamopyrgus antipodarum*).

**Table 2.2:** Summary of habitats and fauna along relevant sections of towpath from Aylmer Bridge to Clonkeen

Location	Habitats and Flora	Fauna
County Boundary at Clonkeen to Hartley Bridge, Ticknevin	Along the northern bank of the canal around the 20 <sup>th</sup> Lock, the towpath mosaic is characterised by a transition from reed and large sedge swamp along the edges of the canal to a mown grass towpath of improved amenity grassland, bordered by dry meadows and grassy verges and finally a treeline. Common species noted along the canal verge included Meadowsweet ( <i>Filipendula ulmaria</i> ), Reed Sweet Grass ( <i>Glyceria maxima</i> ), Reed canary-grass ( <i>Phalaris arundinacea</i> ), Bulrush ( <i>Typha latifolia</i> ). The surface of the towpath transitions from mown grass to gravelled access track east of the 20th Lock. The area north of the bordering treeline is dominated by improved agricultural grassland with patches of wet grassland, scrub and cutover bog, and a small area of mixed broadleaved/conifer	Common Frog ( <i>Rana temporaria</i> ), common invertebrates and birds typical of canal, meadow and woodland habitats such as Robin ( <i>Erithacus rubecula</i> ), Goldcrest ( <i>Regulus regulus</i> ), Chaffinch ( <i>Fringilla coelebs</i> ), Stonechat ( <i>Saxicola torquata</i> ), Swallow ( <i>Hirundo rustica</i> ), Starling ( <i>Sturnus vulgaris</i> ), Willow Warbler ( <i>Phylloscopus trochilus</i> ), Wren ( <i>Troglodytes troglodytes</i> ), Magpie ( <i>Pica pica</i> ) and Blackbird ( <i>Turdus merula</i> ).



Location	Habitats and Flora	Fauna
	woodland and a dry meadow. Wet willowalder- ash woodland is present west of the 20th Lock.	
Hartley Bridge, Ticknevin – Bord na Móna Bridge, Kilpatrick	The northern bank of the canal is characterised by a towpath mosaic incorporating reed and large sedge swamp, a gravelled access track, a grassy verge and bordering treeline. The grassy verge between the track and the treeline is very narrow along much of this section and the reed and large sedge swamp habitat transitions to less diverse amenity grassland approximately 800m east of Hartley Bridge. The dominant land-use north of the bordering treeline is agricultural, comprised primarily of improved agricultural grassland and arable crops. Around Hartley Bridge are numerous roads, buildings and gardens together with a small area of mixed broadleaved woodland to the northwest and an area of recolonising bare ground to the east.	Common Frog ( <i>Rana temporaria</i> ), common invertebrates and birds typical of canal, improved grassland and woodland habitats such as Robin ( <i>Erithacus rubecula</i> ), Meadow Pipit ( <i>Anthus pratensis</i> ), Willow Warbler ( <i>Phylloscopus trochilus</i> ), Rook ( <i>Corvus frugilegus</i> ), Jackdaw ( <i>Corvus monedula</i> ), Whitethroat ( <i>Sylvia communis</i> ), Blue tit ( <i>Parus caeruleus</i> ), Goldcrest ( <i>Regulus regulus</i> ), Swallow ( <i>Hirundo rustica</i> ), Starling ( <i>Sturnus vulgaris</i> ), Wren ( <i>Troglodytes troglodytes</i> ), Magpie ( <i>Pica pica</i> ) and Blackbird ( <i>Turdus merula</i> ).
Bord na Móna Bridge, Kilpatrick – Hamilton Bridge	Both the eastern and western banks of the canal are characterised by the typical towpath mosaic with broken treelines. Habitats present beyond the towpath mosaic included improved agricultural grassland and buildings and artificial surfaces with gardens and lawns. Treeline bordered both the northern and southern sides of the towpath in places.	Common Frog ( <i>Rana temporaria</i> ), common invertebrates and the following birds: Buzzard ( <i>Buteo buteo</i> ), Chiffchaff ( <i>Phylloscopus collybita</i> ), Goldfinch ( <i>Carduelis carduelis</i> ), Willow Warbler ( <i>Phylloscopus trochilus</i> ), Woodpigeon ( <i>Columba palumbus</i> ), Goldcrest ( <i>Regulus regulus</i> ), Jackdaw ( <i>Corvus monedula</i> ), Starling ( <i>Sturnus vulgaris</i> ), Reed Bunting ( <i>Emberiza schoeniclus</i> ), Wren ( <i>Troglodytes troglodytes</i> ), Swallow ( <i>Hirundo rustica</i> ), Blackbird ( <i>Turdus merula</i> ) and Coal Tit ( <i>Periparus ater hibernicus</i> )
Hamilton Bridge – Light Railway Bridge (lifting)	Both the north-eastern and south-western banks of the canal are comprised of the typical towpath mosaic habitats with broken treelines and some adjoining amenity grassland. A roadway and buildings and gardens are present on the southwestern side. Improved agricultural grassland dominates beyond the towpath mosaic on both sides of the canal.	Common Frog ( <i>Rana temporaria</i> ), common invertebrates and the following birds: Sparrowhawk ( <i>Accipiter nissus</i> ), Coal Tit ( <i>Periparus ater hibernicus</i> ), Long-tailed Tit ( <i>Aegithalos caudatus</i> ), Willow Warbler ( <i>Phylloscopus trochilus</i> ), Meadow Pipit ( <i>Anthus pratensis</i> ), Dunnock ( <i>Prunella modularis</i> ), Goldfinch ( <i>Carduelis carduelis</i> ), Goldcrest ( <i>Regulus regulus</i> ), Robin ( <i>Erithacus rubecula</i> ), Wren ( <i>Troglodytes troglodytes</i> ), Swallow ( <i>Hirundo rustica</i> ), Blackbird ( <i>Turdus merula</i> ) and Blue tit ( <i>Parus caeruleus</i> )
Light Railway Bridge (lifting) – Shee Bridge	The northern bank of the canal east of the Light Railway Bridge is characterised by a towpath mosaic incorporating a sharp transition from canal to grassy verge to a gravelled access track, bordered by a treeline. Approximately 600m east of the Light Railway Bridge,	Common Frog ( <i>Rana temporaria</i> ), common invertebrates and the following birds: Goldfinch ( <i>Carduelis carduelis</i> ), Swallow ( <i>Hirundo rustica</i> ), Rook ( <i>Corvus frugilegus</i> ), Great tit ( <i>Parus major</i> ), Jackdaw ( <i>Corvus monedula</i> ), Coal Tit ( <i>Periparus ater hibernicus</i> ), Robin

Location	Habitats and Flora	Fauna
	this gravel path meets a tarmac road running alongside the canal and separated from it by a wide grassy verge. In the west of the section, the land both north and south of the canal is mostly improved agricultural grassland, while in the east of the section, land north of the canal is mostly tilled land and land south of the canal contains many buildings and gardens. The invasive plant species <i>Gunnera</i> sp. Has been noted in this section east of the light railway bridge.	( <i>Erithacus rubecula</i> ), Willow Warbler ( <i>Phylloscopus trochilus</i> ), Magpie ( <i>Pica pica</i> ), Blackbird ( <i>Turdus merula</i> ) and Wren ( <i>Troglodytes troglodytes</i> ).
Shee Bridge – Bond Bridge, Allenwood	This section includes Ecologically Sensitive Area 2 (see Section 2.2 for detailed description). The typical towpath mosaic is recorded along both the northern and southern banks of the canal in this section with long strips of <i>Phragmites</i> well developed along the canal banks. The land on the north of the canal is mostly wet grassland including some areas of mixed wet grassland and scrub. Land to the south is dominated by wet grassland with some scrub and cutover bog.	Common Frog ( <i>Rana temporaria</i> ), common invertebrates and the following birds: Long-tailed Tit ( <i>Aegithalos caudatus</i> ), Robin ( <i>Erithacus rubecula</i> ), Woodpigeon ( <i>Columba palumbus</i> ), Swallow ( <i>Hirundo rustica</i> ), Rook ( <i>Corvus frugilegus</i> ), Great tit ( <i>Parus major</i> ), Coal Tit ( <i>Periparus ater hibernicus</i> ) and Wren ( <i>Troglodytes troglodytes</i> ).
Bond Bridge, Allenwood – Junction with New Barrow Line	This section comprises Ecologically Sensitive Area 2 (see Section 2.2 for detailed description). East of Bond Bridge, the canal banks are characterised by the typical towpath mosaic with continuous treelines and wide grassy verges. Approximately 250m east of Bond Bridge, drainage ditches entered the canal from both banks and the treeline on the south bank transitioned to hedgerow comprised of primarily of Hawthorn ( <i>Crataegus monogyna</i> ). Further east, broadleaved woodland and dry meadows and grassy verges are recorded on both sides of the canal. Land to the north of the canal contained many buildings and artificial surfaces and gardens, as well as some arable crops, improved agricultural grassland, recolonising bare ground, an active quarry and a small area of broadleaved woodland.	Common Frog ( <i>Rana temporaria</i> ), common invertebrates and the following birds: Woodpigeon ( <i>Columba palumbus</i> ), Swallow ( <i>Hirundo rustica</i> ), Rook ( <i>Corvus frugilegus</i> ), Great tit ( <i>Parus major</i> ), Hooded Crow ( <i>Corvus corone cornix</i> ), Willow Warbler ( <i>Phylloscopus trochilus</i> ), Jackdaw ( <i>Corvus monedula</i> ), Wren ( <i>Troglodytes troglodytes</i> ), Robin ( <i>Erithacus rubecula</i> ) and Blackbird ( <i>Turdus merula</i> )
Junction with New Barrow Line – 19th Lock, Lowtown and Lowtown Marina	This section forms part of ESA3. The towpath mosaic on the northern bank of the New Barrow Line between the junction with the Main Line and the R415 Bridge showed a transition from reed and large sedge swamp to a paved towpath and associated grassy verge with a bordering treeline. The land north of this treeline is a patchwork of improved agricultural grassland, broadleaved	Common Frog ( <i>Rana temporaria</i> ), common invertebrates and the following birds: Goldfinch ( <i>Carduelis carduelis</i> ), Great tit ( <i>Parus major</i> ), Woodpigeon ( <i>Columba palumbus</i> ), Coal Tit ( <i>Periparus ater hibernicus</i> ), Rook ( <i>Corvus frugilegus</i> ), Willow Warbler ( <i>Phylloscopus trochilus</i> ), Jackdaw ( <i>Corvus monedula</i> ), Magpie ( <i>Pica pica</i> ), Robin ( <i>Erithacus rubecula</i> ), Goldcrest ( <i>Regulus regulus</i> ), Swallow

Location	Habitats and Flora	Fauna
	woodland and mixed broadleaved/conifer woodland, with a small area of scrub and buildings and artificial surfaces adjacent to the bridge. West of the R415 Bridge, a drainage ditch runs between the grassy verge and the bordering treeline. Two artificial ponds are also present, one of which is surrounded by trees and has an associated area of wet grassland. East of the Main Line in this section is an area of wet grassland bound by treeline, a hedgerow and drainage ditches. The northern drain is a reed and large sedge swamp with a strip of broadleaved woodland to the north of which there is a conifer plantation.	( <i>Hirundo rustica</i> ), Wren ( <i>Troglodytes troglodytes</i> ), Pied Wagtail ( <i>Motacilla alba yarrellii</i> ) and Blackbird ( <i>Turdus merula</i> ).  There is a good diversity of both dragonfly and damselfly in this area with the presence of the following species noted: Brown Hawker Dragonfly ( <i>Aeshna grandis</i> ), Common Blue Damselfly ( <i>Enallagma cyathigerum</i> and Banded Demoiselle ( <i>Calopteryx splendens</i> ).
19th Lock, Lowtown and Lowtown Marina – Binn’s Bridge, Robertstown	The towpath mosaic on the northern bank includes a paved road and broken treeline. To the north, habitats include improved agricultural grassland, arable crops and extensive areas of wet grassland. Many of these fields are divided by hedgerows, treelines and drainage ditches. Roads and buildings, as well as gardens and areas of improved amenity grassland, are also recorded. A few small areas of dry meadows and a broadleaved woodland are also present.	Common Frog ( <i>Rana temporaria</i> ), common invertebrates and the following birds: Long-tailed Tit ( <i>Aegithalos caudatus</i> ), Swallow ( <i>Hirundo rustica</i> ), Woodpigeon ( <i>Columba palumbus</i> ), Pied Wagtail ( <i>Motacilla alba yarrellii</i> ), Rook ( <i>Corvus frugilegus</i> ), Blue tit ( <i>Parus caeruleus</i> ), Hooded Crow ( <i>Corvus corone cornix</i> ), Willow Warbler ( <i>Phylloscopus trochilus</i> ), Jackdaw ( <i>Corvus monedula</i> ), Wren ( <i>Troglodytes troglodytes</i> ), Robin ( <i>Erithacus rubecula</i> ) and Blackbird ( <i>Turdus merula</i> ).
Binn’s Bridge, Robertstown – Bonynghe Bridge or Healy’s Bridge	The typical towpath mosaic is found continuously along both banks of the canal in this section, though a small patch of scrub occurred at one point on the south bank. The mosaic in this section is bound by a wide strip of mixed wet grassland and scrub from east of Binn’s Bridge, save for a small patch of broadleaved woodland on the northern bank. Apart from a relatively small area of houses and gardens just east of Binn’s Bridge, agriculture is the dominant land-use on the northern bank of the canal, with much improved agricultural grassland and wet grassland, some of which is mixed with scrub. To the south, there are extensive areas of wet grassland, sometimes mixed with scrub, mixed broadleaved/conifer woodland, improved agricultural grassland and wet willow-alder-ash woodland. Drainage ditches ran through this area and drained into the canal. There is a small area containing houses and gardens southwest of Bonynghe or Healy’s Bridge. Hedgerows are also present in areas of improved agricultural grassland.	Common Frog ( <i>Rana temporaria</i> ), common invertebrates and the following birds: Goldfinch ( <i>Carduelis carduelis</i> ), Willow Warbler ( <i>Phylloscopus trochilus</i> ), Rook ( <i>Corvus frugilegus</i> ), Goldcrest ( <i>Regulus regulus</i> ), Robin ( <i>Erithacus rubecula</i> ), Wren ( <i>Troglodytes troglodytes</i> ), Swallow ( <i>Hirundo rustica</i> ), Blackbird ( <i>Turdus merula</i> ) and Blue tit ( <i>Parus caeruleus</i> ).  Signs of Otter were also noted at this location.

Location	Habitats and Flora	Fauna
Bonyng Bridge – Burgh Bridge	This section forms ESA4 (see Section 2.2 for a detailed description). The northern bank of the canal in this section is characterised by the typical towpath mosaic with an adjacent linear broadleaved woodland. The southern bank is characterised by a sharp transition from canal to a very narrow grassy verge to broadleaved woodland immediately east of Bonyng Bridge, to improved agricultural grassland for approximately 300 m of the bank, and to mixed dry meadow and scrub for the remainder of the section. A hedgerow borders the aforementioned strip of agricultural grassland. South of the canal, improved agricultural grassland dominates with a field of arable crops and a small area of buildings and gardens near Burgh/Cock Bridge.	Common Frog ( <i>Rana temporaria</i> ), common invertebrates and the following birds: Sparrowhawk ( <i>Accipiter nissus</i> ), Willow Warbler ( <i>Phylloscopus trochilus</i> ), Long-tailed Tit ( <i>Aegithalos caudatus</i> ), Magpie ( <i>Pica pica</i> ), Rook ( <i>Corvus frugilegus</i> ), Bullfinch ( <i>Pyrrhula pyrrhula</i> ), Robin ( <i>Erithacus rubecula</i> ), Sand Martin ( <i>Riparia riparia</i> ), Swallow ( <i>Hirundo rustica</i> ), Wren ( <i>Troglodytes troglodytes</i> ), Great tit ( <i>Parus major</i> ), Blackbird ( <i>Turdus merula</i> ) and Chiffchaff ( <i>Phylloscopus collybita</i> ).
Burgh Bridge (Cock) – 18 <sup>th</sup> Lock	This section forms ESA5 (see Section 2.2 for detailed description). The northern bank of the canal presented the typical towpath mosaic for most of this section, except at 18th Lock, which contained only amenity grassland with a paved access track. North of the towpath mosaic is a continuous strip of scrub approximately 50m wide. The southern bank of the canal is characterised mainly by scrub. A treeline of approximately 200 m in length is present on the southern bank in the middle of this section. A small strip of grassy verge is also present. Immediately around 18th Lock, there is an area of improved amenity grassland surrounded by broadleaved woodland. A strip of wet grassland is also recorded alongside the scrub. South of the riparian zone, the land is dominated by improved agricultural grassland with some buildings and gardens and treelines. Poaching by cattle is evident on the southern bank in this section.	Common Frog ( <i>Rana temporaria</i> ), common invertebrates and the following birds: Long-tailed Tit ( <i>Aegithalos caudatus</i> ), Coal Tit ( <i>Periparus ater hibernicus</i> ), Heron ( <i>Ardea cinerea</i> ), Chiffchaff ( <i>Phylloscopus collybita</i> ), Woodpigeon ( <i>Columba palumbus</i> ), Willow Warbler ( <i>Phylloscopus trochilus</i> ), Rook ( <i>Corvus frugilegus</i> ), Magpie ( <i>Pica pica</i> ), Raven ( <i>Corvus corax</i> ), Dunnock ( <i>Prunella modularis</i> ), Robin ( <i>Erithacus rubecula</i> ), Bullfinch ( <i>Pyrrhula pyrrhula</i> ), Chaffinch ( <i>Fringilla coelebs</i> ), Goldcrest ( <i>Regulus regulus</i> ), Coot ( <i>Fulica atra</i> ), Whitethroat ( <i>Sylvia communis</i> ), Swallow ( <i>Hirundo rustica</i> ), Blackcap ( <i>Sylvia communis</i> ), Pied Wagtail ( <i>Motacilla alba yarrellii</i> ), Wren ( <i>Troglodytes troglodytes</i> ), Blue tit ( <i>Parus caeruleus</i> ), Blackbird ( <i>Turdus merula</i> ), Great tit ( <i>Parus major</i> ) and Song Thrush ( <i>Turdus philomelos</i> ).  Signs of badgers and grey squirrels were also noted.
18 <sup>th</sup> Lock – 17 <sup>th</sup> Lock, Landenstown Bridge	The northern bank of the canal at the 18 <sup>th</sup> Lock is characterised by improved amenity grassland and a paved access track bounded by an area of scrub. Approximately 800m east of the lock, the access track joins a road with a grassy verge and sometimes amenity grassland on both sides. Closer to the 17 <sup>th</sup> Lock, a treeline is present alongside the road. North of the banks, improved agricultural grassland is dominant interspersed with buildings and gardens. The southern bank of the canal in this section is	The following birds were recorded at this location: Mallard ( <i>Anas platyrhynchos</i> ), Jackdaw ( <i>Corvus monedula</i> ), Goldfinch ( <i>Carduelis carduelis</i> ), House Martin ( <i>Delichon urbica</i> ), Siskin ( <i>Carduelis spinus</i> ), Robin ( <i>Erithacus rubecula</i> ), Rook ( <i>Corvus frugilegus</i> ), Swallow ( <i>Hirundo rustica</i> ), Pied Wagtail ( <i>Motacilla alba yarrellii</i> ), Magpie ( <i>Pica pica</i> ), Great tit ( <i>Parus major</i> ), Dunnock ( <i>Prunella modularis</i> ), Coal Tit ( <i>Periparus ater hibernicus</i> ), Wren ( <i>Troglodytes troglodytes</i> ), Chiffchaff ( <i>Phylloscopus</i>

Location	Habitats and Flora	Fauna
	characterised entirely by the typical towpath mosaic with adjoining broadleaved woodland. South of the bank, improved agricultural grassland dominated.	collybita) and Blackbird ( <i>Turdus merula</i> ).  The common frog was noted in this section amongst the reed vegetation on the northern canal bank.
17 <sup>th</sup> Lock, Landenstown Bridge – 16 <sup>th</sup> Lock, Digby Bridge	The northern bank of the canal in this section is characterised along the entire length by the typical towpath mosaic with a bordering treeline. To the north of the treeline the land is dominated by improved agricultural grassland. A small area of broadleaved woodland is also present, as well as some buildings with gardens. The banks at Lock 16 are of improved amenity grassland. The south bank is of approximately 50% wet grassland with a bordering treeline and 50% typical towpath mosaic habitat. South of the canal, mixed wet grassland/scrub, broadleaved woodland and wet grassland are dominant.	Common Frog ( <i>Rana temporaria</i> ), common invertebrates and the following birds: Goldfinch ( <i>Carduelis carduelis</i> ), Blue tit ( <i>Parus caeruleus</i> ), Treecreeper ( <i>Certhia familiaris</i> ), Great tit ( <i>Parus major</i> ), Woodpigeon ( <i>Columba palumbus</i> ), Coal Tit ( <i>Periparus ater hibernicus</i> ), Rook ( <i>Corvus frugilegus</i> ), Willow Warbler ( <i>Phylloscopus trochilus</i> ), Jackdaw ( <i>Corvus monedula</i> ), Magpie ( <i>Pica pica</i> ), Robin ( <i>Erithacus rubecula</i> ), Dunnock ( <i>Prunella modularis</i> ), Jay ( <i>Garrulus glandarius</i> ), Wren ( <i>Troglodytes troglodytes</i> ), Swallow ( <i>Hirundo rustica</i> ), Blackbird ( <i>Turdus merula</i> ), Pied Wagtail ( <i>Motacilla alba yarrellii</i> ) and Song Thrush ( <i>Turdus philomelos</i> ).
16 <sup>th</sup> Lock, Digby Bridge – Leinster Aqueduct	The northern bank of the canal in this section is characterised along the entire length by the typical towpath mosaic with a paved road and bordering treeline. A small area of broadleaved woodland occurred just west of the Leinster Aqueduct. To the north of the treeline the land is dominated by improved agricultural grassland except for an area of broadleaved woodland with buildings and extensive amenity grassland just east of the 16 <sup>th</sup> Lock and Digby Bridge, and areas of wet grassland west of the Leinster Aqueduct. The typical towpath mosaic is also observed along the entire length of the south bank at the Leinster Aqueduct, where it is replaced by a grassy verge and a gravelled track associated with a small patch of broadleaved woodland. This artificial surface forms part of the towpath mosaic along this entire section. A treeline is also present along much of the southern bank in this section. Habitats occurring to the south included wet grassland, a large dry meadow, a substantial amount of improved agricultural grassland and a small area of arable crops, as well as some improved amenity grassland and a small area of broadleaved woodland. In addition, patches of scrub occurred within fields containing agricultural grassland. Himalayan balsam ( <i>Impatiens glandulifera</i> ) is noted to the south of the Leinster Aqueduct, growing along the	Common Frog ( <i>Rana temporaria</i> ), common invertebrates and the following birds: Long-tailed Tit ( <i>Aegithalos caudatus</i> ), Magpie ( <i>Pica pica</i> ), Rook ( <i>Corvus frugilegus</i> ), Dunnock ( <i>Prunella modularis</i> ), Jackdaw ( <i>Corvus monedula</i> ), Wren ( <i>Troglodytes troglodytes</i> ), Robin ( <i>Erithacus rubecula</i> ), Blackbird ( <i>Turdus merula</i> ) and Swallow ( <i>Hirundo rustica</i> ).

Location	Habitats and Flora	Fauna
	river bank.	
Leinster Aqueduct – Junction with Naas Line at Railway Bridge	Along the northern bank of the canal, the typical towpath mosaic incorporating a gravelled road and continuous treeline is observed along the entire section. The area to the north is dominated by improved agricultural grassland and amenity grassland. Just west of the junction with the Naas Line, there is an area of mixed broadleaved woodland and scrub, within which are a small building, a small patch of horticultural land and an area of improved agricultural grassland. An island of broadleaved woodland is present at the junction of the Main Line and the Naas Line.	Common Frog ( <i>Rana temporaria</i> ), common invertebrates and the following birds: Swift ( <i>Apus apus</i> ), House Sparrow ( <i>Passer domesticus</i> ), Heron ( <i>Ardea cinerea</i> ), Coal Tit ( <i>Periparus ater hibernicus</i> ), Woodpigeon ( <i>Columba palumbus</i> ), Chiffchaff ( <i>Phylloscopus collybita</i> ), Rook ( <i>Corvus frugilegus</i> ), Dunnock ( <i>Prunella modularis</i> ), Jackdaw ( <i>Corvus monedula</i> ), Goldcrest ( <i>Regulus regulus</i> ), Robin ( <i>Erithacus rubecula</i> ), Sand Martin ( <i>Riparia riparia</i> ), Chaffinch ( <i>Fringilla coelebs</i> ), Starling ( <i>Sturnus vulgaris</i> ), Swallow ( <i>Hirundo rustica</i> ), Wren ( <i>Troglodytes troglodytes</i> ), Great tit ( <i>Parus major</i> ) and Blackbird ( <i>Turdus merula</i> ).
Junction with Naas Line at Railway Bridge – Sallins Bridge	The western and northern banks of the canal in this section presented the typical towpath mosaic incorporating a tarmac access road and treeline over the first 500m (approx.). Land to the west is dominated by improved amenity grassland while land to the north is dominated buildings and gardens and recolonising bare ground near Sallins Bridge. The eastern bank (early section) is characterised by the typical towpath mosaic with a treeline, later turning to riparian woodland and then to broadleaved woodland after the canal turns to take an easterly course. To the south, land is dominated by houses with gardens and amenity grasslands.	Common Frog ( <i>Rana temporaria</i> ), common invertebrates and the following birds: Sparrowhawk ( <i>Accipiter nissus</i> ), Willow Warbler ( <i>Phylloscopus trochilus</i> ), Long-tailed Tit ( <i>Aegithalos caudatus</i> ), Magpie ( <i>Pica pica</i> ), Mallard ( <i>Anus platyrhynchos</i> ), Bullfinch ( <i>Pyrrhula pyrrhula</i> ), Rook ( <i>Corvus frugilegus</i> ), Goldcrest ( <i>Regulus regulus</i> ), Jackdaw ( <i>Corvus monedula</i> ), Wren ( <i>Troglodytes troglodytes</i> ), Robin ( <i>Erithacus rubecula</i> ), Blackbird ( <i>Turdus merula</i> ) and Swallow ( <i>Hirundo rustica</i> ).  Signs of Otter were also noted at this location.
Sallins Bridge – Railway Bridge	The northern bank of the canal is characterised by amenity grassland immediately east of Sallins Bridge and thereafter by a thin grassy verge. In the early part, this is accompanied by a strip of mixed wet grassland and scrub and then by riparian woodland. Immediately east of Sallins Bridge, the southern bank is one of amenity grassland and a road. The amenity grassland transitioned to a grassy verge with a strip of scrub after approximately 100m. Further east, this bank is replaced by the typical towpath mosaic with a broadleaved woodland. A treeline of approximately 300 m in length is also present in the middle of this section.	Common Frog ( <i>Rana temporaria</i> ), common invertebrates and the following birds: Mallard ( <i>Anus platyrhynchos</i> ), Jackdaw ( <i>Corvus monedula</i> ), Goldfinch ( <i>Carduelis carduelis</i> ), Coot ( <i>Fulica atra</i> ), Rook ( <i>Corvus frugilegus</i> ), Jay ( <i>Garraulus glandarius</i> ), Swallow ( <i>Hirundo rustica</i> ), Coal Tit ( <i>Periparus ater hibernicus</i> ), Pied Wagtail ( <i>Motacilla alba yarrellii</i> ), Magpie ( <i>Pica pica</i> ), Great tit ( <i>Parus major</i> ), Goldcrest ( <i>Regulus regulus</i> ), House Sparrow ( <i>Passer domesticus</i> ) and Wren ( <i>Troglodytes troglodytes</i> ).  Signs of Brown Rat and Grey Squirrel were also noted at this location.
Railway Bridge – 15 <sup>th</sup> Lock	Along the northern bank of the canal, reed and tall sedge swamps transitioned to grassy verges and then to broadleaved woodland. An additional riparian woodland reduced to a treeline in the	Common Frog ( <i>Rana temporaria</i> ), common invertebrates and the following birds: Woodpigeon ( <i>Columba palumbus</i> ), Swallow ( <i>Hirundo rustica</i> ), Rook ( <i>Corvus frugilegus</i> ), Blue tit ( <i>Parus</i>

Location	Habitats and Flora	Fauna
	middle of the section. Amenity grassland with some scrub and exposed sand, gravel or till is present around the 15 <sup>th</sup> Lock. Stone walls also occurred. The southern bank is characterised by the typical towpath mosaic. A broadleaved woodland is present along much of this section. Further north/east, this is gradually replaced by scrub accompanied by a treeline. Around the 15 <sup>th</sup> Lock, amenity grassland is present with an area of scrub and exposed sand, gravel or till. A drain and treeline are also present. Improved agricultural grassland dominate south of the canal.	caeruleus), Hooded Crow ( <i>Corvus corone cornix</i> ), Dunnock ( <i>Prunella modularis</i> ), Jackdaw ( <i>Corvus monedula</i> ), Starling ( <i>Sturnus vulgaris</i> ), House Martin ( <i>Delichon urbica</i> ), Wren ( <i>Troglodytes troglodytes</i> ), Robin ( <i>Erithacus rubecula</i> ) and Blackbird ( <i>Turdus merula</i> ).
15 <sup>th</sup> Lock – 14 <sup>th</sup> Lock, Devonshire Bridge	The towpath mosaic on the northern (western) bank is characterised by a transition from reed and large sedge swamp to improved amenity grassland and grassy verges. A treeline is present along much of this section and is doubled in places. Buildings and stone walls are present at the 14 <sup>th</sup> Lock. The southern (eastern) bank is characterised by a transition from reed and large sedge swamp to an access track and a strip of improved amenity grassland, accompanied by a drainage ditch and a bordering treeline. Killeen Golf Club is present to the south (east) of the canal and represented scattered trees and parkland.	Common Frog ( <i>Rana temporaria</i> ), common invertebrates and the following birds: Goldfinch ( <i>Carduelis carduelis</i> ), Swallow ( <i>Hirundo rustica</i> ), Woodpigeon ( <i>Columba palumbus</i> ), Blue tit ( <i>Parus caeruleus</i> ), Rook ( <i>Corvus frugilegus</i> ), Magpie ( <i>Pica pica</i> ), Jackdaw ( <i>Corvus monedula</i> ), Goldcrest ( <i>Regulus regulus</i> ), Mute Swan ( <i>Cygnus olor</i> ), Starling ( <i>Sturnus vulgaris</i> ), House Martin ( <i>Delichon urbica</i> ), Wren ( <i>Troglodytes troglodytes</i> ), Robin ( <i>Erithacus rubecula</i> ) and Blackbird ( <i>Turdus merula</i> ).  Signs of Brown Rat at this location.
14 <sup>th</sup> Lock, Devonshire Bridge – Ponsonby Bridge	Immediately north of Devonshire Bridge, the northern (western) bank of the canal is characterised by a transition from reed and large sedge swamp to improved amenity grassland, which is replaced by scrub after 100m. A treeline is present also and continued almost unbroken until Ponsonby Bridge. Between the aqueduct over the Painestown River, only a treeline is present on the bank. The southern (eastern) bank of the canal is characterised by the typical towpath mosaic with a bordering treeline. A drainage ditch is present with the treeline from Ponsonby Bridge to the aqueduct over the Painestown River and an area of recolonising bare ground is present where this drained into the river.	Common Frog ( <i>Rana temporaria</i> ), common invertebrates and the following birds: Woodpigeon ( <i>Columba palumbus</i> ), Great tit ( <i>Parus major</i> ), Rook ( <i>Corvus frugilegus</i> ), Coal Tit ( <i>Periparus ater hibernicus</i> ), Jackdaw ( <i>Corvus monedula</i> ), Willow Warbler ( <i>Phylloscopus trochilus</i> ), Robin ( <i>Erithacus rubecula</i> ), Magpie ( <i>Pica pica</i> ), Swallow ( <i>Hirundo rustica</i> ), Goldcrest ( <i>Regulus regulus</i> ), Pied Wagtail ( <i>Motacilla alba yarrellii</i> ), Wren ( <i>Troglodytes troglodytes</i> ), Blue tit ( <i>Parus caeruleus</i> ) and Blackbird ( <i>Turdus merula</i> ).
Ponsonby Bridge – Henry Bridge	The northern bank of the canal consists mostly of reed and large sedge swamp. Just after Ponsonby Bridge, this transitions to a strip of improved amenity grassland, which includes a road for approximately 300 m. After this, the reed and large sedge swamp transition into a	Common Frog ( <i>Rana temporaria</i> ), common invertebrates and the following birds: Long-tailed Tit ( <i>Aegithalos caudatus</i> ), Blue tit ( <i>Parus caeruleus</i> ), Goldfinch ( <i>Carduelis carduelis</i> ), Great tit ( <i>Parus major</i> ), Woodpigeon ( <i>Columba palumbus</i> ), Coal Tit ( <i>Periparus ater</i>

Location	Habitats and Flora	Fauna
	<p>treeline. For the last 600 m before Henry bridge, a typical towpath mosaic is accompanied by a treeline. Reed and sedge swamp are present along the entire section from Ponsonby Bridge to Henry Bridge, as is a road. Strips of grassy verges and improved amenity grassland alternate along the southern side of this road. A treeline is present along much of the southern bank in this section and stonework is present at Henry Bridge. There is an area of recolonising bare ground approximately 300 metres west of Henry Bridge.</p>	<p>hibernicus), Rook (<i>Corvus frugilegus</i>), Chiffchaff (<i>Phylloscopus collybita</i>), Jackdaw (<i>Corvus monedula</i>), Magpie (<i>Pica pica</i>), Robin (<i>Erithacus rubecula</i>), Wren (<i>Troglodytes troglodytes</i>), Swallow (<i>Hirundo rustica</i>) and Blackbird (<i>Turdus merula</i>).</p>
Henry Bridge – 13 <sup>th</sup> Lock	<p>The northern bank of the canal is lined by reed and large sedge swamp and a treeline running almost continuously along the bank for this section. The southern bank of the canal is characterised by the typical towpath mosaic with a broken treeline and stone walls. A surfaced roadway runs along the entire length of this section and is bordered on the south by the Lyons estate. At the 13<sup>th</sup> Lock, some amenity grassland is present to the north and buildings and artificial surfaces are present to the south.</p>	<p>Common Frog (<i>Rana temporaria</i>), common invertebrates and the following birds: Woodpigeon (<i>Columba palumbus</i>), Dunnock (<i>Prunella modularis</i>), Jackdaw (<i>Corvus monedula</i>), Goldcrest (<i>Regulus regulus</i>), Robin (<i>Erithacus rubecula</i>), Wren (<i>Troglodytes troglodytes</i>), Willow Warbler (<i>Phylloscopus trochilus</i>), Blackbird (<i>Turdus merula</i>) and Magpie (<i>Pica pica</i>).</p>
13 <sup>th</sup> Lock – Aylmer Bridge	<p>This stretch comprises ESA6 (see Section 2.2 for detailed description). A gravel path runs along the southern side of the canal between the 13<sup>th</sup> Lock and Aylmer Bridge. This section is bound on the southern side by the old stone wall of the Lyon's Estate, with certain sections having a narrow treeline growing intermittently on either side of the wall. The vegetation along this section is species poor with large areas bordering the southern side of the south towpath overgrown by butterbur and nettles. A narrow verge of Reed and large sedge swamp can be found growing along the verge on either side of the canal. The northern side of the canal consists of a narrow strip of reed and sedge swamp with a strip of dry meadows and grassy verge habitat in parts that then gives way to a narrow strip of broadleaved woodland. Small areas of improved amenity grassland which appears to be regularly maintained can be found around the 13<sup>th</sup> Lock and Aylmer Bridge.</p>	<p>Common Frog (<i>Rana temporaria</i>), common invertebrates and the following birds: Long-tailed Tit (<i>Aegithalos caudatus</i>), Chiffchaff (<i>Phylloscopus collybita</i>), Woodpigeon (<i>Columba palumbus</i>), Willow Warbler (<i>Phylloscopus trochilus</i>), Jackdaw (<i>Corvus monedula</i>), Goldcrest (<i>Regulus regulus</i>), Robin (<i>Erithacus rubecula</i>), Starling (<i>Sturnus vulgaris</i>), Swallow (<i>Hirundo rustica</i>), Wren (<i>Troglodytes troglodytes</i>), Pied Wagtail (<i>Motacilla alba yarrellii</i>), Blackbird (<i>Turdus merula</i>) and Coal Tit (<i>Periparus ater hibernicus</i>).</p>



## 2.2 ECOLOGICALLY SENSITIVE AREAS

In line with Waterways Ireland methodology, ecologically sensitive areas (ESA) were identified, using the following criteria:

- Links with EU Habitats Directive Annex 1 habitats
- Species Diversity
- Rare or unusual species present
- Rarity within the study area.

Six ESA's occur along the section of the Grand Canal associated with the project. A summary of these ESAs is provided below in Table 2.3.

Table 2.3 Ecologically Sensitive Areas along Greenway

ESA Name	Habitats Present and Habitat Code
<b>ESA1</b> <b>Clonkeen (Offaly Border) to the 20th Lock at Ticknevin</b>	The canal verge supports a diverse flora, with many species representative of both damp and dry neutral grassland. At the towpath boundary, the grassland type and species composition reflects the slightly increased level of management comparative to the canal verge. Here the herb layer is less. The towpath boundary grades sharply into a dominant stand of Pteridium for long sections. This ESA is also of ecological interest for the diversity and heterogeneity of heath and scrub communities beyond the canal boundary. This area has representative climax vegetation types for both wet and dry heath communities. Beyond the Pteridium, a sloping bank zones into Salix and Ulex scrub with dense and open heath dominated by Calluna-Vaccinium-Cladonia subcommunity. As the slope grades down to the peatland basin Molinia dominates with Scirpus and Erica tetralix. The shrubby species Myrica gale is an important sub community in saturated areas this ESA. Further patchworks of Pteridium and Salix occur throughout and increasing so in regenerated cut over areas and ditches.
<b>ESA2</b> <b>Shee Bridge to Bond Bridge</b>	This ESA includes canal bank and the high ecological quality habitats beyond the canal boundary within the townland of Allenwood, bordering Derrymullen to the east. The open channel Nuphar-lutea community is abundant with a diverse Phragmites-Glyceria fringe zoning into a canal verge Filipendulo-Iridetum mosaic with many constant species of neutral grassland frequent through-out. The habitats within the canal boundary on the north bank comprise a mosaic of neutral to wet grassland with pockets of regenerating Salix and Crateagus-Prunus scrub subject to low intensity and infrequent management. Beyond the canal boundary on the south bank is regenerating Salix and broadleaved woodland on cut-over bog with links to a woodland corridor extending south west of the canal. A remnant lowland Calluna-Scirpus mire wet heath community occurs in an area of cut over bog adjacent to the canal. The range of habitats from scrub, heath and canal verge make this stretch of ecological interest.
<b>ESA3</b> <b>Bond Bridge to 19th Lock at Lowtown</b>	The ESA runs from Bond Bridge east including the junction with the New Barrow Line and inclusive of the 19 <sup>th</sup> Lock incorporating the Milltown Feeder. This ESA is important in terms of its connectivity function linking three main canal channels. These areas are well trafficked and maintained, however there is a diverse emergent Phragmites-Glyceria-Schoenoplectus fringe on both banks and the canal verge is species rich.

ESA Name	Habitats Present and Habitat Code
<b>ESA4</b> <b>Bonyng to Cock Bridge</b>	<p>The ESA includes both embanked sides of the canal boundary which comprise a continuous band of dense woodland/scrub interspersed with semi natural grassland mosaic on the sloped shallow neutral and calcareous soils. The mosaic and verge of the canal towpath are particularly species rich with species typical of dry calcareous and neutral grassland. A diverse herb layer is frequent. The canal verge is also species rich with a mixture of wet neutral grassland species zoning into Filipendula ulmaria-Angelica sylvestris mire community and/or a community typical of Filipendulo-Iridetum. Many common and tall herbs are frequent such as Gypsewort Lycopus europeaus, Rumex acetosa, Angelica sylvestris and Valeriana officianalis. Other species such as Stachys palustris, Lychnis flos-cuculi and Cirsium palustre are occasional. Toberdaly Bog, a dry degraded remnant raised bog, is characterised by bog cotton, bog asphodel, ling, cladonia and white beak sedge, with Sphagnum capillifolium and S.pappillosum. The degraded raised bog, which is being cut at the northern edge, may align with the Annex I habitat 'degraded raised bogs still capable of natural regeneration (7120)' if the hydrology of the bog can be repaired.</p>
<b>ESA5</b> <b>Cock Bridge to 18th Lock (Landenstown)</b>	<p>This ESA has been identified for the species rich grassland and scrub mosaic on the embankment running parallel to the north canal boundary and the species rich canal verge on both banks between Cock Bridge to the 18th Lock. From the 18th Lock due west the raised northern embankment begins as a low and narrow ridge covered in Crataegus monogyna- Prunus spinosa-Rubus fruticosus scrub with a species rich towpath verge typical of a disturbed Cynosurus cristatus-Centaurea nigra community. A small basin or shallow seepage zone of Molinia-Anthoxanthum sub-community occurs at the eastern end of the embankment. Devil's bit Scabious Succisa pratensis, Tormentil Potentilla erecta, and Carex spp. are constants and abundant. As the top of the embankment slopes gradually upwards the ground becomes freer draining and the tussocky patchwork of Purple Moor Grass-Sweet Vernal Grass Molinia- Anthoxanthum grades into semi-natural species rich neutral grassland. Grazing pressure by rabbits maintains a short sward on canal-ward sides of the embankment free of scrub encroachment. As the embankment progresses westward, the Crataegus-Spinosa scrub is more dense and mature with little apparent grazing pressure. Within the understorey of mature Ivy covered scrub stands Remote Sedge C. remota and Hart's Tongue Fern Phyllitis scolopendrium are frequent. The embankment becomes fully dominated by Crataegus-Prunus- Rubus scrub at the western end of the embankment before Cock Bridge. The structural diversity and grading between successional scrub layers and species rich grassland supports a rich terrestrial invertebrate community with 11 butterfly species recorded during the survey within this ESA. The ESA is also rich in Hoverflies (Syrphidae). Although of limited size, the Molinia-Anthoxanthum sub community patchwork at the east of the embankment had high consistency of Devil's bit Scabious, host plant of the Marsh Fritillary. No larval webs were detected during the survey. The scrub patchwork provides excellent nesting habitat for birds of conservation concern, notably Yellowhammer Emberiza citrinella and Linnet Carduelis cannabina and important breeding habitat for Whitethroat Sylvia communis, Blackcap Sylvia atricapilla. There are a number of trails through the vegetation on the top and crest of the embankment indicative of low recreational pressure. Future access to this area should be closed to the public using wildlife friendly fencing to limit the disturbance and the denudation of vegetation.</p>
<b>ESA6</b> <b>Ardclough to Aylmer Bridge</b>	<p>This ESA is identified for the diverse vegetation within the open channel and the rich diversity and zonation on the canal verge. The aquatic diversity includes Sagittaria sagittifolia swamp amongst well developed fringe Nuphar-Potamogeton communities.</p>

## 2.3 ECOLOGICAL CUMULATIVE IMPACT ASSESSMENT

In acknowledgement of the ecological corridor function of the Grand Canal, Waterways Ireland commissioned a cumulative ecological impact assessment of the Grand Canal in 2015. This assessed total habitat loss associated with proposed Greenways along the full Grand Canal corridor and branches off the canal. This assessment has assumed a worst case scenario and quantified habitat loss based on a 5m construction envelope based on a 3.5m wide path. The proposed path for this Greenway is 3m wide.

The ECIA has identified the following habitat loss based on the above assumptions:

Table 2.4 ECIA percentage habitat loss for Grand Canal total

Habitat	% total habitat loss
<b>Towpath Mosaic</b>	42.7%
<b>Paved towpath, classed as Buildings and Artificial Surfaces</b>	33.4%
<b>Gravel pathways classified as Spoil and Bare Ground</b>	2.1%
<b>Mown grassland classified as Amenity Grassland</b>	3.6%
<b>Species poor grassy verges classified as Dry Meadows and Grassy Verges</b>	7%
<b>Scrub (WS1)</b>	8.2%

The report states that the latter habitats account for approximately 96% of the maximum construction envelope of the Greenway and the dominant habitats are common in a local, national and international context and in terms of sensitivity and magnitude; these habitats collectively are not of significant conservation interest.

Of the six ESAs identified along or adjacent to this Grand Canal Greenway, two correspond to dry calcareous and neutral grassland. To avoid disturbance to these ESAs measures as outlined in Section 3.4.1. below will be applied.

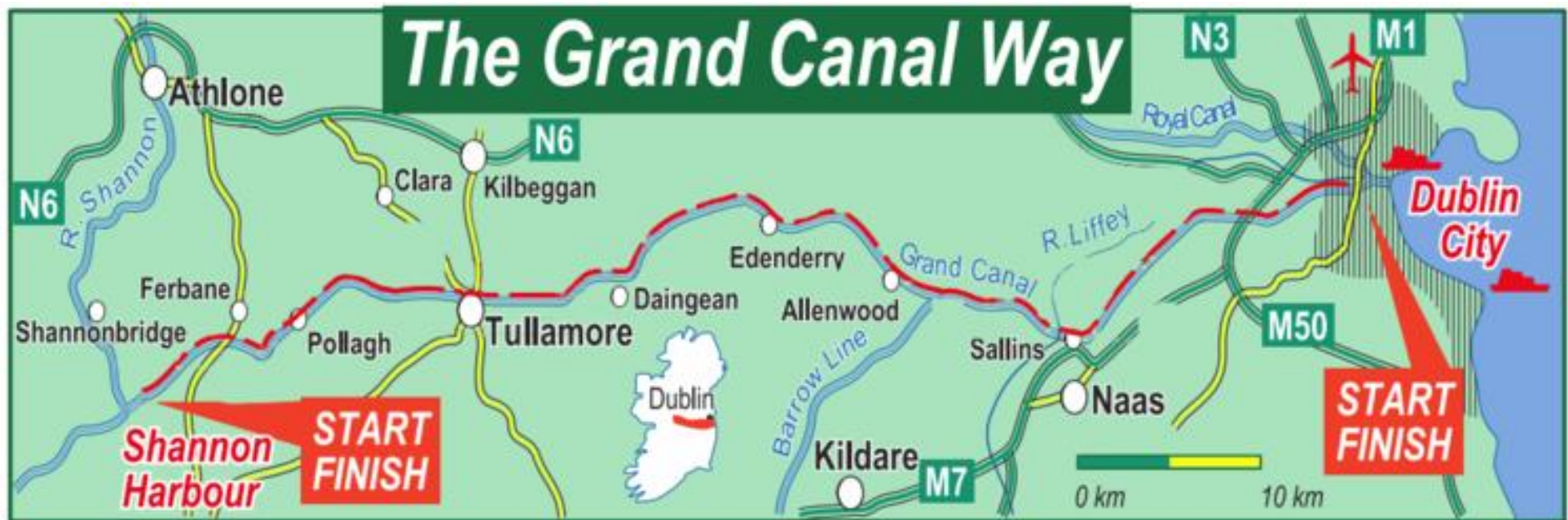


Figure 1.1 Existing Grand Canal Way from Dublin City to Shannon Harbour



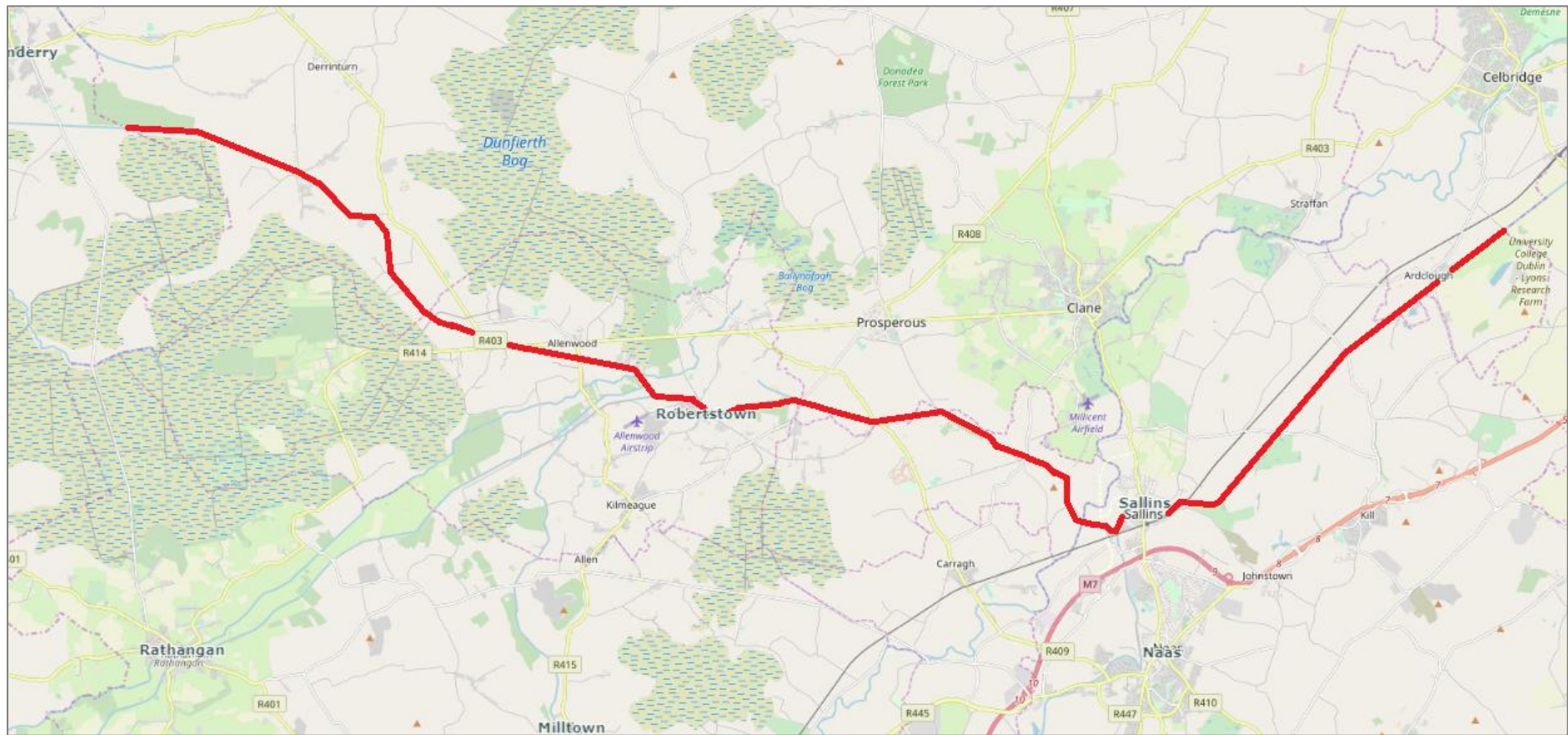


Figure 1.2 Route of Proposed Grand Canal Greenway in County Kildare (Aylmer Bridge to Clonkeen)

### 3. PROJECT DESCRIPTION

#### 3.1 Description of Proposed Route

The current Part 8 proposal is for the construction of the Grand Canal Greenway as outlined below, extending from the Kildare / Dublin boundary to the Kildare / Offaly. The route from Hazelhatch to Alymer Bridge was developed previously as part of the Arthur's Way project, and the current proposal seeks to extend the Greenway westward from Alymer Bridge to Clonkeen on the County Offaly border.

The Grand Canal Greenway in Kildare is considered in line with the National Greenway Strategy and will provide a nationally and regionally important high quality shared cycle way and footpath predominantly on the existing towpaths of the Grand Canal, the majority of which are also a National Way-marked Trail (The Grand Canal Way). The Greenway will provide a safe, scenic and substantially segregated amenity for the enjoyment of all ages and abilities. It is also envisaged that the Greenway will contribute to Ireland's tourism product and make a significant contribution to the rural development of County Kildare.

The proposed Greenway route can be broken into the following segments heading east to west;

- Alymers Bridge to 13<sup>th</sup> Lock - Existing unbound surface to the 13<sup>th</sup> lock running along the south bank of the Canal upgraded to a compacted stone and dust surface.
- 13<sup>th</sup> Lock to Henry Bridge to Ponsonby Bridge - Existing public road with a bound surface running along the south bank of the Canal. The Greenway along this section will be a shared surface. Consideration was given to creation of the Greenway along the north bank at this location, to avoid a shared surface. However the north bank is lined by reed, a large sedge swamp and an existing treeline and is considered to be ecologically significant and therefore its disruption is unwarranted.
- Ponsonby Bridge to Devonsire Bridge - The Greenway remains on the south bank, and will see the existing grass towpath upgraded to a compacted stone and dust surface.



Grass towpath at Devonsire Bridge

- Devonsire Bridge to 15<sup>th</sup> Lock - The existing towpath on the south bank has an unbound surface from west of Devonsire Bridge at lock 14 to west of the 15<sup>th</sup> lock. This section will be upgraded to an compacted stone and dust surface.
- 15<sup>th</sup> Lock to Sallins to the Leinster Aqueduct - Remaining on the south bank the existing unbound and grass towpath will be upgraded to a compacted stone and dust surface. The canal bank entering Sallins is narrow in places and will require widening works to accommodate the Greenway. As the towpath does not continue under Sallins Bridge and there is no capacity to construct the Greenway under same, it is necessary for the Greenway to diverge from the canal bank. To accommodate this a shared cycle & pedestrian footbrige is proposed to take users north of the canal. Given the traffic hazards posed by crossing the Clane Road (R407) at the Sallins Bridge, the Greenway will run along Chapel Lane where an existing pedestrian crossing will be utilised as a crossing point. The Greenway will at this point run on the northern bank of the canal along the existing bound road which will be upgraded as required. This bound surface runs as far the Leinster Aqueduct.



View east from Sallins Bridge



- The Leinster Aqueduct to Digby Bridge to Landenstown Bridge - The Greenway remains on the northern bank and will upgrade the existing unbound and grass towpath as far as Landenstown Bridge. The Greenway crosses over the public county road at Digby Bridge as the towpath does not extend under bridge.



The Leinster Aqueduct

- Landenstown Bridge to 18<sup>th</sup> Lock - The Greenway crosses from the northern bank to the southern bank at Landenstown Bridge as there is not sufficient room between the public road and the canal bank for the Greenway to be safely accommodated. The Greenway follows the existing grass towpath which will be upgraded to a compacted stone and dust surface. East of the 18<sup>th</sup> Lock a bridge will be installed and the Greenway will revert back to northern bank to follow the established grass towpath, which will be upgraded to a compacted stone and dust surface.
- 18<sup>th</sup> Lock to Cock Bridge to Bonyngge Bridge - The Greenway will continue on the upgraded existing grass towpath on the northern bank under Cock Bridge and under Bonyngge Bridge.
- Bonyngge Bridge to Robertstown - West of Bonyngge Bridge a new bridge is proposed to take the Greenway back to the southern bank and the existing grass towpath which will be upgraded to a compacted stone and dust surface. It was considered vital, during the route selection process that the Greenway arrive in Robertstown on the southern bank. This ensures that users of amenity are directed into the Village. This represents a unique opportunity for Robertstown, as the village is located on the midway point of the route through Kildare. The route will see visitors come off the Canal bank due to restrictions in width of the canal bank and the absence of space under Binn Bridge and traverse through the centre of the village. The opportunity for Robertstown as a community is to provide for a range of experiences that visitors expect from any high quality destination, including cafes, restaurants, pubs and a diversity of accommodation types. But perhaps more significantly is the potential to develop and provide a wide range of things to see and do in the area, which if successful will serve to retain visitors in the area for longer.





Binn Bridge - Disused Canal Hotel Robertstown Village

- Robertstown to Shee Bridge - Amenity users revert back to the southern bank of the Canal west of Binn's Bridge. On the outskirts of the village a bridge will be installed to take the Greenway to the northern bank onto the existing bound and unbound and grass towpath, all to be upgraded as indicated on the accompanying drawings. The Greenway remains on the northern bank passing the 19<sup>th</sup> Lock, passing under Fenton Bridge, Bond Bridge and Shee Bridge.
- Shee Bridge to Hamilton Bridge - After exiting west under Shee Bridge the Greenway takes the form of a Boardwalk after which a proposed bridge will take users back to the southern bank and along the existing grass towpath which will be upgraded to a compacted stone and dust surface for a distance of approximately 1km. After which a bridge will revert the Greenway back to the northern bank to the existing unbound and grass towpath and will extend under Hamilton Bridge.
- Hamilton Bridge to County Bounds - The Greenway remains on the northern bank and will see the predominantly unbound and grass towpath upgraded to a compacted stone and dust surface. The Greenway passes under Lullymore Bridge and Ticknevin Bridge before extending to the Kildare / Offaly County Boundary and joining with the Offaly section of Grand Canal Greenway.

## **General Description of Proposed Scheme**

As outlined above, the proposal is to develop a cycleway and footway on the existing towpaths of the Grand Canal. The proposal entails the upgrading of the existing towpath, which forms The Grand Canal Way a National Way-marked Trail. The route selection was determined to ensure as much as the route as possible is off-road. Where possible the route utilises bridge underpasses to keep users on the canal bank and off public roads. This ensures that users are afforded an opportunity to cycle or walk on a predominantly traffic free route across the entire County.

The proposed development, subject of this Part 8, will include the following;

1. Improvement and upgrading of the existing towpath along the Grand Canal through the provision of a suitable surface i.e. Quarry Dust, Surface Dressing or Asphalt (Tarmac) depending on local conditions for pedestrian and cyclist use.
2. Provision of traffic safety measures and signage to facilitate safe pedestrian and cycling crossings and access to shared surfaces at Sallins, Digby Bridge, Landenstown Bridge, Bonyngue Bridge and Robertstown and along limited sections of existing local road network.
3. Provision of access controls (pedestrian / cycling friendly gates) road markings, traffic calming measures, ducting and associated drainage works on the proposed cycle / walk way.
4. Provision of route signage boards and marker/distance posts along the proposed route. The route signage boards will be located at main access points onto the route in towns and villages, while marker/distance posts will be installed at 5km intervals.

## **Surface Types**

Tailored surface finishes shall be employed to ensure a durable and fit for purpose 3m wide trail in accordance with TII Publications DN-GEO-0347 - Rural Cycle Scheme Design and the National Trails Office guidance for Shared Use Trails / Greenways – Blueways. These surfaces will improve accessibility, and provide a more robust surface capable of withstanding increased footfall and traffic.

The proposed surface types to be used on the cycleway are outlined below;

Type A: Compacted Stone and Dust (unbound)

Type B: Surface Dressing (bound)

Type C: Asphalt / Tarmac (bound)

Type A which is an unbound dust surface is the preferred surface for the Greenway, given the rural nature of the proposal, where the surface is required to give a sense of the environment. Also given the rural setting of the Greenway proposal, the facilities attractiveness is equally as important as the comfort of the user. Therefore the unbound surface is the preferred option to minimise environmental impacts along the towpaths as it provides more natural aesthetics and blends with the rural environment. The unbound surface will complement and enhance the existing areas that it passes through whilst being sensitive to the surrounding environment.

Type B is a bound surface dressed surface and will be applied to any existing deteriorated bound surfaces and areas of road widening incorporating shared use surfaces. It will also be applied to existing sections of the canal bank that may be used by limited traffic in the future.

Type C is a bound asphalt / tarmac surface and will be applied to any similar existing deteriorated surfaces, areas of road widening incorporating shared use surfaces and approximately 15m either side of approaches to road crossings.

Excavation on the towpath to accommodate the proposed works will be kept to a minimum and it is intended to construct on the existing surface in consultation with Waterways Ireland.

### **3.2 Construction Materials and Methodology**

Materials for construction of the works will be imported and stockpiled within the site boundaries at the local and regional road access points as detailed in the construction methodology. The materials to be employed shall principally consist of:

- Geotextile ground reinforcing cloth
- Granular sub-base material (NRA clause 804)
- 6mm crushed limestone dust
- Dense Bitumen Macadam to NRA Specification for Road Works (Series 900)
- Hot rolled asphalt
- Topsoil / grass seed
- Signage and miscellaneous furniture

#### Construction Methodology

Construction materials will be transported from stockpiled areas either along the canal banks in bog meisers or along the existing public road in appropriately sized Dumpers or Trucks for construction of the trail. The detailed construction methodology included in the planning application lists the access points where it is likely that adjacent to these access points, and at a safe setback distance from canal stockpiles will be located.

Excavation, using mini diggers will be kept to a minimum, if undertaken at all, to ensure minimum disruption to the Canal Bank. Levelling of materials will be carried out using mini excavators in restricted areas. Excavation of the existing surface will be kept to a minimum and avoided completely where there is a risk of damage to existing tree roots. Excavated material will be used for the reinstatement of the edges of the new trail to reduce material importation costs as well as minimise the risk of the introduction of invasive species. It is not envisaged that there will be a need to remove large quantities of excavated material from within the site boundary.

Detailed construction methodologies for each of the surface types are contained below in the section relating to Construction Methodologies for Surface Types.

#### Access Routes

Access to the cycle path shall be gained via all existing regional and local road access points along the length of the route and are indicated on supporting drawings for this application.

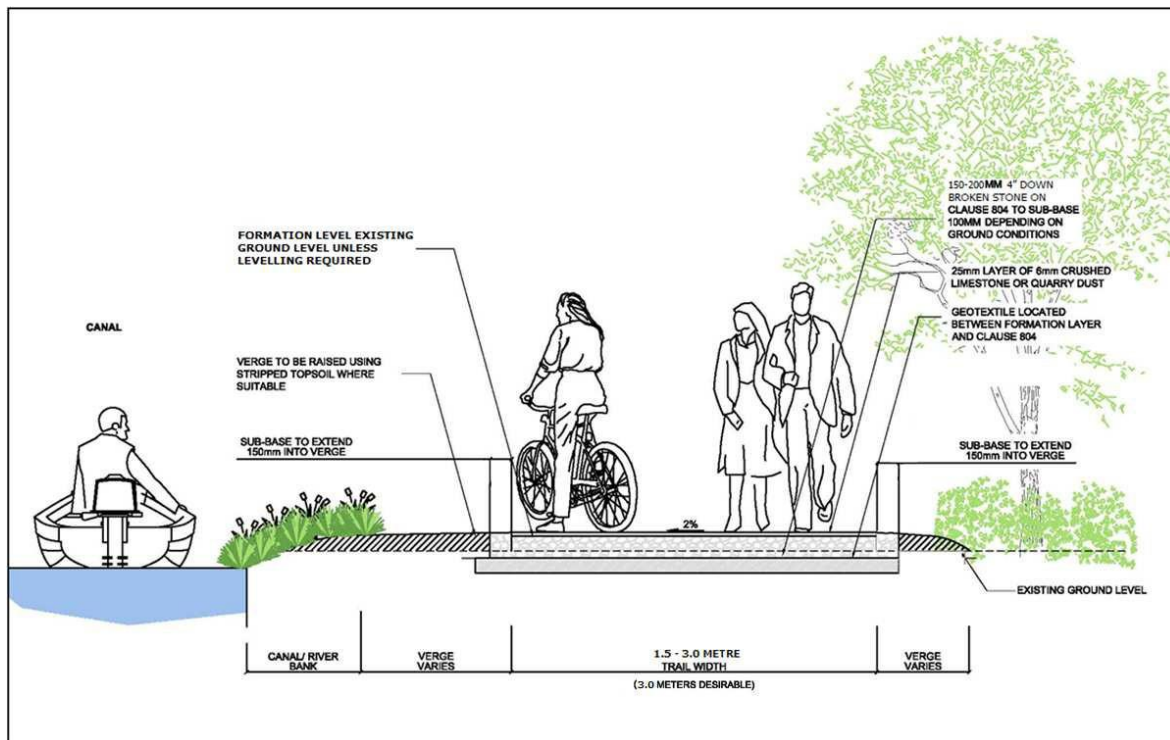


Figure 2 TYPE A: Compacted Stone and Dust

Type A: Compacted Stone and Dust	
LOCATIONS	MATERIAL SPECIFICATION
Primarily in rural areas along sections of the route that will be trafficked by pedestrians and cyclists only	<p>Geotextile Polybrane 240 Membrane or alternative equivalent product grade</p> <p>Sub -Base layer 4" Down Broken Stone, then Granular sub-base, in accordance with Clause 804 of Tii Specification.</p> <p>Surface layer 0/6mm crushed limestone or quarry Dust.</p>
<p><b>CONSTRUCTION SEQUENCE (Refer Figure 2 above)</b></p> <p>Formation Tray Excavation where unavoidable (Desirable Width of 3.3mm. Note width will vary from a maximum 3.3m wide and reduce to suit existing restricted access widths for example at lock houses and lock gates) (b) Overlay to Existing Path (Desirable Path Width of 3.0m. Note width will vary from a maximum 3.0m wide and reduce to suit existing restricted access widths for example at lock houses and lock gates)</p> <ul style="list-style-type: none"> <li>Grade out irregularities to form 3.3m wide formation tray (width of formation tray to be approximately 300mm wider than the path width) to maximum depth of 100mm below ground level. (Actual depth will depend on depth of sub-base being used, which will depend on ground conditions. Where possible new construction will overlay existing). Formation tray should be rectangular in section with vertical sides and level base.</li> <li>Any Stripped vegetation and excavated topsoil to be stacked neatly either side of formation tray to be used for reinstatement of path shoulders.</li> <li>There would be no excavation requirements in regard to the overlay of the existing surface other than to address isolated issues with soft spots.</li> </ul> <p><b>Geotextile Installation</b></p> <ul style="list-style-type: none"> <li>Lay and secure geotextile sheet in formation tray or on top of the existing ground. Overlap joining sheets by 1.0m.</li> </ul>	

- If required in soft ground - Lay and secure geogrid on top of geotextile sheet. Overlap joining sheets by 1.0m.

#### Sub-Base Layer

- Using either a drag box or suitable excavator lay the required depth of 4" down Broken Stone upon the geotextile sheet to falls and levels, to form 1:50 (2%) camber or 1:40 (2.5%) cross-fall in maximum layer depths of 150mm – 200mm. Then 100mm Clause 804 granular sub-base. Depths of Sub-base will depend on existing ground conditions
- Compact sub-base layer using a pedestrian roller taking care not to apply undue pressures to the canal bank until satisfactory compaction is achieved.
- Once sub-base layer is compacted, check levels of the surface at regular intervals along the compacted sub-base layer for consistent even surface regularity. Any part of the sub-base layer deviating from the required level must be raked off or topped up with additional Clause 804 granular sub-base and re-compacted to the correct levels.

#### Surface Layer

- Using either a drag box or suitable excavator lay 25mm depth of 6mm limestone dust to falls and levels, to form 1.5m to 2.5m wide path surface with 1:50 (2%) camber or 1:40 (2.5%) crossfall along the centre line of compacted sub-base layer.
- Compact surface layer using a roller until satisfactory compaction is achieved.
- Once rolling is finished, check levels of the surface at regular intervals along the compacted surface layer for consistent even surface regularity. Any part of the surface layer deviating from the required level must be raked off or topped up with additional 6mm limestone dust and re- compacted to the correct levels.

#### Landscaping

- Using available topsoil and turfs from excavations (and only if necessary, imported topsoil). Landscaped verges and edges should be finished level with path surface and taper down and away from the path surface to allow surface water to run off onto adjacent verges

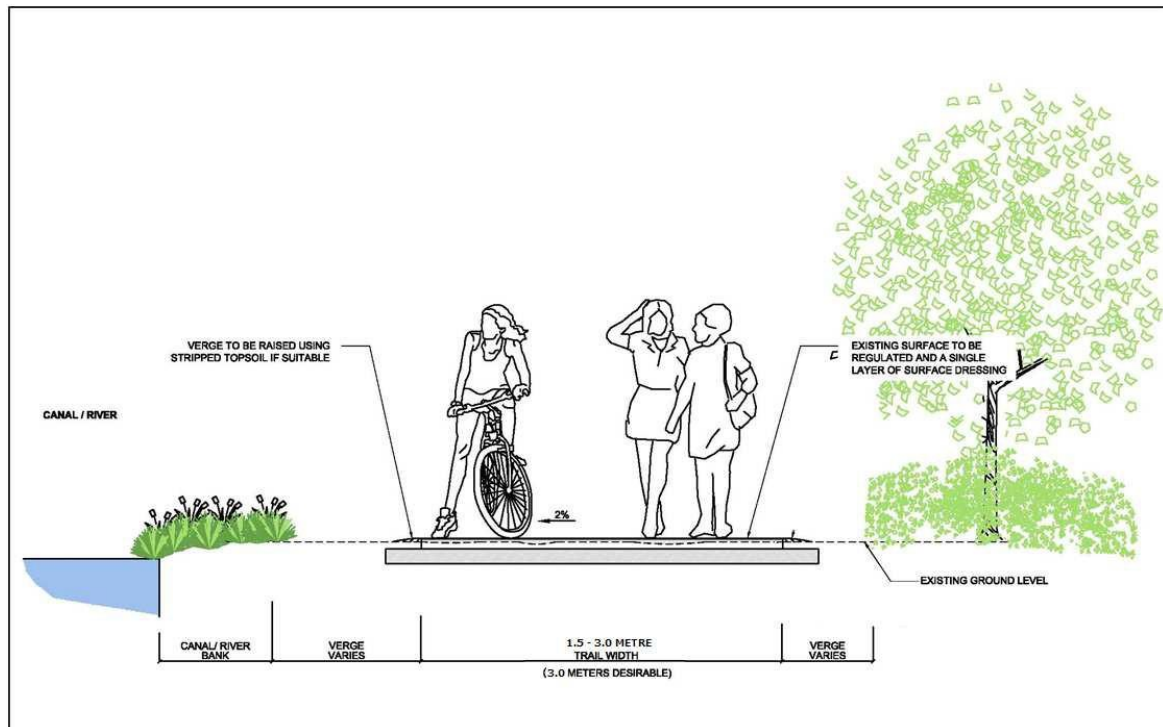


Figure 3 Type B: Surface Dressing (bound)

Type B: Surface Dressing (bound)	
LOCATIONS	MATERIAL SPECIFICATION
Existing deteriorated bound surfaces and locations. It will also be applied to existing sections of the canal Bank that will be used by limited traffic in the future.	<p>Tack Coat Cationic Bitumen Emulsion in accordance with NRA Specification for Road Works and BS 434.</p> <p>Base layer Regulating course to NRA Specification for Road Works (Series 900) to fill potholes and surface irregularities and create necessary cross- falls and cambers.</p> <p>Surface layer Single layer of chippings (3mm) applied to a surface dressing adhesive of resin or hot sprayed coat of bitumen emulsion to NRA Specification for Road Works.</p>
<p><b>CONSTRUCTION SEQUENCE (Refer Figure 3 above)</b></p> <p>Surface Preparation (Desirable Path Width of 3.0m and varies depending on width of existing bound surface)</p> <p>Clean existing surface of weed growth and debris and apply tack coat were required..Base Layer Using mini paving machine lay regulating course to fill potholes and achieve falls and levels, to form 3.0m wide surface (will vary depending on width of existing bound surfaces) with 1:50 (2%) camber or 1:40 (2.5%) cross-fall.</p> <p>Compact layer thoroughly using a roller and continue rolling until full compaction is achieved taking care not to apply undue pressures to the canal bank.</p> <p>Once rolling is finished, check levels of the surface at regular intervals along the compacted regulating layer for consistent even surface regularity. Any part of the regulating course layer deviating from the required level must be regulated with additional material and re-compacted to the correct levels.</p> <p>Surface Layer</p> <p>Spray surface dressing adhesive of hot sprayed coat of bitumen emulsion on the regulated surface</p>	

and apply the 10mm chippings in accordance with Clause 919.

Compact surface course layer thoroughly using a roller until full compaction is achieved taking care not to apply undue pressures to the canal bank

Loose chippings to be swept and removed from the finished surface before opening for use.

Landscaping

Using available topsoil and turfs from excavations (and only if necessary, imported topsoil). Landscaped verges and edges should be finished level with path surface and taper down and away from the path surface to allow surface water to run off onto adjacent verges.

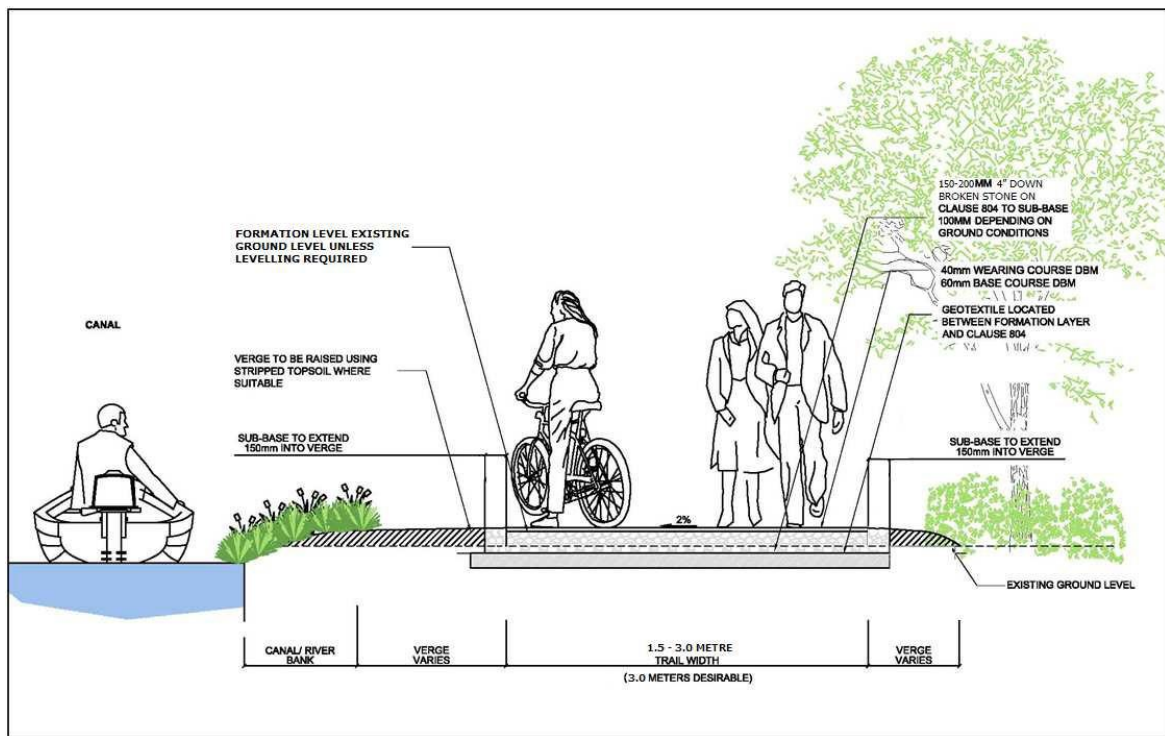


Figure 3 Type C: Bitmac/Asphalt

Type C: Bitmac/Asphalt	
LOCATIONS	MATERIAL SPECIFICATION
Urban sections of the trail, sections of road widening for shared use and approaches to road crossings.	<p>Geotextile Polybrane 240 Membrane or alternative equivalent product grade</p> <p>Sub -Base layer 4" Down Broken Stone then Granular sub-base, in accordance with Clause 804 of Tii Specification.</p> <p>Base layer 60mm Dense Bitumen Macadam base course to NRA Specification for Road Works (Series 900)</p> <p>Surface layer 40mm hot rolled asphalt to NRA Specification for Road Works (Series 900) or Dense Bitumen Macadam wearing course to NRA Specification for Road Works (Series 900)</p>
<p><b>CONSTRUCTION SEQUENCE (Refer Figure 4 above)</b></p> <p>ation Tray Excavation where unavoidable (Desirable Width of 3.3mm. Note width will vary from a maximum 3.3m wide and reduce to suit existing restricted access widths for example at lock houses and lock gates) (b) Overlay to Existing Path (Desirable Path Width of 3.0m. Note width will vary from a maximum 3.0m wide and reduce to suit existing restricted access widths for example at lock houses and lock gates)</p> <p>Grade out irregularities to form 3.3m wide formation tray (width of formation tray to be approximately 300mm wider than the path width) to maximum depth of 100mm below ground level. (Actual depth will depend on depth of sub-base being used, which will depend on ground conditions. Where possible new construction will overlay existing). Formation tray should be rectangular in section with vertical sides and level base.</p> <p>Any Stripped vegetation and excavated topsoil to be stacked neatly either side of formation tray to be used for reinstatement of path shoulders.</p> <p>There would be no excavation requirements in regard to the overlay of the existing surface other than to address isolated issues with soft spots.</p> <p>Geotextile Installation</p>	



Lay and secure geotextile sheet in formation tray or on top of the existing ground. Overlap joining sheets by 1.0m.

If required in soft ground - Lay and secure geogrid on top of geotextile sheet. Overlap joining sheets by 1.0m.

#### Sub-Base Layer

Using either a drag box or suitable excavator lay the required depth of 4" down Broken Stone upon the geotextile sheet to falls and levels, to form 1:50 (2%) camber or 1:40 (2.5%) cross-fall in maximum layer depths of 150mm – 200mm. Then 100mm Clause 804 granular sub-base. Depths of Sub-base will depend on existing ground conditions

Compact sub-base layer using a pedestrian roller taking care not to apply undue pressures to the canal bank until satisfactory compaction is achieved.

Once sub-base layer is compacted, check levels of the surface at regular intervals along the compacted sub-base layer for consistent even surface regularity. Any part of the sub-base layer deviating from the required level must be raked off or topped up with additional Clause 804 granular sub-base and re-compacted to the correct levels.

#### Base Layer

Using mini paving machine lay 60mm depth of dense bitumen macadam base course to NRA Specification for Road Works (Series 900) and to falls and levels, to form 2.5m wide path surface with 1:50 (2%) camber or 1:40 (2.5%) cross-fall.

Compact layer thoroughly using a roller and continue rolling until full compaction is achieved taking care not to apply undue pressures to the canal bank.

#### Surface Layer

Using mini paving machine lay 45mm depth of hot rolled asphalt or dense bitumen macadam wearing course to NRA Specification for Road Works (Series 900) and to falls and levels, to form 2.5m wide path surface with 1:50 (2%) camber or 1:40 (2.5%) crossfall.

Compact surface course layer thoroughly using a roller and continue rolling until full compaction is achieved taking care not to apply undue pressures to the canal bank.

#### Landscaping

Using available topsoil and turfs from excavations (and only if necessary, imported topsoil).

Landscaped verges and edges should be finished level with path surface and taper down and away from the path surface to allow surface water to run off onto adjacent verges.

### Best Practice Construction Approach

All construction works, relating to the activities and construction sequence outlined above, will be undertaken in accordance with the following:

- Inland Fisheries Ireland's Requirements for the Protection of Fisheries Habitat during Construction and Development Works.
- CIRIA (Construction Industry Research and Information Association) Guidance Documents
- Control of water pollution from construction sites (C532)
- Control of water pollution from linear construction projects: Technical Guidance (C648)
- Control of water pollution from linear construction projects: Site Guide (C649)
- Environmental Good Practice on Site (C692)
- NRA Guidance Documents
- Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes
- Guidelines for the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads
- Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, during and Post Construction of National Road Schemes.

### Measures from the Ecological Cumulative Impact Assessment (2016)

#### Earthworks

- Excavation and infilling will be carried out in small progressive stages;
- Any topsoil that is of use for landscaping will be stored on the site. Where this is required during the construction phase, it will be stored suitably far away from the canal and other surface water features and covered to avoid excessive sediment run-off or wind blow;
- Whilst no significant run off of silt laden run off is anticipated, given the proposed construction methodology, the site will be regularly monitored by construction staff for signs of run-off such as silt in surrounding vegetation and measures will be put in place to prevent this where necessary. This may include the provision of a solid containment berm (of soil) or alternatively the erection of a silt fence. A silt fence may be constructed by attaching a sheet of geotextile membrane to a stock fence and burying the bottom of it into the ground, thus allowing water to pass through but not the heavier fraction of the sediment;
- Excavations will be carried out using a suitably sized excavator;
- Any excavated soil that is not re-used will be disposed of to a Local Authority approved waste disposal facility;
- In all circumstances, excavation depths and volumes will be minimised and excavated material will be re-used where possible.

#### Fuel Use and Storage

- The use of machinery at the site carries the potential for accidental hydrocarbon contamination of the area, by fuel spillages or oil leaks for example. The works will be carried out in accordance with the following measures to avoid such impacts:

- Mobile storage such as fuel bowzers will be bunded to 110% capacity to prevent spills. Tanks for bowzers and generators shall be double skinned.
- When not in use, all valves and fuel trigger guns from fuel storage containers will be locked.
- All plant refuelling will take place on site using mobile fuel bowzers. Only dedicated trained & competent personnel will carry out refuelling operations.
- Plant refuelling will take place as far as practicable from watercourses. A spill kit and drip tray shall be on site at all times and available for all refuelling operations. Equipment shall not be left unattended during refuelling.
- All pipework from containers to pump nozzles will have anti siphon valves fitted.
- Strict procedures for plant inspection, maintenance and repairs shall be detailed in the contractor's method statements and machinery shall be checked for leaks before arrival on site.
- All site plant will be inspected at the beginning of each day prior to use.
- Defective plant shall not be used until the defect is satisfactorily fixed.
- All major repair and maintenance operations will take place off site.
- Care will be taken at all times to avoid contamination of the environment with contaminants other than hydrocarbons, such as uncured concrete or other chemicals.
- The plant refuelling procedures described above shall be detailed in the contractor's method statements.

During construction and maintenance works, existing excavated material will be used where possible, with importation of material only where necessary. Imported material will only come from a suitably assessed quarry, where there is no risk of importation of invasive species.

Should disturbance to species rich grassland be unavoidable, then its topsoil should be stockpiled, covered and stored. This topsoil will contain a species rich seed bank specific to the local area and should be utilised as backfill or landscaping material and allowed to regenerate naturally following construction.

Disseminate information on sensitive ecological receptors, such as sensitive habitats, breeding birds etc. occurring adjacent to or in the wider area surrounding routes. This information will aim to educate recreational users on the conservation status and sensitivities of such receptors to encourage responsible usage of routes.

Where necessary provide landscaping to minimise potential disturbance to sensitive species. Planting of vegetation screens and the management of existing hedgerows and treeline to screen sensitive species habitat i.e. nesting sites, from routes will be undertaken.

Provide route facilities, such as trail-heads in areas away from sensitive habitats and species. All work completed should be in compliance with the Wildlife Acts, 1976 – 2012;

In areas where aquatic Annex II-listed species (e.g. White-clawed Crayfish) or Flora Protection Order species are known to occur the works shall be carried out under licence from the NPWS.

In relation to the Greenway, if at detailed design stage, lighting or structural works in relation to bridges or other structures are proposed, bat surveys should be undertaken, with appropriate mitigation undertaken as necessary. None are proposed for these works.

All contractors should incorporate strict biosecurity protocols into their Construction Environmental

Management Plans. This should include the thorough cleaning and disinfection of all machinery prior to arrival and departure from the site, to prevent the spread of invasive species. In the event that additional topsoil or infill material is required as part of the construction works, it should be sourced from a stock/quarry that has been screened for the presence of any invasive species and should have confirmation that no invasive species are present.

#### Measures for Ecologically Sensitive Areas

Six ESAs have been identified close to or adjoining the Grand Canal Towpath. Measures to protect these areas will include:

- Any stripped topsoil from the species rich grassland areas will be stockpiled, covered and stored (outside species-rich areas, ESAs, areas prone to flooding or areas with tall herb vegetation). This topsoil will contain a species-rich seed bank and should be utilised, where possible, as backfill or landscaping material and allowed to regenerate naturally (ECIA pg 45)
- Prior to works commencing these will be identified from the maps and fenced off to restrict access of construction staff, machinery and other equipment/material from these areas.
- Prior to the commencement of construction a briefing outlining the sensitivity of this ESA and the requirement to adhere to measures intended to safeguard the status of this ESA will be provided to all construction staff.

#### Non-Native Invasive Species

The presence or otherwise of non-native invasive species has been identified along the proposed Greenway Route during habitat surveys undertaken in July and August 2015. The proposed works will involve the movement of soil on the site and will create disturbed ground that may be subject to colonization with invasive species such as Japanese Knotweed and Butterfly Bush. In stream works are not proposed as part of the Greenway, but are proposed as part of the ongoing maintenance works. There will be no in-channel works as part of the scheme but there is considered to be some potential for the spread of aquatic invasive species (e.g. Zebra Mussel or Elodea spp).

Any vegetation clearance or construction works to be undertaken in the vicinity of areas identified as supporting non-native species will be undertaken in accordance with the Transport Infrastructure Ireland (TII) (formerly the National Roads Authority (NRA)) guidance measures for the control and management of noxious weeds and non-native invasive species (see NRA, 2010).

- In the event that additional topsoil and quarried stone is required on the site, it will be sourced from a stock that has been screened for the presence of any invasive species and where it is confirmed that none are present.
- All machinery will be thoroughly cleaned and disinfected prior to arrival and departure from the site (through pre-agreed Biosecurity Protocols) to prevent the spread of invasive species such as Japanese Knotweed (*Fallopia japonica*), Giant Rhubarb (*Gunnera* sp.), Rhododendron (*R. ponticum*) and aquatic invasives. This process will be detailed in the contractor's method statement.
- Sites of known infestation shall be clearly marked prior to works and avoided during construction. The importance of preventing the spread of these species will form part of a tool box talk to all personnel prior to construction stage.

#### Measures to Protect Water Quality & Surface Water Bodies

- One aquaduct occur along the Greenway Route –the Blundell Aquaduct. This aqueduct crosses over watercourses associated with the Boyne catchment. To prevent the ingress of any surface water or dust emissions to these watercourses during the construction phase temporary silt trap and impermeable barrier will be placed along the edge of the aqueduct while dust screens will be placed over the aqueduct guardrails.
- Suitable prevention measures should be put in place at all times to prevent the release of sediment to the Grand Canal and other drainage channels associated with construction areas and migration to adjacent watercourses To reduce erosion and silt-laden runoff, create, where possible, natural vegetation buffers between the construction footprint and the Grand Canal and other drainage channels and divert runoff from exposed excavated areas.
- Disturbance to natural drainage features should be avoided during the construction and/or maintenance of routes.
- Excavated material will not be stored immediately adjacent to watercourses.
- During route maintenance no construction activities should be undertaken at watercourse crossing in wet weather conditions.
- Any refuelling or lubrication of machinery will not be undertaken within 50m of a watercourse.

#### Other Measures to Minimise Disturbance During Construction

- Any excavations and/or vegetation removal will minimised during construction and/or maintenance works.
- Construction machinery should be restricted to public and or site roads. As a general rule machinery should not be allowed to access, park or travel over areas outside the footprint of proposed walking/cycling routes.
- Where necessary drainage waters from construction areas should be managed through a series of treatment stages that may include swales, check dams and detention ponds along with other pollution control measures such as silt fences and silt mats.
- Where vegetation associated with treelines, hedgerows, individual mature trees, scrub or woodland is required, this shall only be undertaken outside the breeding bird season, between March and August inclusive.
- Where extensive areas of ground are to be exposure during route construction or maintenance dust suppression should be undertaken during periods of dry weather.
- All chemical substances required during construction and/or maintenance works will be stored in sealed containers.
- Spill kits will be required on site during construction and/or maintenance works.
- Disseminate information on sensitive ecological receptors, such as sensitive habitats, breeding birds etc. occurring adjacent to or in the wider area surrounding routes. This information will aim to educate recreational users on the conservation status and sensitivities of such receptors to encourage responsible usage of routes.
- Where necessary provide landscaping to minimise potential disturbance to sensitive species. Planting of vegetation screens and the management of existing hedgerows and treeline to screen sensitive species habitat i.e. nesting sites, from routes will be undertaken.
- Provide route facilities, such as trail-heads in areas away from sensitive habitats and species.

### **3.3 Road Crossing and Access Controls**

To ensure the safety of users of the Greenway and to ensure that current agricultural practices can continue unhindered and that residential amenity of those who live along the proposed route is not adversely affected, a number of controlled accessed or gates are proposed over the length of the route (see drawings for locations). The proposed access controls are specifically designed for cyclist / pedestrian use while still providing sufficient security to the amenity. A typical detail of the arrangement is provided on drawing no 400/18/229 and is similar to that in the photograph below.



Access Control / Gates

Signage will be erected at the appropriate junctions and interfaces along the proposed route as identified on the scheme drawings. A post construction health and safety audit will identify the exact signage requirements and will be conducted prior to the route being fully operational. Additional safety measures to ensure the safety of users may be installed particularly on areas of shared surface and road crossings.

### **3.4 Local Residents and Agricultural Properties**

The route traverses through the town of Sallins and the Village of Roberstown and the fringes of Allenwood Village, but for the most part the route is through areas of open countryside. The route has sections of shared surface, which currently provide access to residential and agricultural properties and are therefore lightly trafficked by vehicles. In addition where access to agricultural land is currently only available via the towpath, these sections are trafficked by agricultural machinery and livestock, on an infrequent basis. As a result passing bays are proposed, to accommodate traffic, cyclists / walkers in these sections. The proposal has been designed to minimise impact on residential amenity and agricultural practices.

### **3.5 Public Lighting**

No lighting of the route is proposed under the current scheme.

### 3.6 Ducting

Appropriate ducting is to be provided for at construction stage subject to agreement with Waterways Ireland and relevant stakeholders.

### 3.7 Amenity

Any future proposals for amenity areas along the canal, including jetties / marina facilities for boat users, car parking, landscaping, or barge facilities etc. will require planning permission.

### 3.8 Architectural Heritage

There are a number of protected structures located within or adjacent to the proposed route. No works are proposed to any protected structure, it is considered therefore that the proposed development will not materially affect the character of any protected structure.

Structure	Townland	Kildare RPS Ref	NIAH Ref
Henry Bridge	Clonaghilis	B15-12	11901501
Ponsonby Bridge	Baronrath	B14-47	11901406
Devonsire Bridge	Kileenmore	B14-17	11901405
Leinster Aqueduct	Waterstown / Osberstown	B19-13	
Digby Bridge & Lock 16	Landenstown	B14-46	11901403
Landenstown Bridge & Lock 17	Landenstown	B14-45	11901402
Bonyng Bridge	Downings South	B13-16	
White-Eye Supply Single Arch Stone aqueduct with embankment	Robertstown	B13-32	11806012
Section of the Grand Canal	Robertstown	B13-35	11806015
Binns Bridge	Roberstown West	B13-12	11806004
Bond Bridge	Derrymullen	B13-42	11901304
Shee Bridge	Allenwood South	B12-02	11901201
Ticknevin Bridge	Ticknevin	B08-23	11900801

**Table 3.1** Structures on RPS located on the Grand Canal Greenway route.

The proposed Greenway extends under or over / across the protected structures outlined above. Proposed signage and access control gates and crossing points will be located in the vicinity of these protected structures. Consideration was given to the installation of safety rails along the trail edge under bridges where a 3m width is not achievable, however to safeguard the protected structures this was decided against. To ensure the safety of users, cyclist will be encouraged by way of a controlled gate and signage to dismount and walk underneath the bridges. No works are proposed to the structures themselves.

### 3.9 Footbridge Construction

The existing crossing points at Binns's Bridge, Bonyngue Bridge and Sallins Bridge was initially assessed in conjunction with Kildare County Council's Municipal District Engineers and was assessed to be unsafe for various reasons e.g. inadequate width of the bridge, poor visibility and the level of complexity required for safe pedestrian crossing. In addition east of the 18<sup>th</sup> Lock a further crossing point is considered necessary as the Greenway must at this point change from the southern bank (east of the 18<sup>th</sup> Lock) to the northern bank (west of the 18<sup>th</sup> Lock). This crossing point is considered necessary as the northern bank east of the 18<sup>th</sup> Lock adjoins the public road network and is considered unsafe for the Greenway to share the public road at this point.

Therefore in order to mitigate the risks and provide a suitable safe crossing point on the canal it was determined that a footbridge at these locations is required. The purpose of the proposed footbridges is to provide users of the Greenway with an easy and safe crossing point on the canal and thereby avoiding unavoidable hazards highlighted during the assessment of the above locations.

The concept is to provide footbridges and access ramps, where required which compliment the surrounding environment. In this regard the swing bridges proposed are considered to have minimal impact on the rural setting within which they are set. The footbridge at Sallins shall have a minimum height over the water surface of 3.5m to provide adequate air draft for boats using the canal. The span of the bridges will vary from location to location depending on local conditions at that point with access ramps to meet accessibility for all requirements. The bridge and access ramps shall be a composite steel/timber structure manufactured off site. The foundations and abutments shall be constructed in-situ with the bridge and ramps craned into position and secured to the support abutments and footings. Refer to Drawing No 400/18/227 for details.

#### Construction Sequence

- Prepare site, and place appropriate pedestrian and traffic controls/diversions along the canal banks.
- Drive an appropriate pile arrangement for the two main bridge abutments (steel H-Piles 2-4nr per abutment) and the four other ramp supports. This operation shall be conducted from the bank of the canal with no interference to the water body of the canal.
- Excavate canal bank to formation level for the construction of the two main reinforced concrete bridge abutments and the four other ramp supports. This operation shall be conducted from the bank of the canal with no interference to the water body of the canal.
- Fix the steel reinforcement for the two bridge abutments and the four other ramp supports. This operation shall be conducted from the bank of the canal with no interference to the water body of the canal.
- Erect formwork for the two main bridge abutments and the four other ramp supports and seal to ensure no leachate of concrete. Pour the concrete as required for each of the abutments and supports.
- Strip the concrete shutters once the concrete has set and clad the exterior exposed faces of the concrete abutments and supports with natural stone.
- Deliver the footbridge and ramps to the site and crane into position securing the bridge and ramps to the abutments as required.



### 3.10 Environmental Management

Due to the sensitive nature and environmental designations of the area in which the work is to be undertaken, the appointed construction contractor will be required to develop and implement an Environmental Management Plan (EMP). This EMP will set out all requirements and conditions identified from the environmental studies, and planning conditions, such as timing, mitigation measures and site procedures. An independent Ecological Clerk of Works (ECoW) shall also be appointed and will be on site on a full time basis to oversee works and to advise on issue which arise.

All construction works will be undertaken in accordance with the following:

- Inland Fisheries Ireland's *Requirements for the Protection of Fisheries Habitat during Construction and Development Works*.
- CIRIA (Construction Industry Research and Information Association) Guidance Documents
  - Control of water pollution from construction sites (C532)
  - Control of water pollution from linear construction projects: Technical Guidance (C648)
  - Control of water pollution from linear construction projects: Site Guide (C649)
  - Environmental Good Practice on Site (C692)
- NRA Guidance Documents
  - Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes
  - Guidelines for the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads
  - Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, during and Post Construction of National Road Schemes.

#### **Earthworks**

- Excavation and infilling will be carried out in small progressive stages;
- Any topsoil that is of use for landscaping will be stored on the site. Where this is required during the construction phase, it will be stored suitably far away from the canal and other surface water features and covered to avoid excessive sediment run-off or wind blow;
- Whilst no significant run off of silt laden run off is anticipated, given the proposed construction methodology, the site will be regularly monitored by construction staff for signs of run-off such as silt in surrounding vegetation and measures will be put in place to prevent this where necessary. This may include the provision of a solid containment berm (of soil) or alternatively the erection of a silt fence. A silt fence may be constructed by attaching a sheet of geotextile membrane to a stock fence and burying the bottom of it into the ground, thus allowing water to pass through but not the heavier fraction of the sediment;
- Excavations will be carried out using a suitably sized excavator;

- Any excavated soil that is not re-used will be disposed of to a Local Authority approved waste disposal facility;
- In all circumstances, excavation depths and volumes will be minimised and excavated material will be re-used where possible.

### ***Fuel Use and Storage***

- The use of machinery at the site carries the potential for accidental hydrocarbon contamination of the area, by fuel spillages or oil leaks for example. The works will be carried out in accordance with the following measures to avoid such impacts:
- Mobile storage such as fuel bowsers will be bunded to 110% capacity to prevent spills. Tanks for bowsers and generators shall be double skinned.
- When not in use, all valves and fuel trigger guns from fuel storage containers will be locked.
- All plant refuelling will take place on site using mobile fuel bowsers. Only dedicated trained & competent personnel will carry out refuelling operations.
- Plant refuelling will take place as far as practicable from watercourses. A spill kit and drip tray shall be on site at all times and available for all refuelling operations. Equipment shall not be left unattended during refuelling.
- All pipework from containers to pump nozzles will have anti siphon valves fitted.
- Strict procedures for plant inspection, maintenance and repairs shall be detailed in the contractor's method statements and machinery shall be checked for leaks before arrival on site.
- All site plant will be inspected at the beginning of each day prior to use.
- Defective plant shall not be used until the defect is satisfactorily fixed.
- All major repair and maintenance operations will take place off site.
- Care will be taken at all times to avoid contamination of the environment with contaminants other than hydrocarbons, such as uncured concrete or other chemicals.
- The plant refuelling procedures described above shall be detailed in the contractor's method statements.

### ***Overall Recommendations***

During construction and maintenance works, existing excavated material should be used where possible, with importation of material only where necessary. Imported material should come from a suitably assessed quarry, where there is no risk of importation of invasive species.

Should disturbance to species rich grassland be unavoidable, then its topsoil should be stockpiled, covered and stored. This topsoil will contain a species rich seed bank specific to the local area and should be utilised as backfill or landscaping material and allowed to regenerate naturally following construction.

Disseminate information on sensitive ecological receptors, such as sensitive habitats, breeding birds etc. occurring adjacent to or in the wider area surrounding routes. This information will aim to educate recreational users on the conservation status and sensitivities of such receptors to encourage responsible usage of routes.

Where necessary provide landscaping to minimise potential disturbance to sensitive species. Planting

of vegetation screens and the management of existing hedgerows and treeline to screen sensitive species habitat i.e. nesting sites, from routes will be undertaken.

Provide route facilities, such as trail-heads in areas away from sensitive habitats and species. All work completed should be in compliance with the Wildlife Acts, 1976 – 2012;

In areas where aquatic Annex II-listed species (e.g. White-clawed Crayfish) or Flora Protection Order species are known to occur the works shall be carried out under licence from the NPWS.

In relation to the Greenway, if at detailed design stage, lighting or structural works in relation to bridges or other structures are proposed, bat surveys should be undertaken, with appropriate mitigation undertaken as necessary. *None are proposed for these works.*

All contractors should incorporate strict biosecurity protocols into their Construction Environmental Management Plans. This should include the thorough cleaning and disinfection of all machinery prior to arrival and departure from the site, to prevent the spread of invasive species. In the event that additional topsoil or infill material is required as part of the construction works, it should be sourced from a stock/quarry that has been screened for the presence of any invasive species and should have confirmation that no invasive species are present.

### ***Measures for Ecologically Sensitive Areas***

Measures to protect these areas are as follows:

- Any stripped topsoil from the species rich grassland areas should be stockpiled, covered and stored (outside species-rich areas, ESAs, areas prone to flooding or areas with tall herb vegetation). This topsoil will contain a species-rich seed bank and should be utilised, where possible, as backfill or landscaping material and allowed to regenerate naturally (ECIA pg45)
- Prior to works commencing these shall be identified from the maps and fenced off to restrict access of construction staff, machinery and other equipment/material from these areas.
- Prior to the commencement of construction a briefing outlining the sensitivity of this ESA and the requirement to adhere to measures intended to safeguard the status of this ESA will be provided to all construction staff.

### ***Non-Native Invasive Species***

The presence or otherwise of non-native invasive species has been identified along the proposed Greenway Route during habitat surveys undertaken in July and August 2015. The proposed works will involve the movement of soil on the site and will create disturbed ground that may be subject to colonization with invasive species such as Japanese Knotweed and Butterfly Bush. In stream works are not proposed as part of the Greenway, but are proposed as part of the ongoing maintenance works. There will be no in-channel works as part of the scheme but there is considered to be some potential for the spread of aquatic invasive species.

Any vegetation clearance or construction works to be undertaken in the vicinity of areas identified as supporting non-native species will be undertaken in accordance with the Transport Infrastructure

Ireland (TII) (formerly the National Roads Authority (NRA)) guidance measures for the control and management of noxious weeds and non-native invasive species (see NRA, 2010).

- In the event that additional topsoil and quarried stone is required on the site, it will be sourced from a stock that has been screened for the presence of any invasive species and where it is confirmed that none are present.
- All machinery will be thoroughly cleaned and disinfected prior to arrival and departure from the site (through pre-agreed Biosecurity Protocols) to prevent the spread of invasive species such as Japanese Knotweed (*Fallopia japonica*), Giant Rhubarb (*Gunnera* sp.), Rhododendron (*R. ponticum*) and aquatic invasives. This process will be detailed in the contractor's method statement.
- Sites of known infestation shall be clearly marked prior to works and avoided during construction. The importance of preventing the spread of these species will form part of a tool box talk to all personnel prior to construction stage.

#### ***Measures to Protect Water Quality & Surface Water Bodies***

- A number of aqueducts occur along the Greenway Route. These aqueducts cross over watercourses associated with the catchment area of the River Shannon and River Barrow. One aqueduct, the Blundell Aqueduct is located within the River Boyne Catchment area. However this does not cross a watercourse conveying water to the River Boyne. To prevent the ingress of any surface water or dust emissions to these watercourses during the construction phase temporary silt trap and impermeable barrier will be placed along the edge of the aqueduct while dust screens will be placed over the aqueduct guardrails.
- Suitable prevention measures should be put in place at all times to prevent the release of sediment to the Grand Canal and other drainage channels associated with construction areas and migration to adjacent watercourses To reduce erosion and silt- laden runoff, create, where possible, natural vegetation buffers between the construction footprint and the Grand Canal and other drainage channels and divert runoff from exposed excavated areas.
- Disturbance to natural drainage features should be avoided during the construction and/or maintenance of routes.
- Excavated material will not be stored immediately adjacent to watercourses.
- During route maintenance no construction activities should be undertaken at watercourse crossing in wet weather conditions.
- Any refuelling or lubrication of machinery will not be undertaken within 50m of a watercourse

#### ***Other Measures to Minimise Disturbance During Construction***

- Any excavations and/or vegetation removal will be minimised during construction and/or maintenance works.
- Construction machinery should be restricted to public and or site roads. As a general rule

machinery should not be allowed to access, park or travel over areas outside the footprint of proposed walking/cycling routes.

- Where necessary drainage waters from construction areas should be managed through a series of treatment stages that may include swales, check dams and detention ponds along with other pollution control measures such as silt fences and silt mats.
- Where vegetation associated with treelines, hedgerows, individual mature trees, scrub or woodland is required, this shall only be undertaken outside the breeding bird season, between March and August inclusive.
- Where extensive areas of ground are to be exposed during route construction or maintenance dust suppression should be undertaken during periods of dry weather.
- All chemical substances required during construction and/or maintenance works will be stored in sealed containers.
- Spill kits will be required on site during construction and/or maintenance works.
- Disseminate information on sensitive ecological receptors, such as sensitive habitats, breeding birds etc. occurring adjacent to or in the wider area surrounding routes. This information will aim to educate recreational users on the conservation status and sensitivities of such receptors to encourage responsible usage of routes.
- Where necessary provide landscaping to minimise potential disturbance to sensitive species. Planting of vegetation screens and the management of existing hedgerows and treeline to screen sensitive species habitat i.e. nesting sites, from routes will be undertaken.
- Provide route facilities, such as trail-heads in areas away from sensitive habitats and species.

## **4. THE PROJECT & EUROPEAN SITE BASELINE**

### **4.1 IDENTIFICATION OF EUROPEAN SITES**

Current guidance on undertaking EU Habitats Directive Article 6 Assessments advises that all European Sites occurring within a 15km radius of a project site should be included within a Screening Assessment (Scott Wilson et al., 2006; DEHLG, 2010). Twelve European Sites, comprising ten SACs and two SPAs occur within the surrounding 15km radius of the site (see Figure 4.1 and Table 4.1 for list of European Sites). The DOEHLG 2010 guidelines state that it may be necessary to include European Sites occurring in a wider area beyond 15km where there potential pathways between the project and these sites occur and where the project could have potential to negatively affect such sites and their conservation objectives at these greater distances. For instance it is noted that the Grand Canal eventually discharges to the Lower River Liffey, upstream of Dublin Bay, at which is located a number of European Sites. However, given the nature of the project and the minor engineering works required for the completion (as described in above) along with the significant distance separating the project route from these European Sites downstream, these Dublin Bay European Sites are considered to lie outside the sphere of influence of the project.

The nearest European Site to the project site (001387 Ballynafagh Lake SAC) extends to meet the Grand Canal at a point approximately two kilometres to the east of Robertstown. However, Ballynafagh Lake was linked to the Grand Canal as a feeder and any hydrological link between the two is by gravity towards the canal without any reverse flow from the canal up-gradient towards the lake.

Potential impact pathways are restricted to hydrological pathways as these represent the principal emissions generated by activities at the project site. In addition the potential for interactions between the project site and mobile Annex 2 qualifying species/special conservation interest bird species of European Sites is also considered as a potential pathway. European Sites and their associated qualifying features are likely to occur in the sphere of influence of the project only where hydrological pathways establish a link between the project and the European Site or where mobile species of surrounding European Sites are predicted to rely upon habitats associated with the Grand Canal corridor. Table 4.1 provides a determination as to whether each European Site within a 15km buffer distance of the project site occur within the sphere of influence of the project. This determination has been undertaken in line with the following assessment questions:

- Is there a hydrological pathway linking the Project site to European Sites and does this pathway have the potential to function as an impact pathway?
- Is there an aerial pathway linking the Project site to European Sites and does this pathway have the potential to function as an impact pathway?
- Do mobile Annex II qualifying species of surrounding SACs or special conservation interest bird species of surrounding SPA rely on the Grand Canal corridor?

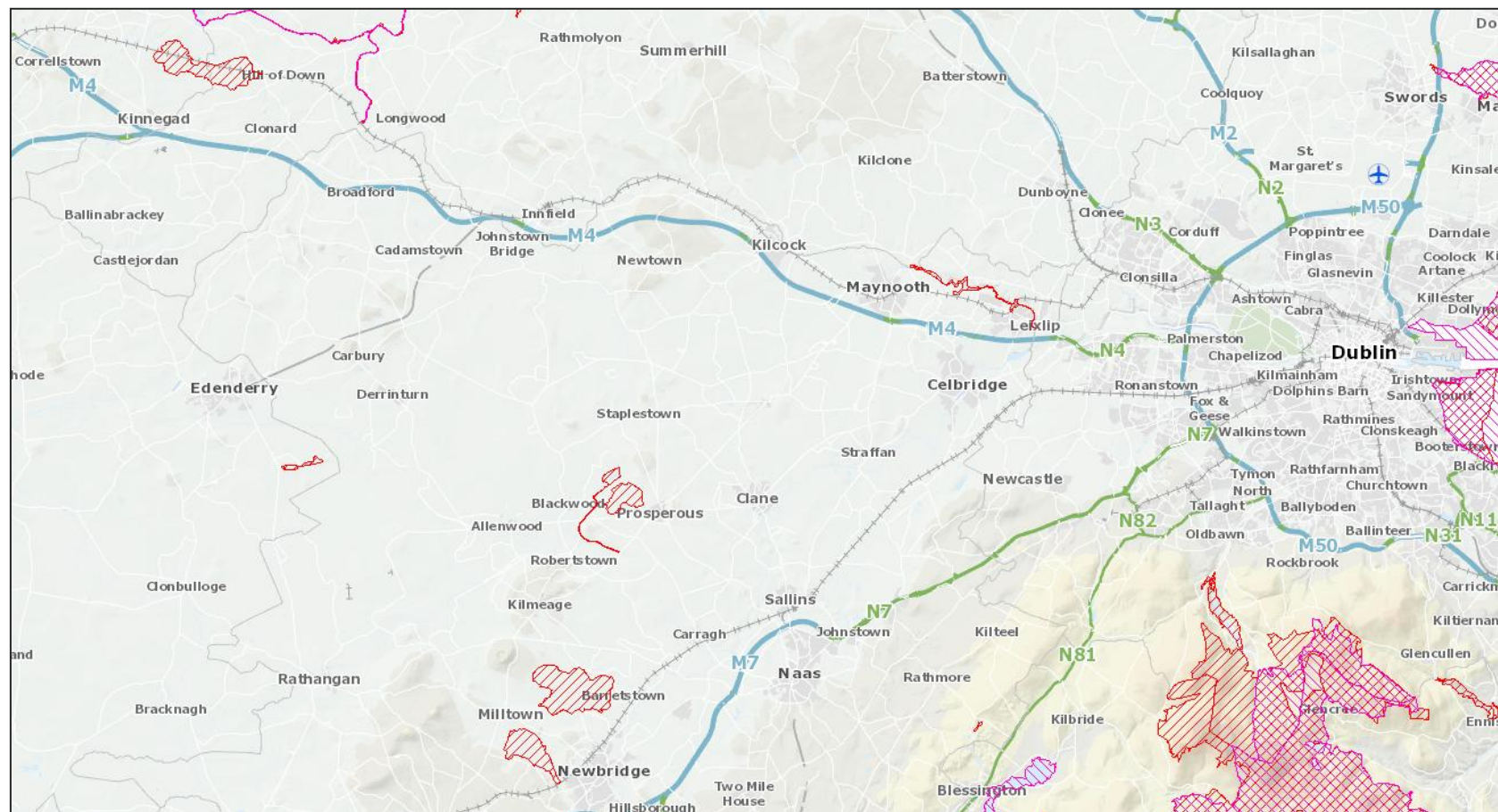


Figure 4.1 Extract from the NPWS Map Viewer Showing Locations and Extents of all SACs and SPAs within 15km of the Subject Site

**Table 4.1: Assessment to determine whether European Sites occur within the projects sphere of influence**

European Sites	Qualifying Features	Distance from Project Site	Is there a hydrological pathway and does it have the potential to function as an Impact Pathway	Do the project have the potential to interact with mobile species	Do European Sites occur within the projects sphere of influence?
Ballynafagh Lake SAC 001387	[7230] Alkaline fens [1016] <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1065] <i>Euphydryas aurinia</i> (Marsh Fritillary)	Site extends to meet the Grand Canal corridor	No. This SAC is designated for the Annex 1 habitat Alkaline Fens. Examples of this habitat are located at a remote distance from the project site and not linked to the project site by hydrological pathways.	No	Project site is adjacent to the SAC but qualifying features are remote from and not hydrologically linked to project site.
Ballynafagh Bog SAC 000391	[7110] Raised Bog (Active)* [7120] Degraded Raised Bog [7150] Rhynchosporion Vegetation	1.8km north of subject site	The project site is not linked to Ballynafagh Bog SAC by hydrological pathways.	No	No. No potential impact pathways link the project site to this SAC.



European Sites	Qualifying Features	Distance from Project Site	Is there a hydrological pathway and does it have the potential to function as an Impact Pathway	Do the project have the potential to interact with mobile species	Do European Sites occur within the projects sphere of influence?
Pollards-town Fen SAC 000396	[7210] Cladium Fens* [7220] Petrifying Springs* [7230] Alkaline Fens [1013] Geyer's Whorl Snail (Vertigo geyeri) [1014] Narrow-mouthed Whorl Snail (Vertigo angustior) [1016] Desmoulin's Whorl Snail (Vertigo moulinsiana)	8.2km to south of subject site	No. Hydrological link is down gradient from fen via feeder to Grand Canal Barrow Line.	No.	No. No potential impact pathways link the project site to this SAC.
Rye Water Valley/ Carton SAC 001398	[7220] Petrifying Springs* [1014] Narrow-mouthed Whorl Snail (Vertigo angustior) [1016] Desmoulin's Whorl Snail (Vertigo moulinsiana)	7.1km to north of subject site	The project site is not linked to the Rye Water Valley/ Carton SAC by any hydrological pathways.	No.	No. No potential impact pathways link the project site to this SAC.
Moulds Bog SAC 002331	[7110] Raised Bog (Active)* [7120] Degraded Raised Bog [7150] Rhynchosporion Vegetation	5km to south of subject site	The project site is not linked to Moulds Bog SAC by any existing hydrological pathways.	No.	No. No potential impact pathways link the project site to this SAC.

European Sites	Qualifying Features	Distance from Project Site	Is there a hydrological pathway and does it have the potential to function as an Impact Pathway	Do the project have the potential to interact with mobile species	Do European Sites occur within the projects sphere of influence?
Glenasmole Valley SAC 001209	[6210] Orchid-rich Calcareous Grassland* [6410] Molinia Meadows [7220] Petrifying Springs*	12.5km to south-east of subject site	The project site is not linked to Glenasmole Valley SAC by any existing hydrological pathways.	No.	No. No potential impact pathways link the project site to this SAC.
Wicklow Mountains SAC 002122	[3110] Oligotrophic Waters containing very few minerals [3160] Dystrophic Lakes [4010] Wet Heath [4030] Dry Heath [4060] Alpine and Subalpine Heaths [6130] Calaminarian Grassland [6230] Species-rich Nardus Grassland* [7130] Blanket Bogs (Active)* [8110] Siliceous Scree [8210] Calcareous Rocky Slopes [8220] Siliceous Rocky Slopes [91A0] Old Oak Woodlands [1355] Otter (Lutra lutra)	13.4km to south-east of subject site	This SAC and its associated qualifying habitats are located at a remote distance from the project site and there is no potential for a hydrological impact pathway to occur.	No. It is considered that the distance between the project route and this SAC along with the minor nature of the works associated with the project will in themselves be sufficient to ensure that protected species associated with this SAC is not be influenced by the project.	No. No potential impact pathways link the project site to this SAC.

European Sites	Qualifying Features	Distance from Project Site	Is there a hydrological pathway and does it have the potential to function as an Impact Pathway	Do the project have the potential to interact with mobile species	Do European Sites occur within the projects sphere of influence?
Red Bog Kildare SAC 000397	[7140] Transition Mires	9.2km to south-east of subject site	The project site is not linked to Red Bog Kildare SAC by any existing hydrological pathways.	No.	No. No potential impact pathways link the project site to this SAC.
River Boyne and River Blackwater SAC 002299	[7230] Alkaline Fens [91E0] Alluvial Forests* [1099] River Lamprey (Lampetra fluviatilis) [1106] Atlantic Salmon (Salmo salar) [1355] Otter (Lutra lutra)	14.2km to north of subject site	No. This SAC is designated for a range of lotic, riparian and coastal Annex 1 habitats.  This SAC and its associated qualifying habitats are located at a remote distance from the project site and occur within a separate surface water catchment. As such there is no potential for a hydrological impact pathway to occur.	No: A number of Annex 2 species are listed as qualifying features of interest for this SAC. With the exception of otters all these species are either fishes or sedentary species and will not be influenced by the project due to the lack of a hydrological connection (for fishes) and the distance (for sedentary species) between the project site and this cSAC. Also in relation to otters it is considered that the distance between the project route and this SAC along with the minor nature of the works associated with the project will in	No. No potential impact pathways link the project site to this SAC.

European Sites	Qualifying Features	Distance from Project Site	Is there a hydrological pathway and does it have the potential to function as an Impact Pathway	Do the project have the potential to interact with mobile species	Do European Sites occur within the projects sphere of influence?
				themselves be sufficient to ensure that the population of otter associated with this SAC is not be influenced by the project.	
The Long Derries, Edenderry SAC 000925	[6210] Orchid-rich Calcareous Grassland*	1.4km to south of subject site	No. This SAC is designated for Annex 1 grassland habitat. Examples of this habitat are located at a remote distance from the project site, are not linked to the project site by hydrological pathways and are no influenced by lotic processes.	No. No mobile Annex 2 species are listed as qualifying features of interest for this SAC.	No. No potential impact pathways link the project site to this SAC.

European Sites	Qualifying Features	Distance from Project Site	Is there a hydrological pathway and does it have the potential to function as an Impact Pathway	Do the project have the potential to interact with mobile species	Do European Sites occur within the projects sphere of influence?
River Boyne and River Blackwater SPA 004232	Kingfisher	14.2km to north of subject site	No habitats are listed as special conservation interests for this SPA.	<p>No. Grand Canal corridor along the section of the proposed Greenway is located well outside the territories and home ranges of the kingfisher population supported by this SPA. The maximum size of a kingfisher home range is approximately 5km.</p> <p>In addition kingfisher were not recorded along the section of the Grand Canal within the project corridor during ecological surveys of the Grand Canal in 2015 (Tobin Consulting Engineers, 2015).</p>	No. No potential impact pathways link the project site to this SPA.

European Sites	Qualifying Features	Distance from Project Site	Is there a hydrological pathway and does it have the potential to function as an Impact Pathway	Do the project have the potential to interact with mobile species	Do European Sites occur within the projects sphere of influence?
Poula-phouca Reservoir SPA 004063	Greylag Goose and Lesser Black-backed Gull.	11.8km to south-east of subject site	No habitats are listed as special conservation interests for this SPA.	<p>No. Grand Canal corridor along the section of the proposed Greenway is located well outside the territories and home ranges of the Greylag Goose and Lesser Black-backed Gull populations supported by this SPA.</p> <p>In addition Greylag Goose and Lesser Black-backed Gull were not recorded along the section of the Grand Canal within the project corridor during ecological surveys of the Grand Canal in 2015.</p>	No. No potential impact pathways link the project site to this SPA.

The absence of any potential impact pathways, coupled with the approach to the management of operations and emissions generated at the project site will ensure that this project does not have the potential, either alone or in combination with other project, to result in likely significant effects to European Sites or the local environment surrounding the project site. A Screening Matrix, in line with European Commission (2001) guidelines is provided below in Table 4.2.

**Table 4.2: Screening of the Project's potential to negatively affect European Sites**

Assessment Criteria	
<i>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on European Sites by virtue of:</i>	
Size and Scale	The project is approximately 39km in length and will involve the provision of a greenway along the towpath of the Grand Canal.
Land-take	The project does not involve any land-take from European Sites.
Distance from the nearest European Sites or key features of the site	The project site is located immediately adjacent to the Ballynafagh Lake SAC. This is the nearest SAC to the project site.
Resource requirements	No resources associated with any European Sites will be required for, or utilized by the proposed project.

Emissions	<p><b>Surface Water Drainage</b></p> <p>Activities during the construction phase will have the potential to generate a limited amount of silt-laden surface runoff and could in the event of an accident result in the spillage of fuels, oils, construction chemicals and cement-based products to the Grand Canal.</p> <p>The potential for such construction phase effects to arise and negatively affect the water quality of the Grand Canal is considered to be limited. As outlined in Section 3 above the project has incorporated into the design a number of measures to manage surface water generated at the site during the construction. These measures represent a best practice approach to the construction phase and will limit the potential for accidents, spills and the generation of silt-laden runoff to the Grand Canal.</p> <p>No other emissions such as light, visual, air or noise will be generated during the project.</p>
Excavation requirements	<p>The proposed project will not include excavating activities that have the potential to result in adverse effects to European Sites. Any excavations associated with the proposed project will be restricted to within the footprint of the proposed Greenway.</p>
Transportation requirements	<p>Transportation requirements associated with the project will be limited and will not result in any changes to the existing transport patterns.</p>
Duration of construction, operation etc.	<p>The construction phase is estimated to last for approximately 6 months. The design life of the Greenway will be for a minimum 50 years.</p>
Other	<p><b>Human Disturbance</b></p> <p>The proposed development is situated at a remote distance from the qualifying interests of any European Sites. The populations of mobile species supported by European Sites in the wider surrounding area will not be disturbed by the construction or operation phase of the project.</p>



In-Combination Effects	As the project is not predicted to have the potential to result in any adverse emissions or disturbances to European Sites and due to the absence of impact pathways connecting the proposed Greenway to surrounding European Sites, there will be no potential for it to combine with other plans and projects to result in likely significant effects to conservation status of European Sites and their qualifying features of interest in the surrounding area.
<b>Describe any likely changes to the European Sites arising as a result of:</b>	
Reduction of habitat area	The proposed development will not result in a reduction in area of any habitats occurring within European Sites in the surrounding area.
Disturbance of key species	<p>Aside from fish species, two mobile species are listed as features of the surrounding European Sites. These are kingfisher and otters. The kingfisher is listed as a feature for the River Boyne and River Blackwater SPA. This is located over 14km from the proposed Greenway and well outside the beyond the home range and territories of the Kingfisher population associated with this SPA.</p> <p>The River Boyne and River Blackwater SAC supports populations of otters. This SAC is located over 14km from the proposed Greenway.</p>
Habitat or species fragmentation	Due to the remote locations of the qualifying interests of any European Sites from the proposed site and the lack of any hydrological link between the project sites and these European Sites, it is considered that the project will not have the potential to result in habitat or species fragmentations for qualifying features associated with these designated conservation areas.
Reduction in species density	The project will not result in a reduction in the densities of any key species supported by surrounding European Sites

Changes in key indicators of conservation status	Due to the absence of impact pathways between the project site and surrounding European Sites, the project is not predicted to result in changes to key indicators, such as the range and extent of Annex 1 qualifying habitats, water quality underpinning the status of Annex 1 habitats and Annex 2 species or range, distribution and density of Annex 2 species.
<b>Describe any likely impacts on the European Sites as a whole in terms of:</b>	
Interference with key relationships that define the structure and function of the site	The project will not have the potential to interfere with the key relationships that define the structure and function of European Sites .
Provide indicators of significance as a result of the identification of effects set out above in terms of:  Loss Fragmentation Disruption Disturbance Change to key elements of the Site (e.g. water quality etc.)	<p>Due to the distance between the proposed Greenway and surrounding European Sites the qualifying interests of any European Sites from the proposed site and the absence of impact pathways the project will not result in any loss of qualifying habitats or habitats upon which qualifying species of surrounding European Sites rely.</p> <p>Due to the distance between the proposed Greenway and surrounding European Sites and the absence of impact pathways the project will not result in any fragmentation of qualifying habitats or habitats upon which qualifying species of surrounding European Sites rely.</p> <p>Due to the distance between the proposed Greenway and surrounding European Sites and the absence of impact pathways the project will not result in any disruption to European Sites and their features of interest.</p> <p>Due to the distance between the proposed Greenway and surrounding European Sites and the absence of impact pathways the project will not result in any disturbance to qualifying habitats of</p>

	<p>European Sites. Due to the distance and absence of hydrological pathways the project will not have the potential to disturb sedentary species, fish species and kingfishers of surrounding European Sites. Due to the nature of the project and the distance between the project and the home ranges and natal territories of otters the project will not have the potential to result in disturbance to the otter populations of surrounding European Sites.</p> <p>Due to the distance and absence of impact pathways the project will not have the potential to change key elements underpinning the conservation status of surrounding European Sites.</p>
<p><b>Describe from the above the elements of the project or plan or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.</b></p>	
<p>It has been concluded that likely significant effects to the European Sites will not arise as a result of the implementation of the proposed project. Therefore a Stage 2 Appropriate Assessment is not required.</p>	

## **5. SCREENING STATEMENT CONCLUSION: FINDING OF NO SIGNIFICANT EFFECTS**

During the Screening of the proposed Grand Canal Greenway between Aylmer Bridge and Clonkeen it was found that twelve European Sites occur within a 15km radius of the project site. The nearest European Site to the project site (001387 Ballynafagh Lake SAC) extends to meet the Grand Canal at a point approximately two kilometres to the east of Robertstown. However, Ballynafagh Lake was linked to the Grand Canal as a feeder and any hydrological link between the two is by gravity towards the canal without any reverse flow from the canal up-gradient towards the lake. All of these European Sites (and their associated qualifying features of interest/special conservation interests) are adjudged to be located outside the sphere of influence of the project. No impact pathways link the project to any of these surrounding European Sites.

In light of the findings of this Screening for Appropriate Assessment it is concluded that the project will not have a significant negative effect on European Sites and will not negatively affect their conservation objectives or integrity.

This Screening has resulted in a Finding of No Significant Effects and as such a Stage II Appropriate Assessment is not required.