



Pendle View

Barrow, Lancashire

Ecological Wetland Area Establishment Plan

February 2016



Report Control Sheet

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For and on behalf of Collington Winter Ltd			

<i>Revision</i>	<i>Date</i>	<i>Description</i>	<i>Prepared</i>	<i>Reviewed</i>	<i>Approved</i>

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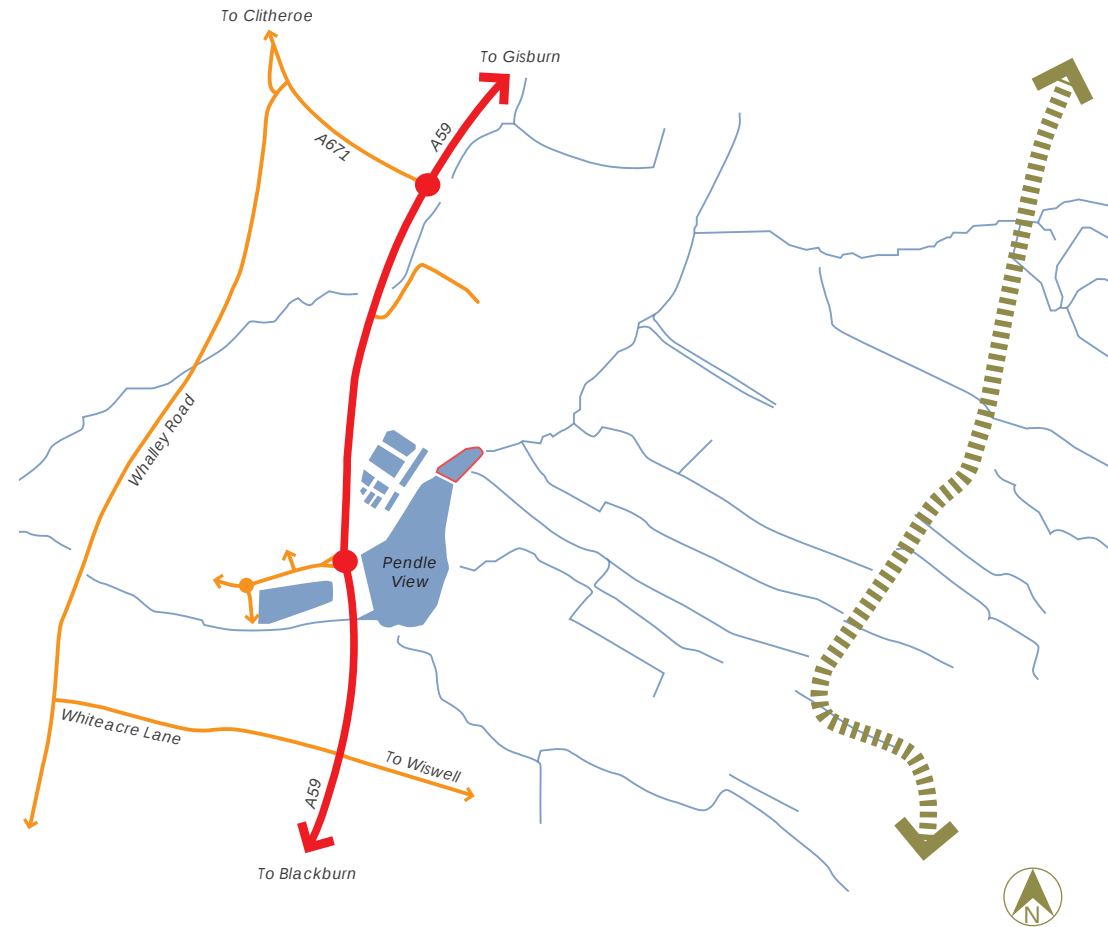


Figure 1.1 - Location of Pendle View

Key



Fly Lake



Fishing Lakes & Stock Ponds



Water Course



A59



Local Roads



Moorland Line - Pendle Hill

1.0 Introduction

Collington Winter Ltd was commissioned by Building Themes International plc in February 2016, to provide an Ecological Wetland Area Establishment Plan (EWAEP) for the Fly Lake at Pendle View.

Planning consent was granted in October 2015, for a change in use of the fishery into a leisure park, with lodges, cabins and associated buildings and infrastructure. A number of conditions were attached to the Planning Permission and this EWAEP has been produced to discharge part of Condition No. 3.

Condition No 3 states:

*No development shall take place until a programme of phasing for implementation of the whole development, including the approval of off-site highway works, improvements to the site access and **formation of the ecological wetland area**, has been submitted to and agreed in writing by the local planning authority. Development shall be carried out in accordance with the approved programme and any amendments must be agreed in writing by the local planning authority.*

Reason: In the interest of the amenity of the area and to comply with Policies DMG1, EN2 and DME3 of Ribble Valley Core Strategy (Adopted Version).

Location

Pendle View is located to the south east of the market town of Clitheroe in Lancashire. The A59 runs north-south to the west of the site entrance.

The site sits within a rural, farmed landscape below the moorland line associated with Pendle Hill. The landscape has a network of native hedgerows with hedgerow trees and numerous ditches and small streams run off Pendle Hill in the direction of Pendle View.

Pendle View

Pendle View is currently operating as a commercial coarse fisheries, with three fishing lakes and a series of stock ponds and associated infrastructure.

The 3.4ha, Carp Lake and 0.38ha, Fly Lake are in-line and are fed predominantly by a stream which enters the Fly Lake from the north east. A number of other streams running off the slopes of Pendle Hill feed into these lakes. There is an overflow which runs into the Barrow Brook to the south west of the Carp Lake, via a sluice.

Ecological Wetland Area Establishment Plan

This EWAEP will:

- Review the ecological survey reports prepared as a part of the planning application;
- Review the character and current conditions of the Fly Lake;
- Provide information on the requirements to re-profile the lake bed and suggest suitable plant species to create the ecological wetland which responds to local character;
- Provide a plant schedule; and
- Provide information for the ongoing management of the wetland.



2.0 Review of Previous Surveys

As a part of the planning application for Pendle View, a number of ecological surveys were commissioned.

Extended Phase 1 Habitat Survey

An Extended Phase 1 Habitat Survey was carried out by Miller Ecology in April 2015. The aim of this survey was to assess wildlife interests at Pendle View, with particular reference to any legal requirements and any potential development constraints. A desk top review of both the site and surrounding area of up to 2km was undertaken to identify the presence of any statutory designations and notable species records. A walkover survey was carried out to assess the wildlife potential and habitats, following guidance set out in *Guidelines for Baseline Ecological Assessment* (IEA, 1995).

Notable Species

The results of the survey show that there was no definitive evidence for the presence of badger *Meles meles* and water vole *Arvicola amphibius*, however a number of fresh spraints and a well used latrine point close to the northern edge of the Fly Lake indicate that otter *Lutra lutra* uses the site for feeding and laying up.

Birds using the site were recorded and a two pairs of great crested grebe *Podiceps cristatus* were noted along with a greenfinch *Chloris chloris* and reed buntings *Emberiza schoeniclus*. Other species recorded on site include a kestrel *Falco tinnunculus*, a grey wagtail *Motacilla cinerea*, pied wagtail *Motacilla alba*, goldfinch *Carduelis carduelis*, chiffchaff *Phylloscopus collybita*, long-tailed tit *Aegithalos caudatus*, treecreeper *Certhia familiaris*, coot *Fulica*

Review of Previous Surveys : Section 2

atra, mallard *Anas platyrhynchos*, Canada goose *Branta canadensis*, black headed gull *Chroicocephalus ridibundus*, tufted duck *Aythya fuligula*, moorhen *Gallinula chloropus*, mute swan *Cygnus olor*, blue tit *Cyanistes caeruleus*, robin *Erithacus rubecula*, blackbird *Turdus merula*, wood pigeon *Columba palumbus* and magpie *Pica pica*.

Whilst a kingfisher *Alcedo atthis* was not observed during the survey, discussions with anglers on the site indicated that they are regularly present on site.

The survey noted that the site holds feeding and roosting potential for bats and recommends that a further survey is undertaken to determine the likely presence.

Whilst the site at Pendle View has abundant water bodies, many of which are stocked with fish, the likelihood of the presence of amphibians such as great crested newts *Triturus cristatus*, is low due to the predatory nature of the fish. Three ponds on site did not contain fish at the time of the survey and these were assessed as having excellent (pond 1), good (pond 2) and poor (pond 4) suitability. Further survey of these ponds was recommended.

No reptiles were noted during the site survey, however it was felt that there was optimum habitat for grass snake *Natrix natrix*.

Habitats

The survey, which followed Phase 1 habitat survey methodology (JNCC, 2010) recorded the following on-site habitats:

- *semi-improved grassland*;
- *amenity grassland*;
- *hedgerows*;
- *open water* - Mesotrophic Lakes and Eutrophic Standing Waters are listed on Schedule 41 of the NERC Act (2006) as **Habitat of Principal Importance**.
- *reedbed* - The reedbed is located at the north eastern corner of the Carp Lake and is listed on Schedule 41 of the NERC Act (2006) as a **Habitat of Principal Importance**. The in-line Carp and Fly Lakes have a high ecological value and the survey recommends ecological enhancement to increase biodiversity.
- *trees & scrub*.

The survey identified a number of wetland species on site which included reed-canary grass *Phalaris arundinacea*, hard rush *Juncus inflexus*, tufted hair-grass *Deschampsia cespitosa*, reed sweet-grass *Glyceria maxima*, purple loostrife *Lythrum salicaria*, floating sweet-grass *Glyceria fluitans*, reedmace *Typha latifolia*, common water-plantain *Alisma plantago-aquatica*, branched bur-reed *Sparganium erectum*, lesser pond-sedge *Carex acutiformis*, water forget-me-not *Myosotis scorpioides*, common water-starwort *Callitriche stagnalis*, soft rush *Juncus effusus*, ribwort plantain *Plantago lanceolata* and common reed *Phragmites australis*.

The report makes recommendations relating to the use of the lakes by protected species, which should be followed prior to and during development of the site.

Breeding Bird Surveys

Breeding Bird Surveys were carried out in April, May and June 2015 by Ecology Services UK.

A total number of 36 bird species were recorded during the surveys, 18 species of which were either confirmed, probable or possible breeding pairs. The most abundant species noted on site was great crested grebe *Podiceps cristatus*, moorhen *Gallinula chloropus* and coot *Fulica atra*.

No birds listed on Annex 1 of the EC Birds Directive or listed on Schedule 1 of the Wildlife and Countryside Act 1981 were observed during the surveys.

The survey concluded that the site at Pendle View is of at least of **local importance for a limited range of bird species**.

Recommendations relating to the lakes include the retention of the reedbed and areas of open water to maintain the cover and foraging opportunities for bird species.

Great Crested Newt Surveys

Ecology Services UK carried out a series of Great Crested Newt (GCN) Surveys in April and May 2015.

Whilst palmate newt *Lissotriton helveticus* and common frog *Rana temporaria* were found on the site, no great crested newts *Triturus cristatus* were found on or adjacent to the site at Pendle View during the surveys. Whilst there may have been a number of constraints to the surveys carried out, Ecology Series

UK consider that it is unlikely that any GCN are present at Pendle View within the survey area.

The survey recognised that the site is of **high local importance for palmate newt**.

Bat Surveys

A series of Bat Surveys were carried out by Ecology Services UK in April and May 2015. The surveys included daytime, activity, anabat and emergence surveys. The survey concluded that whilst no roosts were identified in buildings or trees within the survey area, there was extensive bat activity during all of the surveys and activity was recorded across the entire site.

There was strong evidence of at least one noctule *Nyctalus noctula* roost in a tree and due to this Ecology Service UK consider the site to be of **county significance for the noctule bat**.

Water Vole Advice

Ecology Services UK carried out a series of Water Vole Surveys in April and May 2015.

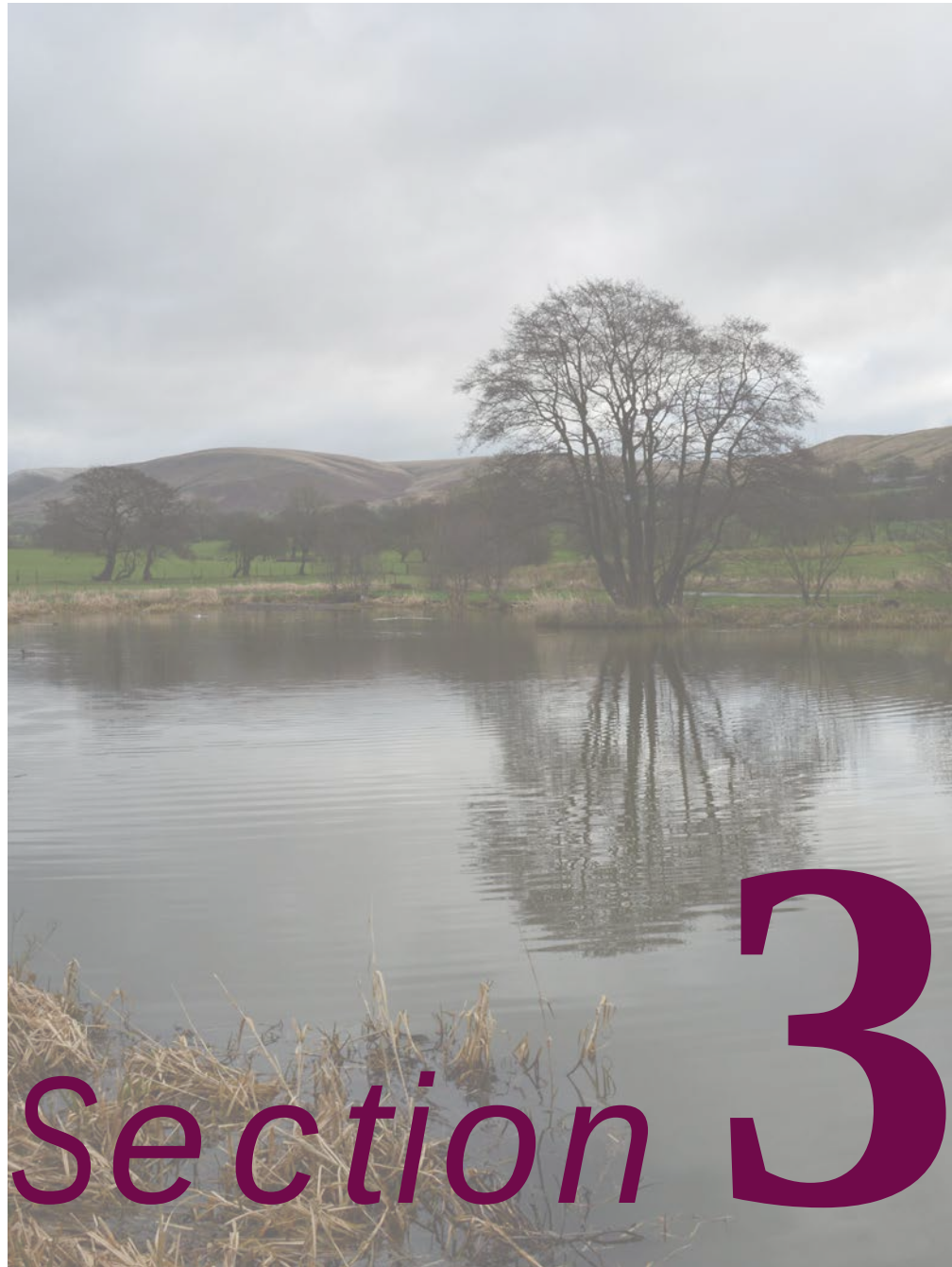
The banks of all the water bodies and the inflow and outflow streams and any suitable vegetation, were examined for evidence of use by water vole *Arvicola amphibius*. Whilst there are records of activity on the site which dates from 1977, no water vole were observed during the surveys.

Ecology Services UK concluded that whilst the current use of the site largely

limits the attractiveness of habitats to water voles, the site does hold potential for optimum habitat to be created to afford shelter, nesting and foraging opportunities.

The Next Steps

It is recommended that prior to commencement of works, all ecological survey reports prepared as part of the planning application are consulted and a suitably qualified ecological consultant is commissioned to provide 'tool box talks' on on-site habitats of importance and protected species.



3.0 *The Fly Lake*

The 0.38ha, Fly Lake is the smaller of the in-line water bodies at Pendle View. It is understood that it was de-silted recently and that there is a depth of up to 3m at the centre. It is currently stocked with trout species.



The lake is surrounded with amenity grass and the banks of the lake are revetted with wooden palisades. The Fly Lake is a predominantly open water body, with marginal and emergent vegetation restricted to the banks.



The Carp Lake and Fly Lake were recorded on the 1st edition Ordnance Survey of 1993 at 25 miles to the inch, with the Carp Lake shown as a reservoir. It is understood that the reservoir was built as an early flood defence for the settlement of Barrow. A small stream at the north east corner

The Fly Lake : Section 3



of the Fly Lake provides the main source of water, entering through a man-made culvert beneath the access track, A second culvert is located on the eastern bank, adjacent to the island.



At the time of survey, a recent bout of heavy rainfall had resulted in a large amount of debris and track surface dressing material being washed into the lake.



Several young and early mature alder *Alnus glutinosa* grow along the water's edge and occupy a small island adjacent to the eastern bank. The bank is fringed with a bank of reed canary grass *Phalaris arundinacea*, reed sweet grass *Glyceria maxima*, tufted hair grass *Deschampsia*



cespitosa, hard rush *juncus inflexus* and purple loosestrife *Lythrum salicaria*.

Marginal vegetation also grows at the south eastern and south western corners of the lake.



A grass covered path runs along the top of the dam structure between the lakes, with two wooden pedestrian bridges providing access across the spillways.





4.0 *Wetland Establishment*

Wetlands are defined as areas which are temporarily or permanently filled with water and support moisture loving plant communities. Wetlands have three characteristics:

- Plant communities which have adapted to wet conditions;
- Throughout the growing period there must be some degree of saturation so that the specific plants which have adapted to life in his habitat are able to thrive; and
- Hydric soils develop which are typically anaerobic.

Many wetlands have long periods of drawn down, often during the summer months, which provides optimal conditions for the plant communities. Resident and migratory birds feed on the seeds and tubers of emergent plants and as water levels begin to rise, algae and invertebrate species appear, providing food for wetland fauna. Wetlands perform several important functions which include:

- Flood alleviation;
- Improved water quality;
- Provide valuable habitats for flora & fauna; and
- Reduce soil erosion from river & pond banks.

The lakes at Pendle View are part of a hydrological catchment, with water emerging from Audley Lough and Audley Reservoir on the slopes of Pendle Hill and entering the lakes via a man-made culvert. The development of the wetland in the Fly Lake has the potential to reduce the water holding capacity

Wetland Establishment : Section 4

of the Fly Lake. Under normal conditions it is important that water continues to flow through the Fly Lake to maintain oxygen levels and ensure a healthy wetland is created. It is however recommended that prior to commencement of the work to create an ecological wetland area, a suitably qualified hydrological engineer is consulted to ensure that sufficient overflow systems are in place for surplus water to bypass the Fly Lake, when water levels in the catchment are high and flood water passes through the in-line system.

Establishment of a mature wetland takes some years to achieve and in the first instance the proposed scheme will focus on a rapid establishment of habitats, using species of local provenance, to maintain local character. Some species will be more successful than others and it is anticipated that over time, the more dominant species will thrive and develop into a mature wetland.

There is an established seed bank on site, which will naturally colonise the site over time and other species are brought in by wind or visiting birds. To achieve a rapid establishment of the wetland, it is recommended that on-site donor plants, created from lifting and splitting existing clumps and nursery grown plug plants, from a specialist nursery, are used.

Wetland Area Profiles

It is understood that the Fly Lake was de-silted recently and varies in depth up to 3m. By maintaining an area of open water within the lake, a habitat recognised as being of principal importance (Schedule 41 of the NERC Act (2006)) will be retained and will encourage use of the lake by a wider variety of species.

For maximum ecological benefits, one third of the bed of the lake

should gently undulate down to a maximum depth of 1m, with a maximum depth of 2m to ensure emergent species do not colonise the entire lake bed. The bank profiles are currently created with a log revetment, offering little potential for habitat creation (see Figure 4.2). Current depths in the lake challenge the development of emergent species. It is recommended that a degree of re-profiling of the banks is undertaken to create shallow shelves for emergent species to colonise (see Figure 4.3).

Any uncontaminated overburden from the development of the site can be used to create a series of shallows and bays around the edge of the lake. Sheltered bays will ensure that waterfowl are able to establish territories and if undulations are created, bankside cliffs may provide nesting habitat for species such as water vole and kingfishers. Most native plant species grow perfectly well when planted directly into subsoil, clay or sand. Topsoil should be avoided as it is rich in nutrients, and although this will often allow more rapid growth in the first few years, the end result is usually less successful.

Islands within the wetland are valuable for a variety of species. There is one existing small island off the eastern bank of the lake, which is currently covered with alder. This island could be extended to include a gradually sloping profile, which can be planted with emergent species. A second island could be created to a similar specification.

The current topography of the Fly Lake is largely restrictive to creating bankside cliffs for birds such as kingfishers to nest. Kingfishers typically nest within 50cm of the top of a bank and generally between 75cm and 2m above the normal water levels. By creating islands within the lake, the profile can be adapted to include suitable sites for such nests.

Figure 4.1 - Suggested Planting Zones

New and enlarged islands within the lake can provide a refuge for wildlife for foraging and breeding. Island profiles can be adapted to provide opportunities for cliff nesting sites for kingfishers or holt sites for otters.

Maintain an area of open, deeper water as a central channel. Open water is recognised as a Habitat of Principal Importance under Schedule 41 of the NERC Act (2006).

Alder and willow to the north of the lake will provide shelter from winds and will create a wet woodland habitat

Inlet

Wooden Boardwalk
(specified by others).

Maintain spillways.

Inlet

KEY



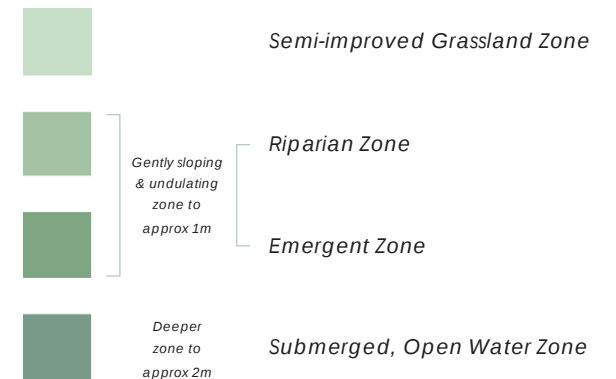
Existing Trees



Proposed Trees



Suggested Planting Zones



Create a new reedbed to extend the size of the current reedbed in the Carp Lake. Reedbeds are recognised as a Habitat of Principal Importance under Schedule 41 of the NERC Act (2006).

Carp Lake

Wetland Establishment : Section 4

Planting Techniques

Riparian and emergent species should be planted in the gently sloping ground at the lake edges, up to 45cm in depth and should be planted in groups of 15 to 20 to create swathes of the same species. This will result in a variation in height, texture and shade which will offer a variety of foraging and nesting opportunities for the resident and visiting species. The plants will gradually spread into the deeper water to a depth that they are comfortable with.

The submerged species should be planted in the deeper areas of the lake on shelves with a depth from 45 to 75cm.

It is recommended that planting of the wetland area is carried out between September to April when the plants are dormant. Plants can be harvested from a donor site at this time of the year. If this method is preferred,

All plant material is to be of UK/local provenance.

Once the vegetation has established, the winter water table level should be maintained at c20cm below the level of emergent planting to ensure that resident and visiting waterfowl do not disturb the vegetation. The level can be gradually raised to c10cm as the plants become more established. By providing areas of shingle beach, waterfowl can be encouraged to avoid establishing riparian and emergent habitats.

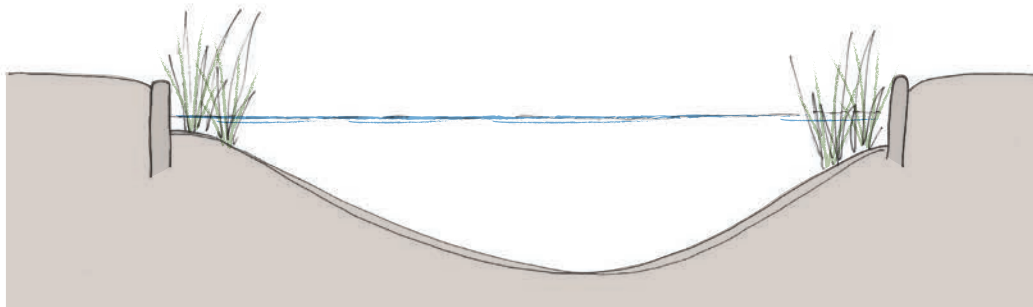


Figure 4.2 - Current Lake Profile

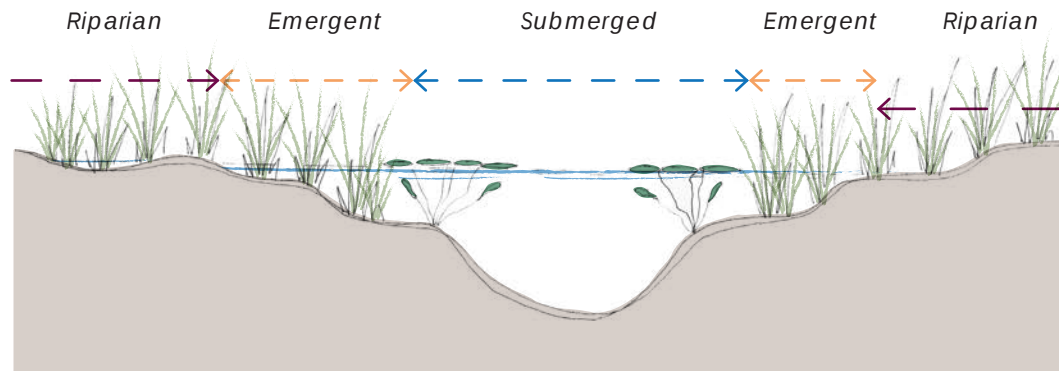


Figure 4.3 - Recommended Lake Profile

Timetable for Work

Work Stage	Month	Action
Breeding Birds: It is an offence under the Wildlife and Countryside Act (1981) to destroy, damage or take nests in use or being built. The Fly Lake supports both above ground and ground nesting species. Schedule 1 of the Wildlife and Countryside Act (Part 4) lists birds which are afforded special protection. This protection is greater than for other birds and includes it being an offence to disturb a bird whilst it is building a nest or is in, on, or near, a nest containing eggs or young. It is also an offence to disturb the dependent young of a Schedule 1 species. For this reason all works to the Fly Lake, which may potential disturb or damage nesting habitats are to take place outside of the nesting season, which runs from March to September. Protected Species: It is recommended that prior to commencement of the works, a suitably qualified ecological consultant provides a 'tool box talk' on best practice methodology and mitigation measures for all protected species.		
1 - Plant Identification:	March to September	Identify any in-situ plant species to be retained and/or used a donor vegetation.
2 - Fish:	September to March	Ensure that all fish within the Fly Lake have been removed according to best practice methodology prior to commencement of the work.
3 - Retained Plants:	September to March	Lift any plant species which are to be retained. All plant material removed the lakes should be left on the bank for a minimum of two days after lifting to allow aquatic invertebrates and amphibians to return to the water. Place into a suitably sized container, with an aquatic substrate and remove to a nursery area.
4 - Donor Plants:	September to March	Lift and divide plants from donor sites. All plant material removed the lakes should be left on the bank for a minimum of two days after lifting to allow aquatic invertebrates and amphibians to return to the water. Place into a suitably sized container, with an aquatic substrate and remove to a nursery area.
5 - Trees:	Prior to work	Protect all in-situ trees which are to be retained for the duration of the work. Refer to Arboricultural Consultant for recommended Root Protection Zones.
6 - De-watering	September to March	The Fly Lake should be de-watered. Divert the flow of water entering the lake from the inlets to the north east and east. It is recommended that a suitably qualified hydrological consultant is consulted for advice on diverting the flow from the inlets to the Carp Lake. Ensure adequate silt traps are in place so that silt from the Fly Lake does not escape into the Carp Lake.

Wetland Establishment : Section 4

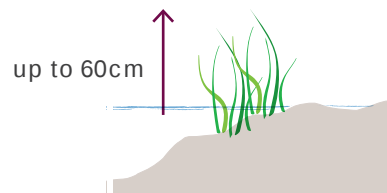
Work Stage	Month	Action
7 - Groundworks <i>N.B If clearance & groundworks are to be scheduled over the breeding bird season (from late March to September), it is recommended that an Ecological Watching Brief is in place to monitor the site for signs of nesting and all vegetation should be checked previously (within 24hours of removal). If a nest or nest in construction is located, a suitable stand of distance should be maintained until the young have fledged.</i>	September to March	Clear the lake edges of any un-retained vegetation. All plant material removed the lakes should be left on the bank for a minimum of two days after lifting to allow aquatic invertebrates and amphibians to return to the water. Silt on the bed of the Fly Lake should be removed to expose the bed. The lake is likely to have a puddled clay bed, which may be protected with a layer of stone. Extreme care must be taken not to damage this layer. Silt should either be removed from site, retained in 'silt bags' to allow the water to drain and then be used on site for landscape enhancement or can be deposited behind a permeable membrane around the edges of the lake to create the new profile. It is recommended that specialist advice is sought on how best to deal with the silt. Silty water must not be discharged into adjacent fields or areas of high wildlife value. N.B consent may be required from the Environment Agency to move silt off site. Re-profile the bed of the lake using on-site uncontaminated overburden to achieve a series of shelves and islands. Most native plant species grow perfectly well when planted directly into subsoil, clay or sand. Topsoil is rich in nutrients, and although this will often allow more rapid growth in the first few years, the end result is usually less successful.
8 - Planting	September to March	Establish new plant and tree species and re-establish all nursery held stock into the newly formed bank at the recommended planting depth and density. Do not use any compost or fertilizers to establish the plants as this will increase nutrient levels within the lake, causing algae blooms.
9 - Raise Water levels	On completion	On completion of the planting the level of the water should be steadily raised to ensure that the new plants are not washed out of the beds or damaged by waterfowl.
NOTES: When working in or close to watercourses, the contractor is referred to Environment Agency publication "<i>Works in, Near or Liable to Affect Watercourses</i>". All such works shall be in compliance with this guidance. Prior to commencement of work, it is recommended that the Environment Agency is notified of the timing and scope of work to be carried out. Prior to the commencement of work, it is recommended that the landscape contractor is fully conversant with existing legislation, including European legislation, relating to wildlife and nature conservation issues, and protected species and habitats. The Contractor shall operate best practice Biosecurity procedures to avoid the introduction and spread of invasive, non native species across the site throughout the works. Any non-native invasive species identified under Schedule 9 of the Wildlife and Countryside Act (1981 as amended) are to be removed from site. Invasive non-native species must not be placed in garden waste or and must be removed from site using industry best practice techniques. Select plants for maximum nectar and foraging opportunities as well as to provide cover for resting and nesting.		

Suitable Species



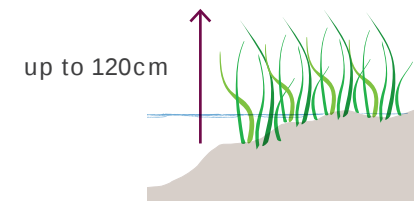
Alisia plantago-aquatica

(Common water-plantain)



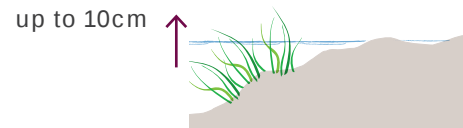
Iris pseudacorus

(Yellow flag)



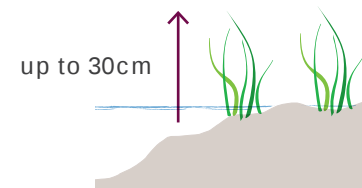
Callitriche stagnalis

(Common water-starwort)



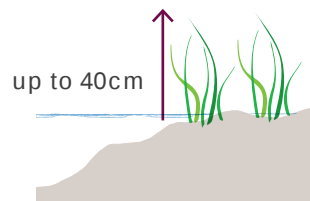
Juncus effusus

(Soft rush)



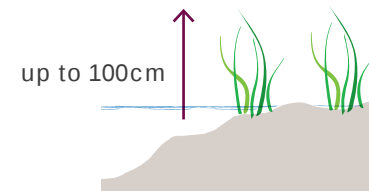
Caltha palustris

(Marsh Marigold)



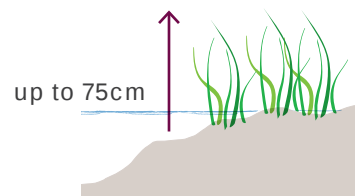
Lythrum salicaria

(Purple loosestrife)



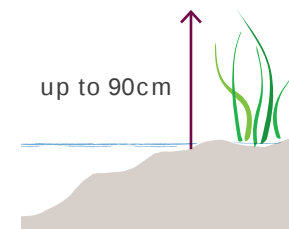
Carex acutiformis

(Lesser pond-sedge)



Juncus inflexus

(Hard rush)

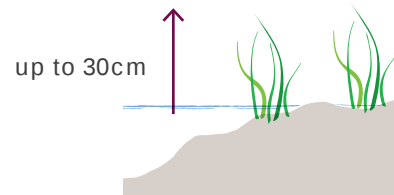


Wetland Establishment : Section 4



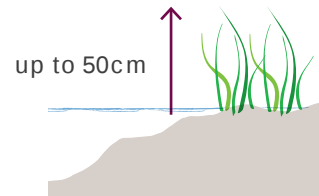
Mentha aquatica

(Water mint)



Myosotis scorpioides

(Water forget-me-not)



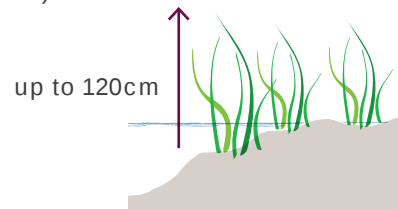
Myriophyllum spicatum

(Spiked Water-milfoil)



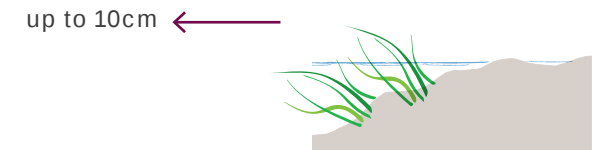
Phragmites australis

(Common reed)



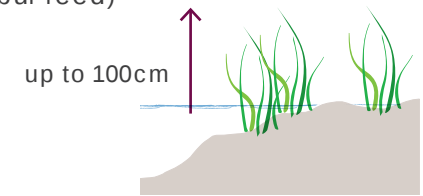
Ranunculus circinatus

(Water-crowfoot)



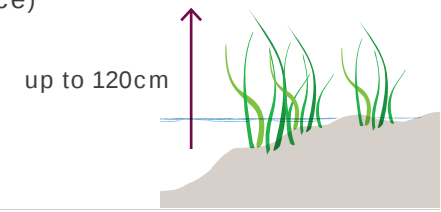
Sparganium erectum

(Branched bur-reed)



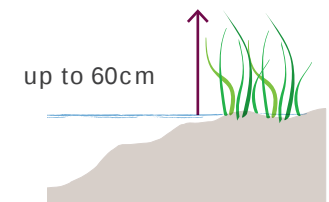
Typha latifolia

(Reedmace)



Veronica beccabunga

(Brooklime)





5.0 *Plant Schedule*

The following table contains a list of the species suggested for planting at Pendle View. These are predominantly species which are already growing on site and are suited to the localised conditions.

The species list, sizes and densities are given as a guide, which should be adapted once the profile of the lake has been prepared with a series of shelves and islands, and is ready for planting.

Riparian & Emergent Species				
Species	Common Name	Size	Propagation	Density/m2
<i>Alisia plantago-aquatica</i>	Common water-plantain	7cm / 230cc	Vegetative	9
<i>Callitriche stagnalis</i>	Common water-starwort	7cm / 230cc	Vegetative	9
<i>Caltha palustris</i>	Marsh Marigold	7cm / 230cc	Vegetative	9
<i>Carex acutiformis</i>	Lesser pond-sedge	7cm / 230cc	Vegetative	6
<i>Iris pseudacorus</i>	Yellow Flag	7cm / 230cc	Vegetative	9
<i>Juncus effesus</i>	Soft rush	7cm / 230cc	Vegetative	6
<i>Lythrum salicaria</i>	Purple loostrife	7cm / 230cc	Vegetative	6
<i>Juncus inflexus</i>	Hard rush	7cm / 230cc	Vegetative	6
<i>Mentha aquatica</i>	Water mint	7cm / 230cc	Vegetative	6
<i>Myosotis scorpioides</i>	Water forget-me-not	7cm / 230cc	Vegetative	9
<i>Phragmites australis</i>	Common reed	7cm / 230cc	Vegetative	6
<i>Sparganium erectum</i>	Branched bur-reed	7cm / 230cc	Vegetative	6
<i>Typha latifolia</i>	Reedmace	7cm / 230cc	Vegetative	6
<i>Veronica beccabunga</i>	Brooklime	7cm / 230cc	Vegetative	9
Submerged Species				
<i>Myriophyllum spicatum</i>	Spiked Water-milfoil	7cm / 230cc	Vegetative	3
<i>Ranunculus circinatus</i>	Water-crowfoot	7cm / 230cc	Vegetative	3
Trees				
<i>Alnus glutinosa</i>	Alder	40-60cm, 1+1 transplanted, whips, Bare root		1
<i>Salix caprea</i>	Goat Willow	40-60cm, 1+1 transplanted, whips, Bare root		1



6.0 Management

Wetland Vegetation

Riparian and emergent plants should be managed to ensure that, over time, the wetland does not become overgrown or over-dominated by one to two species.

Under ideal conditions, management of riparian and emergent species is undertaken by grazing animals, however it is not anticipated that the site, once re-developed, will be accessible for livestock.

Manage plant species by reducing and/or clearing vegetation on a three to five year rotation. Typically up to a third of the wetland vegetation would be reduced each year, ensuring that there is adequate remaining species to provide foraging, resting and nesting habitats. The entire wetland must not be reduced and/or cleared at once as this will inevitably result in the loss of some species.

Cut vegetation from late September and ensure that known protected species on site are protected and that work is carried out outside the bird nesting season, when vegetation is beginning its dormant phase. All arising should be left in-situ on the edges of the wetland, to dry for 1-7 days before being removed from site. During this time any aquatic invertebrates and amphibians within the arisings can return to the water.

It is recommended that vegetation reduction and/or clearance is carried out

selectively, by hand, however if a mechanical excavator is used, ensure that the puddled clay lake bottom is protected. Use plug plants to fill any gaps or replace any unsuccessful species throughout the in autumn, as required. Established plants should be lifted and divided where necessary.

Over hanging trees should be monitored and formative pruning carried out if they over-shade the wetland.

Following periods of high rainfall within the catchment the wetland area should be assessed for signs of flood damage. Any material that has been washed into the wetland from the adjacent track, should be removed, so that areas of open, deep water are not reduced. Review silt accumulation within the wetland on an annual basis. If necessary remove and take off site if necessary, subject to agreement with the Environment Agency.

The reedbeds should be managed through rotational cutting to enhance and maintain biodiversity.

Algae

Treat algae according to best practice guidance. Should algal blooms become a problem they can be raked out of the swales/pond and left on the bank for a minimum of two days after dredging to allow aquatic invertebrates and amphibians to return to the water, before removing from the site.

Blue-green algae and other algal groups are important contributors to the aquatic biology of lakes and wetlands and need nutrients to grow which exist in various forms in freshwater.

Where high levels of phosphorus exist, and other requirements for growth are met - for example, adequate light, mixing, flow and temperature - then the numbers of blue-green algae can increase. Increased periods of growth are called blooms. Blooms can have a negative effect on the appearance, quality and use of the water.

Blue-green algal blooms and scums are natural annual features of some waters. Changes in water management - such as changing water circulation, increasing shade by planting emergent and floating aquatics, reducing nutrient input or, in some cases, removing nutrients - can control the algae.

Blooms of blue-grey algae can be toxic to humans and animals. As the site at Pendle View will be used by families, the presence of blue-green algae blooms should be reported immediately to the Environment Agency.

Man-made Structures

Inspect all structures such as inlets, banks, culverts, overflow systems, spillways etc on a quarterly rotation and after periods of heavy rainfall within the catchment which leads to over-topping. Clear structures of debris, litter and accumulations of leaf litter and silt.

To maximise the system, and maintain the structures as safe and fit for purpose at all times, undertaken any necessary repairs as required.

To avoid the introduction of invasive, non-native species through best practice, Biosecurity procedures.

