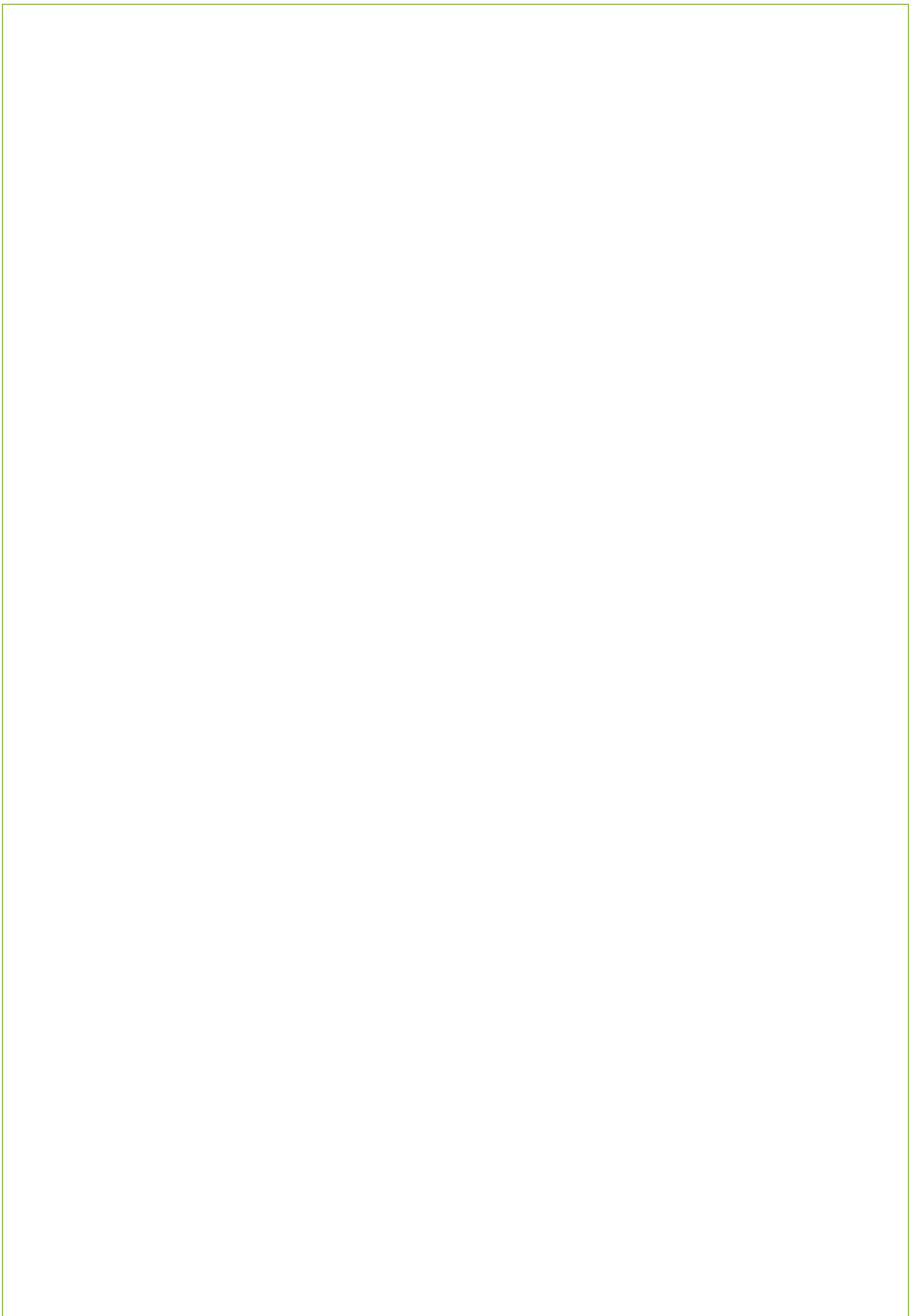


University College Cork

Biodiversity Action Plan 2018-2023



Lalor Ecology



This UCC Biodiversity Action Plan 2018-2023 was developed by Caroline Lalor of Lalor Ecology, UCC Buildings and Estates and the UCC Green Forum. Much of the biodiversity data that contributed to this Biodiversity Action Plan came from the UCC Biodiversity Survey 2014-2018. We acknowledge the ecologists who conducted specialist surveys and contributed valuable data: Dr. Rory Hodd, Isobel Abbot, Conor Kelleher and Caroline Lalor. We also acknowledge the contributions made by Dr. Paddy Sleeman and Cork Nature Network, Dr. Dara Fitzpatrick and Dario Fernandez-Bellon of UCC.

Cover Photos: Caroline Lalor

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1 INTRODUCTION

1.1 Background

University College Cork (UCC) has made a clear commitment to reducing and managing its environmental footprint in a variety of ways. UCC was the first Green Campus in the world and also the first University in the world to achieve the international ISO50001 standard for Energy Management. In 2016 it published its first *Sustainability Strategy*.

UCC is also committed to managing its green areas in an environmentally friendly way and maintaining and enhancing the biodiversity value of its estate. There are a number of biodiversity-friendly initiatives already in place:

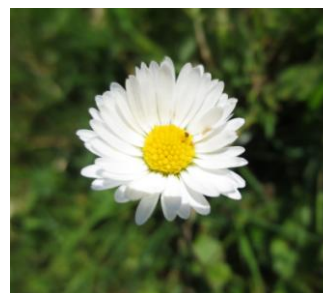
- *New mowers mulch grass back into soil*
- *A native planting scheme is in place across campus*
- *Biodiversity training has been given to all grounds staff*
- *Companion planting scheme is followed which helps control aphids while at the same time supports wildlife such as butterflies and hoverflies on campus*
- *Swift nest boxes have been installed on buildings in the North Mall Campus and Main Campus*
- *Bat boxes are being installed on Main, North Mall, Western and Curraheen Agricultural Campuses in 2018.*

UCC has commissioned a suite of biodiversity surveys within its properties which began in 2014 and which are ongoing. The information gathered during these surveys will be used in many ways, some of which are outlined within this Plan.

This Biodiversity Action Plan has been developed to identify opportunities to enhance and protect the biodiversity value of the University's estate and it feeds into UCC's *Sustainability Strategy* and *Energy Policy*.



“People from a planet without flowers would think we must be mad with joy the whole time to have such things about us” (Iris Murdoch)



UCC has a number of biodiversity-friendly initiatives already in place.



1.2 What is Biodiversity and Why is it Important?

Biodiversity is simply a shortened version of the term 'biological diversity'. It refers to the huge variety of life on the planet. This includes not just the variety of species, but the variety of the genetic information within and between species, the variety of the habitats and ecosystems where these species live. Biodiversity is everywhere – not just in National Parks, Nature Reserves or other protected sites – biodiversity is in our gardens, in our cities, on stone walls, in the earth and even inside us!

Humans are not only part of biodiversity, but we depend upon it. The ecosystems, habitats and species within them provide humans with resources, services and benefits, some of which are essential for our lives and others of which greatly enhance our lives. Examples include oxygen production, provision of food and water, flood control, water purification, nutrient recycling, pollination, provision of raw materials and spiritual and recreational benefits.

The Convention on Biological Diversity defines "biological diversity" as the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

Biodiversity and natural landscapes or green spaces are known to also be of benefit to human health, both physical and mental. In the urban environment of Cork City, green spaces, such as those in UCC, can add greatly to the mental and physical health of students, staff and the general public who spend time within UCC grounds.

1.3 What are the Threats to Biodiversity?

Biodiversity and the important functions that it undertakes are under threat globally and locally.

For the taxonomic groups for which formal conservation assessments have been completed we know that, on



Biodiversity is simply a shortened version of the term 'biological diversity'



The main threats to biodiversity are:

- *Habitat destruction*
- *Introduction of non-native invasive species*
- *Pollution*
- *Climate change*



average, just over 20% of species are threatened with extinction in Ireland (NBDC).

The most recent assessment of the status of EU protected habitats and species in Ireland in 2013 showed that 91% of the 58 habitats assessed have unfavourable conservation status (NPWS, 2013).

The conservation status of species was slightly more positive, with 32% of species assessed having unfavourable conservation status (NPWS, 2013).

1.4 Our Approach

This is UCC's first Biodiversity Action Plan. It grew out of a 3-year pilot Biodiversity Survey which was commissioned by UCC in 2014. This Biodiversity Survey involved detailed surveys on habitats, bryophytes, bats and other small mammals within certain UCC campuses. In addition, casual records of invasive species, birds, invertebrates and fungi were gathered during fieldwork. Existing knowledge of the species occurring within UCC campus was also gathered and added to a GIS database. The pilot survey has been extended and further survey work on bryophytes was completed in 2018 and further surveys are expected to continue into future years.

Stemming from all this information a series of management actions were devised for each of UCC's 8 campuses involved in the surveys. It was decided that a *UCC Biodiversity Action Plan* was the next step.

This Biodiversity Action Plan (BAP) gives a brief description of the biodiversity that we know about across UCC's campuses and identifies three main Objectives. Each Objective has been broken down into deliverable actions. For each Action, a Lead Department or Group has been identified and a deadline set. The delivery of the BAP is managed by UCC Buildings and Estates.



A Biodiversity Action Plan is a means of managing resources to contribute to the conservation of biodiversity, or wildlife, through developing management plans.



2 BIODIVERSITY IN UCC

UCC has four campuses on the western edge of Cork City (Main Campus, North Mall Campus, Western Campus and Mardyke Sports Campus), three slightly west of the city within Cork County (ERI Campus, Curraheen Agricultural Campus and Curraheen Sports Campus) and one approximately 97km south-west of the city (Lough Hyne Campus) totaling 74ha. Various surveys were carried out within these campuses in 2014, 2015, 2016 and 2018. Further survey work continues and hence as more information on the biodiversity within UCC becomes available, this Biodiversity Action Plan will need to be updated.

2.1 Habitats

During the Habitat Surveys of 2014 and 2016, 27 different habitats were recorded on UCC campuses. Seven of the eight campuses were included in these surveys- Main Campus, North Mall Campus, Western Campus, Mardyke Sports Campus, ERI Campus, Curraheen Agricultural Campus and Curraheen Sports Campus). This corresponds to a total of 72.82ha of surveyed area. The main habitats present are described briefly here.

2.1.1 Buildings and Artificial Surfaces (BL3)

This habitat covers approximately 21.7ha of the surveyed area and is one of the habitats of least value to wildlife. However, this habitat does support some biodiversity. Plants recorded here include Cat's Ear (*Hypochaeris radicata*) and Buddleja (*Buddleja davidii*). The humid areas of concrete and tarmac harbour some infrequently recorded bryophytes and are of **high local importance** for bryophytes. The rest of this habitat has generally been assessed as having **negligible importance** for biodiversity.

2.1.2 Amenity Grassland (GA2)

This habitat occurs throughout all surveyed campuses except Curraheen Agricultural Campus. It occurs both in small pockets together with ornamental borders and single trees among buildings and carparks as well as covering larger areas such as sports pitches. This habitat is dominated by grasses such as Perennial Rye Grass and Yorkshire Fog and commonly includes native wildflowers such as Daisy and Dandelion. However, due to current management practices which maintain the sward very tight this habitat is currently of limited biodiversity value and has generally been assessed as having **low local importance** for biodiversity. Amenity grassland covers approximately 18.6ha plus an additional hectare (approx.) that is present within the WD5 habitat (see below).

2.1.3 Scattered Trees and Parkland (WD5)

This habitat consists of large, mature trees, both native and non-native, scattered amongst a generally tight sward of amenity grassland. This habitat occurs mainly in the Main Campus and Western Campus. It also occurs in smaller patches



in the North Mall Campus. It covers approximately 1.5ha.

Many of the trees contain crevices and hollows which can be used by bats for roosting and other species. Currently the trees contribute more to biodiversity than the grassland as the grassland is managed in a tight sward. Some of the large trees in this habitat near the Glucksman Gallery on Main Campus have been identified as being of **high local value for bryophytes** and have also been identified as providing potential roost sites for bats. In general, this habitat is currently of **moderate local importance**.

2.1.4 Riparian Woodland (WN5)

There are two main parcels of Riparian Woodland, one in the ERI Campus and one in the North Mall Campus. The Riparian Woodland in the ERI Campus is a small patch (0.29ha) of woodland that has developed from open grassland since 2006 since UCC took over the site from Cork City Waterworks. It is not known why the woodland suddenly and so quickly developed here but it is supposed that there has been some change in either the river's flood regime or the drainage of the land or both. This is a willow-dominated woodland on the banks of the River Lee. Alder is Locally Frequent. The shrub and field layers generally have very low cover. Common Nettle and Remote Sedge occur



in the field layer. There is a patch of the invasive Himalayan Balsam within the woodland. As a willow-dominated woodland on a floodplain, it has been classed as Annex I habitat Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (91E0). While it is not considered to be of International Importance as some of the qualifying species are absent and it is a relatively small woodland, it is still an important habitat within the University's campus. It has been assessed as being of **County Importance** as it is an interesting

example of an internationally rare habitat within Cork County.

The second parcel of Riparian Woodland is in the North Mall Campus covering approx. 1.7ha. While this is a larger expanse of woodland, it has a high proportion of non-native species, both in the canopy layer and in the other layers in the woodland. The canopy is composed of Ash, Sycamore and Alder. The structure and ground flora of the woodland are similar to native woodland. Native species present such as Pendulous Sedge (*Carex pendula*), Wood Dock (*Rumex sanguineus*) and Hemlock Water-dropwort (*Oenanthe crocata*) are indicative of this type of riparian woodland. Non-native, invasive species are also present and include Himalayan Balsam, Japanese Knotweed, Traveller's Joy, Winter Heliotrope and Cherry Laurel. This woodland is an important habitat within the urban environment of Cork City and has been assessed as being of **High Local Importance**.

2.1.5 Rivers : Eroding/Upland Rivers (FW1) and Depositing Lowland Rivers (FW2) and Tidal Rivers (CW2)

The River Lee flows through Cork City via two channels, the North Channel and the

South Channel. The River Lee flows within or adjacent to five of UCC's campuses: the ERI Campus (River Lee before it splits into two channels), Main Campus and Western Campus (South Channel) and Mardyke Sports Campus and North Mall Campus (North Channel). The River Lee is at its Lower Stage as it flows through Cork City, with flat flood plains and a generally slow current. The river is tidal adjacent to the North Mall Campus and the North Mall Campus also includes a tidal mill race. The flow of the River Lee is somewhat controlled artificially by the dam at Inniscarra, approximately 14km upstream of UCC. As it flows through and adjacent to UCC, it adds important elements biodiversity to the Campuses.



An Otter Survey of the River Lee near UCC was conducted by Dr. Paddy Sleeman of UCC and Cork Nature Network (CNN) in 2017. This survey found that there were three otter resting sites adjacent to UCC: one at the Main Entrance to UCC Main Campus near the Western Road, one adjacent to the western end of the North Mall Campus and a third just west of the Western Campus. Numerous otter spraints were recorded along the River Lee within Main Campus and adjacent to the North Mall Campus, Mardyke Sports and Western Campuses. Evidence of Mink was also recorded along the South Channel of the River Lee near the Main and Western Campuses.

In addition to this, a series of Otter Surveys were carried out by Ryan Hanley in 2014, 2015 and 2016 along the River Lee as part of the EIS for the Lower Lee Drainage Scheme (Ryan Hanley, 2016). This survey identified two active otter holts in the vicinity of the ERI Campus, one upstream and one downstream near the Lee Water Treatment Plant. This second holt appeared to be a natal den where successful breeding took place in 2015. They also concluded that in 2015 there was a high possibility of a natal den existing in the Distillery Channel on UCC's North Mall Campus. (This is likely to be the same holt identified as west of the North Mall Campus by the CNN Survey)

It can be concluded that the River Lee in the vicinity of UCC's city campuses is an important habitat for otters and supports feeding and potentially breeding grounds for this protected species.

The river habitats within and adjacent to UCC Campuses have yet to be surveyed for invertebrates and birds but casual records of birds on the river were made during the Biodiversity Survey. These include Grey Wagtail (Red Listed breeding species) and Kingfisher (Amber Listed breeding species), both in UCC Main Campus. There is a record of breeding Grey Wagtail in the vicinity of UCC Main Campus in Cork City from the Breeding Bird Atlas 2007-2011 (National Biodiversity Data Centre, 2018).

The unwanted invasive species, American Mink, was also recorded in the river during the Mammal Survey 2016 at Main Campus. Fox and Brown Rat were recorded in the river bed of the tidal mill race at North Mall Campus. The River Lee was also identified as one of the main habitats of importance for bats at the North Mall, Main and Western Campuses.



2.1.6 Flower Beds and Borders (BC4)

0.15ha of this habitat has been mapped widely across the Main, North Mall and Western Campuses and on Main Campus it often occurs in a mosaic with Scattered Trees and Parkland (WD5) (approx. 2ha). The species in this habitat are largely non-native, ornamental species and this habitat has been assessed as having **Low Local** importance for biodiversity.

2.1.7 Planted Broadleaved Woodland (WD1)

This type of modified woodland occurs within Main and North Mall Campuses covering approximately 1ha. These woodlands are largely dominated by non-natives such as *Acer* spp., Sycamore and English Elm. Non-natives in the field layer include Japanese Knotweed, Buddleja, Himalayan Balsam and Cherry Laurel. However, native species also occur in the canopy, shrub and field layers. Such species include Alder, Ash, Hawthorn, Lords-and-Ladies, Elder and Enchanter's Nightshade. This habitat has generally been assessed as having **Moderate Local** importance for biodiversity.



2.1.8 Treelines (WL2)

2.3km of treelines were recorded within UCC Campuses and they vary from young, recently planted treelines to lines of mature trees along rivers or in fields functioning as field boundaries. They include native species such as Alder (*Alnus glutinosa*) but are largely non-native species such as Sycamore (*Acer pseudoplatanus*), Large-leaved Lime (*Tilia platyphyllos*), London Plane (*Platanus x acerifolia*), Common

Lime (*Tilia x europaea*), Beech (*Fagus sylvatica*) and Horse Chestnut (*Aesculus hippocastanum*). Along the River Lee the treelines provide habitat for invertebrates which in turn provide important foraging for bats. At Curraheen Agricultural Campus they provide foraging and perhaps commuting habitat for bats and other wildlife. The conservation value varies from **Low Local** to **Moderate-High Local**, depending on the particular treeline.

2.1.9 Hedgerows (WL1)

2.4km of hedgerows were recorded within three UCC Campuses – the North Mall, Curraheen Sports and Curraheen Agricultural Campuses. In the two campuses at Curraheen they are mainly dominated by native species, including Hawthorn, Blackthorn, Hazel, Bramble and Bracken. The hedgerows in the North Mall Campus are dominated by non-native species such as Griselinia and *Acer* sp. Other common species include Traveller's Joy and Buddleja. Ash, Bramble and Holly occur occasionally. The

hedgerows in the two Curraheen Campuses have been assessed as having **Moderate Local** importance for biodiversity while those in the North Mall Campus are of **Low Local** importance.

2.1.10 Stonewalls and other stonework (BL1)

884m of this habitat was recorded from the North Mall Campus, the Mardyke Sports Campus and Main Campus. An old stone wall forms most of the northern boundary of the North Mall Campus. This is largely vegetated with non-natives such as Traveller's Joy and Buddleja but it also supports Bramble and Ivy. Breeding mammals, Wood Mouse and Bank Vole, were recorded at the base of this stone wall. This stone wall was assessed as having **Moderate Local** importance for biodiversity. There is a short section of an old stone wall on Main Campus adjacent to the Student Centre which supports both natives (e.g. Herb-Robert, Maidenhair Spleenwort) and non-natives (e.g. Traveller's Joy, Petty Spurge). This stone wall was considered to have **Low Local** importance. In general, the stone walls in the Mardyke Campus were assessed as having **Low Local** importance for biodiversity. However, the stone wall along the southern boundary was assessed as having **High Local** importance for bryophytes. A species new to Mid-Cork was recorded here and the bryological flora recorded on this wall was found to be representative of calcareous walls.

2.2 Bats

2.2.1 Bat Survey 2015 – Aardwolf Wildlife Surveys

Two bat roosts were recorded during this survey. A small **Common Pipistrelle Bat roost** was located within UCC's North Mall Campus and a larger roost, **possibly a maternity roost, of Brown Long-Eared Bats** was located adjacent to UCC's Curraheen Agricultural Campus. Other species of bats were recorded in other campuses foraging and/or commuting within UCC. Such species include Leisler's Bat, Daubenton's Bat, Common and Soprano Pipistrelle Bats and Brown Long-Eared Bat. The main habitats of importance for the bats are the River Lee, trees, treelines, hedgerows and some old buildings.

2.3 Small Mammals

2.3.1 Small Mammal Survey 2016 – Abbot Ecology

A Small Mammal survey of Main and North Mall Campuses was undertaken in 2016. Six species of small mammal were found to occur within these campuses - Fox, Wood Mouse, Bank Vole, Brown Rat, Cat and American Mink. Of these, only Fox and Wood Mouse are native species. Bank Vole and Wood Mouse were found to be breeding at the base of the stone wall boundary north of the Butler Building in the North Mall Campus.

Otters have previously been surveyed in the River Lee – see Section 2.1.5 above.

2.4 Bryophytes (mosses, liverworts and hornworts)

2.4.1 Bryophyte Survey 2014 – Denyer Ecology

This survey included Main, North Mall, Western and the Mardyke Sports Campuses. A total of 86 bryophyte species were recorded, two of which were new records for Mid-Cork. In addition, the exposed calcareous rock-face (ER2) on Main Campus was considered to be of County Importance for bryophytes due to the assemblage of bryophytes which were recorded there. Some specialist and infrequently recorded species were also found.

2.4.2 Bryophyte Survey 2018 – *Nimbosa Ecology*

In March 2018, the Bryophyte Survey of UCC was completed by Dr. Rory Hodd of *Nimbosa Ecology* on all remaining campuses (ERI Campus, Curraheen Sports Campus, Curraheen Agricultural Campus and Lough Hyne Campus). A total of 112 species of bryophytes were recorded within these 4 campuses. Combining the 2014 and 2018 surveys, there was a total of **141 species of bryophytes** recorded from the 8 campuses surveyed.

Two species recorded in 2018 are considered to be **Nationally Scarce** in Ireland. These species are Green-tufted Stubble-moss (*Weissia controvers* var. *densifolia*), which was recorded at Lough Hyne, and Brook-side Feather-moss (*Hygroamblystegium fluviatile*), which was recorded from the ERI Campus in the flood-zone of the River Lee in the Priority Annex I habitat *Alluvial Forests with Alnus glutinosa and Fraxinus excelsior* (91E0).

A number of other specialist and infrequently recorded species were also found.

2.5 Casual Records

2.5.1 Birds

A bird survey has not been carried out on UCC Campuses as part of the Biodiversity Survey project to date. However, casual records were made during the survey and also existing records for North Mall Campus (Dario Fernandez-Bellon) and Main Campus (Dr. Dara Fitzpatrick) were submitted on request. These records are summarised in Appendix I. Some of the records include breeding Jay and Spotted Flycatcher on Main Campus and breeding Spotted Flycatcher, Sparrowhawk and Robin on North Mall Campus, all of which, except for Jay, are **Amber Listed** species. In addition, the **Red Listed** species, Grey Wagtail, was observed on the River Lee in Main Campus as was the **Amber Listed** species, Kingfisher.

2.5.2 Invertebrates

Casual records of invertebrates were made during the Biodiversity Surveys in UCC. These were mainly of butterflies, ladybirds and bumble bees and are summarized below in Table 1. Summary of casual records of invertebrates made during biodiversity surveys in UCC 2014 and 2016.

Table 1. Summary of casual records of invertebrates made during biodiversity surveys in UCC 2014 and 2016

Species (Common Name)	Species (Scientific Name)	Campus
7-Spot Ladybird	<i>Coccinella 7-punctata</i>	Curraheen Ag Campus
Harlequin Ladybird *	<i>Harmonia axyridis*</i>	Western Campus; North Mall Campus
Large White Butterfly	<i>Pieris brassicae</i>	North Mall Campus
Meadow Brown Butterfly	<i>Maniola jurtina</i>	North Mall Campus
Painted Lady Butterfly	<i>Vanessa cardui</i>	ERI Campus
Peacock Butterfly	<i>Inachis io</i>	North Mall Campus; Main Campus
Red Admiral Butterfly	<i>Vanessa atalanta</i>	Western, North Mall, ERI and Curraheen Ag. Campuses
Speckled Wood Butterfly	<i>Pararge aegeria</i>	ERI Campus; Curraheen Ag Campus
Red-tailed Bumblebee	<i>Bombus lapidarius</i>	North Mall Campus

* indicates an invasive species

3 FURTHER SURVEYS

It has been decided to extend the survey work to cover all campuses with the existing survey and then to commission surveys on all UCC campuses on birds and invertebrates (terrestrial and fresh-water).

An approximate schedule, dependent upon budgets etc. is as follows:

Table 2. Approximate schedule of further biodiversity surveys in UCC

Survey	Campus	Year of Completion
Bryophyte Survey	ERI, Curraheen Agricultural, Curraheen Sports and Lough Hyne Campuses.	2018
Small Mammal Survey	ERI, Western, Mardyke Sports, Curraheen Agricultural, Curraheen Sports and Lough Hyne Campuses.	2019
Habitat Survey	Lough Hyne Campus	2019
Bird Survey	Main Campus, North Mall Campus	2020
Bird Survey	Western Campus, Mardyke Sports Campus, ERI Campus,	2021
Invertebrate Survey	Main Campus, North Mall Campus and Western Campus	2022
Bird Survey	Curraheen Sports, Curraheen Agricultural and Lough Hyne Campuses	2023

4 UCC'S BIODIVERSITY ACTION PLAN

Objective 1: To identify and implement measures to enhance and protect biodiversity in UCC.

Targets				
T1.1	Implement biodiversity management recommendations from UCC Biodiversity Survey 2014-2018.			
T1.2	Implement biodiversity management recommendations from future Biodiversity Surveys within UCC Campus.			
T1.3	Work towards completing existing biodiversity surveys across all UCC Campuses.			
Actions		Pollinator-Friendly	Lead Department/s /Personnel	Deadline
A1.1	Erect suitable bat boxes in appropriate locations as recommended in UCC's Main, North Mall, Western and Curraheen Agricultural Campuses		Buildings + Estates	2018
A1.2	Maintain existing semi-natural habitats – treelines, hedgerows, grasslands, woodland, flowing water, etc.	✓	Buildings + Estates	Annually
A1.3	Establish and Implement Grassland Management Programmes for wildflower meadows and wild pollinators to include Spring and Summer Meadows in each campus as per guidance in the Campus Management Plans (see Section 6 for more Information)	✓	Buildings + Estates; Green Forum	2019
A1.4	Install approximately six Grey Wagtail nest boxes for this Red Listed species in Main Campus, North Mall Campus and ERI Campus		Buildings and Estates; Green Forum	2019
A1.5	Develop a comprehensive Invasive Species Management Plan for UCC	✓	Buildings and Estates	2019
A1.6	Consider developing a UCC Pollinator Plan – Pollinator Friendly actions in the Campus Management Plans are highlighted.	✓	Buildings and Estates; Green Forum	2020
A1.7	Identify the opportunities for establishing honey bee hives within UCC Campus	✓	Buildings and Estates	2019
A1.8	Liase closely with the OPW and works on the Lower River Lee Drainage Scheme in relation to habitat and other mitigation measures that may impact on important areas within or adjacent to UCC		Buildings + Estates; Green Forum	Ongoing
A1.9	Identify areas where other enhancement measures will be implemented (see Section 7)		Buildings and Estates	2019
A1.10	Implement biodiversity management recommendations from future Biodiversity Surveys within UCC Campus.		Buildings and Estates	Annually
A1.11	Commission further Biodiversity Surveys in future years as planned (see Section 3 above)		Buildings and Estates	Annually
A1.12	Establish a monitoring programme to monitor the success of the Biodiversity Action Plan		Buildings + Estates; Green Forum	2019

Objective 2: To ensure that biodiversity is integral to the planning and design process across all of UCC’s developments.

Targets				
2.1	To integrate biodiversity planning in all future University developments			
2.2	To ensure that all future developments in UCC enhance the environment			
2.3	To mitigate against any unavoidable damage caused to the environment caused by developments within UCC.			
Actions		Pollinator - Friendly	Lead Department/ Personnel	Deadline
A2.1	Develop a policy/guidance document outlining biodiversity requirements and policies for new University developments for design teams.	✓	Buildings and Estates	2019
A2.2	Develop a policy/guidance document outlining requirements for building contractors.		Buildings and Estates	2019
A2.3	Investigate the potential for green roofs on existing and future buildings in UCC	✓	Buildings and Estates, Green Forum	2019
A2.4	Investigate the possibilities of utilizing flat roof space for biodiversity enhancement measures e.g. bird nest boxes, invertebrate nests boxes etc.	✓	Buildings and Estates, Green Forum	2020
A2.5	Phase out the use of any peat-based soil-improvement products that may be used in UCC’s grounds.		Buildings and Estates, Green Forum	2020

Objective 3: To encourage student and staff engagement with biodiversity and increase knowledge and awareness of biodiversity.

Targets				
3.1	To encourage passive and active engagement with biodiversity within campus			
3.2	To facilitate the use of UCC's campuses as an educational resource			
3.3	To monitor the effectiveness of the UCC Biodiversity Action Plan			
Actions		Pollinator-Friendly	Lead Department/Personnel	Deadline
A3.1	Develop site specific interpretation for biodiverse areas and areas where biodiversity actions have been taken	✓	Buildings and Estates	Ongoing
A3.2	Develop nature trails through campus to encourage passive learning and wider engagement with biodiversity and the biodiversity enhancement measures being taken on campus.	✓	Buildings and Estates	Ongoing
A3.3	Develop a corresponding app free to download from UCC's website which gives more information on the biodiversity along the nature trails	✓	Buildings and Estates, Green Forum	2019 and ongoing
A3.4	Upload information on biodiversity within UCC on the Green Campus Webpages as habitat improvements and further biodiversity data becomes available.	✓	Green Forum	Ongoing
A3.5	Develop opportunities for student research projects related to biodiversity to be conducted within UCC's Campuses	✓	Buildings + Estates, Green Forum, School of BEES	Ongoing
A3.6	Develop opportunities for student and staff engagement in biodiversity enhancement projects.	✓	Buildings and Estates	Ongoing
A3.7	Develop monitoring surveys for UCC – e.g. bat activity monitoring surveys, bumblebee monitoring surveys, butterfly monitoring surveys etc. Encourage students and staff to get involved in these.		Green Forum; School of BEES	2020
A3.8	Develop other monitoring schemes to assess the effectiveness of the UCC Biodiversity Action Plan (e.g. student and staff questionnaires etc.)		Green Forum	2022

5 CAMPUS BIODIVERSITY MANAGEMENT PLANS

It is important to note that the following Biodiversity Management Plans were developed following the fieldwork completed in 2014, 2015, 2016 and 2018. Hence, they will need to be updated as new biodiversity data becomes available following current and future surveys.

UCC Main Campus Management Plan

The main habitats of biodiversity interest on UCC's Main Campus are Exposed Calcareous Rock (**County Importance** for bryophytes), River Lee, Modified Woodland, and Treelines. Some of the trees have been identified as being of **High Local Value** for bryophytes and some of the mature trees, particularly along the River Lee, offer potential roost sites for bats. The areas of Amenity Grassland and the mosaic habitat of Flower beds and borders / Scattered Trees and Parkland (which includes amenity grassland) offer biodiversity enhancement opportunities. The River Lee which runs through the main campus supports otters and mink. Kingfisher (Amber Listed) and Grey Wagtail (Red Listed) were also recorded here. Spotted Flycatcher (Amber Listed) is known to breed on Main Campus.

Some biodiversity enhancement measures have already taken place on Main Campus:

- Four open-bottomed, self-cleaning timber bat boxes were erected on large trees on Main Campus and two large American-style bat-boxes were erected on south-facing walls of the Main Rest and O'Rahilly Buildings.
- A Biodiversity Garden has been created on the northern side of the avenue from Gaol Cross Bridge to the Aula Maxima on a steep north-sloping patch of ground overlooking the River Lee. The plants here were carefully chosen to provide food and/or habitat for native species including pollinators, other invertebrates, birds and small mammals.
- Close-by to this on the southern side of the same avenue, environmentally-friendly management of certain areas are planned once current construction works are finished.
- Two swift nest-boxes have been installed on the Boole Library Building.

UCC Main Campus Management Plan: Targets and Actions

Targets				
MCT.1	Maintain the Exposed Calcareous Rock (ER2) habitat as it is.			
MCT.2	Maintain river, riverbanks, treelines and large trees, particularly along the river.			
MCT.3	Manage a proportion of the grassland habitats as Pollinator-Friendly Wildflower Meadows			
MCT.4	Enhance UCC Main Campus for biodiversity			
MCT.5	Increase awareness of and engagement with the biodiversity within Main Campus			
Actions		Pollinator-Friendly	Lead Department/s Personnel	Timeline
MCA.1	Ensure all grounds-staff are aware of the importance of the ER2 habitat and the importance of not removing any vegetation here.		Buildings + Estates	2018
MCA.2	Minimise the use of herbicides on Main Campus (perhaps limit it to footpaths and hardstanding areas).	✓	Buildings + Estates	Annually
MCA.3	Establish and Implement Grassland Management Programmes for wildflower meadows and wild pollinators to include Spring and Summer Meadows in Main Campus (see Section 6 for more Information).	✓	Buildings + Estates; Green Forum	2019
MCA.4	Ensure that all relevant data on Japanese Knotweed and Himalayan Balsam that has been gathered during the UCC Biodiversity Survey is passed on to O' Donovan Agri-Environmental Services, the consultants who are undertaking the eradication programme.		Buildings + Estates; Green Forum	2018
MCA.5	Install two Grey Wagtail nest boxes for this Red Listed species in Main Campus. These should be mounted on a wall near the River Lee (e.g. underside of a bridge)		Buildings + Estates; Green Forum	2019
MCA.6	Install bat boxes/tubes on the new bridge at Perrot's Inch (see guidelines at https://www.batconservationireland.org/wp-content/uploads/2013/09/BCI_Guidelines_waterways.pdf)		Green Forum	2019
MCA.7	When planting ornamental plants in borders and flowerbeds, consider planting native plants and/or nectar-rich ornamental plants and/or night-scented plants Appendix II for some suggested plants.	✓	Buildings and Estates; Green Forum	Ongoing
MCA.8	Create pollinator nesting sites on Main Campus – earth banks/bare soil/dry stone walls/bee hotels	✓	Buildings + Estates; Green Forum	2020
MCA.9	Encourage student and staff engagement with some of the actions outlined here (e.g. MCA.3, MCA.5, MCA.6, MCA.8).	✓	Buildings + Estates; Green Forum	Ongoing
MCA.10	Provide information in suitable formats (information signs, apps etc.) and develop Biodiversity Walks through Main Campus.	✓	Buildings + Estates; Green Forum	Ongoing
MCA.11	Commission further Biodiversity Surveys in future years as planned (see Section 3)		Buildings + Estates	Annually

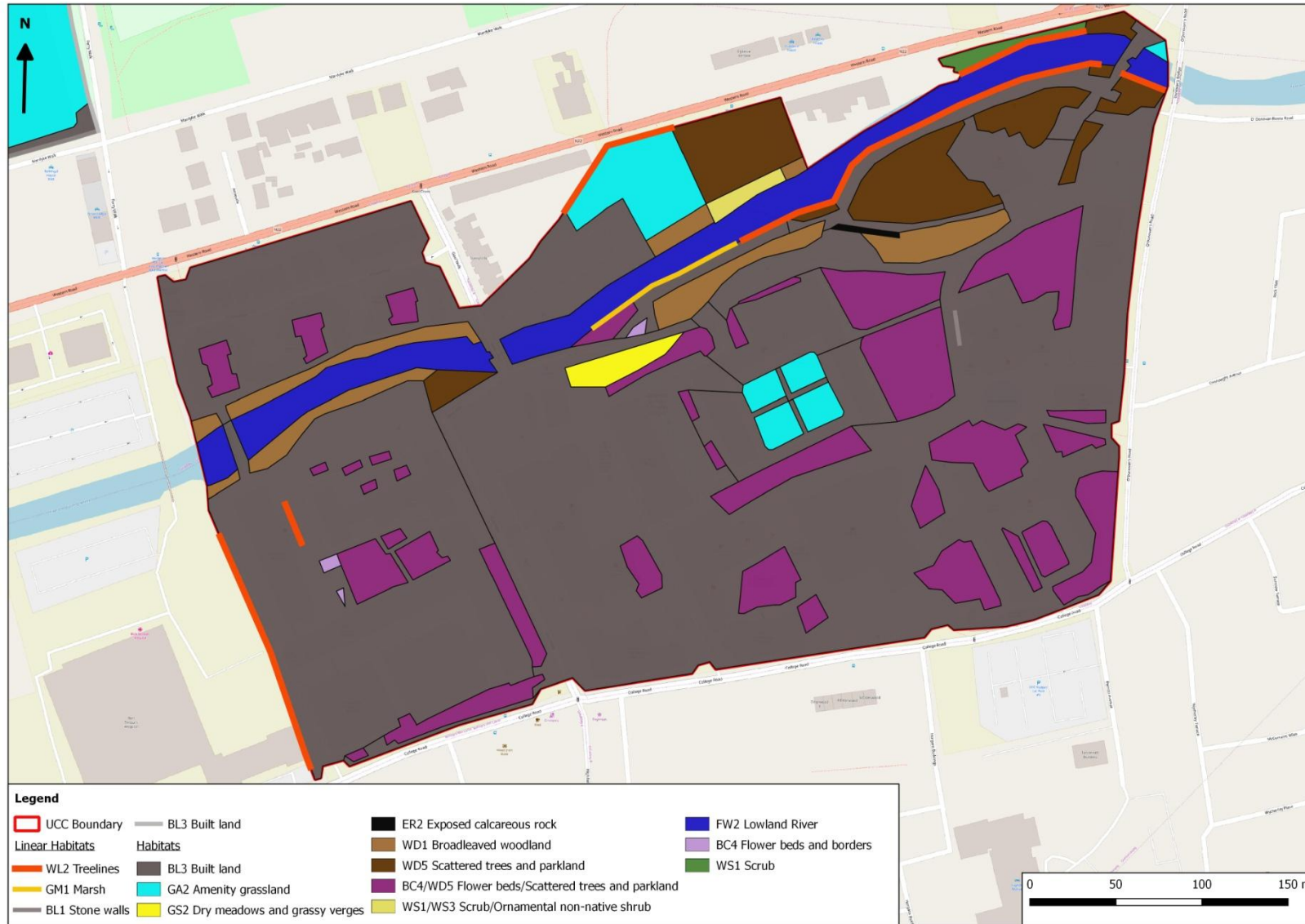


Figure 1. Map of habitats on Main Campus (mapped in 2014)

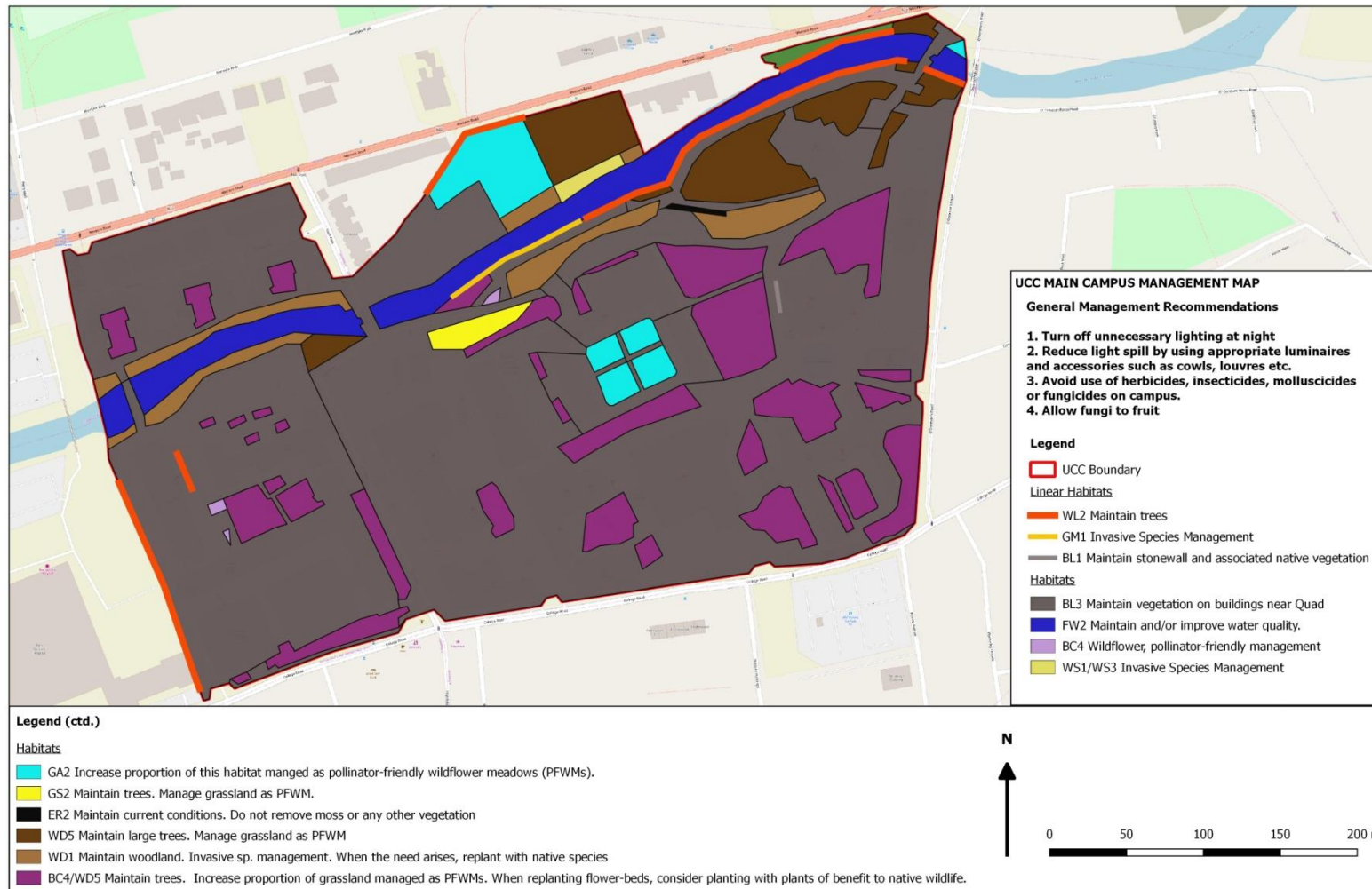


Figure 2. Map outlining management recommendations for Main Campus UCC. Refer to Main Campus Management Plan for more details.* PFWM = Pollinator Friendly, Wildflower Meadow



Figure 3. Locations of Invasive Species on Main Campus recorded during UCC Habitat Survey in 2014

UCC North Mall Campus Management Plan

The main habitats of biodiversity interest on the North Mall Campus are the Riparian Woodland (WN5) and the large patch (0.27ha) of Dry Meadows and Grassy Verges (GS2) to the south of the tidal Mill Race Channel, both of which have been assessed as **Moderate-High Local importance** for biodiversity.

A number of habitats have been assessed as being of **Moderate Local Importance** for biodiversity - these include some of the remaining semi-natural grassland patches (GS1, GS2, GS1/GA2), the modified woodlands (WD1, WD2/WS1), the tidal mill-race channel (CW2) and two patches of Ornamental/non-native shrub (WS3) on the northern boundary which provide food for native hoverflies, bees and butterflies. These patches of WS3 are linked by a small patch of GS1/GA2, which, at the time of survey, included some wildflowers which were attracting native insects. Together, these patches of scrub and grassland could be managed as a Pollinator-Friendly Garden.

The existing Amenity Grassland (GA2), Flower beds and Borders (BC4) and Scattered Trees and Parkland (WD5) were assessed as being of **Low Local Importance** for biodiversity. However, their value could be increased by following the recommendations of the Management Plan.

The stone wall (BL1) along the northern boundary behind the Butler Building is important for breeding small mammals. Wood Mouse (native species) and Bank Vole (non-native) were both found to be breeding here. This stone wall was assessed as being of **Moderate Local Importance** for biodiversity.

A Common Pipistrelle Bat Roost was located in a disused stone building in the north-east of the North Mall Campus. This roost is legally protected and input from a bat specialist would be needed if there were any works that may impact upon the roost planned for the future. This building is of **Moderate Local Importance** for biodiversity.

The tidal mill race channel supports a specialist bryophyte assemblage and has been assessed as being of **Moderate Local Importance** for biodiversity. It may also be important for otters as there is a high probability of a natal holt existing in this area (Ryan Hanley, 2016).

Some biodiversity enhancement measures have already been implemented on the North Mall Campus:

- Six swift nest boxes with web-cams were installed under the eaves on the north-facing wall of the Cork Enterprise Centre building in 2014.
- In 2017, the Japanese Knotweed was treated as part of a Japanese Knotweed Management Plan. This is part of a 5-year programme to successfully eradicate Japanese Knotweed and Himalayan Balsam from the North Mall Campus. Works are ongoing.
- Four open-bottomed, self-cleaning timber bat boxes were erected on large trees and two, large American-style bat-boxes were erected on south-facing walls of the Cooperage.

UCC North Mall Campus Management Plan: Targets and Actions

Targets				
NMT.1	Ensure Common Pipistrelle Roost is properly safeguarded.			
NMT.2	Continue to support the Japanese Knotweed Management Plan for the North Mall Campus			
NMT.3	Maintain river, woodland, riverbanks, treelines and large trees, particularly along the river.			
NMT.4	Manage a proportion of the grassland habitats as Pollinator-Friendly Wildflower Meadows			
NMT.5	Enhance UCC North Mall Campus for biodiversity			
NMT.6	Increase awareness of and engagement with the biodiversity in North Mall Campus			
Actions		Pollinator-Friendly	Lead Department/s Personnel	Deadline
NMA.1	Ensure that a system is in place to highlight the presence of a bat roost if there are any plans for works to be undertaken in the building in which it is located. Further guidance is given in Appendix III		Buildings + Estates	Ongoing
NMA.2	Ensure that all relevant data on Japanese Knotweed and Himalayan Balsam that has been gathered during the UCC Biodiversity Survey is passed on to O' Donovan Agri-Environmental Services, the consultants who are undertaking the eradication programme.		Buildings + Estates	2018
NMA.2	Minimise the use of herbicides on North Mall Campus (perhaps limit it to footpaths and hardstanding areas).	✓	Buildings + Estates	Annually
NMA.3	Establish and Implement Grassland Management Programmes for wildflower meadows and wild pollinators to include Spring and Summer Meadows in North Mall Campus. (see Section 6 for more Information).	✓	Buildings + Estates; Green Forum	2019
NMA.4	Install two Grey Wagtail nest boxes for this Red Listed species in North Mall Campus. These should be mounted on a wall near the River Lee (e.g. underside of a bridge)		Buildings + Estates; Green Forum	2019
NMA.5	When (re)planting ornamental plants in borders and flowerbeds, consider planting native plants and/or nectar-rich ornamental plants and/or night-scented plants (see Appendix II for some suggested plant lists).	✓	Buildings and Estates; Green Forum	Ongoing
NMA.6	Create pollinator nesting sites on Main Campus – earth banks/bare soil/dry stone walls/bee hotels	✓	Buildings + Estates; Green Forum	2019
NMA.7	Establish monitoring programmes (e.g. for bats, butterflies, bees, hoverflies, wildflower meadows) for North Mall Campus and encourage students and staff to get involved.	✓	Buildings + Estates; Green Forum	2019
NMA.8	Provide information in suitable formats (information signs, apps etc.) to increase awareness of the biodiversity and the enhancement measures within North Mall Campus.	✓	Buildings + Estates; Green Forum	2019 and ongoing
NMA.9	Encourage student and staff engagement with some of the actions outlined here (e.g. NMA.3, NMA.4, NMA.6).		Green Forum	Ongoing
NMA.10	Commission further Biodiversity Surveys in future years as planned (see Section 3)		Buildings + Estates	Annually

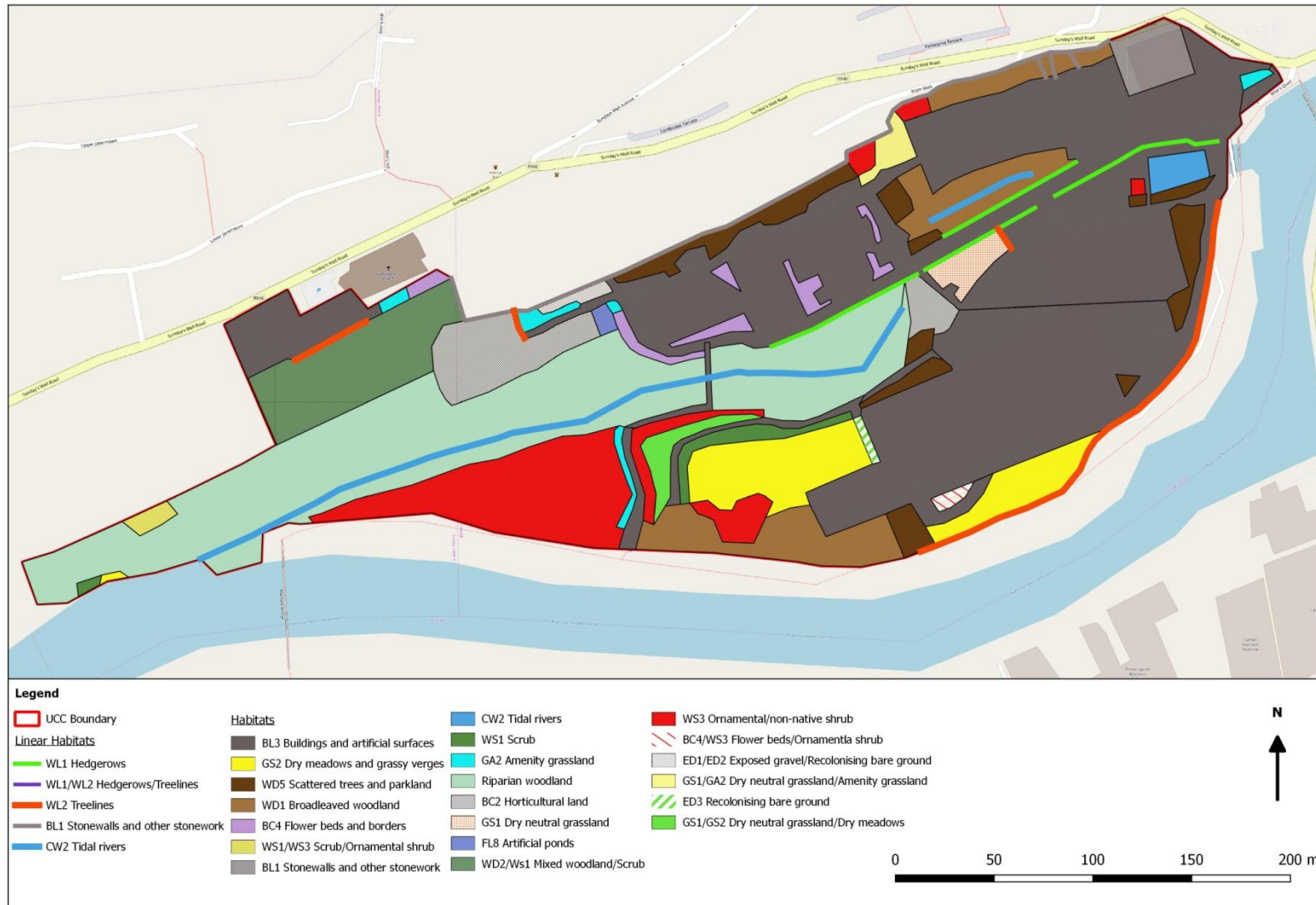


Figure 4. Map of habitats on North Mall Campus (mapped in 2014)

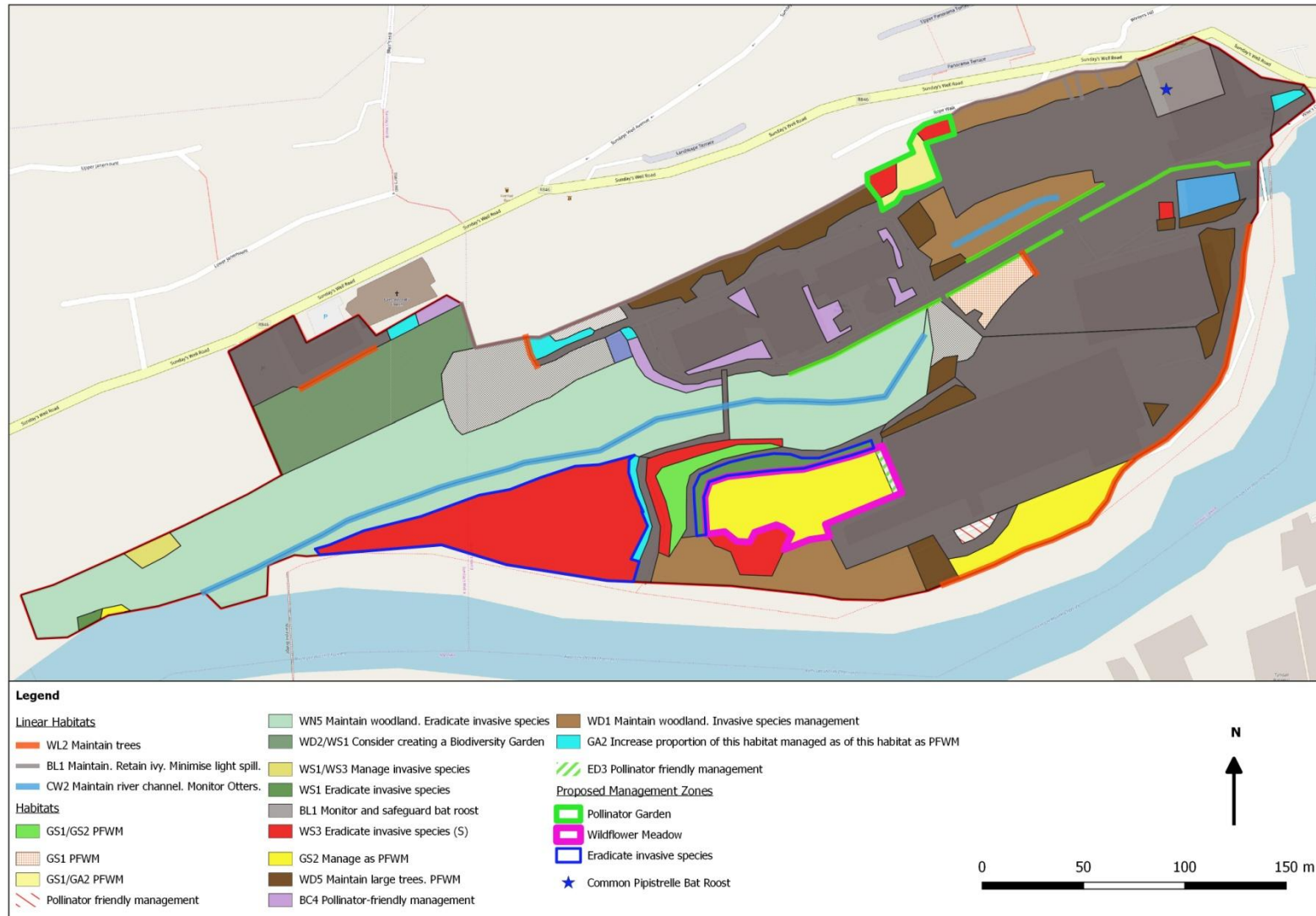


Figure 5 Map outlining management recommendations for North Mall Campus UCC. Refer to North Mall Management Plan for more details. NOTE: WS3 (S) refers to the WS3 habitat south of the Mill Race and PFWM refers to Pollinator-Friendly Wildflower Meadow.

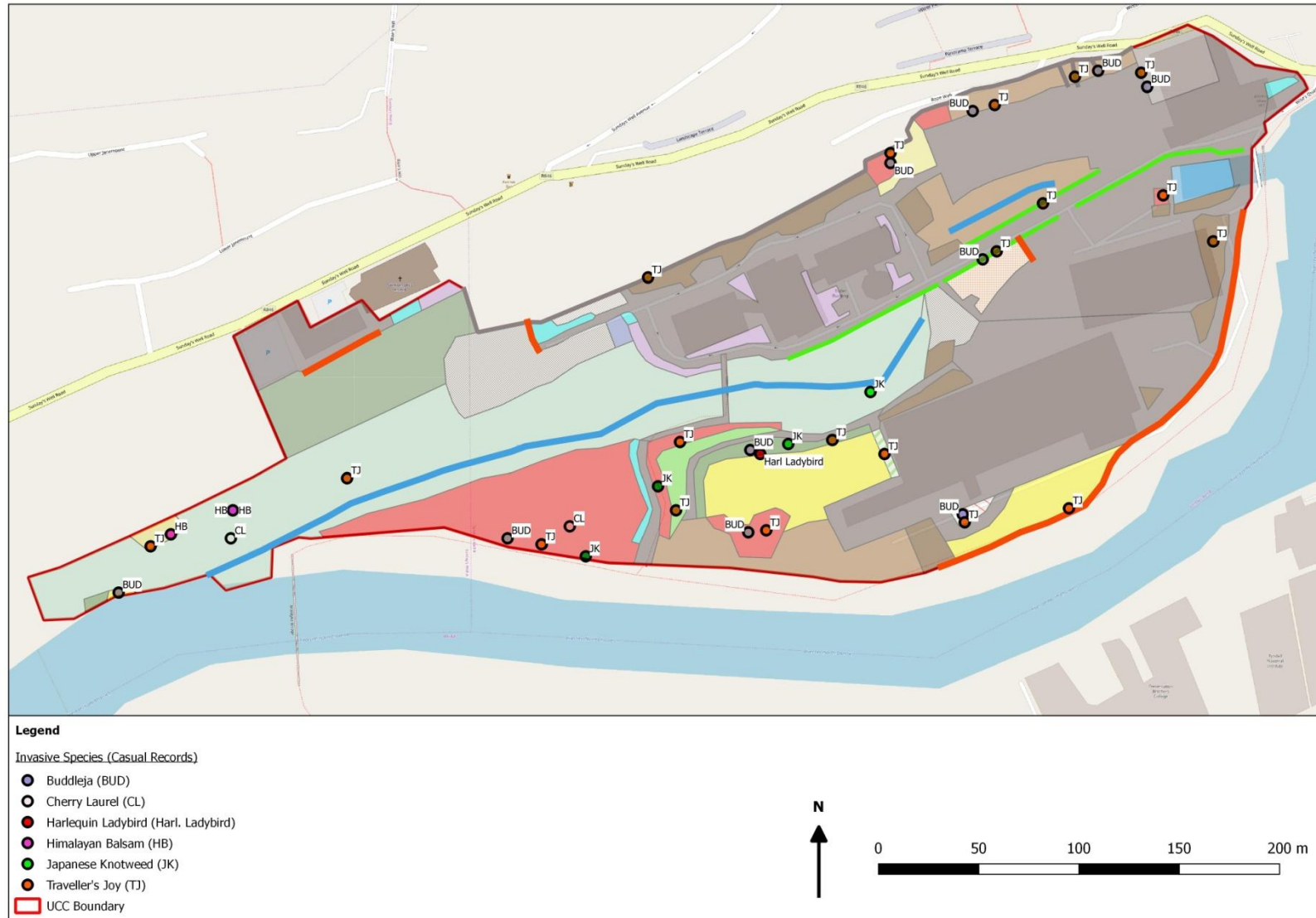


Figure 6 Approximate locations of invasive species recorded during UCC Biodiversity Surveys in 2014 and 2016 on the North Mall Campus.

UCC Western Campus Management Plan

The main habitats of biodiversity interest on the Western Campus are the Treelines (WL2) which have been assessed as being of **Moderate Local** importance for biodiversity. The treeline along the banks of the River Lee is likely to provide at least occasional bat roost sites and feeding habitat for bats. The remaining habitats on the Western Campus are generally of **Low Local** importance for biodiversity. However, the woodland on this campus, although highly modified, does provide some local value for biodiversity. Mature trees within the campus, particularly along the river, were identified as being among the best habitats for bats within this campus.

Although not strictly within the campus, the River Lee is obviously an important habitat here. An otter holt or resting place was identified just west of this campus by the Cork Nature Network survey in 2017.

Biodiversity enhancement measures that have been undertaken on Western Campus include:

- Two open-bottomed bat-boxes were erected on large trees on Western Campus. These were mounted in 2018.

UCC Western Campus Management Plan: Targets and Actions

Targets				
WCT.1	Maintain woodland, treelines and large trees, particularly along the river..			
WCT.2	Enhance UCC Western Campus for biodiversity			
WCT.3	Increase awareness of and engagement with the biodiversity within Main Campus			
Actions		Pollinator-Friendly	Lead Department/s Personnel	Timeline
WCA.1	Minimise the use of herbicides on Western Campus (perhaps limit it to footpaths and hardstanding areas).	✓	Buildings + Estates	Ongoing
WCA.2	Establish and Implement Grassland Management Programmes for wildflower meadows and wild pollinators to include Spring and Summer Meadows in Main Campus (see Section 6 for more Information).	✓	Buildings + Estates; Green Forum	2019
WCA.3	Create pollinator nesting sites on Western Campus – earth banks/bare soil/dry stone walls/bee hotels	✓	Buildings + Estates; Green Forum	2020
WCA.4	When (re)planting ornamental plants in borders and flowerbeds, consider planting native plants and/or nectar-rich ornamental plants and/or night-scented plants (see Appendix II for some suggested plant lists).	✓	Buildings and Estates; Green Forum	2019
WCA.5	Install bat boxes/tubes on the bridge over the River Lee in Western Campus (see guidelines at https://www.batconservationireland.org/wp-content/uploads/2013/09/BCI_Guidelines_waterways.pdf)		Green Forum	2020
WCA.6	Encourage student and staff engagement with some of the actions outlined here (e.g. WCA.3, WCA.4, WCA.5,).	✓	Buildings + Estates; Green Forum	Ongoing
WCA.7	Develop an Invasive Species Management Plan for Western Campus	✓	Buildings + Estates; Green Forum	2020
WCA.8	Provide information in suitable formats (information signs, apps etc.) and develop Biodiversity Walks through Western Campus.	✓	Buildings + Estates; Green Forum	Ongoing
WCA.9	Commission further Biodiversity Surveys in future years as planned (see Section 3)		Buildings + Estates	Annually

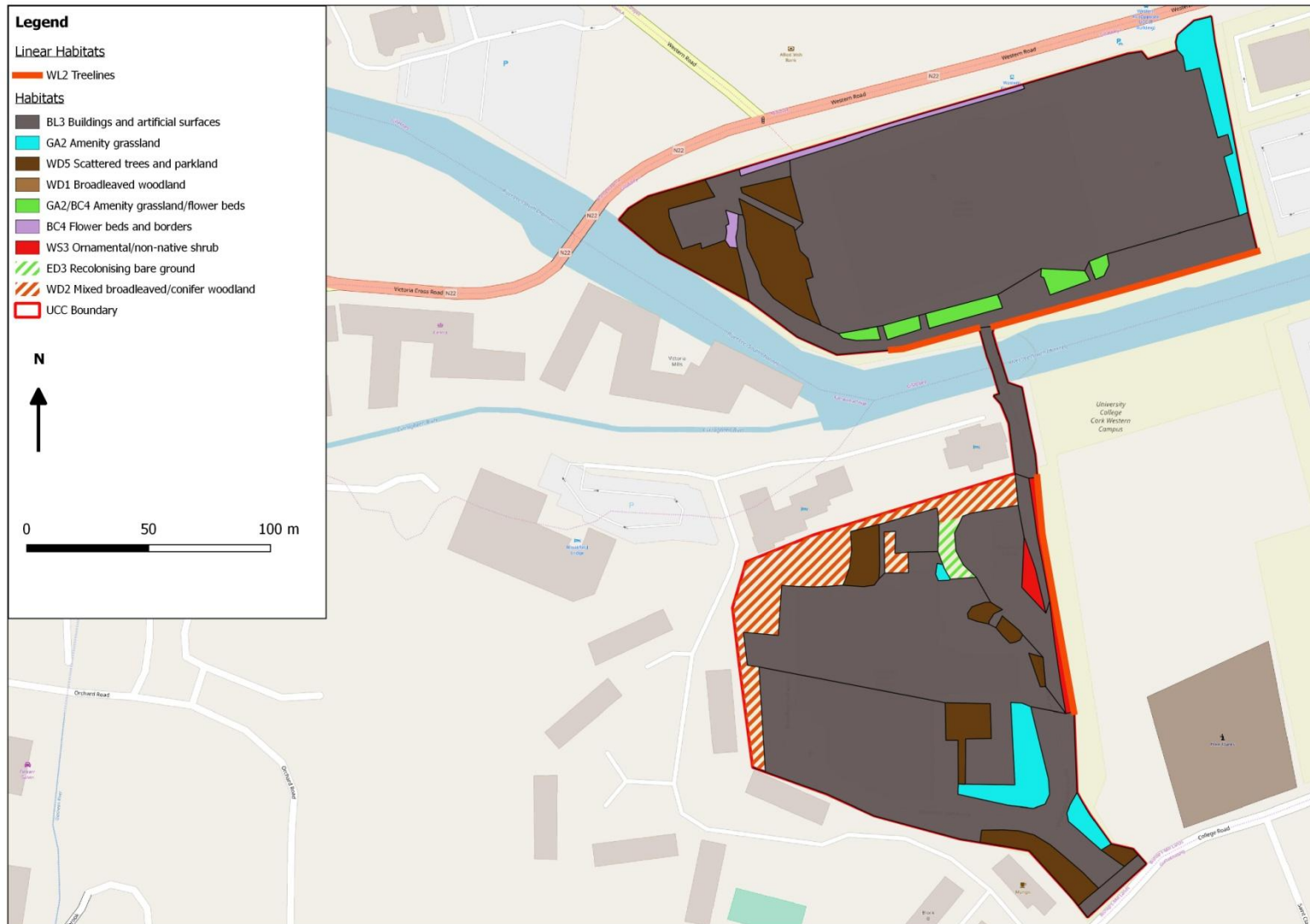


Figure 7. Habitat map of UCC Western Campus. Mapped in 2016

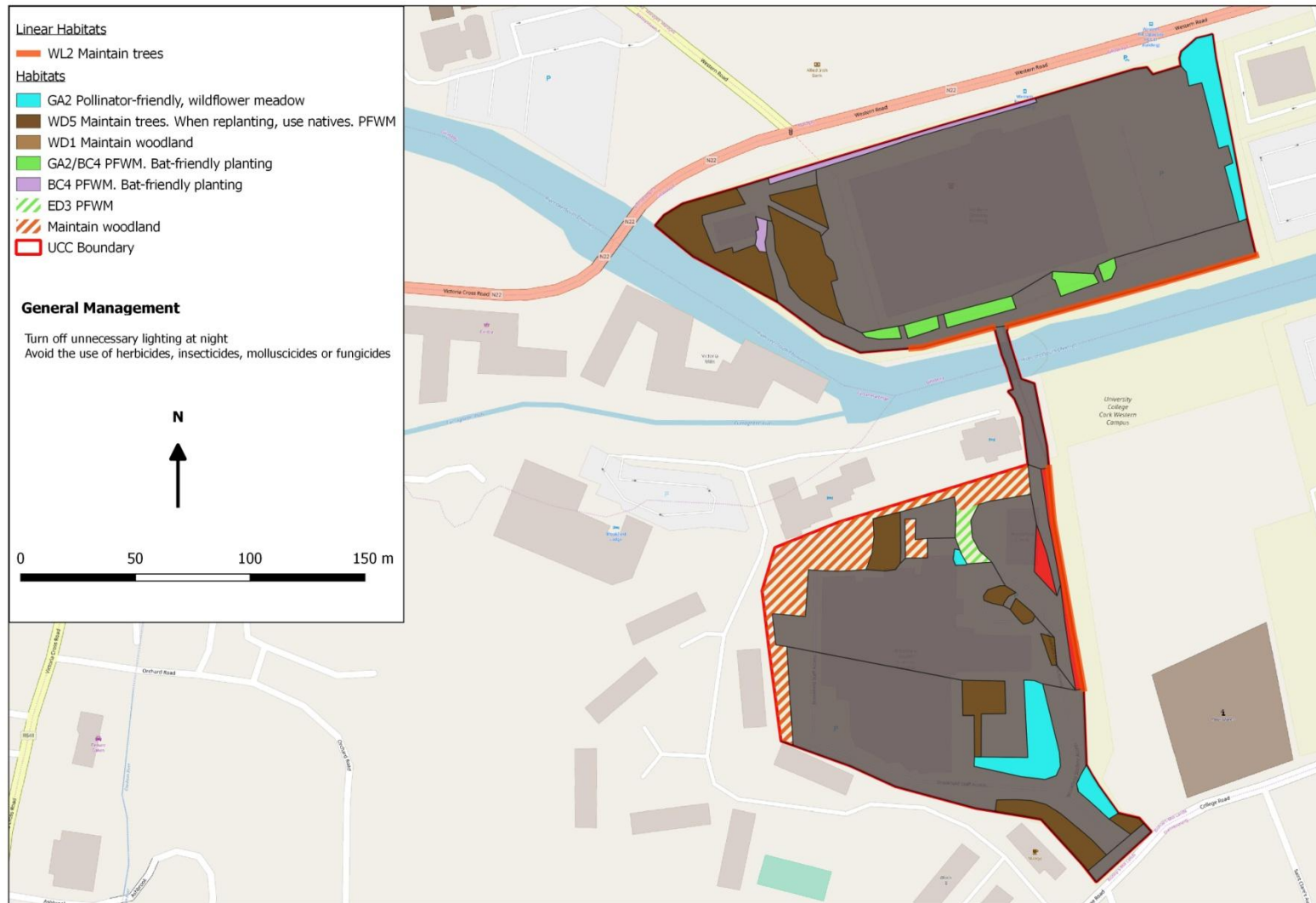


Figure 8. Map outlining management recommendations for Western Campus UCC. Refer to Western Campus Management Plan for more details. PFWM = Pollinator-friendly Wildflower Management.

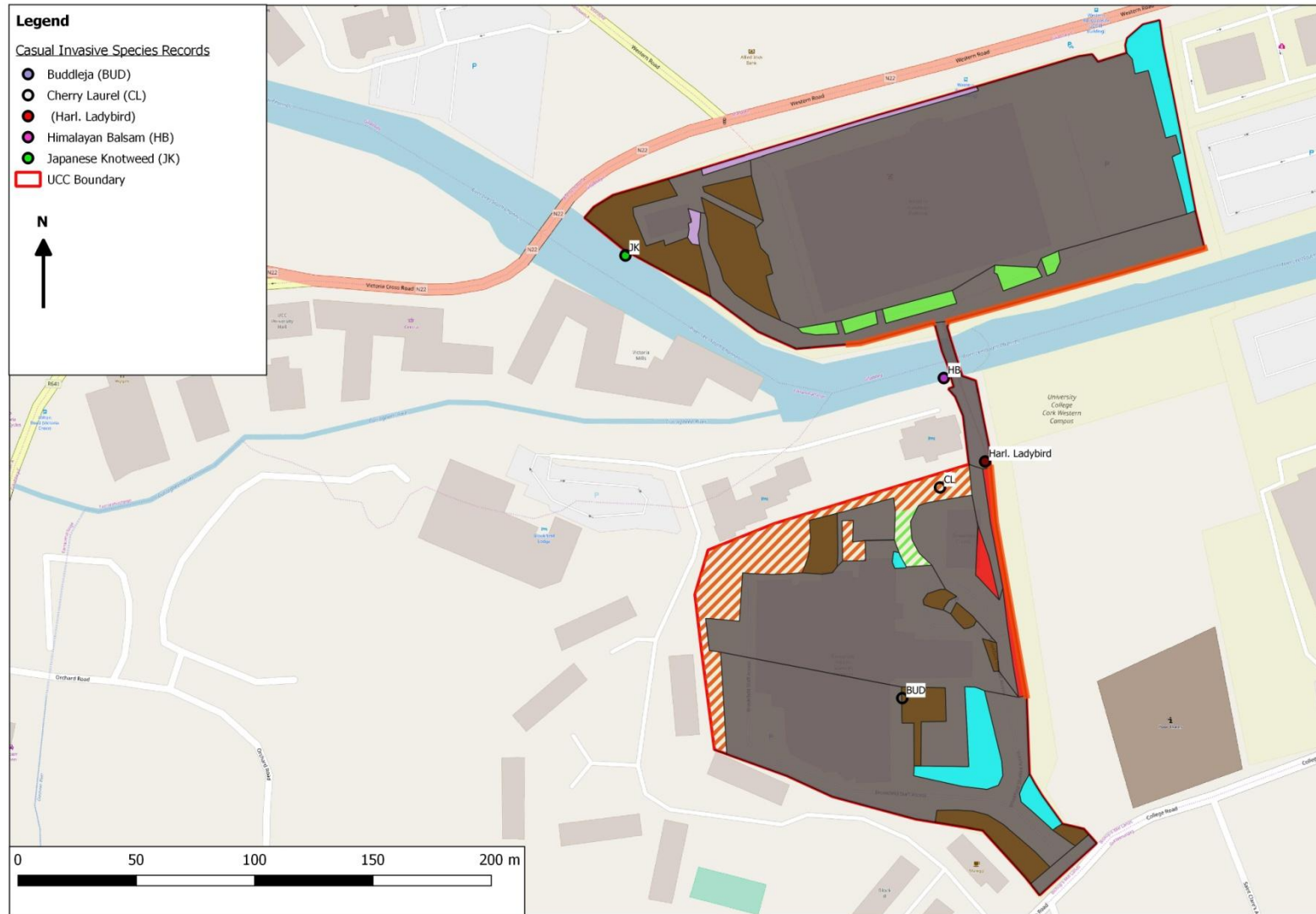


Figure 9. Map showing locations of casual records of invasive species on Western Campus recorded during the UCC Habitat Survey in 2016

UCC Mardyke Sports Campus Management Plan

UCC's Mardyke Sports Campus lies on the bank of the River Lee's North Channel. It is managed for sporting activities and the biodiversity value of most habitats here has been assessed as **low local** value to **negligible value** for biodiversity. One exception to this is the treeline/amenity grassland along the northern boundary. The trees here are used by bats, mostly pipistrelles, and this habitat has been assessed as being of **Moderate Local importance** for biodiversity.

In addition, the stonewall along the southern boundary has been assessed as **High Local Importance** for bryophytes due to the representative flora of calcareous walls that it supports including one species, Slender Stubble-Moss (*Gyroweisia tenuis*), which had never been recorded in the Mid-Cork Vice County before.

UCC Mardyke Campus Management Plan: Targets and Actions

Targets				
MSCT.1	Maintain treelines and large trees, particularly along the northern boundary.			
MSCT.2	Enhance UCC Mardyke Campus for biodiversity			
MSCT.3	Increase awareness of and engagement with the biodiversity within Main Campus			
Actions		Pollinator-Friendly	Lead Department/s Personnel	Timeline
MSCA.1	Minimise the use of herbicides on Mardyke Campus where possible.	✓	Buildings + Estates	Ongoing
MSCA.2	Manage small areas of grassland as Pollinator-friendly wildflower meadows, where possible.	✓	Buildings + Estates; Green Forum	2019
MSCA.3	When (re)planting ornamental plants in borders and flowerbeds, consider planting native plants and/or nectar-rich ornamental plants and/or night-scented plants (see Appendix II for some suggested plant lists).	✓	Buildings and Estates; Green Forum	2019
MSCA.4	Do not remove moss growth from stone walls where possible, particularly from the southern boundary wall.		Buildings and Estates; Green Forum	Ongoing
MSCA.5	Encourage student and staff engagement with some of the actions outlined here (e.g. MCA.2, MCA.3).	✓	Buildings + Estates; Green Forum	Ongoing
MSCA.6	Develop an Invasive Species Management Plan for the Mardyke Campus	✓	Buildings + Estates; Green Forum	2019
MSCA.7	Commission further Biodiversity Surveys in future years as planned (see Section 3)		Buildings + Estates	Annually

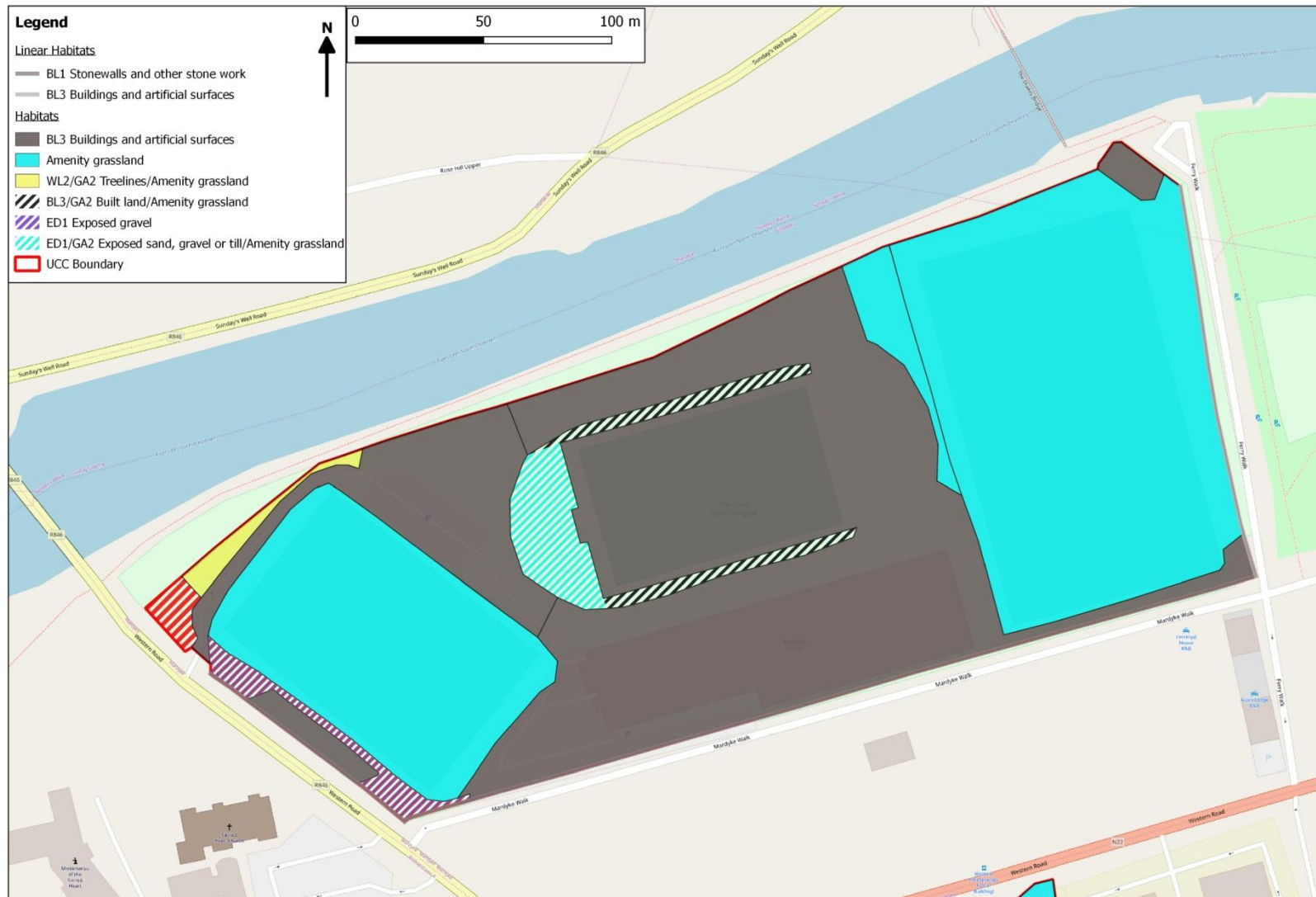


Figure 10. Habitat Map of UCC Mardyke Sports Campus. Mapped in 2016



Figure 11. Map outlining management recommendations for Mardyke Sports Campus UCC. Refer to Mardyke Sports Campus Management Plan for more details. PFWM = Pollinator-friendly Wildflower Management.

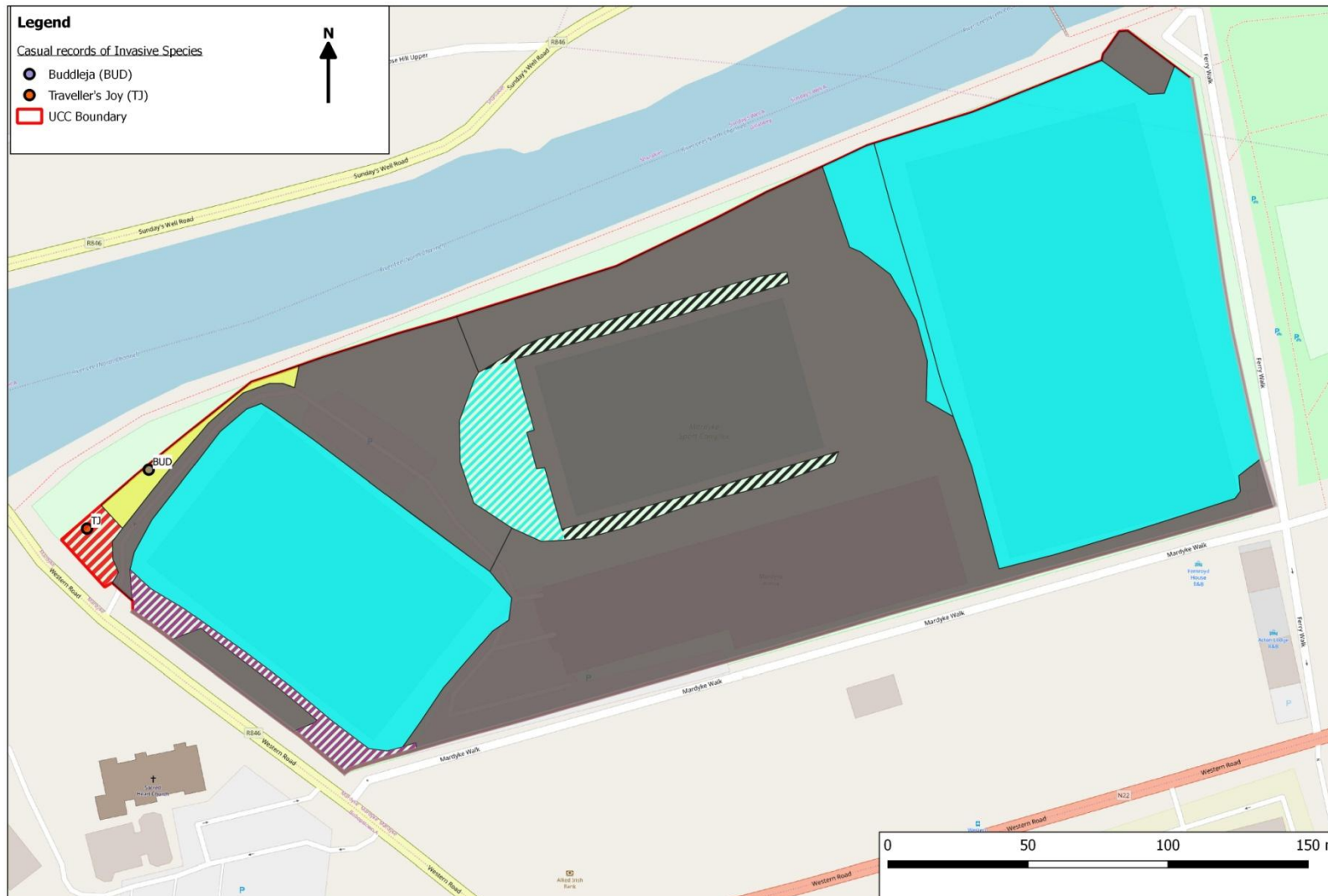


Figure 12. Map showing locations of casual records of invasive species recorded in Mardyke Sports Campus during the Habitat Survey in 2016

UCC ERI Campus Management Plan

The main habitat of conservation importance at the ERI Campus is the Riparian Woodland (WN5) which has also been classified as an Annex I habitat as defined under the EU Habitats Directive. It is a small (0.29ha) and recently developed example of Annex I 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*. While it has been classified as a habitat of international importance, due to its small size and fragmentary nature, it has been assessed as being of **County Importance**.

The Dry meadows and Grassy verges (GS2) habitat adjacent to the WN5 woodland was assessed as being of **Moderate Local Importance** for biodiversity.

The edge of the WN5 woodland where it borders the river was identified as the most important feature on site for bats as it provides feeding habitat with insect prey and shelter.

The Bryophyte Survey 2018 also identified the Riparian Woodland as the most important habitat on site for bryophytes. An oceanic liverwort was recorded growing on trees in the wet woodland and specialist species of floodzone habitats which have only scattered distributions in Ireland, were found growing at this site. In addition, an extensive colony of the uncommon hornwort, Smooth Hornwort (*Phaeoceros laevis*), was recorded at the ERI in an area of bare soil beside the building.

UCC ERI Campus Management Plan: Targets and Actions

Targets				
ERIT.1	Maintain WN5 Annex I 91E0 woodland habitat.			
ERIT.2	Enhance ERI Campus for biodiversity			
ERIT.3	Increase awareness of and engagement with the biodiversity within Main Campus			
Actions		Pollinator-Friendly	Lead Department/s Personnel	Timeline
ERIA.1	Maintain the WN5 Annex I 91E0 woodland habitat as it is.		Buildings + Estates	Ongoing
ERIA.2	Liaise with O' Donovan Agri-Environmental Services, the consultants who are undertaking the Invasive Species Control programme in UCC, to remove the Himalayan Balsam within the WN5 Annex I Woodland.		Buildings + Estates	2020
ERIA.3	Minimise the use of herbicides on ERI Campus (perhaps limit it to footpaths and hardstanding areas).	✓	Buildings + Estates; Green Forum	2019
ERIA.4	Manage small areas of grassland as Pollinator-friendly wildflower meadows.	✓	Buildings + Estates; Green Forum	2019
ERIA.5	When (re)planting ornamental plants in borders and flowerbeds, consider planting native plants and/or nectar-rich ornamental plants and/or night-scented plants (see Appendix II for some suggested plant lists).	✓	Buildings and Estates; Green Forum	2019
ERIA.6	Encourage student and staff engagement with some of the actions outlined here (e.g. ERIA.4, ERIA.5).	✓	Buildings + Estates; Green Forum	Ongoing
ERIA.7	Develop an Invasive Species Management Plan for the ERI Campus	✓	Buildings + Estates; Green Forum	2020
ERIA.8	Provide information in suitable formats (information signs, apps etc.) to increase awareness of the biodiversity features and the enhancement measures within the ERI Campus.	✓	Buildings + Estates; Green Forum	2020
ERIA.9	Commission further Biodiversity Surveys in future years as planned (see Section 3)		Buildings + Estates	Annually

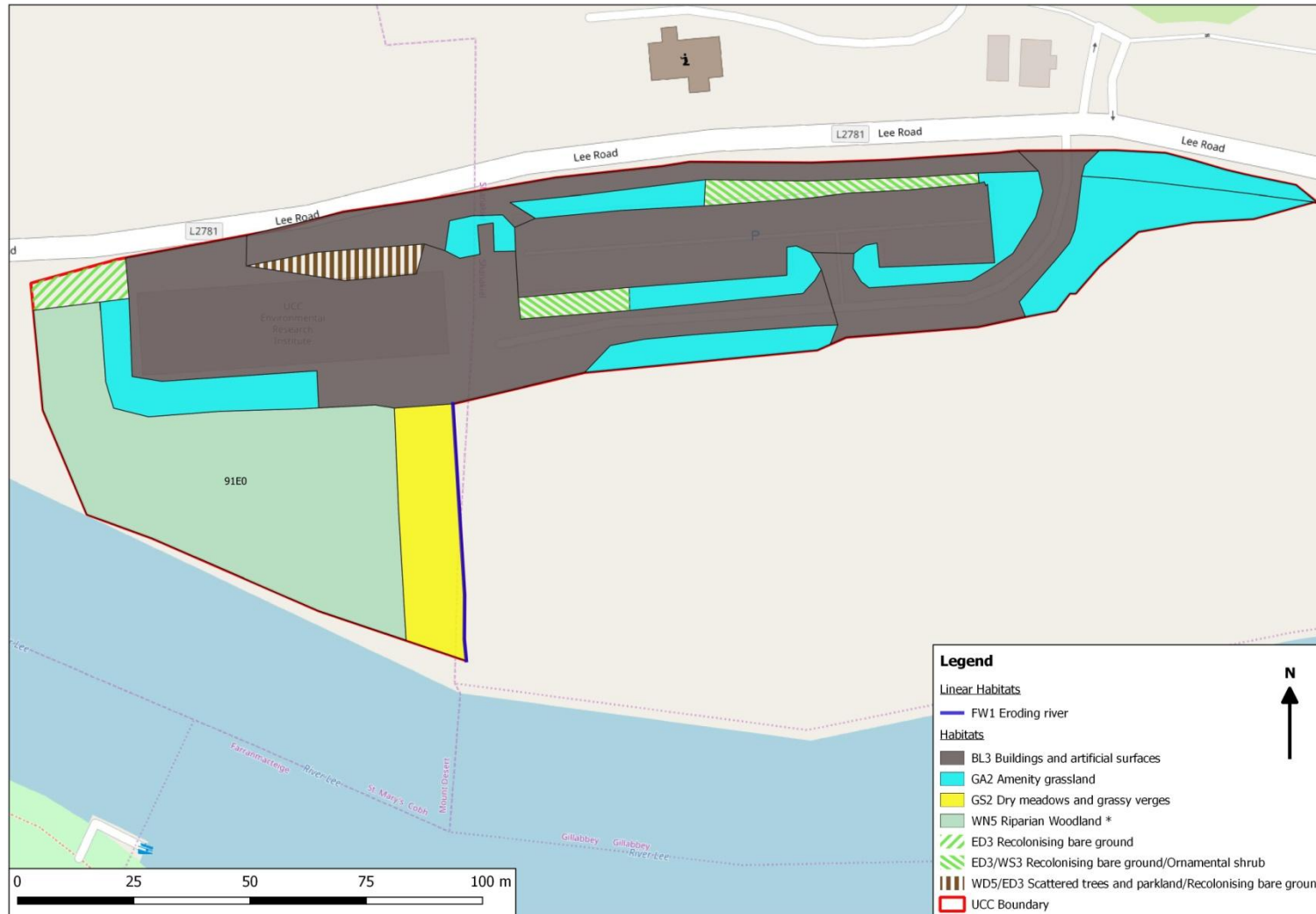


Figure 13. Habitat map of UCC ERI Campus. Mapped in 2016. NOTE: * indicates Priority Annex I Habitat – 91E0 Alluvial Forests with *Alnus glutinosa* and *Fraxinus excelsior*.

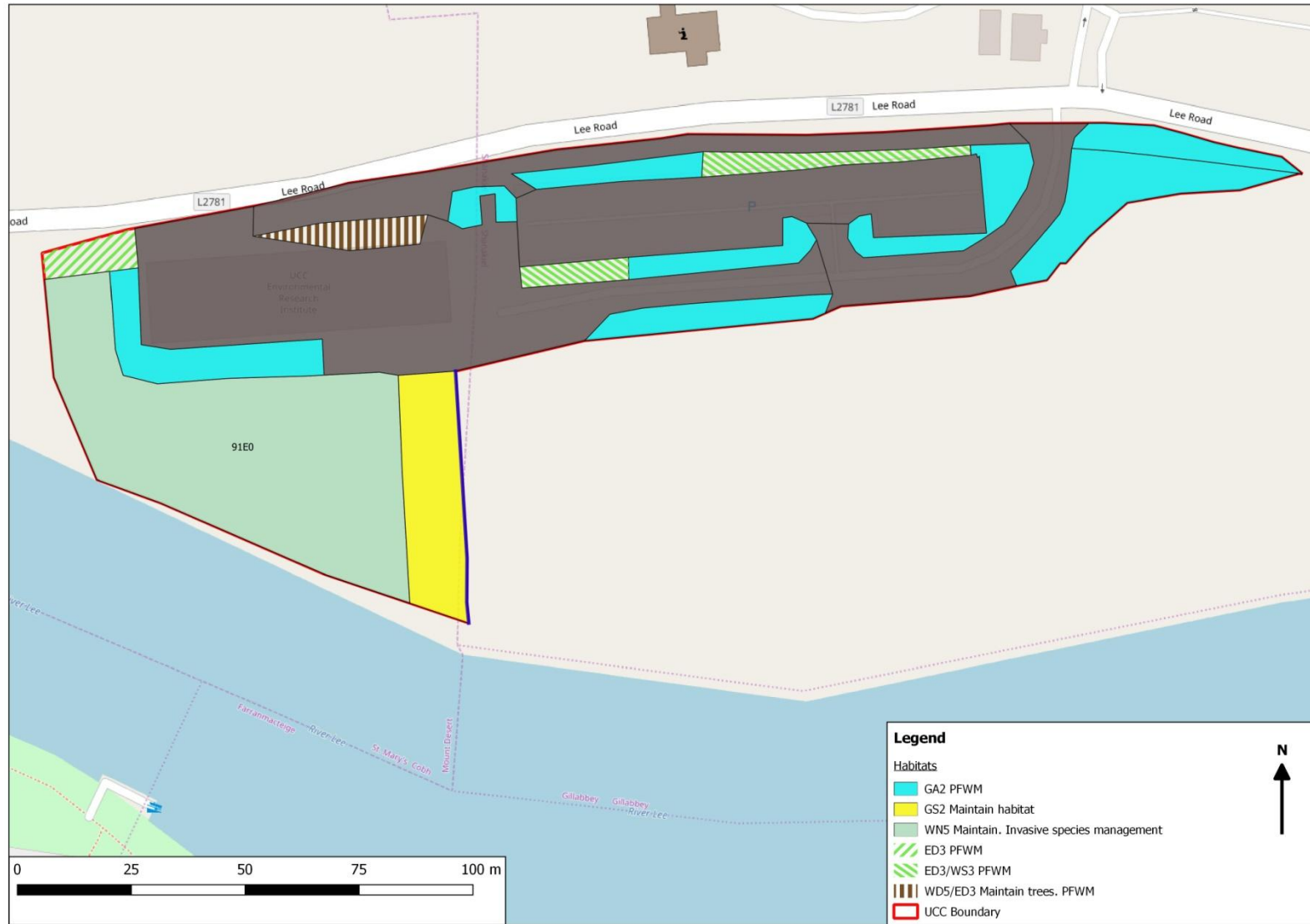


Figure 14. . Map outlining management recommendations for ERI Campus UCC. Refer to ERI Campus Management Plan for more details. PFWM = Pollinator-friendly Wildflower Management.

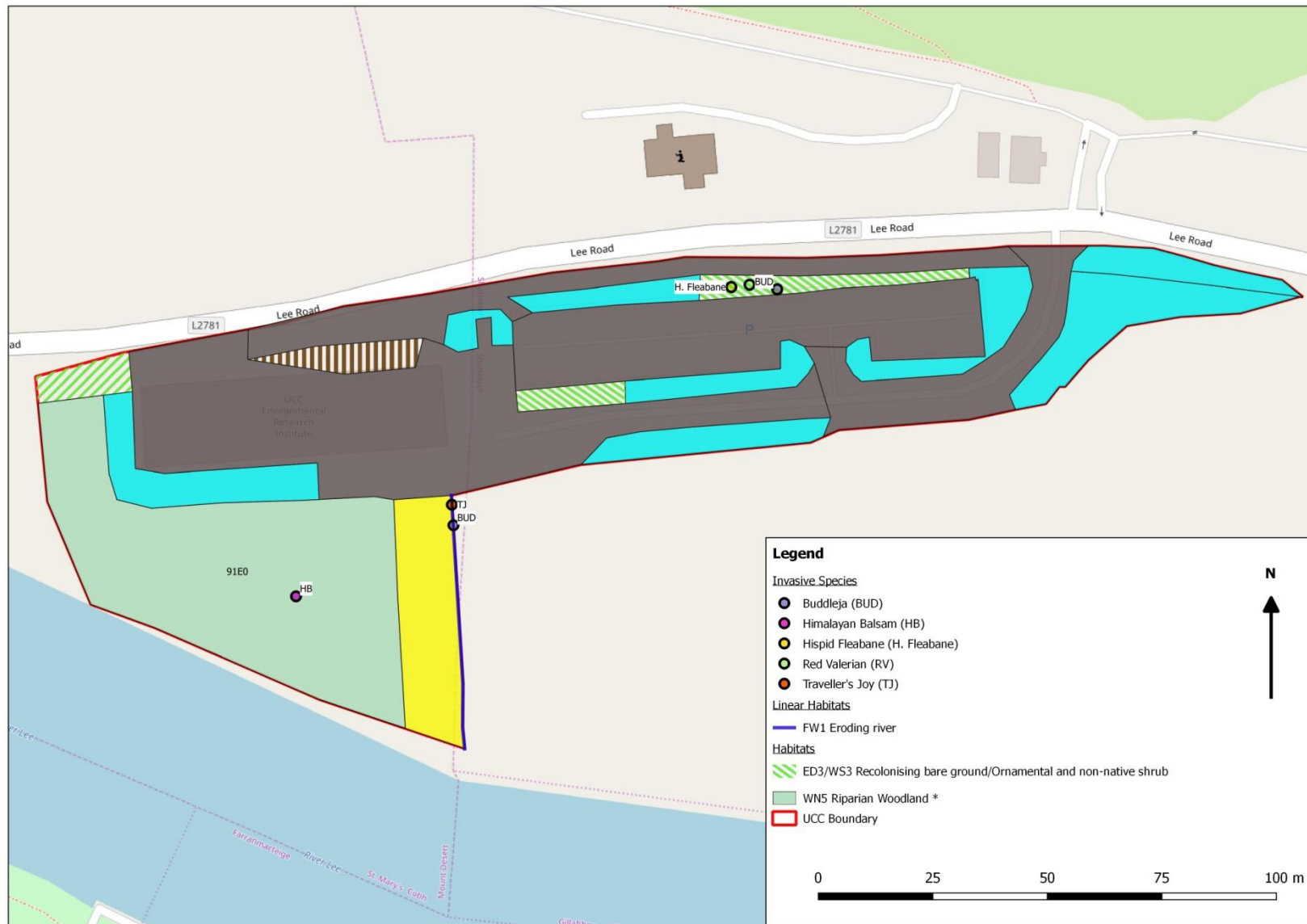


Figure 15. Map showing locations of casual records of invasive species recorded within ERI Campus during the Habitat Survey 2016

UCC Curraheen Sports Campus Management Plan

This Campus was converted from agricultural production to an outdoor sports-pitch facility for UCC. The hedgerows and treelines seem to have been largely retained. The grassland habitat is mainly managed intensively for the sporting facilities.

The habitats of greatest importance for biodiversity here are the relatively unmanaged habitats in the north-eastern section of the site where there is some Scrub/Dry Meadow habitat (GS2/WS1) and an area of Dry Meadows and Grassy Verges (GS2). These areas have been assessed to be of **Moderate Local Importance** for biodiversity.

All of the Hedgerows (WL1) and almost all of the Treelines (WL2) have also been assessed as being of **Moderate Local Importance** for biodiversity. The hedgerows are largely comprised of native species typical of this habitat such as Hawthorn, Blackthorn, Bramble, Common Nettle, Honeysuckle and Bracken. The treeline along the southern boundary is a relatively recently planted treeline and is of **Low Local Importance** for biodiversity. However, the remaining treelines, which are mainly along the northern boundaries, are much older with more mature trees and undergrowth. Hence, even though they are largely comprised of non-native species, they provide a richer habitat for local wildlife. Species here include Lodgepole Pine, Beech, Oak and Sycamore.

The Twopot River runs adjacent to the Curraheen Sports Campus along the eastern boundary. It flows in a northerly direction and joins the Curraheen River further downstream. This habitat further adds to the biodiversity within the site as it provides a freshwater habitat for a variety of species. Casual records here include Grey Wagtail, Grey Heron and Mallard. The river is small and channelised along some of its length and there is some rubbish present. It has been assessed as being of **Moderate Local Importance** for biodiversity.

The 2018 Bryological Survey concluded that the Sports Campus is of little significance for bryophytes. Two uncommon species were recorded from here: a moss species, *Didymodon nicholsonii*, which is occasional but spreading in Ireland, was recorded from an area of tarmac (BL3). A second moss species, *Bryum donianum*, which is infrequent in Ireland, was recorded on a wall near the entrance to the campus. A small section of this wall near the entrance to the Sports Campus supports good wall-top bryophytes and is of **Low Local Importance** for bryophytes.

UCC Curraheen Sports Campus Management Plan: Targets and Actions

Targets				
CST.1	Maintain habitats of highest value on the Sports Campus			
CST.2	Enhance ERI Campus for biodiversity			
CST.3	Increase awareness of and engagement with the biodiversity within Curraheen Sports Campus			
Actions		Pollinator-Friendly	Lead Department/s Personnel	Timeline
CSA.1	Allow natural succession to take place to scrub and perhaps woodland in the existing GS2/WS1 habitat.		Buildings + Estates; Green Forum	Ongoing
CSA.2	Manage the Dry Meadows and Grassy Verges (GS2) habitat in the north of the site as a pollinator friendly, wildflower meadow.	✓	Buildings + Estates; Green Forum	2019
CSA.3	Maintain treelines and hedgerows	✓	Buildings + Estates; Green Forum	ongoing
CSA.4	Remove rubbish from the Twopot River		Buildings + Estates; Green Forum	2019
CSA.5	Encourage student and staff engagement with some of the actions outlined here (e.g. CSA.4).	✓	Buildings and Estates; Green Forum	2019
CSA.6	If deemed appropriate, provide information in suitable formats (information signs, apps etc.) to increase awareness of the biodiversity features and the enhancement measures within Curraheen Sports Campus.	✓	Buildings + Estates; Green Forum	Ongoing
CSA.7	Commission further Biodiversity Surveys in future years as planned (see Section 3)	✓	Buildings + Estates; Green Forum	Ongoing

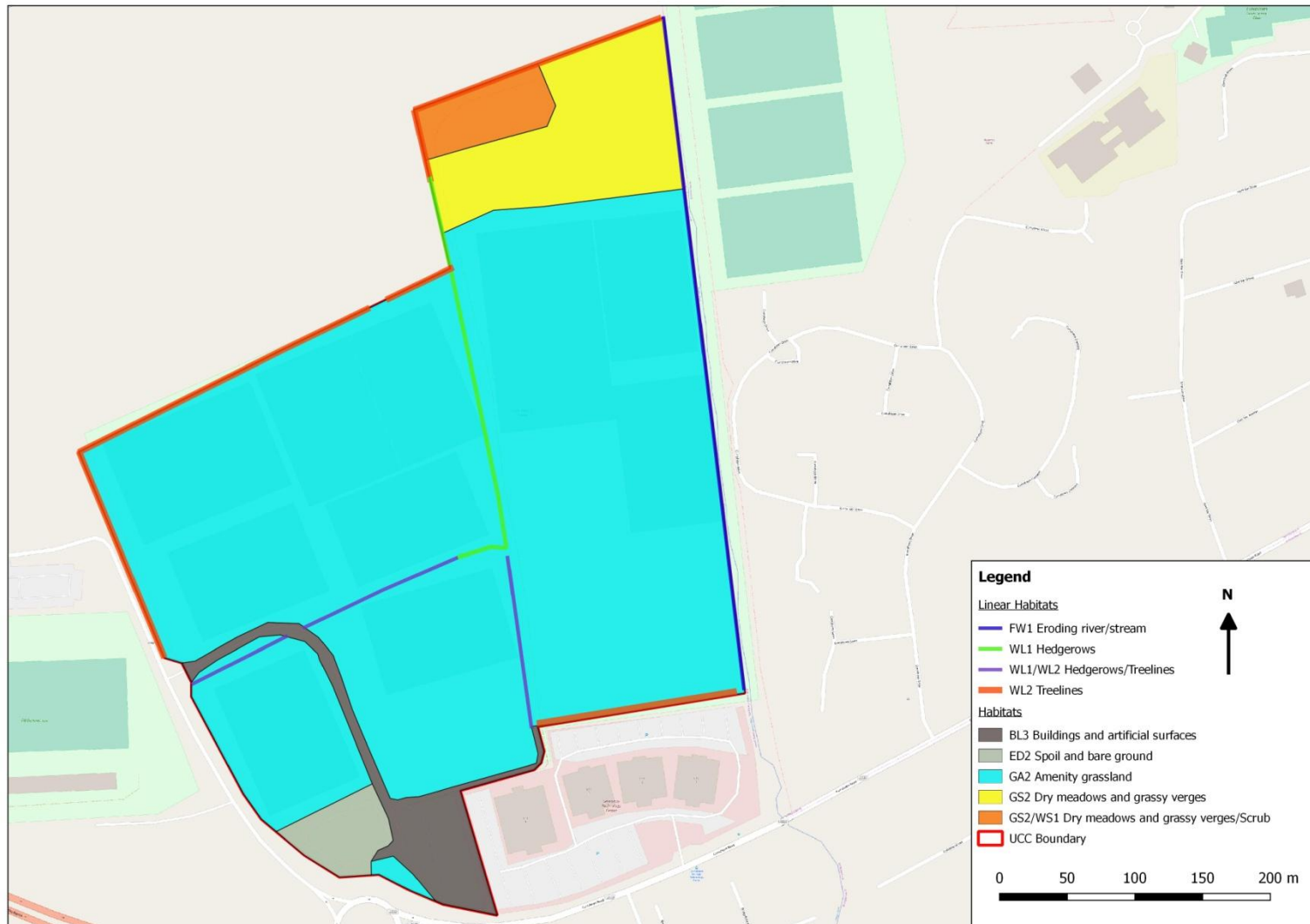


Figure 16. Habitat map of UCC Curraheen Sports Campus. Mapped in 2016

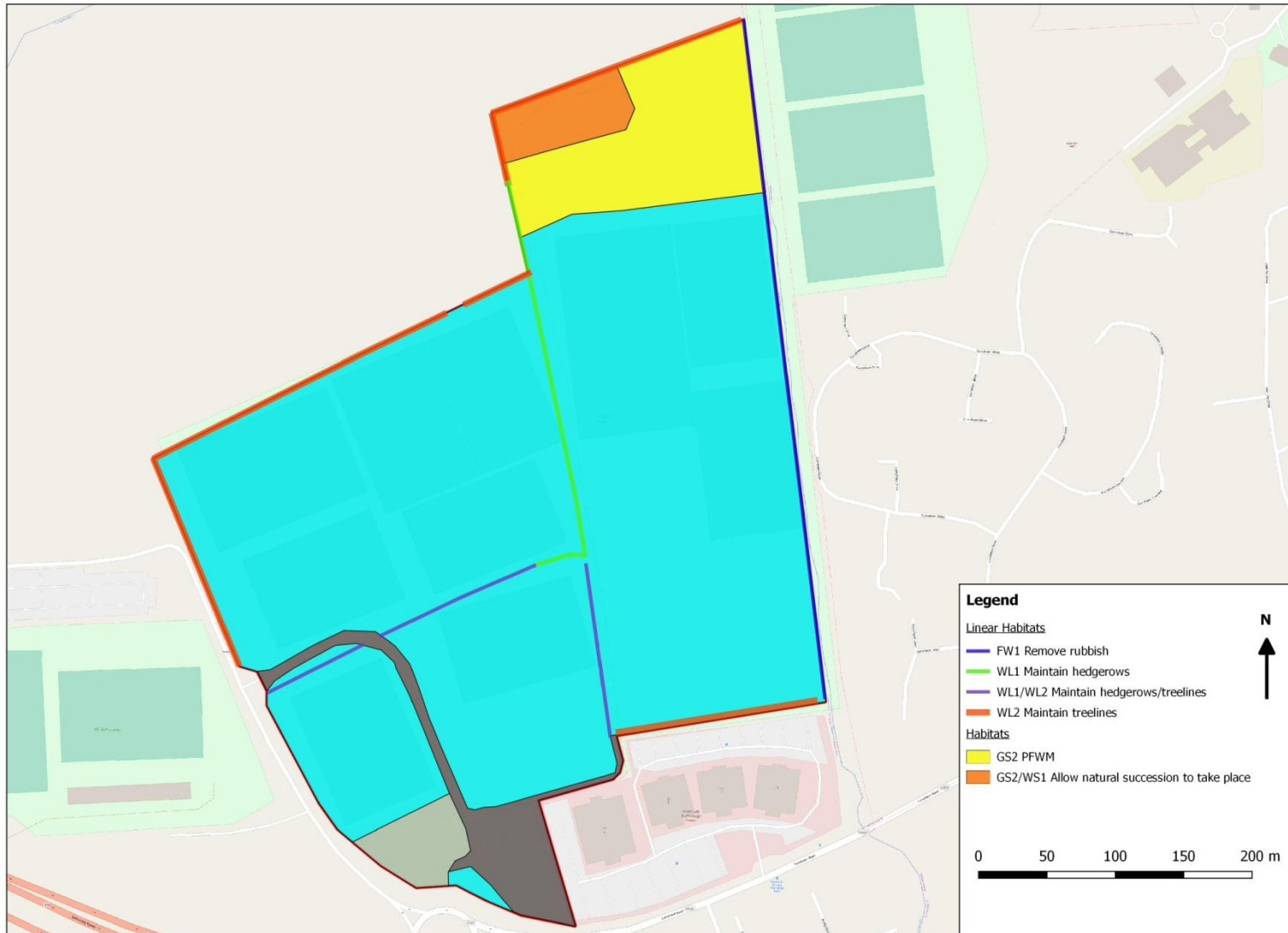


Figure 17. Map outlining management recommendations for Curraheen Sports Campus UCC. Refer to Curraheen Sports Campus Management Plan for more details. PFWM = Pollinator-friendly Wildflower Management.

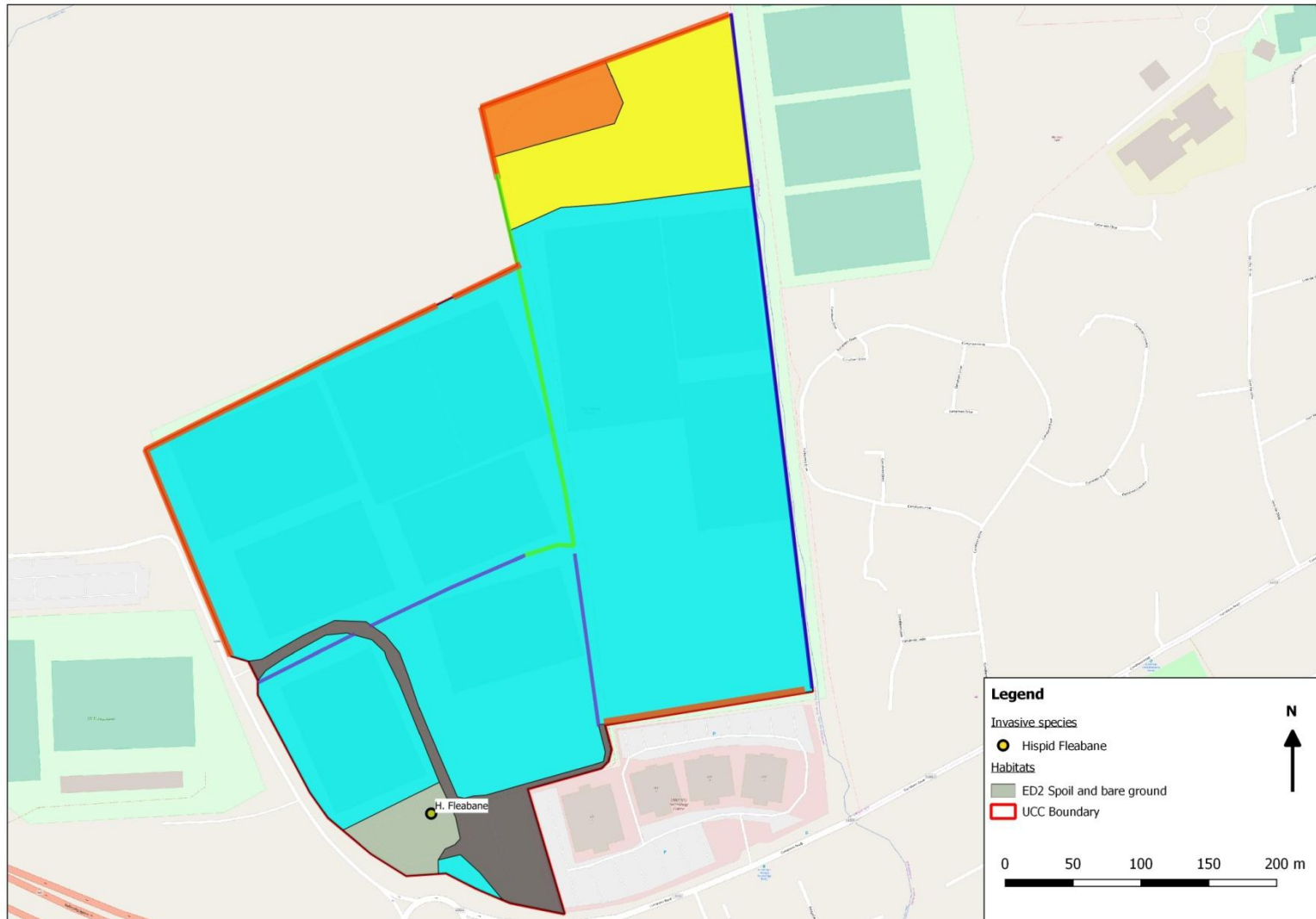


Figure 18. Map showing locations of casual records of invasive species recorded within Curraheen Sports Campus during the UCC Habitat Survey in 2016.

UCC Curraheen Agricultural Campus Management Plan

The UCC Agricultural Campus is currently managed for agriculture and is composed primarily of improved agricultural grassland (GA1), Treelines (WL2), Hedgerows (WL1) and Drainage Ditches (FW4), with a small area of Wet Grassland (GS4) in the north-eastern corner. The habitats of most value to biodiversity here are the semi-natural ones: Hedgerows, Treeline, Drainage Ditches and Wet Grassland. These have all been assessed as being of **Moderate Local Importance** for biodiversity.

The hedgerow along the eastern boundary includes a short section of exposed earth bank which seems to have rabbit holes and possibly solitary bee nest holes.

The Treeline is comprised mainly of mature Poplar and Beech trees and it may provide an important commuting habitat for the Brown Long-Eared Bats which were found to be roosting nearby.

A relatively large roost of an estimated 15 bats was located during the bat survey just to the west of the Agricultural Campus boundary. This roost is thought to be a maternity roost for the species.

Himalayan Honeysuckle and Traveller's Joy were recorded from the hedgerows.

Biodiversity enhancement measures that have been undertaken on Curraheen Agricultural Campus include:

- Two open-bottomed bat-boxes were erected on large trees on Curraheen Agricultural Campus. These were mounted in 2018.

UCC Curraheen Agricultural Campus Management Plan: Targets and Actions

Targets				
CAgT.1	Maintain habitats of highest value on the Sports Campus			
CAgT.2	Enhance Curraheen Agricultural Campus for biodiversity			
CAgT.3	Monitor the Brown Long-Eared bat roost			
CAgT.4	Increase awareness of and engagement with the biodiversity within Curraheen Agricultural Campus			
Actions		Pollinator-Friendly	Lead Department/s Personnel	Timeline
CAgA.1	Maintain treeline, hedgerows and wet grassland	✓	Buildings + Estates; Green Forum	Ongoing
CAgA.2	Manage the Wet Grassland (GS4) habitat in the north-eastern corner of the site as a pollinator friendly, wildflower wet meadow.	✓	Buildings + Estates; Green Forum	Ongoing
CAgA.3	Remove invasive plant species	✓	Buildings + Estates; Green Forum	Ongoing
CAgA.4	Establish a monitoring scheme for the Agricultural Campus to include pollinators and bats.	✓	Buildings + Estates; Green Forum	2019
CAgA.5	Encourage student and staff engagement with some of the actions outlined here (e.g. CAgA.4).	✓	Buildings and Estates; Green Forum	2020
CAgA.6	If deemed appropriate, provide information in suitable formats (information signs, apps etc.) to increase awareness of the biodiversity features and the enhancement measures within Curraheen Ag Campus.	✓	Buildings + Estates; Green Forum	Ongoing
CAgA.7	Commission further Biodiversity Surveys in future years as planned (see Section 3)	✓	Buildings + Estates; Green Forum	Ongoing

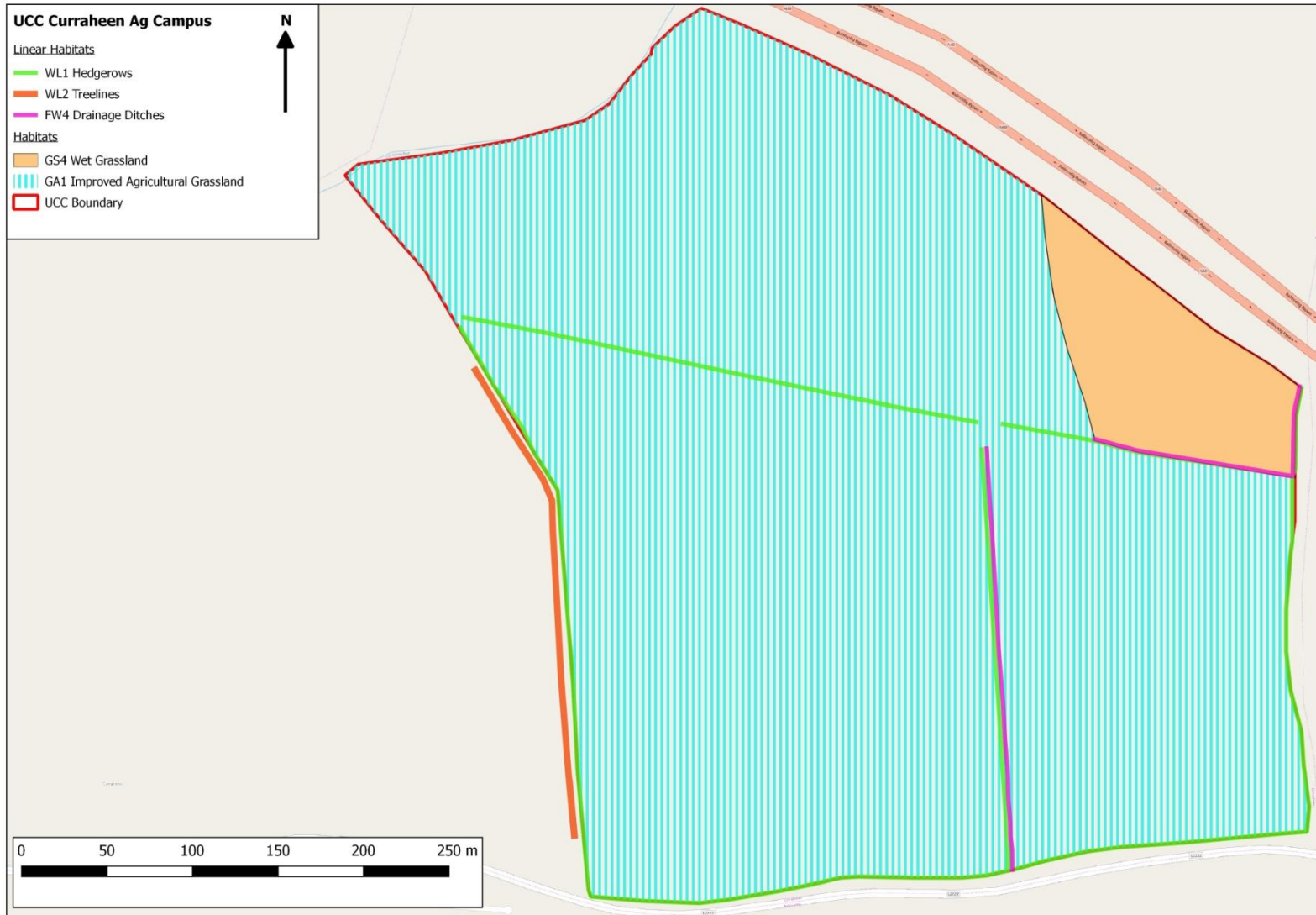


Figure 19. Habitat map of UCC Curraheen Agricultural Campus. Mapped in 2016.

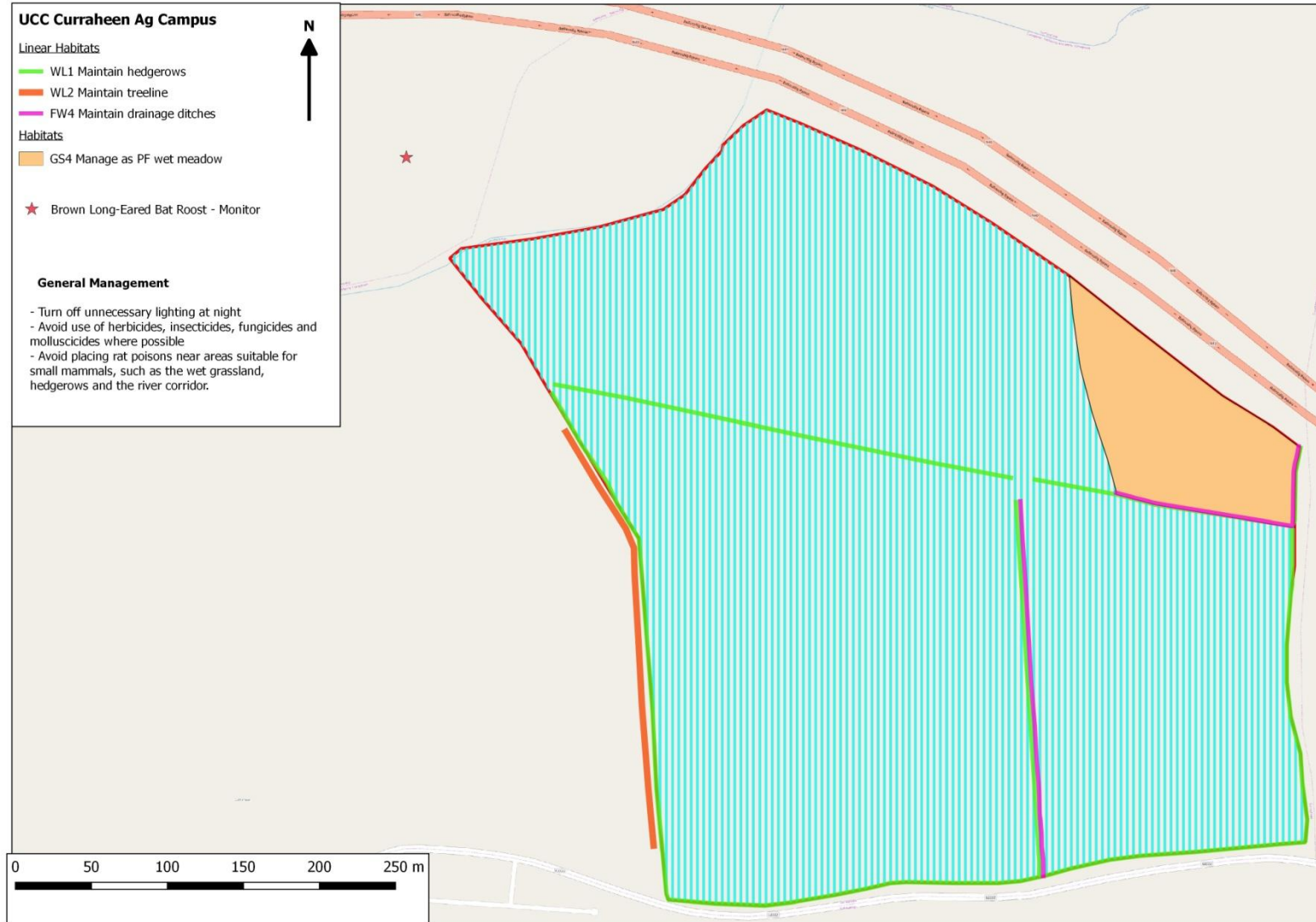


Figure 20. Map outlining management recommendations for Curraheen Agricultural Campus UCC. Refer to Curraheen Ag. Campus Management Plan for more details. PF = Pollinator-friendly.

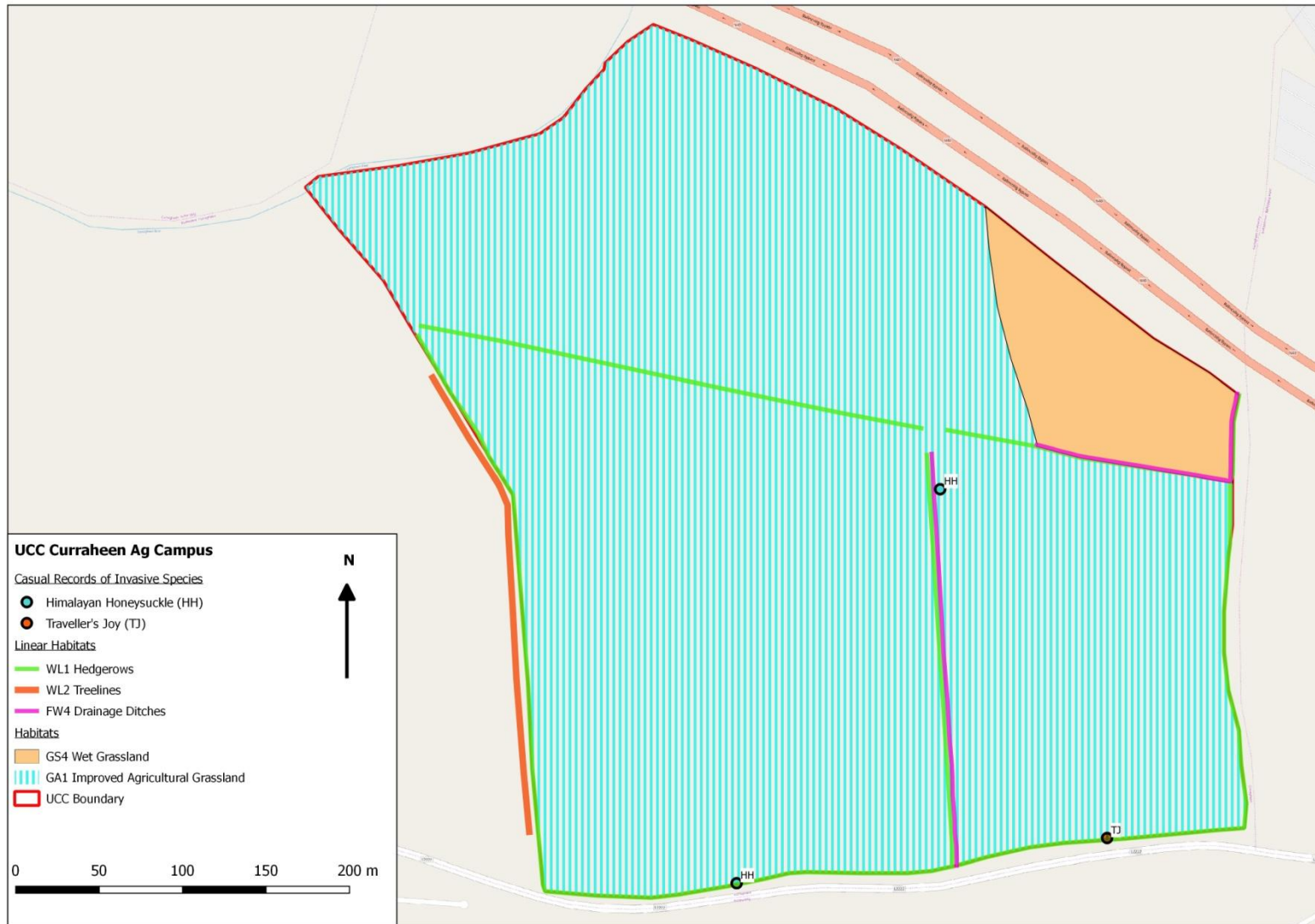


Figure 21. Map showing locations of casual records of invasive species recorded within Curraheen Ag. Campus during the UCC Habitat Survey 2016.

UCC Lough Hyne Campus Management Plan

Lough Hyne Campus has been surveyed for bats and bryophytes to date.

The bat survey was conducted in 2015 and found that there was little use of the site by bats due to its unsuitability – the vegetation is mainly low and scrubby and the buildings are all well sealed. However, the local area is known to be high in species richness for bats and four species were detected either on or immediately adjacent to the site over the lake: Common and Soprano Pipistrelle, Leisler's and Daubenton's bats.

The bryophyte survey at Lough Hyne was conducted in 2018. It found a number of species of interest.

- Green-tufted Stubble-moss (*Weissia controversa* var. *densifolia*), a **Nationally Scarce** species, was recorded from beside the Kitching Lab at Lough Hyne.
- A number of species of oceanic distribution were recorded, including Killarney Featherwort (*Plagiochila bifaria*), Straggling Pouchwort (*Saccogyna viticulosa*) and Spotty Fingers Liverwort (*Frullania fragilifolia*), species which are **restricted mainly to the west of Ireland**, where they are not uncommon.
- Species **restricted to coastal habitats**, particularly Seaside Grimmia (*Schistidium maritimum*) and Yellow Crisp-moss (*Tortella flavovirens*) were also recorded at Lough Hyne.

A Management Plan has not been developed for this site as not enough data has yet been gathered.

6 WILDFLOWER MEADOW GRASSLAND MANAGEMENT

Managing some of the grassland habitats within the UCC Campus for wildflowers and pollinators will be a major method of enhancing the biodiversity value of the campus and will be of great benefit to pollinators by providing food sources and nest sites. It could also be a way of increasing awareness of the importance of biodiversity through volunteer work, information signs and workshops and passive education.

6.6 *Managing Existing Grasslands as Wildflower Meadows*

The basis of wildflower meadow management is to favour the growth of wildflowers rather than grasses. This can be done quite simply and cheaply:

- Reduce the frequency of mowing in existing grassland areas
- Remove all cuttings from the grassland
- Eliminate the use of pesticides (herbicides, fungicides, insecticides) and fertilisers in the wildflower meadows

This management method can be undertaken to cover the complete grassland site, smaller patches or even strips within the grassland. Paths and open areas can be kept mown within the meadow to encourage people to walk through and appreciate the wildflower meadow.

This method is favoured over sowing commercial wildflower seed mixes as it reduces the risk of introducing non-native plants into the grassland. Many of the commercial wildflower seed mixes include species that are not native to Ireland.

A number of options are available and there are good guidelines available from the All-Ireland Pollinator Plan website (<http://www.biodiversityireland.ie/projects/irish-pollinator-initiative/all-ireland-pollinator-plan/resources/>.) For instance, in the *Guidelines for Gardens: Actions to Help Pollinators* (available at http://www.biodiversityireland.ie/wordpress/wp-content/uploads/Gardens_actions-to-help-pollinators-July-2016.pdf), a few straightforward options are outlined:

1. Delay cutting the grassland until mid-April to allow Dandelions to flower. If you wish, you may continue the normal cutting regime after this.
2. Mow the grass every six weeks to allow flowers like Clover to bloom.
3. Delay cutting the grass until mid-April to allow the Dandelion flowers to bloom. Then do not cut again until the end of summer, in late August or September. If grass growth is very strong and the vegetation starts to fall over under its own weight, then cut once in July and again in September. Remove cuttings after each cut to prevent nutrients building up, which would favour grasses rather than wildflowers.

A mix of all three options could be used across UCC Campus in different places to suit different aims and objectives.

6.7 *Creating a New Wildflower Meadow*

Another method is to create a wildflower meadow from scratch. This will involve more site preparation and the sourcing of suitable wildflower seed of native provenance.

6.8 *Combination Method*

A combination of the two methods can be employed across a site or even within the same small area. For instance, if a lawn is left to grow long, plugs can be planted to enhance the species richness within the new meadow.

For more information on how to create a new wildflower meadow using seed see the following resources:

<http://www.biodiversityireland.ie/wordpress/wp-content/uploads/Pollinator-How-to-Guide-4-wildflower-FINAL.pdf>

<http://www.biodiversityireland.ie/wordpress/wp-content/uploads/Pollinator-Council-Guide-Planting-Code-FINAL.pdf>

7 OTTER ENHANCEMENT MEASURES

Otter (*Lutra lutra*) is protected under EU legislation as a species listed on Annex IV of the Habitats Directive. As such, it is a species requiring strict protection and a person who “deliberately captures, kills or disturbs a specimen in the wild, or who damages or destroys a breeding site or resting place of such an animal, is guilty of an offence” (NPWS, 2009).

The River Lee is an important habitat for Otter, including where it flows through and/or adjacent to UCC properties. As a result, it would be of benefit to both the Otter and UCC to ensure that there is ample habitat for the otter within its campus.

Otters need access to several undisturbed areas of cover along the riverbank within their territory for resting and hiding during the day while they are not hunting within the river. They also need access to sprainting sites so that they can continue to communicate and breed successfully, and areas where they can process prey out of the water. A number of otter enhancement measures could be undertaken in UCC:

- Where a bridge is unlikely to provide ample space over the water during a high water/flood event, an otter ledge should be installed above the high water level to allow otters to move upstream or downstream of the bridge. If this ledge spans the entire length of the bridge and is to be accessed from the riverbank, suitable scrub habitat should be present along the riverbank to guide the otters to the ledge. A ledge would also provide a sprainting site, which is an important part of otter communication.
- Create a wetland habitat, such as a reedbed, perhaps at Perrott’s Inch on Main Campus. A linking habitat (a habitat with tall vegetation where they could remain out of sight) between the river and reed bed would also be important. Appropriate measures would need to be taken to ensure that such enhancement measures do not cause the spread of invasive species.
- Create suitable undisturbed and hidden habitat for otter along the river (e.g. dense scrub, wood piles, rock piles with crevices). This would also provide habitat for other species including invertebrates, hedgehogs and other small mammals.
- Minimise lighting along the river as otters are light-averse. This also benefits bats.

8 REFERENCES

National Biodiversity Data Centre (2018). *Biodiversity Maps*. Available at <https://maps.biodiversityireland.ie/Map> [accessed on 26th March 2018)

National Biodiversity Data Centre (2016). *Gardens: Actions to Help Pollinators*. Available at: <http://www.biodiversityireland.ie/projects/irish-pollinator-initiative/all-ireland-pollinator-plan/resources/>

Ryan Hanley (in association with McCarthy Keville and O'Sullivan) (2016). *Lower Lee (Cork City) Drainage Scheme : Environmental Impact Statement. Main Report*. Available at <http://www.lowerleefrs.ie/project-info-environmental-impact.html>

9 APPENDICES

9.1 Appendix I – Existing Bird Records for UCC Campus

Bird Records: North Mall Campus. Source: Dario Fernandez-Bellon, UCC.

Common Name	Scientific Name	O*	R*	B*
Little grebe	<i>Tachybaptus ruficollis</i>	x		
Great cormorant	<i>Phalacrocorax carbo</i>		x	
Grey heron	<i>Ardea cinerea</i>		x	
Little egret	<i>Egretta garzetta</i>		x	
Mute swan	<i>Cygnus olor</i>		x	
Mallard	<i>Anas platyrhynchos</i>		x	
Eurasian sparrowhawk	<i>Accipiter nisus</i>		x	x
Eurasian buzzard	<i>Buteo buteo</i>	x		
Eurasian kestrel	<i>Falco tinnunculus</i>	x		
Peregrine falcon	<i>Falco peregrinus</i>	x		
Ring-necked pheasant	<i>Phasianus colchicus</i>	x		
Common moorhen	<i>Gallinula chloropus</i>		x	
Eurasian oystercatcher	<i>Haematopus ostralegus</i>	x		
Eurasian curlew	<i>Numenius arquata</i>	x		
Common gull	<i>Larus canus</i>		x	
Herring gull	<i>Larus argentatus</i>		x	
Black-headed gull	<i>Chroicocephalus ridibundus</i>		x	
Rock pigeon	<i>Columba livia</i>		x	
Common wood pigeon	<i>Columba palumbus</i>		x	
Eurasian collared dove	<i>Streptopelia decaocto</i>		x	
Barn owl	<i>Tyto alba</i>	x		
Common swift	<i>Apus apus</i>		x	
Common kingfisher	<i>Alcedo atthis</i>		x	
Sand martin	<i>Riparia riparia</i>		x	
Barn swallow	<i>Hirundo rustica</i>		x	
Common house martin	<i>Delichon urbicum</i>		x	
Pied wagtail	<i>Motacilla alba</i>		x	

Common Name	Scientific Name	O*	R*	B*
Grey wagtail	<i>Motacilla cinerea</i>		x	
Goldcrest	<i>Regulus regulus</i>		x	
Bohemian waxwing	<i>Bombycilla garrulus</i>	x		
Eurasian wren	<i>Troglodytes troglodytes</i>		x	x
Dunnock	<i>Prunella modularis</i>		x	x
Eurasian blackbird	<i>Turdus merula</i>		x	x
Redwing	<i>Turdus iliacus</i>		x	
Song thrush	<i>Turdus philomelos</i>		x	x
Common chiffchaff	<i>Phylloscopus collybita</i>		x	
Eurasian blackcap	<i>Sylvia atricapilla</i>		x	
Spotted flycatcher	<i>Muscicapa striata</i>		x	x
European robin	<i>Erithacus rubecula</i>		x	x
Long-tailed tit	<i>Aegithalos caudatus</i>		x	
Coal tit	<i>Periparus ater</i>		x	
Great tit	<i>Parus major</i>		x	x
Eurasian blue tit	<i>Cyanistes caeruleus</i>		x	x
Eurasian treecreeper	<i>Certhia familiaris</i>		x	
Eurasian jay	<i>Garrulus glandarius</i>		x	
Eurasian magpie	<i>Pica pica</i>		x	
Eurasian jackdaw	<i>Corvus monedula</i>		x	
Rook	<i>Corvus frugilegus</i>		x	
Common raven	<i>Corvus corax</i>	x		
Hooded crow	<i>Corvus cornix</i>		x	
European starling	<i>Sturnus vulgaris</i>		x	
Common chaffinch	<i>Fringilla coelebs</i>		x	
European greenfinch	<i>Chloris chloris</i>		x	
Eurasian siskin	<i>Spinus spinus</i>		x	
European goldfinch	<i>Carduelis carduelis</i>		x	
Eurasian bullfinch	<i>Pyrrhula pyrrhula</i>	x		
House sparrow	<i>Passer domesticus</i>		x	

* O = Occasional; R = Regular; B = Breeding

Bird Records: Casual records from various UCC Campuses made during either the Biodiversity Survey 2014-2016 (CL and IA) or from UCC staff (DF).

Common Name	Scientific Name	B*	Recorder**	Campus
Spotted Flycatcher	Musciapa striata	✓	DF	Main
Jay	Garrulus glandarius	✓	DF	Main
Raven	Corvus corax		DF	Main
Swift	Apus apus		DF	Main
Grey Wagtail	Motacilla cinerea		IA	Main
Kingfisher	Alcedo atthis		IA	Main
Rook	Corvus frugilegus		CL	Curr. Sports
Magpie	Pica pica		CL	Curr. Sports
Hooded Crow	Corvus cornix		CL	Curr. Sports
Grey Heron	Ardea cinerea		CL	Curr. Sports
Grey Wagtail	Motacilla cinerea		CL	Curr. Sports
Mallard	Anas platyrhynchos		CL	Curr. Sports
Long-tailed Tit	Aegithalos caudatus		CL	Western
Blue Tit	Cyanistes caeruleus		CL	Western
Robin	Erithacus rubecula		CL	Western

*B = Breeding

**DF = Dr. Dara Fitzpartick; IA = Isobel Abbott; CL = Caroline Lalor

9.2 Appendix II – List of suggested plants for ornamental beds and borders

10

Common Name	Scientific Name	Bats	Pollinators
Nottingham catchfly	<i>Silene nutans</i>	✓	
Night-scented catchfly	<i>S. noctiflora</i>	✓	
Bladder campion	<i>S. vulgaris</i>	✓	
Night-scented stock	<i>Matthiola bicornis</i>	✓	
Sweet rocket	<i>Hesperis matronalis</i>	✓	
Evening primrose	<i>Oenothera biennis</i>	✓	
Tobacco plant	<i>Nicotiana affinis</i>	✓	
Cherry pie	<i>Petasites hybridus</i>	✓	
Soapwort	<i>Saponaria officinalis</i>	✓	
Aster species	<i>Aster</i> spp.		✓
Allium species	<i>Allium</i> spp.		✓
Comfrey	<i>Symphytum</i> spp.		✓
Crocus	<i>Crocus</i> spp.		✓
Bellflower	<i>Campanula</i> spp.		✓
Calamint	<i>Calamintha</i> spp.		✓
Catmint	<i>Nepeta</i> spp.		✓
Coneflower	<i>Echinacea</i> spp.		✓
Larkspurs	<i>Delphinium</i> spp.		✓
Gaillardia species	Blanket Flower		✓
Globe thistle	<i>Echinops</i> spp.		✓
Heathers	<i>Calluna</i> spp.; <i>Erica</i> spp.; <i>Daboecia</i> spp.		✓
Poppy	<i>Papaver</i> spp.		✓
Phacelia species	<i>Phacelia</i> spp.		✓
Pulmonaria species	<i>Pulmonaria</i> spp.		✓
Salvia species	<i>Salvia</i> spp.		✓
Stonecrops	<i>Sedum</i> spp.		✓
Sunflowers	<i>Helianthus</i> spp.		✓
Vervains	<i>Verbena</i> spp.		✓
Viper's Bugloss	<i>Echium vulgare</i>		✓

Source: National Biodiversity Data Centre (2016).

NOTE: This list is NOT exhaustive – for more planting suggestions visit <https://www.rhs.org.uk/science/conservation-biodiversity/wildlife/perfect-for-pollinators>

10.3 Appendix III – Guidance for safeguarding and protocols surrounding the bat roosts on/adjacent to UCC Campus.

Source: Aardwolf Wildlife Surveys, Bat Survey of UCC Campus 2015

10.3.1 Bat Roosts

Any future maintenance or development works on either of the two buildings that are in use by bats (North Mall Campus and Curraheen Agricultural Site) should be designed with consideration of the presence of the animals to ensure the retention of bat access to the structures. The buildings should be re-assessed by a bat specialist prior to any works to establish current bat-use as bats are highly mobile animals and roost-use may change over time from single to multiple animal use and any proposed works should be overseen by a bat specialist to ensure that these animals are considered throughout the planning and design process and mitigation measures to ensure their safety are devised and implemented. Roost designations are given in Appendix 4.

Should any future works be planned that might impact the bat roosts in the two onsite buildings, a derogation licence to legally allow the actions may be required from the Licensing Department of the *National Parks and Wildlife Service* as, under existing legislation, a bat roosting site is protected whether or not bats are present. In such case, it is recommended that the licence application be made as early as possible to avoid delays as the process can take several weeks.

10.3.2 Timing of Any Structural Works on Buildings With Bats

Any works on the structures found to be harbouring bats (North Mall Campus and Curraheen Agricultural Site) should preferably be undertaken within the autumn and winter months - October to March - as bat numbers are then known to be fewer in buildings. This should lessen the impact on these animals and will also avoid the bird breeding seasons. Outside of these months, it is possible to undertake works but there is an increased risk of encountering bats and birds in buildings so such works could be external or in areas not being used by protected species.

10.3.3 Timber Treatment

In general, any necessary timber treatment operations within roof areas should be carried out during the winter months - November to March - when bats are absent or torpid. Bat safe poisons should be used throughout and any bats discovered during spraying operations should not be sprayed directly. Should bats be discovered during spraying operations, then the work should cease immediately and an experienced bat specialist should be consulted. Contractors should also ensure that only bat safe, pre-treated timbers are used for roof construction. A list of bat-safe chemicals for use in such situations is given below.

Products suitable for use in a bat roost can be described in terms of the active ingredients (biocides) that they contain.

Any products containing active ingredients listed in the following Table 3 are suitable for use in a bat roost. Products intended for remedial timber treatment may also carry a British HSE number indicating that they have received approval under the UK Control of Pesticides Regulations (COPR) 1986, but decorative finishes usually contain such low levels of biocides that they are exempt from this

requirement (in the UK).

Table 3. Insecticides and fungicides *suitable* for use in bat roosts

Insecticides	Permethrin Cypermethrin Boron compounds
Fungicides and decorative finishes	Tri(bexylene glycol) baborate Disodium octoborate Borester 7 Dodecylbenzyltrimethyl ammonium chloride Alkyl(benzyl)dimethylammonium chloride (= Benzalkonium chloride) Copper naphthenate Acypetacs copper Zinc naphthenate Acypetacs zinc Zinc octoate Sodium 2-phenylphenoxide Diclofluanid 3-iodo-2propynyl-N-butyl carbamate (Polyphase/IPBC) Propiconazole

Adapted from English Nature’s Species Conservation Handbook.

10.3.4 Water tanks and other liquid containers in roof spaces

Any water tanks or other liquid containers sited within roof spaces should be permanently covered to prevent the accidental drowning of and contamination by bats and other wildlife.

10.3.5 Lighting

In general, artificial light creates a barrier to commuting bats so onsite lighting should be minimised during the active bat season from March to the end of September as it deters some bat species. Where lighting is required, directional lighting (i.e. lighting which only shines on access roads and not nearby countryside) should be used to prevent overspill. This can be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvres and shields to direct the light to the intended area only.