Biodiversity Action Plans for Six Sites in Ballina, County Mayo

November 2022

Collated in consultation with Ballina Clean-Up Group, by Woodrow Sustainable Solutions Ltd.

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Front page photo: Long flowering meadow with mown paths at Gaelscoil na gCeithre Maol

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The Community Foundation for Ireland is one of the largest philanthropic organisations in Ireland. We were established in 2000 with the support of Government and the business sector. The Community Foundation for Ireland helps people make a difference by inspiring a spirit of giving and by investing in people and solutions to benefit every community.

Introduction

‘Biodiversity’ means all of the living things in an area: plants, trees, birds, mammals, insects, spiders, the fish in our waters, even things we can’t see, such as the bacteria in the soil.

This biodiversity plan aims to provide targeted support and information for participating groups in Ballina, Co. Mayo to help them support the biodiversity in their areas. The plan was co-ordinated by the Ballina Community Clean-up Group. Participating groups included four schools (St. Muredach’s College, St. Mary’s Secondary School, Moyne College and Gaelscoil na gCeithre Maol) along with Mount Falcon estate and Hollister campus ULC.

This plan does not intent to detail every possibly action but focuses on the main hopes of the groups for biodiversity.

Biodiversity Plan Areas

As mentioned above, this plan covers six sites in the vicinity of Ballina, Co. Mayo. The distribution of these sites is shown in Figure 1.

Figure 1: Overview of Study Areas

1. Actions to Enhance Biodiversity:

The following section provides suggestions on various things we can do to promote biodiversity in our communities. Suggestions are provided for the various sites within the plan areas. However, there are many additional ways that we can positively contribute to biodiversity, some of which are outlined in this section.

1.1. Making the most of what you have

When thinking about how to improve the biodiversity of your area, start by thinking about what you have. This section outlines how various actions can be carried out, both by protecting existing valuable areas for biodiversity and by enhancing other areas that are currently not very biodiverse. Enhancing or improving habitats that might already be present can often be more successful or cost-effective than trying to introduce something totally new. In order to do this effectively, it is useful to set out a management plan outlining how these actions will be achieved.

To promote more species and biodiversity in our villages and gardens, we need to ensure there is food, shelter, and security for other species to thrive alongside us.

1.1.1. Food

Pollinator Friendly Planting

Examples of pollinator friendly plants are listed in the 'Pollinator Friendly Planting' table below.

Perennial planting and bulbs are most cost-effective and generally lower maintenance that beds of annuals. However, annuals can also add splashes of colour and promote biodiversity in the garden, particularly in areas which are likely to change in a short time, e.g., a temporary flower bed. For instance, annuals such as single-headed sunflowers, cosmos, annual poppy, scabious and cornflowers will provide food for pollinators and seed eating birds during the year.

Pots/ Baskets

Pollinator plants for hanging baskets or pots include Ageratum, Alyssum 'Sweet White', Heliotrope 'Dwarf Marine', Verbena 'Blue Lagoon' & 'Desert Jewels Mixed'. These plants could be placed at the entrance to the polytunnels to encourage pollinators into the area to pollinate the fruits and vegetables growing there!

Green Manures

Green manures can be used to improve the soil in areas that struggle to support plant growth. These plants provide colour and food for pollinators. They can then be dug back into the soil to act as enrichment for the soil. Buckwheat and Phacelia are examples of green manure plants.

Pollinator Friendly Planting

Examples of pollinator friendly plants are listed in the 'Pollinator Friendly Planting' table below. Many of these species are perennial such as bulbs and herbs. These plants are beautiful and cost-effective additions to the local area. Further resources can be found on the pollinators.ie website.

Table 1:Pollinator Friendly Planting[1]

Plant Type	Spring (March- May)	Summer (June- August)	Autumn (Sept-Oct)
Shrubs and Trees	Hazel (Feb-Apr) Willow (Mar-May) Blackthorn (Mar-May) Hawthorn (Apr-Jun) Broom (Apr-Jun) Wild Cherry (Apr-May)	Bramble (May-Sept) Wild Privet (May-Jul) Crab apple (May-Jun) Elder (May-Jun) Whitebeam (May-Jun) Rowan (May-Jun) Wild Rose (Jun-Jul) Honeysuckle (Jun-Oct) Guelder Rose (Jun-Jul)	Raspberry (Jun-Aug) Ivy (Sept-Nov) Gorse (Jan-Dec)
Fruits, Vegetables and Herbs	Apples Blueberries Cherry plum Currants Rosemary Borage	Blackberries Courgettes Field/runner beans Pumpkins Raspberries Strawberries Tomatoes	Letting a small portion of Brassica plants (e.g., Cabbage, Kale, Brussel sprouts) flower can help provide food for pollinators in your garden
Bulbs	Common snowdrop (*Galanthus nivalis*), Armenian grape hyacinth (*Muscari armeniacum*), Common star of Bethlehem (*Ornithogalum umbellatum*), Crocus species (Crocus, spring-flowering)	Allium species ornamental and edibles (when allowed to flower) (Allium)	Colchicum species (Autumn crocus), Crocus species (Crocus, autumn-flowering),
Night-flowering plants[2,3] **(F: Foodplant for moth caterpillars)**	Night Scented Stock Oak[f] Hazel[f] Holly[f]	Hebe, Honeysuckle, Sweet rocket, Jasmine, Globe artichoke, Purpletop vervain (Verbena)	Ivy[f] Stinging Nettle[f]

[1] https://pollinators.ie/wordpress/wp-content/uploads/2018/04/Planting-Code-2018-WEB.pdf https://pollinators.ie/wordpress/wp-content/uploads/2018/04/Gardens_actions-to-help-pollinators-2018-WEB.pdf
[2] https://butterfly-conservation.org/sites/default/files/moth-foodplant.pdf
[3] https://www.wildlifetrusts.org/actions/how-attract-moths-and-bats-your-garden

Hedge Management

Hedges are fantastic sources of biodiversity in our landscape. Planting and retaining species-rich native flowering hedgerows benefit a variety of species, including insects, birds and bats. When managing existing hedgerows, aim to cut the hedges in rotating sections on a 3-year basis to ensure there is always sections in flower to provide food. These areas should ideally be cut between November – January in an 'A' shape with a wide base and narrower top if managed for pollinators. Leave a 1.5-2m area of unsprayed vegetation at the base of hedgerows to allow wildflowers to grow, and to provide long grass for bumblebees to nest in.

Fruiting trees and shrubs

Plant trees and shrubs that provide flowers in spring for pollinators and fruit later in the year for other animals and humans. For instance, planting a row of soft fruit bushes such as raspberry, gooseberry, loganberry can provide screening for an unattractive wall, divide a space or provide visual interest. Fruit and nut trees such as apple, plum, pear, cherry and hazel could be added as focal points in open spaces. Hazel also works as a hedging plant. These fruiting plants can be integrated across the garden to provide 'edible landscaping' which provides food and interest for people and other species!

Dwarfing rootstock trees can be used to speed fruiting time and save space, or a mix of sizes as suits the needs of the garden users. This could be further expanded over time.

Planting of fruiting shrubs and perennials (Raspberry, gooseberry, rhubarb) could add to edible landscaping.

Planting pollinator friendly spring bulbs underneath orchards and reduced mowing (No Mow May/ 6 Week Mowing) or mowing paths can further enhance the biodiversity.

Pollinators

Providing a variety of pollinator friendly plants that bloom from Spring through to Autumn is important for providing food for our pollinators and colourful flowers throughout the seasons! The All-Ireland Pollinator Plan is a fantastic resource guidance and advice for pollinator-friendly plants and actions throughout the season.

Birds

Many pollinator-friendly trees and shrubs like blackthorn, hawthorn, bird cherry, crab apple, elder, honeysuckle and rowan along with fruit trees and fruit bushes are also provide great nesting and resting spaces as well as food sources for animals in the Autumn. These smaller birds and mammals then provide food for larger animals like birds of prey and foxes.

Allowing a few areas to grow naturally and see what emerges is the easiest and cheapest way to provide food, shelter and colour in an area. Plants that emerge could include dandelions or primroses in spring, perhaps followed by red and white clover, oxeye daisies and buttercups. If the soil is damp, meadowsweet or ragged robin may grow in the area. These are all beautiful native flowers and may be waiting to grow if they are just given the chance! They will also attract pollinating insects which will help support insect-eating bird populations in the area.

1.1.2. Shelter

Everyone wants a safe place to call home, including other species!

Providing nesting and resting spaces for other species is a great way to promote biodiversity and increase awareness in our communities.

Invertebrates:

Leaving areas of dead wood, leaf piles, hollow-stemmed plants, bare earth banks, dry stone walls or unmown areas provide shelter for a variety of invertebrates such as ladybirds and bees in the garden. These log and leaf piles can also be used by hedgehogs.

Dead Hedges/ Dead Wood Areas

Decaying vegetation is an important part of natural ecosystems, and can be home to many different, sometimes specialist species. As well as the dead wood and leaf piles suggested in the previous paragraph, you can also create dead hedges or log walls/walls.

Dead hedges are generally a good way to use up woody prunings if you have a site with such cuttings available. To give these piles of wood some structure and prevent them slumping outwards, upright posts are often placed along the edge of the dead hedge every 1.5m or so. As the lower layers rot away, new cuttings can be added to the top of the hedge each year. Chicken wire care also be used to delineate the hedge boundary but should have gaps in it occasionally to allow hedgehogs pass through.

These areas are important habitat for various insects, beetles and hedgehogs.

Birds

Existing habitats such as trees and hedges are important nesting spots for birds, particularly native, flowering hedgerows that provide shelter for nests and berries/ nuts for food, as well as attracting insects to snack on. Many birds have particular preferences for where they live, and the shape and entrance size of your nest box will determine which species will use it.

Providing nest boxes in the garden can provide homes for different birds. Depending on the size of the entrance hole, the nest boxes will attract different species. Locate your nest boxes as high as possible (2.5m from the ground) on a tall tree where possible. Place the boxes in a sheltered spot, facing north-east to offer shelter from wind, rain and direct sunlight. If there are no suitable trees in the garden, permission could be sought by the owner of the adjacent woodland to install some boxes there.

Providing cover with creeping plants like ivy and honeysuckle can also promote birds, which will nest behind the cover of the plants. This can be useful in areas when trees would not be suitable, for instance, along a bare boundary wall.

There is no need to remove moss from trees or grassy areas. Moss doesn't cause harm and is useful to birds as a nest-building material.

Swifts

Ballina has an important population of Swifts. Swifts are long-lived birds which live almost entirely in the air, landing only to raise their young in the summer. Swifts traditionally nested in cracks and crevices in buildings and as abandoned or vacant buildings are renovated; swifts lose access to these nesting sites. Swifts are very loyal to their nest sites and will return to the same nest site, even after it has been closed up. The swift population has plummeted by close to 50% in the last 30 year, mostly due to the loss of nesting sites! Swifts are now on the Irish red list for birds due to their declining population.

Such threats are also facing the swifts in Ballina. As such, providing permanent nesting spots in Ballina is a vital act in protecting the swift population and ensuring it can recover into the future.

Incorporating swift boxes into buildings and protecting existing nesting sites are the best way of providing permanent nesting spots for swifts in Ballina. Swift Conservation Ireland provides a variety of guidance on creating nesting habitats for swifts including external and built-in nest boxes.[4] Built-in nest boxes are specially created concrete boxes that can be included in new buildings or as part of renovation works.

Integration of swift boxes into existing buildings is the most likely option to result in success. This has been done in Ballina with examples of built-in nest boxes with an attraction call system at the Mary Robinson Centre, Quay National School and in the new St. Mary's Secondary School.

However, where that isn't possible, external nest boxes offer a great alternative home. When establishing new nest box sites, playing swift attraction calls on a speaker is needed to alert swifts to a new nesting site. Boxes should face in a North Westerly or North Easterly direction to shelter them from the glare of the sun

Plate 1: External Swift boxes at Tralee, Co. Kerry – Copyright © Anthony Dawson. Source: Swift Conservation Ireland

Plate 2: Built-in Swift boxes at Westport Town Hall. Source: Swift Conservation Ireland

[4] https://www.swiftconservation.ie/nest-box-advice/

Bats

Bats are natural controls for spiders and night-flying insects such as midges. A single Common Pipistrelle Bat eats about 3,000 midges and other small flies in a single night!

Food:

Planting night-flowering plants will attract nocturnal pollinators which will in turn support bats. Examples of night-flowering plants are provided in the 'Pollinator Friendly Planting' section below. Hedgerows also host many insects that provide food for bats as they fly along them.

Lighting:

Avoiding lighting in areas where bats are commuting will encourage bats and allow them to move across the landscape more easily.

Commuting:

Bats need connected habitats, particularly linear hedgerows to navigate across the landscape. This could mean planting a row of hedging along the boundary of your area or including trees (such as an orchard) in an open green area.

Shelter / Housing:

Bats can roost in cracks and crevices in trees. Protecting old trees not only adds character to an area but also provides habitats for many species including birds and bats!

If there is a suitable spot within your area, erecting bat boxes can also promote bat species in the area. Locate your boxes as high up as possible on trees (4m + ideally). Ideally, place multiple boxes in the area, in sheltered areas facing in south, south-east or south-west to provide warmth. [5]

Bee Habitat Creation[6]

Bumblebees

Leave areas of long grass in undisturbed areas for bumblebees to nest in.

[5] https://www.bats.org.uk/our-work/buildings-planning-and-development/bat-boxes/putting-up-your-box
[6] https://pollinators.ie/wordpress/wp-content/uploads/2018/04/How-to-guide-Nesting-2018-WEB.pdf

Figure 2: Bumblebees of Ireland Poster (Source: pollinators.ie)

Mining Bee Habitat

Important Note:
80% of solitary bees nest in bare ground, so creating areas of bare soil is an easy and effective way to promote pollinators!

Create earth banks/expose bare ground

Pick an open, well drained, sunny location, preferably facing south, or southwest. The soil should be gently packed. Choose a variety of locations for your bare soil- from vertical banks to flat ground- in order to attract different types of solitary bees.

Carefully remove the vegetation from the chosen area with a spade. Aim for a minimum area of bare soil of 10x10cm. Remove all debris that could block a bee from reaching the soil.

Clear back the vegetation from your chosen site annually in late autumn to avoid disturbing the bees.

Cavity Nesting Bees

These bees will nest in dead stems, holes in tree trunks, stone walls and other sites.

1. Leave some plants with suitable dead stems in place

   Leave patches of plants like bramble in place for some species of cavity nesting bees.
2. Leave upright logs and tree trunks in sunny, well-drained locations for bees that nest in the tunnels created in these structures by beetles
3. Drill holes for cavity nesting solitary bees in pieces of untreated timber.
   Using a drill, create holes in the wooden structure; they should be at minimum 10cm in depth and 4-8mm in diameter. The holes should be as high up as possible, ideally 1.5-2m high. The entrance holes should ideally face east or southeast, so they get the morning sun.
   Note:
   Create holes of different diameters to attract different types of bees. Make sure not to drill through the structure. Try to drill with the grain to avoid cracks.
   Holes should be as smooth inside as possible to attract nesting solitary bees. Use a countersinking drill bit or sandpaper to ensure the holes are splinter-free.

Bee Boxes

With regards to bee boxes the All-Ireland Pollinator Plan guidance is:

'Bee boxes can be useful but are only targeting a very small proportion of our solitary bees. If you put up a bee box it should be the size of a Blue Tit bird box – any bigger and it will attract predators and be more likely to harbour disease. These should be placed about 1.5-2m off the ground in a sheltered south or south-east facing location. They should also be near flowers since solitary bees can't fly far for food.'

1.1.3. Security

Avoid pesticide use

Use of pesticides negatively impact on the species diversity of your area. This can be directly by harming the pollinators and other important species we rely on. Indirectly, this can also harm the species diversity of an area by killing off food sources which other species rely on such as slugs and snails (food for birds) and nettles (important food plant for many caterpillars).

Pesticides can also impact on human health. Several weedkillers which used to be widely used are now no longer available for safety reasons, and glyphosate, the most widely used weedkiller at present, is considered a likely carcinogen.

Areas targeted as south facing solitary bee nesting habitat should be protected from spraying. These areas can be created and managed as described in the 'Bee Habitat Creation' section below.

Alternative weed control methods are available with varying levels of time and effort required, such as manual weeding, mulching, cutting back weeds, heat treatment (boiling water).

When pesticide use is deemed unavoidable, use best practice to avoid damaging surrounding habitats. Avoid spraying the base of hedgerows which can support various plant species and also be the site of bumblebee nests.

Use spot treatment of problem areas. Spray in dry, low wind conditions to avoid spray drift. Spraying after sunset avoids direct contact of the spray with pollinating insects. However, please bear in mind that there are nocturnal pollinators, and to avoid spraying plants at all, where possible.

Where this type of maintenance work is managed by a third-party, starting a conversation with that individual/ company on the benefits of biodiversity-friendly alternatives for wildlife and human health is a great first step.

1.2. Meadow Management[7]

Allow grass to grow into a meadow is a simple and cost-effective way of enhancing the biodiversity of your areas. It is important to note that it can take a few years for the soil fertility to drop to a level where wildflowers can compete with grasses. Meadows take time to come into their own but are a very cost-effective way to promote biodiversity.

Important Note:

Many wildflower mixes available commercially are made of non-native flower species and pose the risk of introducing invasive species into our communities. Following the 'Don't Mow, Let It Grow' mentality is a far more sustainable action to promote lasting biodiversity in our communities. Pollinators.ie has great information on how to manage meadows successfully and on why they advise against planting wildflower mixes.

There are three main options in how this can be done:

1. **Patches/ Strips of Long Grass**
2. **A Long Grass Meadow**
3. **A Short 6-Week Grass Meadow**

In all three options, leave the first grass cut of the year **until April** to allow dandelions to bloom, as these are important food for pollinators like queen bees emerging from hibernation.

Figure 3: Examples of different mowing regiemes (Source: pollinators.ie)

[7] Wildflower Meadow Guidance Document: https://pollinators.ie/wordpress/wp-content/uploads/2018/04/How-to-guide-Wildflower-Meadows-2018-WEB.pdf

Figure 4: Important Plants that bloom in lawns that are allowed to flower. (Source: pollinators.ie)

Option 1 & Option 2: Meadow Patches/ Strips or Long flowering Meadow:

1. Delay first cut of the grass until April
2. Leave areas of grass grow long during the summer
3. Cut again in September
4. Remove the cuttings from the area to reduce the soil fertility
5. If the grass growth is strong and plants start to fall over under their own weight, add another cut earlier in the summer e.g., July.

Option 3: Short 6-Week Grass Meadow

1. Delay first cut of the grass until April
2. Cut the grass every 6-week during the summer
3. Remove the cuttings every time and compost as green waste

Managing Green Waste/ Grass Cuttings:

Where reduced mowing is being implemented, create a schedule of when mowing will take place, e.g. No Mow May areas, mown every six weeks, mown once a year in late August/ early September. Paths can also be mown through meadow areas to make these areas accessible for people to walk through.

Ensure that there is somewhere you can take the cuttings to, as removing the mown grass from the area is important for promoting wildflower species. If there is space, grass cuttings can be composted on site.

However, where this is not a feasible option, cuttings can be moved off site. For instance, where you don't have the mowing equipment available to carry out the work within the community, reach out to local farmers/ organisations to check their willingness to cut and take the grass away to a green waste facility or as animal feed.

1.3. Pond/ Wetland/ Rain Garden Creation[8]

Wetlands are very important habitats and support a variety of birds, mammals, invertebrates and bats. Follow the below steps taken from 'Gardening for Biodiversity' by Juanita Browne to establish a pond or bog garden.

1.3.1. Creating a Pond:

1. Decide on a suitable location for the pond. Mark out the outline of the pond with string or sand. Calculate the volume of soil you will be removing (Width x Height x Depth) and think of where you would like that soil to go in the garden. It could be useful in filling in vegetable beds or in creating a bank of bare earth for mining bees.
2. Dig out the outlined area, ensuring there is a gradual slope and shallow areas in your new pond for easy access in and out for different animals. Remove large roots and stones to protect the pond liner from rips. Line the base of the hole with sand. You could also add old pieces of carpet under your liner for added protection.
3. Line the hole with thick butyl pond liner. If you plan to create a 'bog garden' on the edge of your pond, extend the liner so that it will line this other habitat.
4. Place large rocks around the edge of the liner to prevent it slipping while you work.
5. Add another layer of heavy sand on top of liner.
6. Either fill the pond with water from a water butt/ hose or wait for it to fill with rain
7. Include oxygenating plants such as hornwort, a plant to cover the surface such as Water Lily and emerging plants such as Mash Marigold. If you get the plants right, you won't need a pump.
8. Planting marginal plants will also make it easier for animals to reach the pond under cover. A small wooden ramp will prevent any small mammals from drowning if they fall in and can't climb out.

Safety Note:

If there are any potential safety issues regarding installing a pond, the pond can be kept shallow or a kept as a bog garden without any deep areas of standing water.

1.3.2. Bog garden:

1. In order to create a bog garden, first follow steps 1-3 from the pond creation above.
2. Pierce the liner at 1m intervals to allow slow drainage of water.
3. Put a leaky hose or porous pipe which extends to a water source like a water butt on the base of the liner to allow more water to be added in future if the area becomes to dry.
4. Add approximately 5cm of coarse gravel to the base of the liner to allow some water to drain out. This will prevent soil from clogging the drainage holes and prevent pooling of open water.
5. Refill the hole with the excavated soil, making sure to remove any large stones that could pierce the liner. Bog plants like nutrient-rich environments so if the soil is very low in nutrients, leaf mould, compost or well-rotted manure could be added to increase the nutrient level. This is great place to put fallen leaves from around the garden. While the

[8] Detailed Pond Design instructions can be found here: https://www.fingal.ie/sites/default/files/2020-04/gardening-for-biodiversity-booklet.pdf

soil level will likely be higher that the surrounding area initially, don't compact the soil as it will settle back gradually overtime.

Good native plants for pond margins or bog gardens include Marsh Marigold, Purple Loosestrife; Yellow Flag/Iris; Hemp agrimony, Water Avens, Lady's Smock, Water Forget-Me-Not, Marsh Woundwort, Water Mint, Meadowsweet. Some good non-native varieties for your bog garden include *Primula japonica* 'Miller's Crimson'; *Iris ensata*, Japanese water iris; *Matteuccia struthiopteris* AGM; *Rodgersia pinnata* 'Superba; Ligularia 'Greygynog Gold'. (Gardening For Biodiversity, 2020).

A bucket pond could be another alternative to having areas of deep open water.

Plate 3:: Purple loosestrife.

Plate 4: Yellow flag iris. Source: Wikimedia commons

Plate 5: Marsh marigold. Source: Wikimedia commons

Plate 6: Meadowsweet. Source: Fickr

1.3.3. Rain Gardens and Nature-based Sustainable Drainage

Designing green spaces and tree planting to capture and filter rainwater in urban settings can help slow and clean water. This has positive benefits for biodiversity and in flood protection.

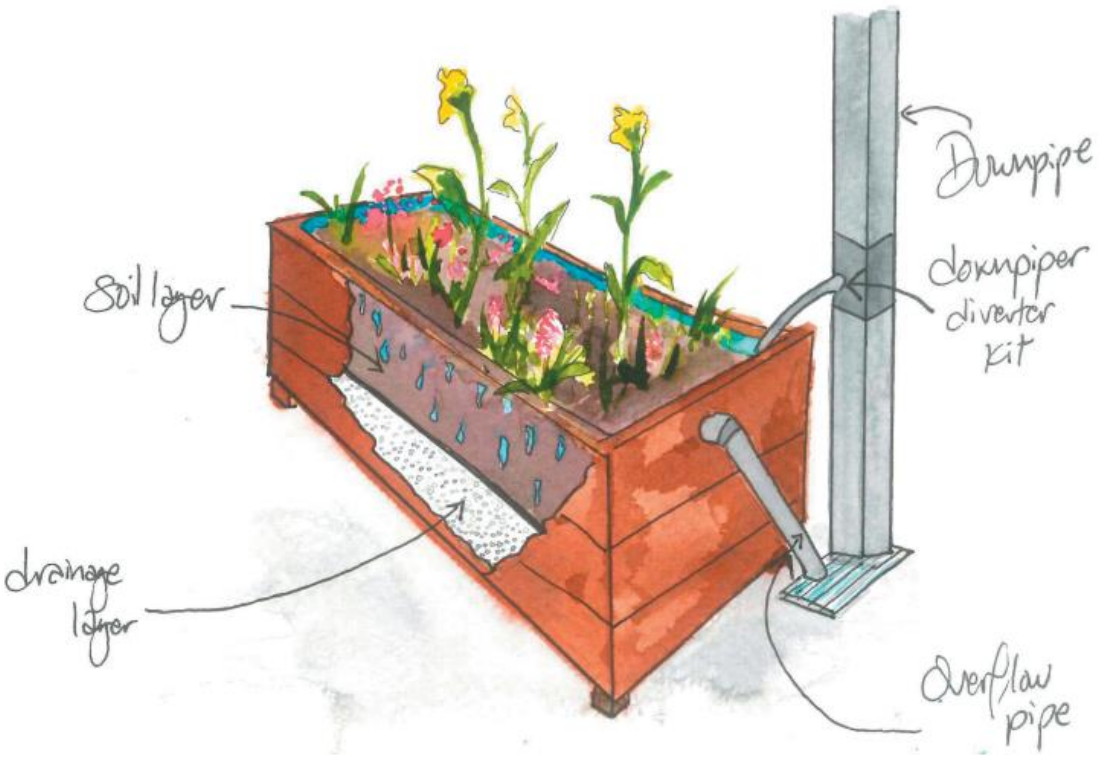
Examples for nature-based sustainable drainage solutions include rain planters, rain gardens, swales, vegetated filter strips and correctly designed tree pits.

In your area, look at where the water flows and where it pools or floods. These could be good sites to introduce elements of nature-based sustainable drainage.

Rainwater Planters

In most settings, rainwater planters could be introduced alongside drainpipes to capture and clean water before discharging excess water.

Figure 5: Example of A Flow-through Rainwater Planter. (Source:Dublin City Council, A How To Guide For Rainwater Planters)



Rain Gardens and Swales

Rain gardens are shallow landscaped depressions that reduce rainfall runoff and help reduce the impact of pollution. Rain gardens can be put anywhere but are particularly useful when placed upstream of a flood-risk area as they help capture and hold water for longer, helping prevent sudden surges of water overwhelming drainage systems.

Likewise, swales are broad, shallow channels of vegetation that are designed to slow and hold runoff and filter the water. These may be landscapes or simply vegetated with grass.

Tree pits:

A correctly designed and installed tree pit can provide positive benefits to the natural and human communities around it. Trees are important habitats and feeding places for many species, both large and small. They are also important contributes to air and water quality.

Vegetation Filter Strips

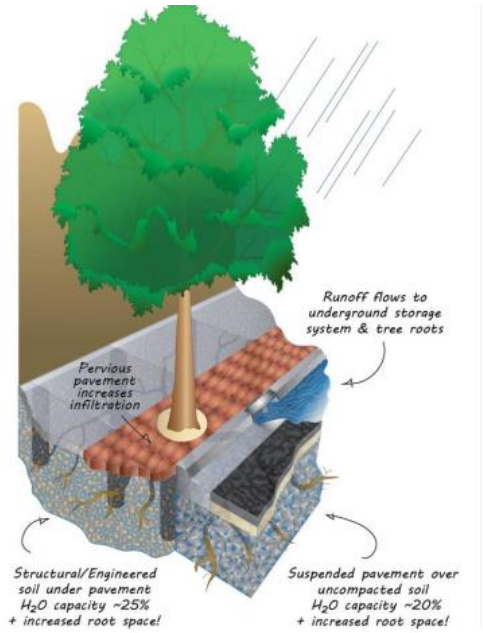
These are strips of vegetation along paths or roadways that capture runoff by having openings along the curbing to allow water to flow into the soil of the vegetation strips.

Figure 6: Example of a rain garden. (Source: Flickr)

Figure 7: Example of a swale. (Source: Flickr)

Figure 8: Example of a filter strip (Source: Flickr)

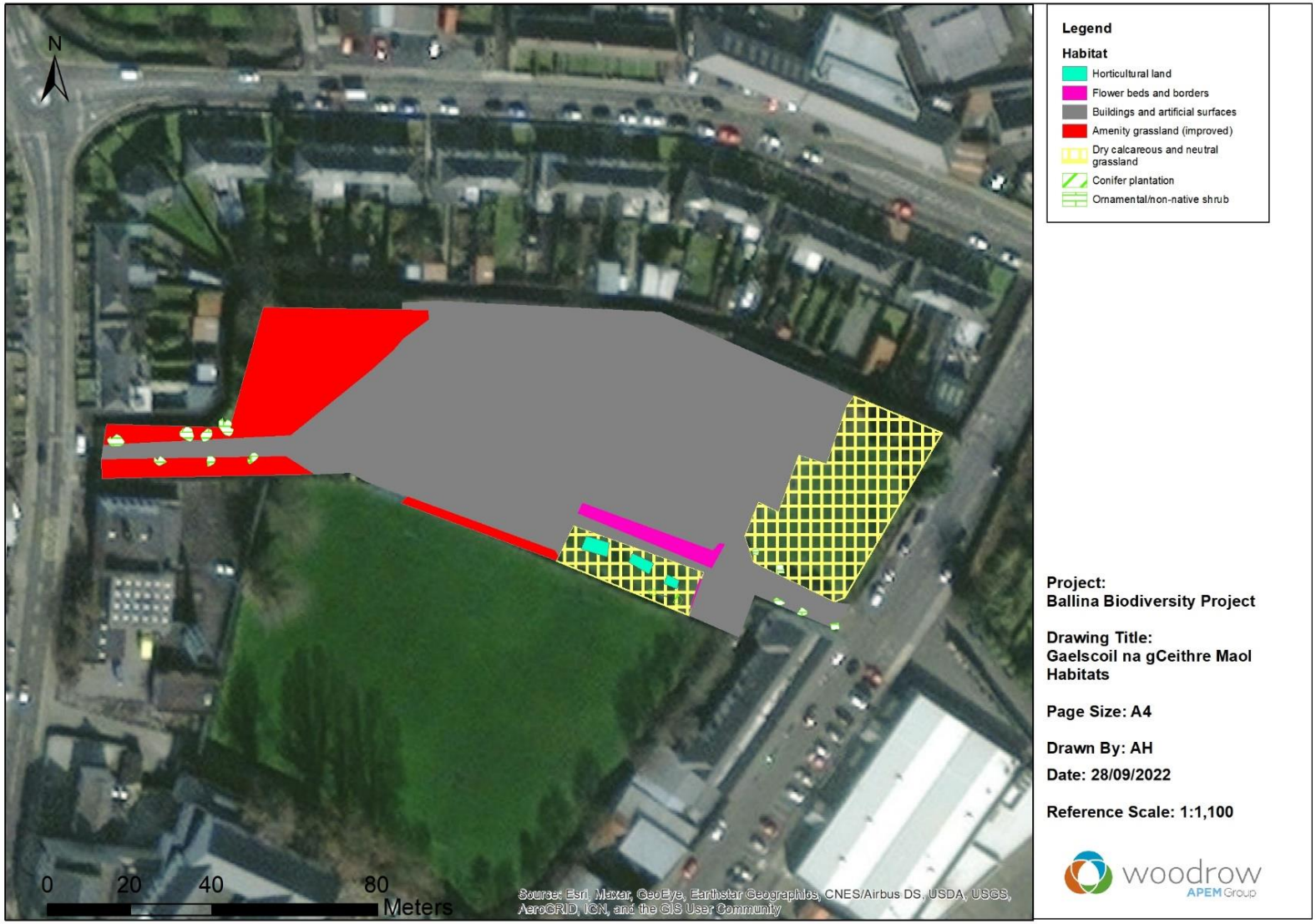
Figure 9: Example of Tree Pit design. (Source US EPA report: Stormwater to Street Trees: Engineering Urban Forests for Stormwater Management)



2. Gaelscoil na gCeithre Maol

Maps

Figure 10: Fossit Habitat Map of Gaelscoil na gCeithre Maol



Photos

Plate 7: Vegetable beds

Plate 8: Flower beds beside the school

Plate 9: Area of newly planted woodland at the school

Plate 10: Bare wall outside of the school, potential site for mural

Plate 11: Bare area of concrete/ tarmac yard beside the school.

Plate 12: Mown area of amenity grassland along a driveway into the school

Desk Study

Designated Sites

There are no designated sites directly connected to the school site.

The River Moy SAC and Killala Bay/Moy Estuary SAC and pNHA within 350m of the site. The school site while not directly connected to the Designated Areas, may be indirectly linked to the SACs and pNHA via on site drainage channels. The Moy_120 watercourse runs within c. 50m of the site and has a current status as 'moderate'.

Protected Species

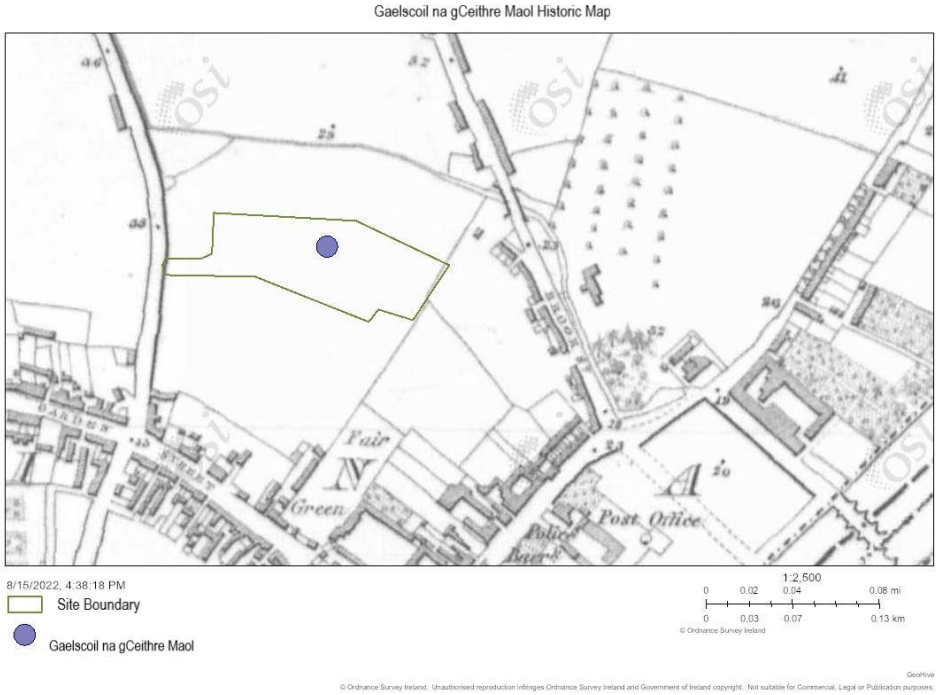
Table 2: Protected Species recorded within 1km of the school

Protected Species	**Last Recorded Date**	**Designation**	Actions on Site for Species
Common Swift	11/08/2017	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Birds of Conservation Concern - Red List	Swift Box installation
Sand Martin	28/07/2017	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern - Amber List	Include in Mural
European Eel	20/07/2005	Threatened Species: OSPAR Convention Threatened Species: Critically Endangered	Include in Mural, Include Nature-based Drainage to intercept and slow water flowing into targeted drains on site.
Eurasian Red Squirrel	23/04/2018	Protected Species: Wildlife Acts	Include in Mural

Land History

In the oldest publicly available maps of the area, sourced from the Geohive.ie map system, the site of the school was once farmland on the outskirts of Ballina. The species traditionally associated with such landscapes include birds such as linnet, yellowhammer and barn owl, and mammals such as bats, badgers and foxes. Hedgerows, treelines and hay meadows would also have been likely to occur, which would support many other species of animals and plants.

Figure 11: Historic map (1829-41) of Gaelscoil na gCeithre Maol



Field Surveys

An initial site visit was carried out on this site on 29.03.2022. A habitat mapping site visit was then carried out by a suitably qualified Woodrow ecologist on the 09.05.2022 to map the habitats on site and create an inventory of the flora and fauna present on the site.

SWOT Analysis

Strength	Weakness
• Actively Engaged Staff Member(s) and Students • Existing Actions Can Be Built Upon • New Area of Woodland will be a valuable natural resource going forwards • Green Flag – enhanced awareness of nature	• Restricted Area for Interventions (small areas of green space)
Opportunity	**Threat**
• Nest Box Installations • Mural on Wall • Adding Dead Hedging • Meadow Strips	• Lack of Personnel to Manage Biodiversity Areas • Pressure to 'Look Tidy'

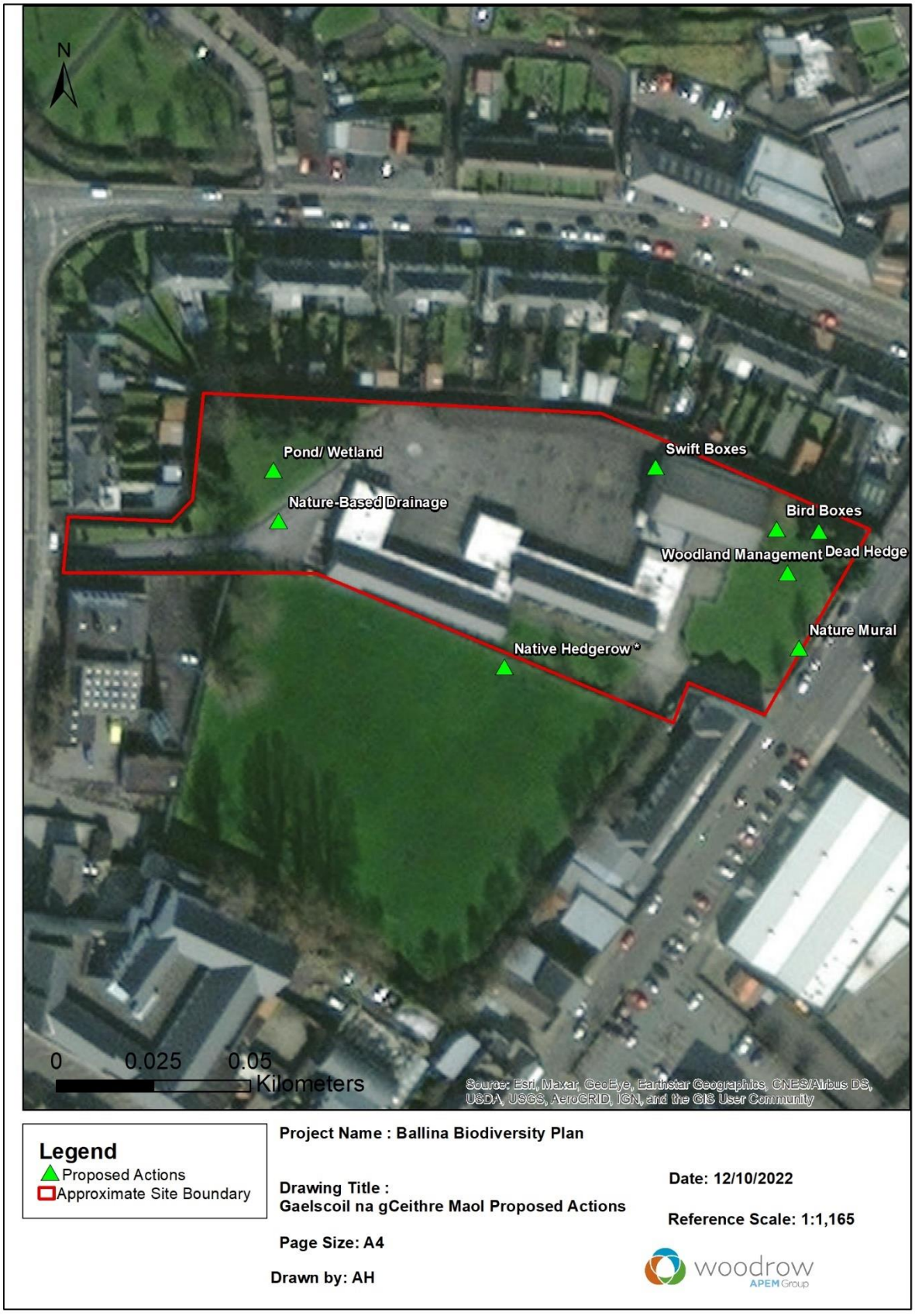
Table of Proposed Actions on Site

*Table 3:**Suggested Biodiversity Actions for Gaelscoil na gCeithre Maol.***

Biodiversity Action Plan Areas		
Project	**Time of Year to implement / Manage**	**Notes**
Nature Mural	Any time	Basing the mural on local species that are notable or recorded in the area such as swifts, red squirrels, salmon or otter. Possible location: see *Plate 10*
Woodland	September-February	Native, locally sources woodland bulb species could be sourced to enhance this areas value for wildlife. Location: see *Plate 9*
Dead Hedge Habitat	Spring	Hedge can be stabilised up uprights to prevent slumping if needed. Depending on the species using the dead hedge, there is potential to disturb some species at any time of year. However, in spring, overwintering species in the dead hedge are likely to be active and able to move away from disturbance and other potential species such as birds are unlikely to be nesting yet.
Wetland habitat/ Pond	Any time	A shallow pond would be of value to biodiversity without presenting a major safety issue. Excavations will likely be easier in summer when the soil is drier. Fill pond using rainwater, as tap water can turn the pond green. A thick butyl pond liner will be needed to keep the water from seeping away. Location: see *Plate 12*
Native Hedgerow	September-February	Engage with landowner of neighbouring green space to see a native hedgerow could be planted along the margin of the field. If the landowner is willing to engage with the plan, the planting advice would be to plant in winter when the trees are dormant. An idea mix includes 75% hawthorn and 25% of at least 4 other native species. Once installed and big enough to cut, divide the hedge into management sections and trim each section into an 'A' shape on a 2–3-year rotation.

General Bird Boxes	Any time	Install any time of year, preferably before March to be used in that year's breeding season. Different designs can encourage different species
Swift Boxes and Call system	September-March	Any works should be done outside of the Swift breeding season (late April to late August). Swifts are colonial nesters and need more than one nest box at a site, preferably with a call system to attract them to the new nest sites. Ensure box is located with a clear flight line into the nest box.
Nature-based Drainage	N/A	Look at potential to include nature-based drainage solutions to slow and filter water before reaching the drains on site. For instance, rainwater planters and tree pits may be appropriate on site

Figure 12: Suggested locations for proposed biodiversity actions



3. St. Muredach’s College

Maps

Figure 13: Habitat Map of St. Muredach's College

Photos

Plate 13: Wooded Driveway to the School, with understory of spring flowers

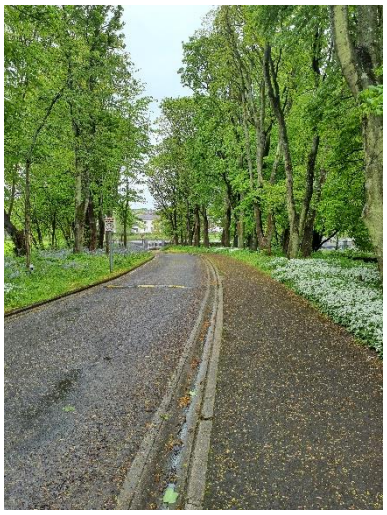


Plate 14: Large areas of amenity grassland at the school, could be managed as meadows

Plate 15: Area of newly planted hedgerow at the school

Plate 16: Bare wall of the handball alley beside the school, potential site for mural. Lots of standing water in the vicinity so could be potential for a rain garden/ swale area in the area of the alley.

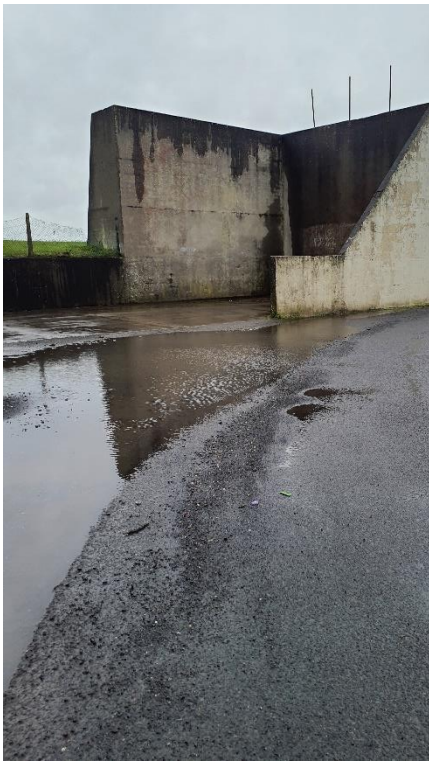


Plate 17: Example of moderately invasive Butterfly bush (*Buddleja davidii*) along the sloping ground at the edge of the southern school pitch

Plate 18: Example of unmown area beside the northern school pitch.

Desk Study

Designated Sites

There are no designated sites directly connected to the school site.

The River Moy SAC and Killala Bay/Moy Estuary SAC and pNHA is directly across the road from the site. The school site while not directly connected to the Designated Areas, may be indirectly linked to the SACs and pNHA via on site drainage channels. Surface runoff from the site is also likely to reach the designated site, given their proximity.

Protected Species

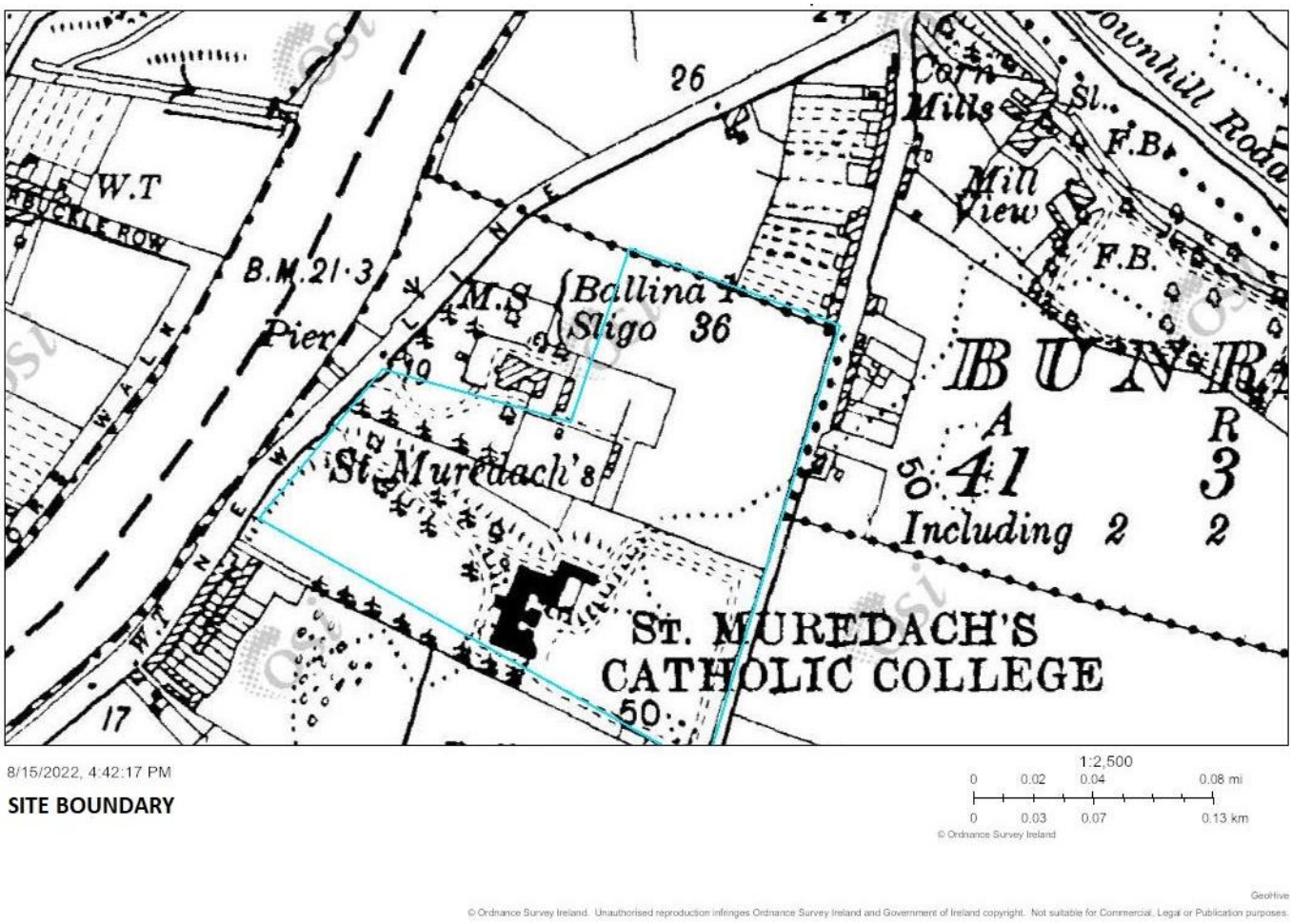
Table 4: Protected Species recorded within 1km of the school

Protected Species	Last Recorded Date	Designation	Possible Actions on Site for Species
European Otter	01/11/1980	Protected Species: EU Habitats Directive - Annex II & Annex IV Wildlife Acts	Include in Mural, Include Nature-based Drainage to intercept and slow water flowing into targeted drains on site.
Common Snipe	15/12/2015	Protected Species: Wildlife Acts EU Birds Directive - Annex II, Section I & Annex III, Section III Bird Species Threatened Species: Birds of Conservation Concern - Red List	Include Nature-based Drainage to intercept and slow water flowing into targeted drains on site.
Mute Swan	24/03/2011	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern - Amber List	Include Nature-based Drainage to intercept and slow water flowing into targeted drains on site.
Sand Martin	28/07/2017	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern - Amber List	Include Nature-based Drainage to intercept and slow water flowing into targeted drains on site.
European Eel	25/07/2007	Threatened Species: OSPAR Convention Threatened Species: Critically Endangered	Include in Mural, Include Nature-based Drainage to intercept and slow water flowing into targeted drains on site.

Land History

According to the oldest publicly available maps of the area, sourced from the Geohive.ie map system, the site of the school has remained largely unchanged in the 200 years. Of particular interest is that presence of the treelined drive up to the school and along its southern and northern boundaries, which remain today. The treelined avenue has a mixed understory of planted and possibly naturally regrated spring flora, which is of ecological interest in the wider area given the loss of the surrounding rural and woodland habitats due to urbanisation.

Figure 14: Historic map (1829-41) of St. Muredach's College



Field Surveys

An initial site visit was carried out on this site on 29.03.2022. A habitat mapping site visit was then carried out by a suitably qualified Woodrow ecologist on the 09.05.2022 to map the habitats on site and create an inventory of the flora and fauna present on the site.

SWOT Analysis

Strength	**Weakness**
• Presence of woodland habitats and mature trees on the grounds • Large areas of green space, allowing for potential to include planting of trees or a wetland area • Presence of treelines, mature trees and proximity to the river means the site is likely a good site for foraging bats and birds	• Need to ensure biodiversity areas can be managed long-term, e.g. appropriate equipment and areas to compost cuttings • Presence of invasive species on site • Lots of impermeable surfaces in the vicinity of the school buildings themselves • Green school student council members will change on a year-to-year basis, so long-term plans will need support from staff and/ or parents councils to ensure they are followed through
Opportunity	**Threat**
• Mini woodland planting • Wetland creation • Meadow management potential • Bat and bird box installation	• Invasive species on site • Pressure to ‘Look Tidy’

Table of Proposed Actions

Table 5: ***Suggested Biodiversity Actions for St. Muredach's College***

Biodiversity Action Plan Areas		
Project	**Time of Year to implement**	**Notes**
Nature Mural	Any time	Basing the mural on local species that are notable or recorded in the area such as swifts, red squirrels, salmon or otter. - Possible location: see Plate 16
Woodland	September-February	Preserve this area as it currently is for wildlife. Remove any invasive species that appear in this area. Planting additional native woodland plants in the sloped area to the north of the drive could enhance this areas value over the long-term. This additional area of woodland could be planted to serve as an outdoor classroom area, with paths through it. Location: see Plate 13
Wetland habitat/ Pond	Any time	A shallow pond would be of value to biodiversity without presenting a major safety issue. There is an existing wet area to the east of the northern pitches. This area could be excavated to provide a shallow pool. Excavations will likely be easier in summer when the soil is drier. Fill pond using rainwater, as tap water can turn the pond green. A thick butyl pond liner will be needed to keep the water from seeping away. Location: see *Plate 12*
Native Hedgerow	September-February	The young native hedgerow that is planted along the north east site boundary will be of great benefit to wildlife as it grows. If possible, adding another section of native hedgerow along the margin of the southern pitch would enhance habitat connectivity into the future. The planting advice would be to plant in winter when the trees are dormant. An idea mix includes 75% hawthorn and 25% of at least 4 other native species. Native tree species can also be included.

		Once installed and big enough to cut, divide the hedge into management sections and trim each section into an 'A' shape on a 2–3-year rotation.
General Bird Boxes	Any time	Install any time of year, preferably before March to be used in that year's breeding season. Different designs can encourage different species. Bird boxes installed on trees are more likely to be used as they are generally closer to food and shelter than those on buildings.
Swift Boxes and Call system	September-March	Any works should be done outside of the Swift breeding season (late April to late August). Swifts are colonial nesters and need more than one nest box at a site, preferably with a call system to attract them to the new nest sites. Ensure box is located about 4-5m high, facing north, northwest or west with a clear flight line into the nest box. This is to provide shade during the day so that the nest doesn't get to hot for the chicks.
Invasive Species Control	Depends on the species in question	Two invasive species were noted on the school grounds: Winter Heliotrope (low risk of invasion impact) and Buddleia (*Buddleja davidii*) (medium risk of invasion impact). Advice on control measures is available in the following documents: • Prevention, Control and Eradication of Invasive Alien Species (EPA Research Report 368) • The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (Transport Infrastructure Ireland)
Nature-based Drainage	N/A	Look at potential to include nature-based drainage solutions to slow and filter water before reaching the drains on site. For instance, rainwater planters and tree pits may be appropriate on site

Figure 15: Suggestion locations for proposed actions

4. Moyne College

Maps

Figure 16: Habitat Map of Moyne College

Photos

Plate 19: Flower bed along the drive into the school

Plate 20: Area of amenity grassland at the front of the school, could be managed as a meadow

Plate 21: Area of bare ground along the edge of the site, potential site for planting shade-tolerant pollinator friendly plants

Plate 22: Area of amenity grassland at the edge of the site, could be planted with a row of native trees to connect to treeline in background.

Plate 23: Northern boundary of the site, could be planted with native hedging to provide screening from neighbouring site.

Plate 24: Example sloped area along the southern site boundary, could be planted with pollinator friendly bulbs and hardy perennials.

Desk Study

Designated Sites

There are no designated sites directly connected to the school site.

The River Moy SAC and Killala Bay/Moy Estuary SAC and pNHA are within 100m of the site. The school site while not directly connected to the Designated Areas, may be indirectly linked to the SACs and pNHA via on site drainage channels, particularly as the site slopes downhill towards the river Moy.

Protected Species

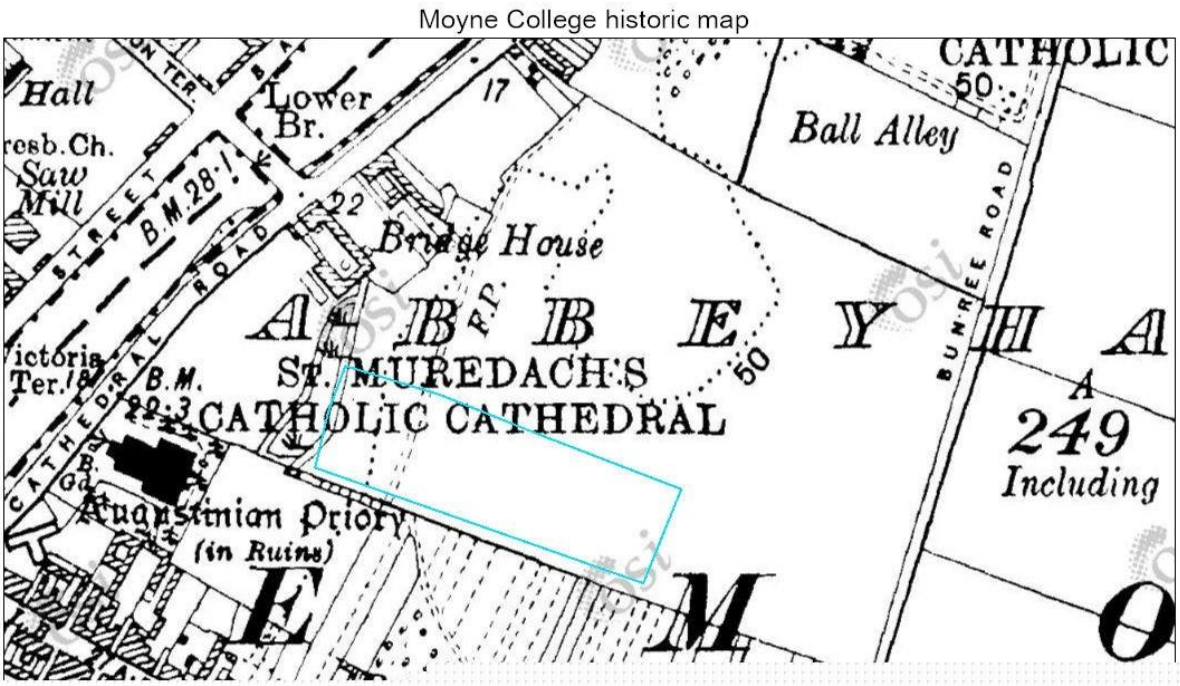
Table 6:Protected Species recorded within 1km of the school

Protected Species	Last Recorded Date	Designation	Actions on Site for Species
Common Swift	11/08/2017	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern - Red List	Swift Box installation
Sand Martin	28/07/2017	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern - Amber List	Include Sand Martin Boxes if there is an appropriate location on the site
Snipe	15/12/2015	Protected Species: Wildlife Acts EU Birds Directive - Annex II, Section I & Annex III, Section III Bird Species Threatened Species: Birds of Conservation Concern - Red List	-
European Eel	20/07/2005	Threatened Species: OSPAR Convention Threatened Species: Critically Endangered	Include Nature-based Drainage to intercept and slow water flowing into targeted drains on site.
Eurasian Red Squirrel	23/04/2018	Protected Species: Wildlife Acts	-

Land History

In the oldest publicly available maps of the area, sourced from the Geohive.ie map system, the site of the school was once farmland on the outskirts of Ballina. The species traditionally associated with such landscapes include birds such as linnet, yellowhammer and barn owl, and mammals such as bats, badgers and foxes. Hedgerows, treelines and hay meadows would also have been likely to occur, which would support many other species of animals and plants. Many of these species no longer occur in the area due to the loss of suitable habitat in the area. However, some species such as foxes have adapted to a more urban lifestyle.

Figure 17: Historic map (1829-41) of Moyne College



Field Surveys

An initial site visit was carried out on this site on 29.03.2022. A habitat mapping site visit was then carried out by a suitably qualified Woodrow ecologist on the 09.05.2022 to map the habitats on site and create an inventory of the flora and fauna present on the site.

SWOT Analysis

Strength	**Weakness**
• Mature Trees on Site • Large areas of green space in the vicinity	• Need to ensure biodiversity areas can be managed long-term, e.g. appropriate equipment and areas to compost cuttings • Lots of impermeable surfaces in the vicinity of the school buildings themselves • Green school student council members will change on a year-to-year basis, so long-term plans will need support from staff and/ or parents councils to ensure they are followed through
Opportunity	**Threat**
• Hedgerow planting • Meadow management potential • Bat and bird box installation	• Potential for damage to new planting areas • Pressure to 'Look Tidy'

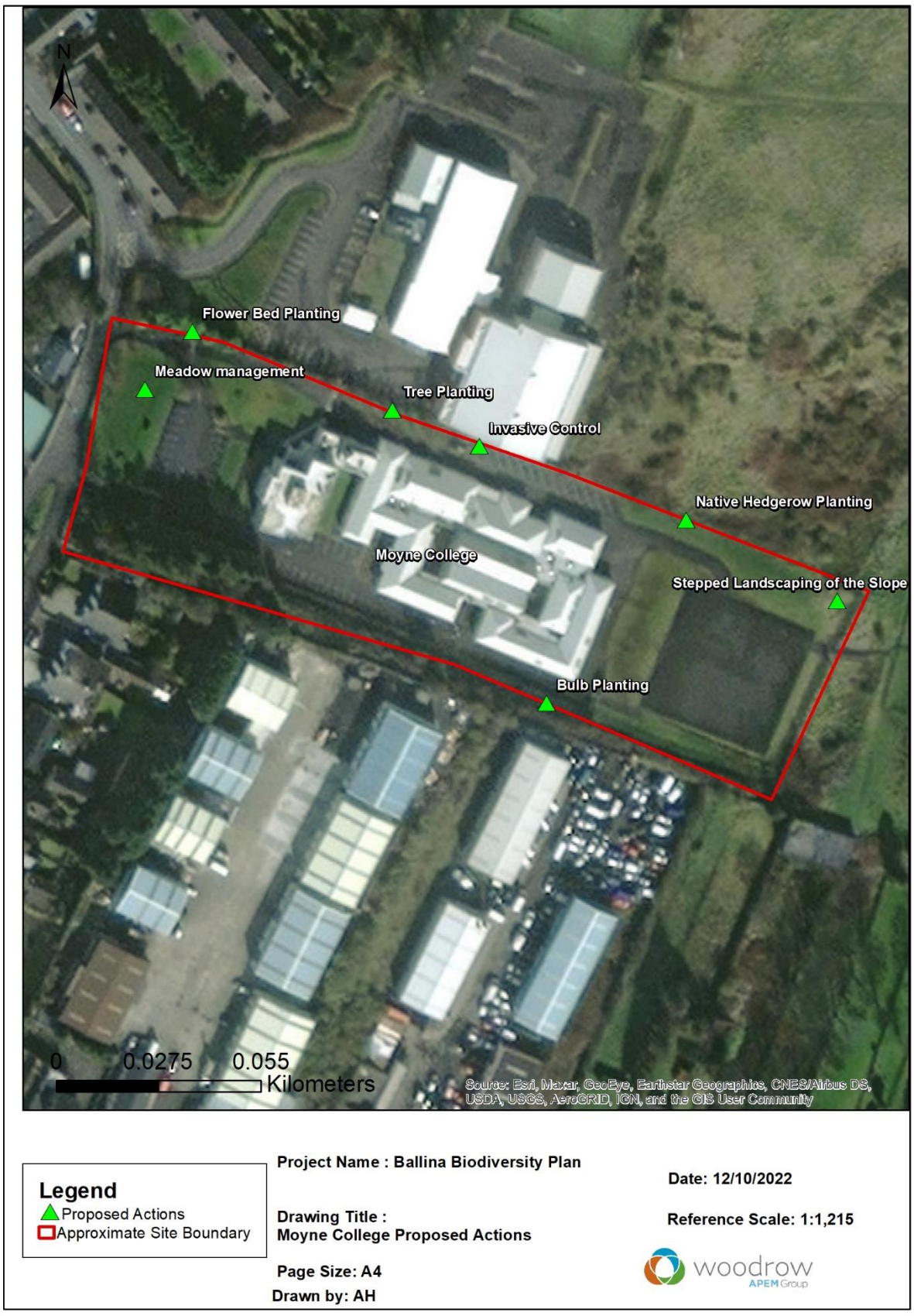
Table of Proposed Actions

Table 7:Proposed Biodiversity Actions for Moyne College

Biodiversity Action Plan Areas		
Project	**Time of Year to implement**	**Notes**
Meadow Management	April- August	• Reduce mowing and remove cuttings to reduce soil fertility and see what wildflowers naturally recolonise the area or are in the seedbank already. • Select areas with low foot traffic to be left grow long during the summer. • Selective mowing of paths through longer meadow areas in fun designs to encourage students to enjoy and play in the area. • Areas of shorter grass mowed on a 6-week rotation starting in April after dandelions have bloomed. • If looking for wildflower seeds, gather from local, native populations. This could be combined with a seed saving workshop Possible location: see Plate 20
Native Hedgerow	September-February	If possible, adding a section of native hedgerow along the bare northern margin of the school would enhance the available habitats within the site into the future. The planting advice would be to plant in winter when the trees are dormant. An idea mix includes 75% hawthorn and 25% of at least 4 other native species. Native tree species can also be included. Once installed and big enough to cut, divide the hedge into management sections and trim each section into an 'A' shape on a 2–3-year rotation. Possible location: see Plate 23
Flower bed planting	Spring-Autumn	Gaps and bare areas in the flowerbeds and along the southern boundary of the site can be planted up with pollinator friendly plants. For more information on pollinator friendly plants, see section 1.1.1 (Food).

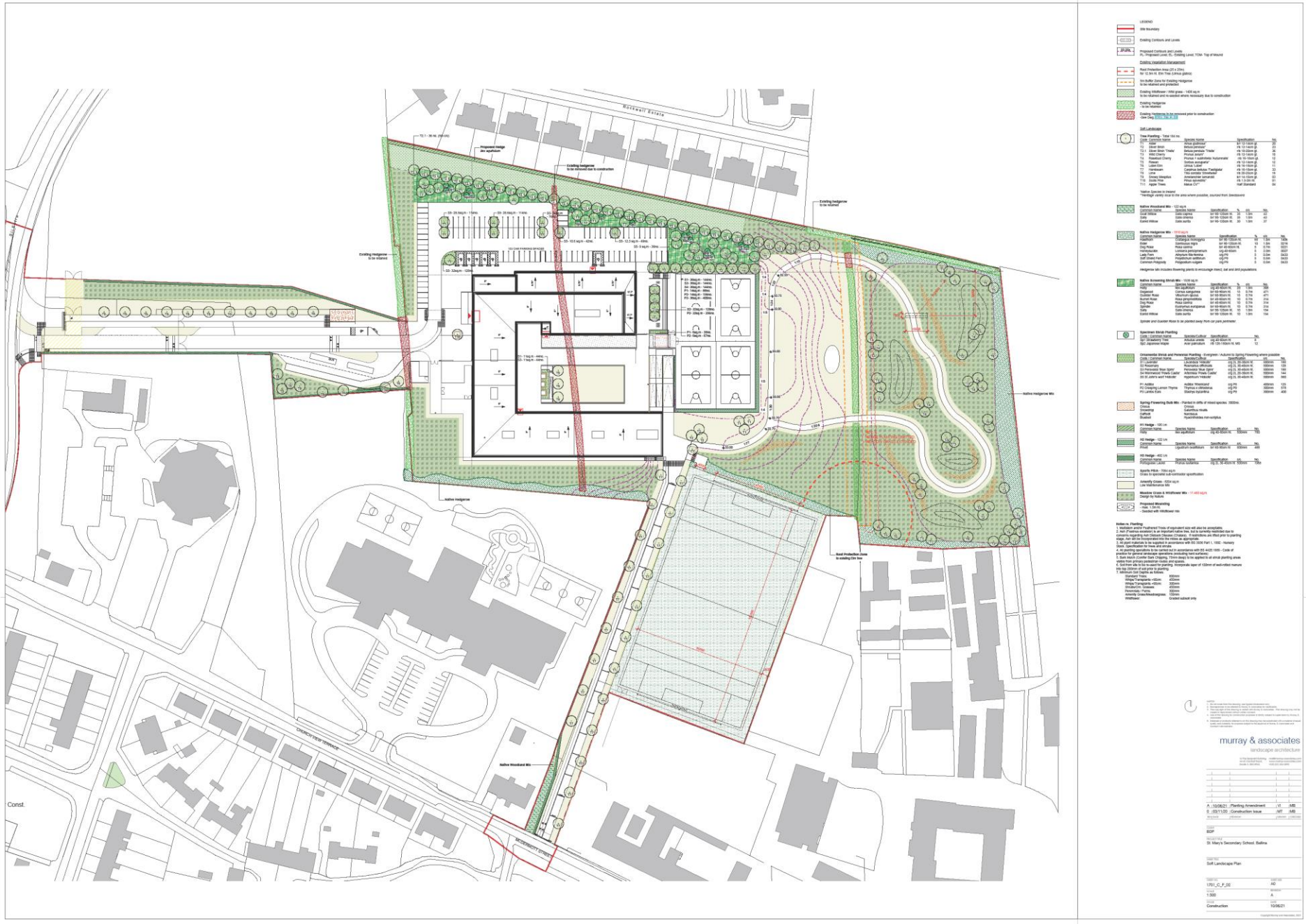
		Possible locations: see Plate 19, Plate 21 and Plate 24
Tree Planting	Winter	Continuing the birch treeline along the northern margin of the site will enhance the habitat connectivity along the edge of the school, without casting heavy shade in the area. Possible location: see Plate 16
Invasive Species Control	Depends on the species in question	An invasive species was noted on the school grounds: Buddleia (*Buddleja davidii*) (medium risk of invasion impact). Advice on control measures is available in the following documents: • Prevention, Control and Eradication of Invasive Alien Species (EPA Research Report 368) • The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (Transport Infrastructure Ireland)
Nature-based Drainage	N/A	Look at potential to include nature-based drainage solutions to slow and filter water before reaching the drains on site. For instance, rainwater planters and tree pits may be appropriate on site

Figure 18: Suggested locations for proposed biodiversity actions



5. St. Mary's Secondary School

Figure 19: Planned Landscaping of St. Mary's College



Desk Study

Designated Sites

There are no designated sites directly connected to the school site.

The River Moy SAC and Killala Bay/Moy Estuary SAC and pNHA within 350m of the site. The school site while not directly connected to the Designated Areas, may be indirectly linked to the SACs and pNHA via on site drainage channels.

Protected Species

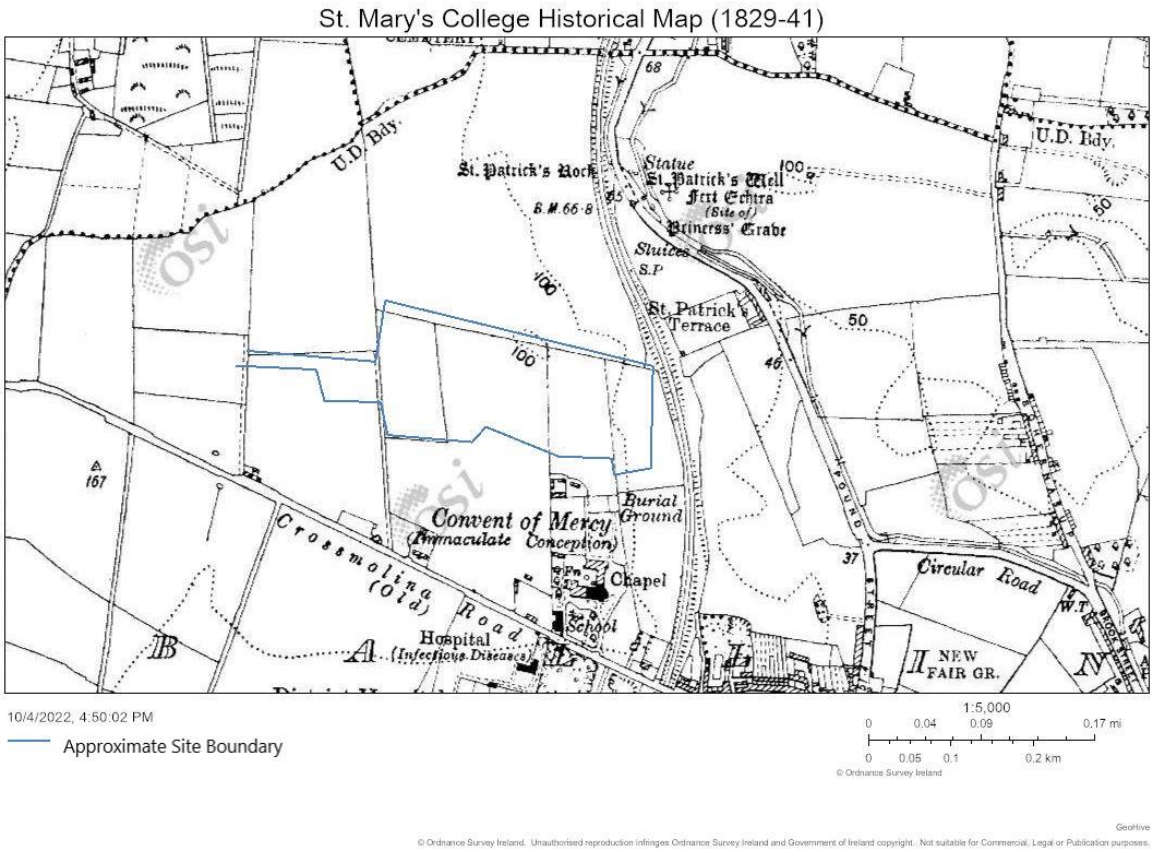
Table 8:Protected Species recorded within 1km of the school

Protected Species	**Last Recorded Date**	**Designation**	Actions on Site for Species
Common Swift	11/08/2017	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern - Red List	Swift Box installation
Large Red Tailed Bumble Bee	18/08/1974	Threatened Species: Near threatened	Planting of pollinator friendly plant on site and leaving piles of stones, stone walls and areas of long grass undisturbed.
European Eel	20/07/2005	Threatened Species: OSPAR Convention Threatened Species: Critically Endangered	Include Nature-based Drainage to intercept and slow water flowing into targeted drains on site.
Eurasian Red Squirrel	23/04/2018	Protected Species: Wildlife Acts	Include in Mural

Land History

In the oldest publicly available maps of the area, sourced from the Geohive.ie map system, the site of the school was once farmland on the outskirts of Ballina. The species traditionally associated with such landscapes include birds such as linnet, yellowhammer and barn owl, and mammals such as bats, badgers and foxes. Hedgerows, treelines and hay meadows would also have been likely to occur, which would support many other species of animals and plants. Many of these species no longer occur in the area due to the loss of suitable habitat in the area. However, some species such as foxes have adapted to a more urban lifestyle.

Figure 20: Historic map (1829-41) of St. Mary's College site



Field Surveys

An initial site visit was carried out on this site on 29.03.2022. A walkover site visit was not carried out on this site as the school was in the process of being constructed and access was not granted to map the existing habitats on site. Instead, a workshop was held with students to provide information to the students on the importance of biodiversity and gather their input into what should be included in the biodiversity plan for the new school grounds.

SWOT Analysis

Strength	Weakness
• New school landscaping design includes biodiversity considerations such as native hedgerow species and wildflower meadow areas.	• Inability to access the new school grounds means baseline habitat data could not be gathered on existing habitats on site
Opportunity	**Threat**
• Built-in swift boxes are to be installed at the new school	• Potential for damage to new planting areas

Table of Proposed Actions

Table 9: ***Suggested Biodiversity Actions for St. Mary's College***

Biodiversity Action Plan Areas		
Project	**Time of Year to implement**	**Notes**
General Bird Boxes	Any time	Install any time of year, preferably before March to be used in that year's breeding season. Different designs can encourage different species. Bird boxes installed on trees are more likely to be used as they are generally closer to food and shelter than those on buildings.
Nature Mural	Any time	Basing the mural on local species that are notable or recorded in the area such as swifts (which have nest boxes installed in the new school, red squirrels, or the Large Red Tailed Bumble Bee which has historic records from the area
Bat Box Installation	Any time	Locate your boxes as high up as possible on trees (4m + ideally). Ideally, place multiple boxes in the area, in sheltered areas facing in south, south-east or south-west to provide warmth.
Bird Feeders/ Bird Bath	Any time	**Feeders:** If possible, put the feeders within 1-2m of a tree or hedge to provide shelter for small birds from predators. Peanuts and sunflower hearts are generally well-likely by birds. **Baths:** As with feeders, place baths where birds can escape into trees or hedges if they feel threatened. A shallow, gently sloping dish will work as a bath, just ensure the edges are rough enough for a bird to grab hold. Putting a study stick down into the water can also work to give birds somewhere to stand. **Note:** Clean feeders and bird baths are very important as these areas are focus points for many birds, increasing the risk of the birds passing on infections or parasites etc. So, ensure feeders and bird baths are cleaned every 1-2 weeks with a veterinary disinfectant or mild bleach (5%) solution. Moving feeders around or having multiple spread across an area can decease the concentration of birds in a single location at once.
Bulb Planting Welcome Area	Autumn or spring	Aim to use pollinator friendly plants to provide both beautiful displays and plenty of food for our insects. See pollinators.ie for detailed examples for pollinator friendly bulbs to use.
Bucket Ponds	Any time	See section 1.3 for advice on creating a pond (big or small). Instead of excavating a big area, a bucket pond can be just that! A bucket dug into the ground in a place where it gets light but is not fully in sunshine all day.

		Add gravel, old bricks and stones to create a base for the pond and don't forget to create slopes or logs going into the water to let animals get in and out of the water.
Compost bins	Any time	Discuss with grounds staff where a suitable spot for a compost bin would be on site. If possible, these could be placed near an areas for vegetable or herb beds to allow students to learn about how composting works and to be able to use the finished compost.
Herb Planters in central courtyard	Spring -Autumn	Setting out small, raised beds for herbs in the central courtyard of the new school could provide ingredients to the students for H.E classes as well as for general use.
Woven Statues	Any time	Introducing woven willow statues of animals in the grounds was suggested to raise awareness and prove a focus point.
Rain Water Harvester, Rain Planter	Any time	As described in section 1.3.3, rainwater planters can be added to downspouts of drains, as can rain water harvesters. Either of these options would be a great way to provide water to herb gardens or vegetable beds without using treated tap water, while also slowing the flow of water into drains after heavy downpours.
Vertical Herb Wall	Any time	If planting space for herb beds is limited, a vertical herb wall could be used instead or in combination.
Vegetable Beds	Any time	Inclusion of vegetable beds was suggested by students to have space for planting fruits and vegetables they want to grow.
Fruit Tree Planting	Winter	Fruit trees could also be planted across the school grounds to for a dispersed orchard.

There is no map for potential locations for proposed actions in this section as the site of the new school was still under construction while this study was undertaken. Actions can be implemented in suitable areas once grounds are opened for staff and students.

Plate 25: Example of mini-pond guidance. Source: UK Wildlife Trust

Plate 26: Example of Willow Sculpture. Source: Geograph.org.uk

Plate 27: Example of a vertical wall planter. Source: Pxhere.com

Plate 28: Example of raised vegetable beds. Source: Flickr.com

6. Hollister ULC

Maps

Figure 21: Habitat Map of Hollister ULC Campus

Photos

Plate 29: Pond at entrance to Hollister ULC building

Plate 30: Area of amenity grassland around the building, managed as a meadow. Could include some additional tree native planting in open areas

Plate 31: Example of trees in woodland alongside the river. Potential area for bat box installation

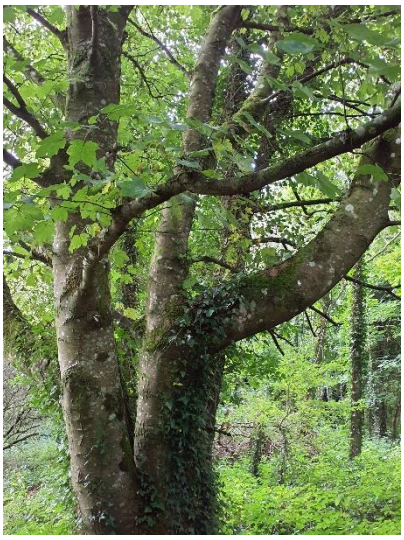


Plate 32: Flower planters along the entrance to the site. Could be planted with pollinator friendly species

Plate 33: The east and north boundaries of the site could be densely planted with native hedging to provide screening from neighbouring sites and the road.

Plate 34: Long flowering meadow and woodland area in the southwest of the site (area 1).

Desk Study

Designated Sites

The River Moy SAC is directly connected to the site. The river moy runs along the eastern boundary of the site and drainage ditches link to the SAC via a drainage ditch along the southern site boundary. The Moy_120 watercourse which runs alongside the site has a current status as 'moderate' according to the EPA.

Protected Species

Table 10:Protected Species recorded within 1km of the Hollister ULC site

Protected Species	Last Recorded Date	Designation	Actions on Site for Species
Common Kingfisher	30/05/2010	Protected Species: Wildlife Acts EU Birds Directive- Annex I Bird Species Threatened Species: Birds of Conservation Concern - Amber List	- If kingfisher are found to nest in the river banks along the site, protect these areas from disturbance - River Clean-up Days - Include from Nature-based Sustainable Drainage Solutions where appropriate to slow and clean water flow into the river.
Great Black-backed Gull	30/05/2010	Protected Species: Wildlife Acts	-
Mallard	30/05/2010	Protected Species: Wildlife Acts EU Birds Directive Annex II, Section I Annex III, Section I Bird Species	Include Nature-based Drainage to intercept and slow water flowing into targeted drains on site.
Mew Gull	30/05/2010	Protected Species: Wildlife Acts	-
Sand Martin	30/05/2010	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern Threatened - Amber List	- If sand martins are found to nest in the river banks along the site, protect these areas from disturbance. - Discuss with local NPWS ranger whether it would be appropriate to install artificial sand martin nest boxes on the site in the future. At present, no suitable locations for such nests were noted.
Eurasian Badger	31/12/2014	Protected Species: Wildlife Acts	Maintain mosaics of woodland and grassland habitats on site to provide resting and feeding sites for badgers.

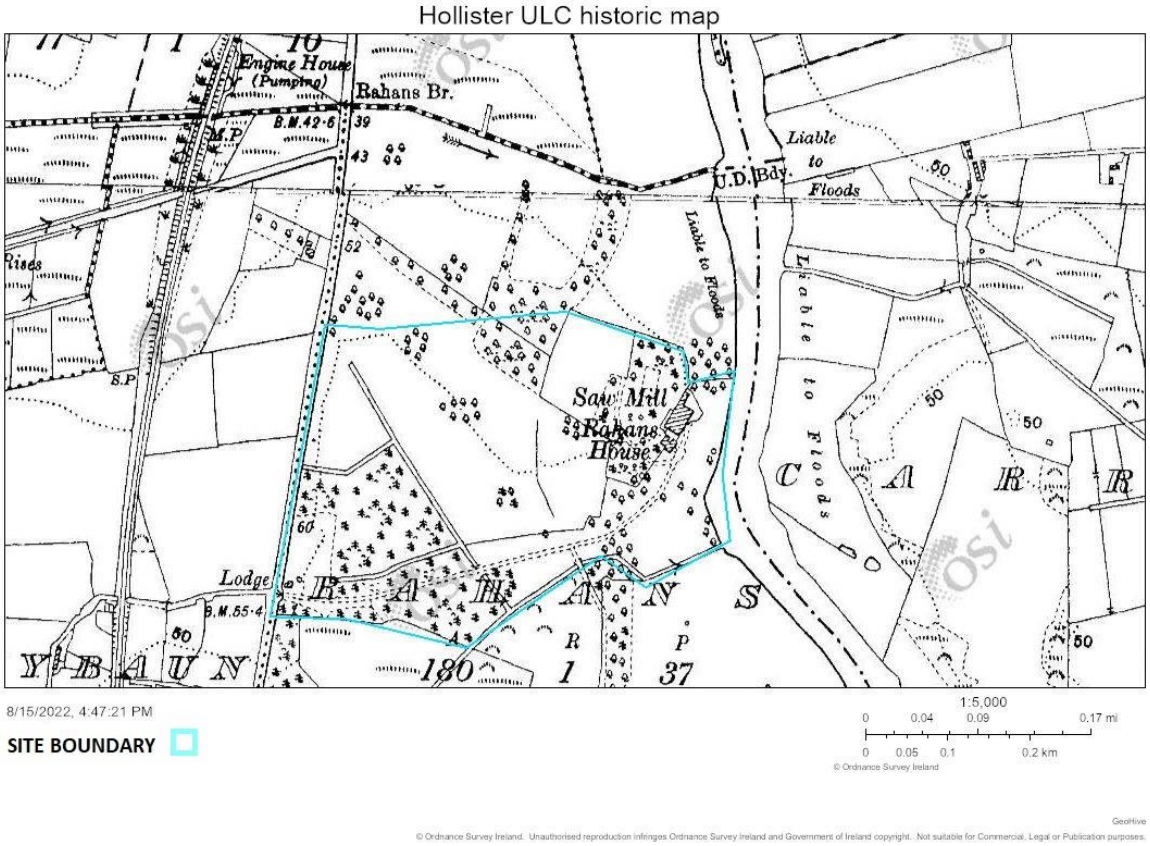
Land History

In the oldest publicly available maps of the area, sourced from the Geohive.ie map system, the site of the Hollister ULC campus was once a mosaic of grassland and scattered deciduous and coniferous woodland outside of Ballina on the site of a saw mill.

The species traditionally associated with such landscapes include farmland birds such as linnet, yellowhammer and barn owl, woodland species such as coal tit, goldcrest and treecreeper. Mammals such as hedgehogs, bats, badgers and foxes. Pine martin, red squirrel and some bat species are also more likely to occur in woodlands. Otter may also occur in woodland habitats along watercourses.

Hedgerows, treelines and hay meadows would also have been likely to occur, which would support many other species of animals and plants. Many of these species no longer occur in the area due to the loss of suitable habitat in the area. However, some generalist species such as various birds, badger and foxes are likely to persist in the area up to present times.

Figure 22: Historic map (1829-41) of the Hollister ULC site



Field Surveys

An initial site visit was carried out on this site on 29.03.2022. A habitat mapping site visit was then carried out by a suitably qualified Woodrow ecologist on the 08.09.2022 to map the habitats on site and create an inventory of the flora and fauna present on the site.

SWOT Analysis

Strength	**Weakness**
- Proactive and interested staff members actively working to improve biodiversity of the site - Lots of green space already managed in line with All Ireland Pollinator Plan - Mature trees and proximity to the river likely to encourage wildlife to the area	- Need to ensure biodiversity areas can be managed long-term, e.g. appropriate equipment and areas to compost or use cuttings, for instance linkages with local farmers - Lots of impermeable surfaces in the vicinity of the buildings themselves
Opportunity	**Threat**
- Lots of green spaces with room for planting of scattered native trees in open spaces to enhance habitat connectivity for bats and birds without reducing the area of meadows managed for pollinators. - Pond creation/ enhancement - Native hedgerow planting for boundary screening	- Need to 'look tidy' to maintain professional image - Ongoing need for co-operation with farmers with appropriate equipment for meadow management

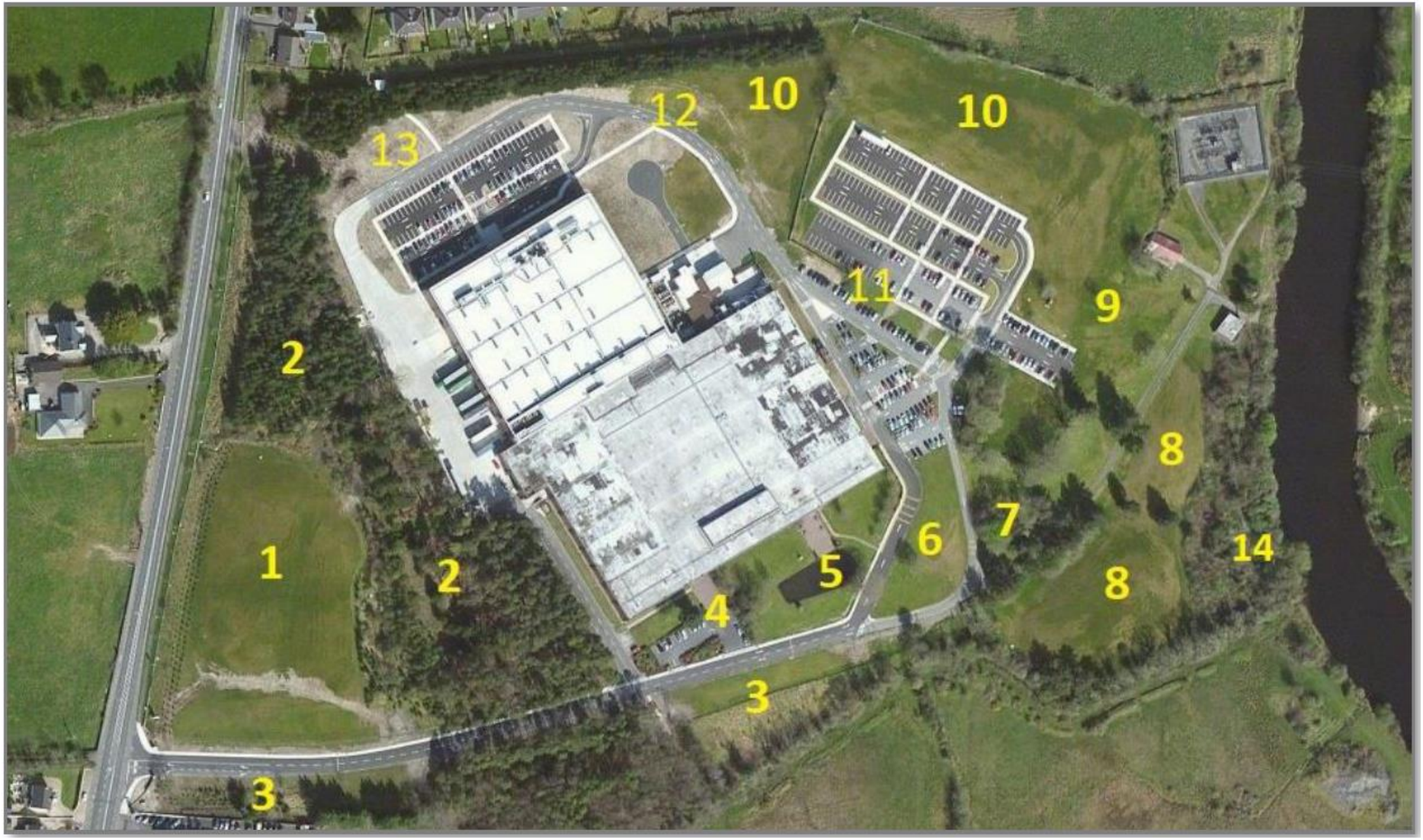
Table of Proposed Actions

Table 11: ***Suggested Biodiversity Actions for Hollister ULC Campus***

Biodiversity Action Plan Areas			
Area No.	**Project**	**Time of Year to implement**	**Notes**
13	Pond	Summer – excavations may be easiest in summer while filling the pond may be fastest in times with higher rainfall	-
5	Pond	Summer – excavations may be easiest in summer while filling the pond may be fastest in times with higher rainfall	-Planting of floating plants such as Yellow Waterlily will provide colour and biodiversity interest to this pond. - Given the steep slopes of the pond, pond planter baskets may be needed to provide a substrate for the plants.
1	Meadow Management	Trial sowing yellow rattle seeds in Autumn Cut short meadows every 6 weeks Cut long meadows once in September and ensure cuttings are removed	- Trial sowing a small patch of yellow rattle into a defined area to manage grass growth to test the effects. - Selective mowing of paths through longer meadow areas to encourage people to walk in certain areas, e.g., to avoid wetter areas. - Areas of shorter grass mowed on a 6-week rotation starting in April after dandelions have bloomed. - Reduce mowing and remove cuttings to reduce soil fertility and see what wildflowers naturally recolonise the area or are in the seedbank already. - Where areas can not be feasible be managed as a long-flowering meadow, aim to cut them on a 6-week rotation to allow flowers to bloom. When looking for wildflower seeds, gather small amounts from local, native populations. This could be combined with a seed saving workshop amongst the environmental committee within Hollister ULC. Remember to leave plenty of seeds in the area to replenish that population for the next year.

10, 12, 13	Screening planting along boundary with houses	Winter (for planting)	Planting a mixed native deciduous and evergreen hedgerow along the site boundary will provide screening and biodiversity benefits over the long term. The planting advice would be to plant in winter when the trees are dormant. An idea mix includes 75% hawthorn and 25% of at least 4 other native species. However, more evergreen species could be included to enhance screening in the winter. Planting a staggered double-row of hedging will provide shelter and screening. *Native evergreen plants include yew, holly, gorse and ivy. Ivy is a wonderful plant for wildlife and is likely to naturally colonise a hedgerow if given enough time. It also grows easily from berries and rooted cuttings.* *Other native hedgerow plants include hawthorn, blackthorn, elder, guelder rose, spindle, and cherry (bird and wild).* Once installed and big enough to cut, divide the hedge into management sections and trim each section into an 'A' shape on a 2–3-year rotation.

Figure 23: Areas for Action from previous Biodiversity Plan for Hollister ULC campus



7. Mount Falcon Estate

Maps

Figure 24: Habitat Map of Mount Falcon Estate

Photos

Plate 35: Example of woodland flora

Plate 36: Walking trail through agricultural grassland on the site, grazed by sheep

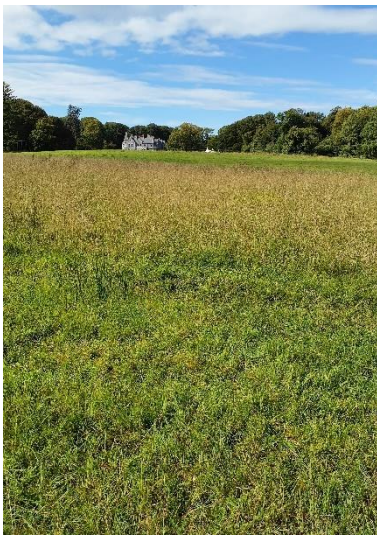


Plate 37: Example of existing bat boxes erected in the woodland on site

Plate 38: Example of invasive Himalayan honeysuckle in the woodland on site

Plate 39: Example of invasive cherry laurel in the woodland on site

Plate 40: Example of invasive *Rhododendron ponticum* mixed with some cherry laurel in the woodland on site

Desk Study

Designated Sites

The River Moy SAC is located directly across the N26 road from Mount Falcon Estate. The river moy runs within 100m east of the site at its closest point on the other side of the N26. Drainage ditches on site are likely to eventually feed into the SAC particularly those along the eastern site boundary. The Moy_120 watercourse which runs alongside the site has a current status as 'moderate' according to the EPA.

Protected Species

Table 12: Protected Species recorded within 1km of Mt. Falcon

Protected Species	**Last Recorded Date**	**Designation**	Actions on Site for Species
Eurasian Curlew	31/12/2001	Protected Species: Wildlife Acts EU Birds Directive - Annex II, Section II Threatened Species: Birds of Conservation Concern - Red List	
Mallard	30/05/2010	Protected Species: Wildlife Acts EU Birds Directive - Annex II, Section I & Annex III, Section I Bird Species	
Northern Lapwing	31/12/2001	Protected Species: Wildlife Acts EU Birds Directive - Annex II, Section II Threatened Species: Birds of Conservation Concern - Red List	
Sand Martin	28/07/2017	Protected Species: Wildlife Acts Threatened Species: Birds of Conservation Concern - Amber List	
Eurasian Red Squirrel	23/04/2018	Protected Species: Wildlife Acts	

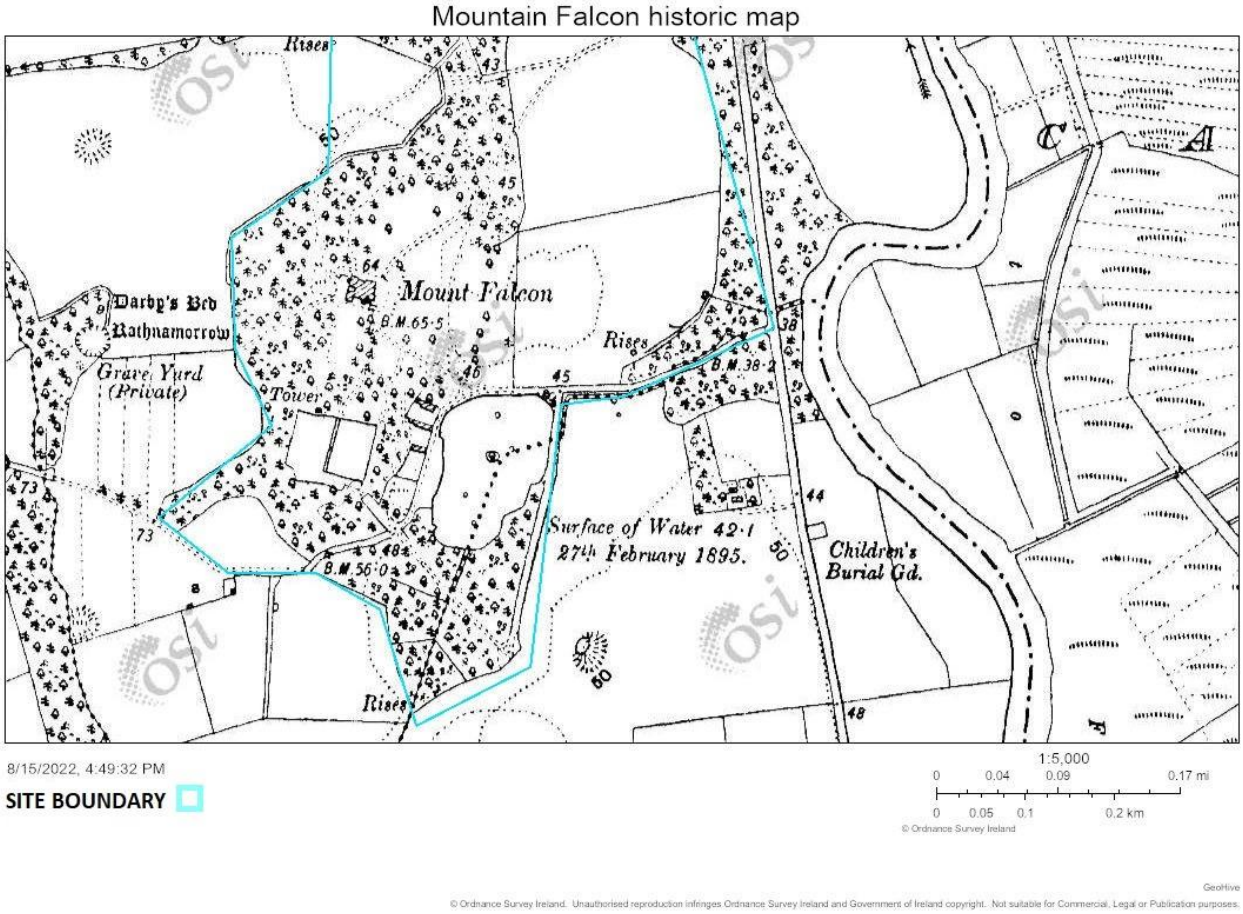
Land History

In the oldest publicly available maps of the area, sourced from the Geohive.ie map system, the site of the Mount Falcon Estate was once a mosaic of grassland and deciduous and coniferous woodland within the Mount Falcon Demesne. The cover of woodland on the site varied between the first and last edition of the 6-inch historic maps within an increase in woodland cover in the last edition of the maps. The lake on the site has been present since the earliest available maps for the site in the early 1800s, with a slight variation in shape compared to the current lake.

The species traditionally associated with such landscapes include farmland birds such as linnet, yellowhammer and barn owl, woodland species such as coal tit, goldcrest and treecreeper. Mammals such as hedgehogs, bats, badgers and foxes. Pine martin, red squirrel and some bat species are also more likely to occur in woodlands. Otter may also occur in woodland habitats along watercourses.

Hedgerows, treelines and hay meadows would also have been likely to occur, which would support many other species of animals and plants. Many of these species no longer occur in the area due to the loss of suitable habitat in the area. However, some generalist species such as various birds, badger and foxes are likely to persist in the area up to present times.

Figure 25: Historic map (1829-41) of the Mount Falcon estate



Field Surveys

An initial site visit was carried out on this site on 29.03.2022. A habitat mapping site visit was then carried out by a suitably qualified Woodrow ecologist on the 09.05.2022 to map the habitats on site and create an inventory of the flora and fauna present on the site.

SWOT Analysis

Strength	**Weakness**
- Management on site are actively engaged with and interested in promoting biodiversity. - Site has a variety of habitats and niches suited to a variety of species - Large areas of woodland and green space - Sightings by management of various protected species using the site. - Many areas of the site are already valuable to and used by various species. - Educational signage and walking routes through the estate provide a link for visitors to think about and engage with nature.	- Management of biodiversity needs to also compliment the commercial needs for the estate, which can create a challenge for management - Presence of large thickets of invasive species threaten species diversity of the woodland
Opportunity	**Threat**
- Management of invasive species in woodland areas will allow for more natural regeneration of woodland flora. - Owl box installation - Bat box installation and protection of existing roost features within the woodland areas. - Creation of woodpile areas within the woodland to create habitats for invertebrates	- Large areas of invasive species present in the woodland areas, particularly rhododendron, cherry laurel and Himalayan honeysuckle. Snowberry is also present on site. These areas will require management to prevent their unchecked spread to other areas of the site and beyond.

Table of Proposed Actions

Table 13: ***Suggested Biodiversity Actions for Mount Falcon Estate***

Biodiversity Action Plan Areas		
Project	**Time of Year to implement**	**Notes**
Invasive Species Control	Depends on the species in question	Four invasive species were noted on the estate grounds: • *Rhododendron ponticum* (high risk of invasion impact, and Third Schedule listed species under Regulations 49 & 50 in the European Communities (Birds and Natural Habitats) Regulations 2011. Under these regulations It will be an offence without a licence, to release or allow to disperse or escape, to breed, propagate, import, transport, sell or advertise such species. • Cherry Laurel ((high risk of invasion impact) • Himalayan honeysuckle (medium risk of invasion impact) • Snowberry (Low risk of invasion impact) Advice on control measures is available in the following documents: • Prevention, Control and Eradication of Invasive Alien Species (EPA Research Report 368) • The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (Transport Infrastructure Ireland) The long-term management of invasive species on site is likely to be the most impactful action to promote and enhance biodiversity on the estate grounds.
Bat box installation	Any time	Given the high foraging potential for bats within the site, this site would likely be idea for including bat boxes. Please see section 1.1.2 for further information on bat boxes.
Owl boxes	Any time	The site is also idea foraging habitat for owls and could be benefit from the inclusion of a barn owl box on site. The best site for a barn owl box is inside a building that allows owls to fly in at 3+m above the ground. These

		boxes generally cheaper, last longer and are easier to erect than their outdoor counterparts. If a suitable building is present. Where a suitable indoor location is not available, nest boxes can be installed in a suitable mature tree on site. Choose a thick trunked tree with a high canopy and few/ no low branches. Ensure the access hole is visible at a distance even when tree is in full leaf as the owls will not use a hole they can't see and access. Place the box at least 3m off the ground, on the edge of the woodland or in an isolated tree facing towards open ground, but sheltered from the prevailing weather, where possible. Further information for types of barn owl boxes can be found in the references or from the Barn Owl Project or Barn Owl Trust.
Log Piles/ Dead Wood Areas	Any time	Leaving small piles of cut logs and leaves in an area can attract invertebrates and other species that rely on deadwood as a habitat. Another alternative use for some of the cuttings within the estate would be to establish dead hedges as described above in section 1.1.2.

Figure 26: Suggested locations for proposed biodiversity actions

8. Linkages

Collaboration is often the key to success. Below are a list of projects, initiatives, groups and bodies that may be potential sources of collaborations in the future.

- Mayo County Council
- Mayo Heritage Officer
- All-Ireland Pollinator Plan
- An Choill Bheag initiative from An Taisce
- Legacy4LIFE programme-
  This programme covers three distinct areas - Pond Diversity, Advancing "Farm to Fork", and Green Communities. The pond diversity and green community elements may be of interest to the groups involved in this biodiversity plan.
- Ballina Tidy Towns Group
- The Barn Owl Project
- Bat Conservation Ireland

9. Appendix

Methodologies for Data Collection

Desktop Survey

A desktop survey was undertaken to gather information on nearby protected areas and the likely distribution of species in the general area prior to the survey visits, so that a targeted approach to surveying could be undertaken. The desktop survey enabled an assessment of the likely on the species and habitats that might be within the plan areas.

Primary sources of information included aerial photographs, datasets on designated areas available from EPA, NPWS, and species records from the National Biodiversity Data Centre (NBDC) database.

Existing Ecological Records

The National Biodiversity Data Centre data records were consulted in order to establish historic records of important and protected species, or the likelihood of their occurrence (through range information).

Important and protected species include those identified in the EU Habitats and Species Directive, as well as amber- and red-listed bird species in BirdWatch Ireland's Birds of Conservation Concern in Ireland (Gilbert et al, 2021). NBDC collects and manages biodiversity data for the island of Ireland and incorporates data from a number of different sources. The National Biodiversity Data Centre (NBDC) was interrogated for all records within the 1km squares encompassing the sites and surrounds.

Designated Sites

Information on areas designated for their ecological features within 1km of the site were obtained, and the potential for connectivity with the Application Site was assessed using available datasets and professional judgement (such as resulting from adjoining watercourses or those in close proximity to the site). Shapefiles of protected sites were obtained from the NPWS, and the GIS mapping tools from the EPA and Environmental Sensitivities Mapping tools were used to establish what designated sites were close to the plan areas.

Field Survey Methodologies

A Woodrow ecologist undertook an initial habitat walkover of the various plan areas during the initial site visit in March 2022. An Extended Phase 1 Habitat Survey (CIEEM, 2017) was then carried out at later dates at the various sites. Survey results and habitat boundaries were mapped and digitised in the field with the aid of the Qfield software and were later clarified and interpreted with the aid of ArcGIS software.

References

- All-Ireland Pollinator Plan (2022) Why We Don't Recommend Wildflower Seed Mixes [online], available: https://pollinators.ie/wildflower-seed/
- Barn Owl Trust UK, Barn Owl Nest Box Guidance: https://www.barnowltrust.org.uk/barn-owl-nestbox/
- Barn Owl Trust UK, Barn Owl Nest Boxes for Trees Guidance: https://www.barnowltrust.org.uk/barn-owl-nestbox/owl-boxes-for-trees/
- BirdWatch Ireland (2022) Nestboxes for Garden Birds [online], available: https://birdwatchireland.ie/irelands-birds-birdwatch-ireland/garden-birds/nestboxes/
- Dublin City Council (2021) How to Guide to Rainwater Planters. [online], available: https://www.dublincity.ie/sites/default/files/2021-04/a-how-to-guide-to-rainwater-planters-english.pdf
- EPA Research (2015) Prevention, Control and Eradication of Invasive Alien Species Authors: Frances E. Lucy, Joe Caffrey, Jaimie T.A. Dick, Eithne Davis and Neil E. Coughlan. Available: https://www.epa.ie/publications/research/biodiversity/Research_Report_368.pdf
- Gardening For Biodiversity Booklet by Juanita Browne, https://laois.ie/wp-content/uploads/Garden-Wildlife-Booklet-WEB-17MB.pdf
- Hedgelink (2022) How to Manage Your Hedges for Dead Wood Insects [online], available: https://hedgelink.org.uk/cms/cms_content/files/32_dead_wood_insects_%26_hedges_leaflet.pdf
- Glasgow City Council et al. (2021) National Infrastructure Commission – Surface Water Flooding Study: Call for Evidence. Impact of rain gardens on Surface Water Management in Glasgow. Available: https://lawaters.ie/app/uploads/2022/05/Impact-of-rain-gardens-on-Surface-Water-Management-in-Glasgow.pdf
- Dept. of Housing, Local Government and Heritage (2021) Nature-based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas - Water Sensitive Urban Design Best Practice Interim Guidance Document. Available: https://lawaters.ie/app/uploads/2021/12/20211216_SUDS_Interim_Guidance.pdf
- Prevention, Control and Eradication of Invasive Alien Species (EPA Research Report 368), https://www.epa.ie/publications/research/biodiversity/Research_Report_368.pdf
- RHS, How to Compost Guide: https://www.rhs.org.uk/soil-composts-mulches/composting
- RHS Gardening. (2022) Dead Wood and Compost Heap Habitats [online], available: https://www.rhs.org.uk/wildlife/dead-wood-compost-heap-habitats
- Swift Conservation Ireland (n.d.) 'Building Nest Boxes For The Swift Into Cement Block, Brick And Externally Insulated Walls Guidance On Best Practice Building Nest Boxes For The Swift Into Cement Block And Brick Walls', available: www.swiftconservation.ie
- Transport Infrastructure Ireland (2010) The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads, Available: https://www.tii.ie/technical-services/environment/construction/Management-of-Noxious-Weeds-and-Non-Native-Invasive-Plant-Species-on-National-Road-Schemes.pdf
- UK Wildlife Trust Mini Pond Creation Guide: https://www.wildlifetrusts.org/actions/how-create-mini-pond

- Urban Design London (n.d.) Designing Rain Gardens: A Practical Guide. Available: https://www.urbandesignlondon.com/documents/85/UDL_Rain_Gardens_for_web_0vwx1Ls.pdf

Other relevant resources include:

- How to attract moths and bats to your garden (WildlifeTrusts.org)
- Moth caterpillar foodplants.pdf (butterfly-conservation.org)
- Bat Conservation Ireland website: https://www.batconservationireland.org/
- Making a Wildlife Garden (fingalbiodiversity.ie)
- Wildlife Detective Booklet for Children: https://www.kilkennycoco.ie/eng/services/heritage/wildlife-detectives-guide.pdf
- Pollinator-friendly grass cutting A5 Flyer (pollinators.ie)
- Wildflower collection guide: https://pollinators.ie/wordpress/wp-content/uploads/2018/04/How-to-guide-Seeds-2018-WEB.pdf
- Introduction to Solitary Bees and their nesting Sites: https://pollinators.ie/the-secret-life-of-solitary-bees/
- Creating nesting habitat for pollinators: https://pollinators.ie/wordpress/wp-content/uploads/2018/04/How-to-guide-Nesting-2018-WEB.pdf
- Local Community Actions to Help Pollinators: https://pollinators.ie/wp-content/uploads/2021/08/Local-Communities_actions-to-help-pollinators-July-2021-WEB-JB.pdf
- Pollinator Friendly Plant List: https://pollinators.ie/wordpress/wp-content/uploads/2018/04/Planting-Code-2018-WEB.pdf
  This link has some excellent lists of plants that are pollinator friendly and are nicely divided up into trees, scrubs etc. so that you can pick the types of plants that suit your site.

Bumblebee ID guides:

- Bumblebees of UK and Ireland Leaflet (birdguides-cdn.com)
- NBDC Crash Course in Bumblebee Identification (pollinators.ie)
- NBDC Bumblebee Poster (pollinators.ie)

Invasive Species Information:

- Invasive Species Ireland website: https://invasivespeciesireland.com/
- NBDC Invasive Species ID guides: https://www.biodiversityireland.ie/projects/invasive-species/id-guides/
- Invasive Alien Species Ireland- Legislation and Policy guidance: https://invasives.ie/about/legislation-policy/
- Invasive Alien Species Ireland- *Rhododendron ponticum* species profile, https://invasivespeciesireland.com/species-accounts/established/terrestrial/rhododendron
- NBDC *Rhododendron ponticum* species profile, https://species.biodiversityireland.ie/profile.php?taxonId=29245&taxonName=rhodo
- NBDC Snowberry species profile, https://species.biodiversityireland.ie/profile.php?taxonId=45555&taxonName=snowberry

- NBDC Himalayan honeysuckle species profile https://species.biodiversityireland.ie/profile.php?taxonId=42928&taxonName=himalayan%20honey
- NBDC Cherry Laurel species profile https://species.biodiversityireland.ie/profile.php?taxonId=28940&taxonName=laurel
- NBDC Buddleia species profile https://species.biodiversityireland.ie/profile.php?taxonId=40247&taxonName=budd
- NBDC winter heliotrope species profile https://species.biodiversityireland.ie/profile.php?taxonId=43895&taxonName=winter%20he

Species Lists

Table 14: List of non-protected species recorded within approximately 1km of Gaelscoil na gCeithre Maol

Species name	Date of last record in NBDC database	Date of last record in NBDC database	Species name	Date of last record in NBDC database	Date of last record in NBDC database
acarine (Acari)	*Acari*	22/09/2016	insect - caddis fly (Trichoptera)	*Limnephilidae*	22/09/2016
annelid	*Erpobdella*	22/09/2016		*Philopotamidae*	22/09/2016
	Glossiphonia	22/09/2016		*Polycentropus*	22/09/2016
	Glossiphonia complanata	31/08/2007		*Rhyacophila*	22/09/2016
	Helobdella	31/08/2007		*Sericostoma*	31/08/2007
	Lumbriculidae	22/09/2016		*Trichoptera*	24/06/2015
	Oligochaeta	24/06/2015	insect - dragonfly (Odonata)	*damselflies (Zygoptera)*	31/08/2007
	Tubificidae	22/09/2016	insect - hymenopteran	*Bombus (Bombus) lucorum*	03/04/2019
bird	Coal Tit *(Periparus ater)*	24/03/2011		*Bombus lucorum agg.*	03/04/2019
	Grey Wagtail *(Motacilla cinerea)*	31/07/2017	insect - mayfly (Ephemeroptera)	*Baetis*	22/09/2016
	Pied Wagtail *(Motacilla alba subsp. yarrellii)*	24/03/2011		*Ecdyonurus*	24/06/2015
crustacean	*Asellus*	22/09/2016		*Green Drake (Ephemera danica)*	20/07/2005
	Gammarus	22/09/2016		*Heptagenia*	24/06/2015
	Gammarus duebeni	31/08/2007		*Serratella ignita*	24/06/2015
flatworm (Turbellaria)	*Planaria*	31/08/2007	insect - stonefly (Plecoptera)	*Leuctra*	24/06/2015
flowering plant	Alternate Water-milfoil *(Myriophyllum alterniflorum)*	31/08/2007	insect - true bug (Hemiptera)	*Aphelocheirus (Aphelocheirus) aestivalis*	22/09/2016
	Branched Bur-reed *(Sparganium erectum)*	03/09/2015	insect - true fly (Diptera)	*Chironomidae*	22/09/2016
	Enchanter's-nightshade *(Circaea lutetiana)*	03/09/2015		*Diptera larva (Diptera)*	24/06/2015
	Fool's-water-cress *(Apium nodiflorum)*	03/09/2015		*Simuliidae*	22/09/2016
	Purple-loosestrife *(Lythrum salicaria)*	31/08/2007	mollusc	*Ancylus fluviatilis*	24/06/2015
	Reed Canary-grass *(Phalaris arundinacea)*	31/08/2007		*Bithynia*	22/09/2016

	Winter Heliotrope *(Petasites fragrans)*[9]	29/01/2018		*Freshwater Nerite (Theodoxus (Theodoxus) fluviatilis)*	22/09/2016
insect - beetle (Coleoptera)	*Dytiscidae*	22/09/2016		*Physella*	22/09/2016
	Elmis aenea	22/09/2016		*Planorbis*	22/09/2016
	Haliplidae	31/08/2007		*Pond snails (Lymnaeidae)*	24/06/2015
	Limnius volckmari	24/06/2015		*Sphaerium*	22/09/2016
	Oulimnius tuberculatus	20/07/2005		*Theodoxus*	24/06/2015
insect - caddis fly (Trichoptera)	*Hydropsyche*	22/09/2016		*Wandering Snail (Radix balthica)*	22/09/2016
	Lepidostomatidae	22/09/2016	moss	*Greater Water-moss (Fontinalis antipyretica)*	31/08/2007
	Leptoceridae	24/06/2015	terrestrial mammal	*Wood Mouse (Apodemus sylvaticus)*	18/11/2014

[9] *Invasive

Table 15: List of non-protected species recorded within approximately 1km of St. Muredach's College

Species group	Species name	Date of last record in NBDC database	Species group	Species name	Date of last record in NBDC database
acarine (Acari)	*Acari*	17/10/2013	insect - caddis fly (Trichoptera)	*Goeridae*	09/08/2010
annelid	*Eiseniella*	17/10/2013		*Hydropsyche*	09/09/2016
	Eiseniella tetraedra	25/07/2007		*Lepidostomatidae*	17/10/2013
	Lumbricidae	09/09/2016		*Limnephilidae*	17/10/2013
	Lumbriculidae	09/09/2016		*Odontocerum albicorne*	09/09/2016
	Tubificidae	09/09/2016		*Philopotamidae*	25/07/2007
bird	Grey Wagtail *(Motacilla cinerea)*	31/07/2017		*Rhyacophila*	09/09/2016
crustacean	*Asellus*	25/07/2007		*Sericostoma*	09/09/2016
	Gammarus	09/09/2016	insect - hymenopteran	*Bombus (Bombus) lucorum*	03/04/2019
	Gammarus duebeni	25/07/2007		*Bombus lucorum agg.*	03/04/2019
flatworm (Turbellaria)	*Planaria*	09/09/2016	insect - mayfly (Ephemeroptera)	*Baetis*	09/09/2016
flowering plant	Alder *(Alnus glutinosa)*	03/09/2015		*Caenis*	25/07/2007
	Alternate Water-milfoil *(Myriophyllum alterniflorum)*	25/07/2007	insect - mayfly (Ephemeroptera)	*Ecdyonurus*	09/09/2016
	Ash *(Fraxinus excelsior)*	03/09/2015		*Green Drake (Ephemera danica)*	20/07/2005
	Beech *(Fagus sylvatica)*	25/07/2007		*Heptagenia*	17/10/2013
	Crack-willow *(Salix fragilis)*	03/09/2015		*Rhithrogena*	09/09/2016
	Osier *(Salix viminalis)*	03/09/2015		*Serratella ignita*	09/09/2016
	Perfoliate Pondweed *(Potamogeton perfoliatus)*	03/09/2015	insect - moth	Angle Shades *(Phlogophora meticulosa)*	29/09/2020
	Purple-loosestrife *(Lythrum salicaria)*	25/07/2007		Garden Tiger *(Arctia caja)*	23/07/2020

	Red Clover *(Trifolium pratense)*	03/09/2015	insect - stonefly (Plecoptera)	*Amphinemura*	09/09/2016
	Reed Canary-grass *(Phalaris arundinacea)*	03/09/2015		*Amphinemura sulcicollis*	09/09/2016
	Water Mint *(Mentha aquatica)*	03/09/2015		*Leuctra*	09/08/2010
	White Clover *(Trifolium repens)*	03/09/2015		*Perla bipunctata*	09/09/2016
	Wild Angelica *(Angelica sylvestris)*	03/09/2015	insect - true fly (Diptera)	*Chironomidae*	09/09/2016
	Winter Heliotrope *(Petasites fragrans)*[10]	29/01/2018		*Dicranota*	09/09/2016
	Wych Elm *(Ulmus glabra)*	03/09/2015		*Simuliidae*	09/09/2016
	Yellow Loosestrife *(Lysimachia vulgaris)*	03/09/2015	mollusc	*Ancylus fluviatilis*	25/07/2007
insect - beetle	*Elmis aenea*	09/09/2016		Wandering Snail *(Radix balthica)*	17/10/2013
	Esolus parallelepipedus	09/08/2010		Long-beaked Water Feather-moss *(Rhynchostegium riparioides)*	25/07/2007
	Hydrophilidae	25/07/2007			
	Hydroporus	09/09/2016			
	Limnius volckmari	09/09/2016			
	Oulimnius tuberculatus	09/08/2010			

[10] *Invasive

Table 16: List of non-protected species recorded within approximately 1km of Moyne College

Species group	Species name	Date of last record in NBDC database	Species group	Species name	Date of last record in NBDC database
acarine (Acari)	*Acari*	22/09/2016	insect - caddis fly (Trichoptera)	*Hydropsyche*	22/09/2016
annelid	*Erpobdella*	22/09/2016		*Lepidostomatidae*	22/09/2016
	Glossiphonia	22/09/2016		*Leptoceridae*	24/06/2015
	Glossiphonia complanata	31/08/2007		*Limnephilidae*	22/09/2016
	Helobdella	31/08/2007		*Philopotamidae*	22/09/2016
	Lumbriculidae	22/09/2016		*Polycentropus*	22/09/2016
	Oligochaeta	24/06/2015		*Rhyacophila*	22/09/2016
	Tubificidae	22/09/2016		*Sericostoma*	31/08/2007
bird	*Grey Wagtail (Motacilla cinerea)*	31/07/2017		*Trichoptera*	24/06/2015
crustacean	*Asellus*	22/09/2016	insect - dragonfly (Odonata)	Damselflies *(Zygoptera)*	31/08/2007
	Gammarus	22/09/2016	insect - hymenopteran	*Bombus (Bombus) lucorum*	03/04/2019
	Gammarus duebeni	31/08/2007		*Bombus lucorum agg.*	03/04/2019
flatworm (Turbellaria)	*Planaria*	31/08/2007	insect - mayfly (Ephemeroptera)	*Baetis*	22/09/2016
flowering plant	Alder *(Alnus glutinosa)*	03/09/2015		*Ecdyonurus*	24/06/2015
	Alternate Water-milfoil *(Myriophyllum alterniflorum)*	31/08/2007		*Green Drake (Ephemera danica)*	20/07/2005
	Ash *(Fraxinus excelsior)*	03/09/2015		*Heptagenia*	24/06/2015
	Branched Bur-reed *(Sparganium erectum)*	03/09/2015		*Serratella ignita*	24/06/2015
	Crack-willow *(Salix fragilis)*	03/09/2015	insect - moth	Angle Shades *(Phlogophora meticulosa)*	29/09/2020

	Enchanter's-nightshade *(Circaea lutetiana)*	03/09/2015		Garden Tiger *(Arctia caja)*	23/07/2020
	Fool's-water-cress *(Apium nodiflorum)*	03/09/2015	insect - stonefly (Plecoptera)	*Leuctra*	*24/06/2015*
	Osier *(Salix viminalis)*	03/09/2015	insect - true bug (Hemiptera)	*Aphelocheirus (Aphelocheirus) aestivalis*	*22/09/2016*
	Perfoliate Pondweed *(Potamogeton perfoliatus)*	03/09/2015	insect - true fly (Diptera)	*Chironomidae*	*22/09/2016*
	Purple-loosestrife *(Lythrum salicaria)*	31/08/2007		*Diptera larva (Diptera)*	*24/06/2015*
	Red Clover *(Trifolium pratense)*	03/09/2015		*Simuliidae*	*22/09/2016*
	Reed Canary-grass *(Phalaris arundinacea)*	03/09/2015	mollusc	*Ancylus fluviatilis*	*24/06/2015*
	Water Mint *(Mentha aquatica)*	03/09/2015		*Bithynia*	*22/09/2016*
	White Clover *(Trifolium repens)*	03/09/2015		*Freshwater Nerite (Theodoxus (Theodoxus) fluviatilis)*	*22/09/2016*
	Wild Angelica *(Angelica sylvestris)*	03/09/2015		*Physella*	*22/09/2016*
	Winter Heliotrope *(Petasites fragrans)*[11]	29/01/2018		*Planorbis*	*22/09/2016*
	Wych Elm *(Ulmus glabra)*	03/09/2015		Pond snails *(Lymnaeidae)*	*24/06/2015*
	Yellow Loosestrife	03/09/2015		*Sphaerium*	*22/09/2016*

[11] *Invasive

	(Lysimachia vulgaris)				
insect - beetle (Coleoptera)	*Dytiscidae*	22/09/2016		*Theodoxus*	*24/06/2015*
	Elmis aenea	22/09/2016		Wandering Snail *(Radix balthica)*	*22/09/2016*
	Haliplidae	31/08/2007	moss	Greater Water-moss *(Fontinalis antipyretica)*	*31/08/2007*
	Limnius volckmari	24/06/2015	terrestrial mammal	Wood Mouse *(Apodemus sylvaticus)*	*18/11/2014*
	Oulimnius tuberculatus	20/07/2005			

Table 17: List of non-protected species recorded within approximately 1km of St. Mary's College

Species group	Species name	Date of last record in NBDC database	Species group	Species name	Date of last record in NBDC database
acarine (Acari)	*Acari*	22/09/2016	insect - caddis fly (Trichoptera)	*Polycentropus*	22/09/2016
annelid	*Erpobdella*	22/09/2016		*Rhyacophila*	22/09/2016
	Glossiphonia	22/09/2016		*Sericostoma*	31/08/2007
	Glossiphonia complanata	31/08/2007		*Trichoptera*	24/06/2015
	Helobdella	31/08/2007	insect - dragonfly (Odonata)	*damselflies (Zygoptera)*	31/08/2007
	Lumbriculidae	22/09/2016	insect - hymenopteran	*Bombus (Bombus) lucorum*	18/08/1974
	Oligochaeta	24/06/2015		*Common Carder Bee (Bombus (Thoracombus) pascuorum)*	18/08/1974
	Tubificidae	22/09/2016		*Small Garden Bumble Bee (Bombus (Megabombus) hortorum)*	27/03/2018
bird	Coal Tit *(Periparus ater)* Pied Wagtail *(Motacilla alba subsp. yarrellii)*	24/03/2011	insect - mayfly (Ephemeroptera)	*Baetis*	22/09/2016
crustacean	*Asellus*	09/02/2017		*Ecdyonurus*	24/06/2015
	Gammarus	22/09/2016		*Green Drake (Ephemera danica)*	20/07/2005
	Gammarus duebeni	22/09/2016		*Heptagenia*	24/06/2015
flatworm (Turbellaria)	*Planaria*	31/08/2007		*Serratella ignita*	24/06/2015
insect - beetle (Coleoptera)	Alternate Water-milfoil *(Myriophyllum alterniflorum)*	31/08/2007	insect - stonefly (Plecoptera)	*Leuctra*	24/06/2015
	Branched Bur-reed *(Sparganium erectum)*	31/08/2007	insect - true bug (Hemiptera)	*Aphelocheirus (Aphelocheirus) aestivalis*	22/09/2016

	Enchanter's-nightshade *(Circaea lutetiana)*	03/09/2015	insect - true fly (Diptera)	*Chironomidae*	22/09/2016
	Fool's-water-cress *(Apium nodiflorum)*	03/09/2015		*Diptera larva (Diptera)*	24/06/2015
	Purple-loosestrife *(Lythrum salicaria)*	03/09/2015		*Simuliidae*	22/09/2016
	Reed Canary-grass *(Phalaris arundinacea)*	31/08/2007	mollusc	*Ancylus fluviatilis*	24/06/2015
insect - beetle (Coleoptera)	*Dytiscidae*	31/08/2007		*Bithynia*	22/09/2016
	Elmis aenea	22/09/2016		*Freshwater Nerite (Theodoxus (Theodoxus) fluviatilis)*	22/09/2016
	Haliplidae	22/09/2016		*Physella*	22/09/2016
	Limnius volckmari	31/08/2007		*Planorbis*	22/09/2016
	Oulimnius tuberculatus	24/06/2015		*Pond snails (Lymnaeidae)*	24/06/2015
insect - caddis fly (Trichoptera)	*Hydropsyche*	20/07/2005		*Sphaerium*	22/09/2016
	Lepidostomatidae	22/09/2016		*Theodoxus*	24/06/2015
	Leptoceridae	22/09/2016		*Wandering Snail (Radix balthica)*	22/09/2016
	Limnephilidae	24/06/2015	moss	*Greater Water-moss (Fontinalis antipyretica)*	31/08/2007
	Philopotamidae	22/09/2016	terrestrial mammal	*Wood Mouse (Apodemus sylvaticus)*	18/11/2014

Table 18: List of non-protected species recorded within approximately 1km of Hollister ULC site

Species Group	Species name	Date of last record in NBDC database	Species Group	Species name	Date of last record in NBDC database
flowering plant	Hawthorn *(Crataegus monogyna)*	27/10/2021	insect - butterfly	Orange-tip *(Anthocharis cardamines)*	17/04/2020
	Vicia sepium var. sepium	27/10/2021	millipede	*Boreoiulus tenuis*	26/05/1994
harvestman (Opiliones)	Leiobunum blackwalli	22/08/1997		Common Flat-backed Millipede *(Polydesmus angustus)*	13/04/1995
	Leiobunum rotundum	22/08/1997		Macrosternodesmus palicola	26/05/1994
	Mitopus morio	13/09/1995		Ophyiulus pilosus	26/05/1994
	Nelima gothica	13/09/1995		Polydesmus coriaceus	13/04/1995
	Nemastoma bimaculatum	13/09/1995		White-legged Snake Millipede *(Tachypodoiulus niger)*	19/04/1995
	Oligolophus tridens	13/09/1995			

Table 19: List of non-protected species recorded within approximately 1km of Mount Falcon Estate

Species Group	Species name	Date of last record in NBDC database	Species Group	Species name	Date of last record in NBDC database
bird	Eurasian Sparrowhawk *(Accipiter nisus)*	30/05/2010	insect - butterfly	Green-veined White *(Pieris napi)*	24/08/2002
	European Robin *(Erithacus rubecula)*	06/09/2020		Speckled Wood *(Pararge aegeria)*	24/08/2002
flowering plant	Alder *(Alnus glutinosa)*	06/09/2020	insect - dragonfly (Odonata)	Black Darter *(Sympetrum danae)*	24/08/2002
	Alsike Clover *(Trifolium hybridum)*	06/09/2020		Brown Hawker *(Aeshna grandis)*	12/09/2002
	Common Figwort *(Scrophularia nodosa)*	06/09/2020		Common Darter *(Sympetrum striolatum)*	21/09/2002
	Common Nettle *(Urtica dioica)*	06/09/2020		Common Hawker *(Aeshna juncea)*	21/09/2002
	Lords-and-Ladies *(Arum maculatum)*	06/09/2020	insect - moth	Udea lutealis	24/08/2002
	Meadowsweet *(Filipendula ulmaria)*	06/09/2020	insect - true bug (Hemiptera)	Spined Shieldbug *(Picromerus bidens)*	03/09/2018
	Purple-loosestrife *(Lythrum salicaria)*	06/09/2020		*Criorhina ranunculi*	11/03/2018
	Water Mint *(Mentha aquatica)*	06/09/2020	terrestrial mammal	Red Fox *(Vulpes vulpes)*	30/07/2017
	Wood Avens *(Geum urbanum)*	06/09/2020			

Example Signage for Meadow Areas: