Ecological Management Plan

Kingfisher Pond

Northstowe

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1. INTRODUCTION

1.1. General Introduction

Residential development of a large area of land in Northstowe created areas of public open space which Greenbelt Group Ltd (Greenbelt) have been commissioned to manage. This includes a pond, known as “Kingfisher Pond”, which predates the residential development.

No formal management priorities or requirements had been identified for Kingfisher Pond, therefore a management plan was deemed necessary in order to inform Greenbelt’s management of the pond.

This document provides a preliminary overview of Kingfisher Pond and an initial Ecological Management Plan to inform how the aquatic and immediately terrestrial habitats should be managed.

1.2. Objectives of the EMP

This EMP aims to summarise the information currently available to describe the pre-development ecological baseline of Kingfisher Pond, identify important data gaps, propose longer-term objectives, and establish a series of management actions to protect and where possible enhance the pond.

2. AUTHOR EXPERIENCE

This EMP has been prepared by Mr Chris Wright, B.Sc., M.Sc. (Ecology). Chris graduated as an ecologist in 1990 and has over 30 years experience in environmental consultancy as a field surveyor, technical reviewer and team leader. Chris has managed multi-disciplinary teams which, in addition to ecologists, have included noise, air quality, transport planning, flood risk, audit, sustainability, environmental permitting and waste specialists. Chris has also managed site investigation, drainage and earth moving contractors and has completed the Site Management Safety Training Scheme (SMSTS) gaining the Site Safety Plus certificate[1].

Chris holds Natural England licenses for work with bats, great crested newts and barn owls[2] and is a Chartered Institute of Ecology and Environmental Management (CIEEM) trained EcIA practitioner.

Chris's project experience ranges from small housing developments to work on nuclear power stations and he has worked throughout the UK and internationally in over 20 countries on development projects.

Chris has undertaken numerous habitat and protected species surveys for developments as well as for conservation monitoring purposes, and has prepared Ecological Management Plans for numerous residential developments. Chris has also assessed the implications of development proposals on Internationally and Nationally designated sites (SPA, SAC and SSSI), Local Wildlife Sites, wildlife habitats and wildlife corridors.

Protected species work undertaken by Chris has included surveys for great crested newt, riparian mammals (otter and water vole), badgers, reptiles and barn owls, and surveys of bat roosts and bat foraging and commuting habitats. Chris has provided mitigation advice for a range of bat species, barn owl, great crested newt, badger, otter and water voles.

Chris undertakes annual habitat monitoring of development sites following the creation/protection of a diverse range of habitats including ponds and aquatic / wetland habitats, grasslands and deciduous woodlands, and provides advice on habitat management techniques.

In addition to professional ecology work, Chris has undertaken voluntary conservation work to monitor a great crested newt population for *Chytrid*, reptile and amphibian surveys for Leeds City Council, otter surveys for the Yorkshire Wildlife Trust, and has constructed a number of pond and riparian habitats to enhance habitats for amphibians. Chris is a member of the West Yorkshire Bat Group and the Yorkshire Wildlife Trust.

[1] Site Safety Management Training Scheme. Site Safety Plus. 2017 citb. Registration No. 608375
[2] Class survey Licence WML A34 CL18 – Bat Survey Level 2: Registration 2017-27400-CLS-CLS, CL08 – Great Crested Newt Level 1: Registration 2016-19624-CLS-CLS, and Barn Owl Level 1 Survey Class License (CL29) Registration reference 2022-10432-CL29-OWL.

3. METHODOLOGY

3.1. Site Visit

In order to evaluate Kingfisher Pond, a site visit was made on 23 October 2023. The site visit aimed to assess a number of aspects suspected to be of importance to the condition of the pond, as follows[3]:

- Water level within the pond on the day of the site visit.
- Presence, types and extent of emergent vegetation within the pond.
- Presence of aquatic vegetation.
- Presence of marginal vegetation.
- Presence, types and extent of terrestrial vegetation immediately adjacent to the pond.
- Surrounding landuses.
- Drainage provisions surrounding the pond.
- Anecdotal information on the pond, particularly that relating to its condition prior to the Northstowe development.

3.2. Desk Based Assessment

A brief review of information provided by Greenbelt and obtained during an initial search on-line was undertaken. The information referred to included:

- 3772 Greenspace Master Plan. Greenbelt. November 2022.
- Northstowe P1 Western Park. Sustainable Urban Drainage Scheme (SUDs) safety review. Draft 2. ROSPA. June 2017.
- Landscape Management Zones, Western Park Northstowe Phase 1 Cambridge. Drawing Number 551, Job Ref JSL2642. RPS. July 2016.
- Kingfisher Pond - Northstowe Hydrogeological Assessment. Baseline Conceptual Report. FWM8714-RT001-R03-00. HR Wallingford. March 2021.
- Kingfisher Pond - Northstowe Hydrogeological Assessment Phase III Report. FWM8714-RT003-R01-00. HR Wallingford. May 2021.
- South Cambridgeshire District Council. Kingfisher Pond- Northstowe Hydrogeological Assessment – Action Plan.

[3] It is recognised that a single visit in the Autumn season will not enable a comprehensive understanding of the condition of the pond. The aim of this work was to ascertain, in very broad terms, the overall condition of the pond. Consequently, evaluation of certain aspects such as the presence of aquatic vegetation was intended to be preliminary only.

3.3. Preparation of Ecological Management Plan

The data sources referenced above were used to inform the content of the Ecological Management Plan.

The Ecological Management Plan includes a superficial description of Kingfisher Pond based on the information obtained during the site visit and desk based assessment, together with a gap analysis to identify significant areas of data shortfall, and a number of recommendations for habitat management work and data requisition.

4. KINGFISHER POND DESCRIPTION

4.1. Location and Environmental Setting

Kingfisher Pond is located in the northern section of the Northstowe development between residential housing and sports fields. The residential areas contained dwellings with garden areas and landscape planting, and the sports fields were a combination of natural grass fields and artificial grass with dedicated drainage.

The pond is understood to intersect the groundwater table and to be in hydraulic continuity with the underlying aquifer. The underlying aquifer is the River Terrace Gravels, a shallow aquifer extending as a relatively narrow north - south orientated deposit. Due to the hydraulic continuity, the water levels within the pond are likely to be primarily related to groundwater levels within the River Terrace Gravels aquifer. The direction of groundwater flow in the vicinity of Kingfisher Pond could not be confirmed during the desk based assessment.

4.2. Physical Description of Pond and Immediate Surrounds

Kingfisher Pond is a natural water feature surrounded by a thin belt of trees and shrubs within a fenced off area (Photographs 1, 2 and 3 below). A wooden viewing platform (Photograph 4) was accessible from a gravelled footpath on the eastern side of the pond to facilitate access by local residents of the Northstowe development. The encircling bankside vegetation is expected to restricted access to the pond elsewhere but the continual fencing around the pond is presumed necessary to deter access to the pond itself completely.

Terrestrial vegetation within the fenceline comprised trees of varying age classes, including some dead wood in the canopy (Photograph 5), young self seeded trees and shrubs with ground vegetation of grasses (e.g. Cock's foot grass *Dactylis glomerata* and creeping bent *Agrostis stolonifera*), nettles (*Urtica dioica*) and a stand of hemlock (*Conium maculatum*) in the southern section (under treatment).

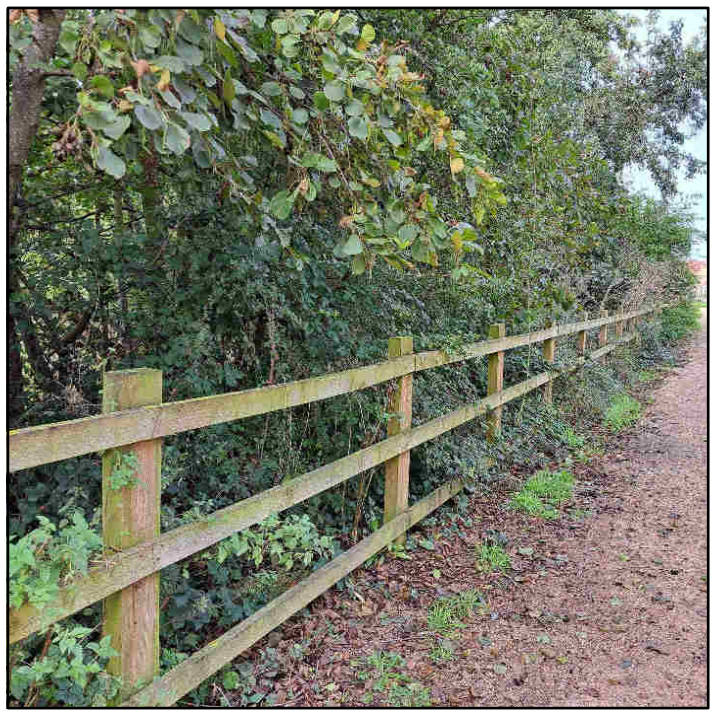
Natural successional changes were evident within the pond, with significant encroachment into the water body by alder (*Alnus glutinosa*) and reedmace (*Typha latifoli*). This encroachment covered the vast majority of the pond (Photographs 6, 7 and 8). There was a general lack of aquatic vegetation visible and marginal vegetation[4] was extremely limited.

Sports fields were present to the south and west of the pond, with the closest being an artificial pitch (Photograph 9). This artificial pitch drained into Kingfisher Pond via artificial drainage pipe (Photograph 10), and a pond overflow pipe was located in the south western corner (Photograph 11). At the time of the site visit the outflow was notably higher (about 500mm) than the water surface of the pond, which indicates a relatively low water level within the pond at the time.

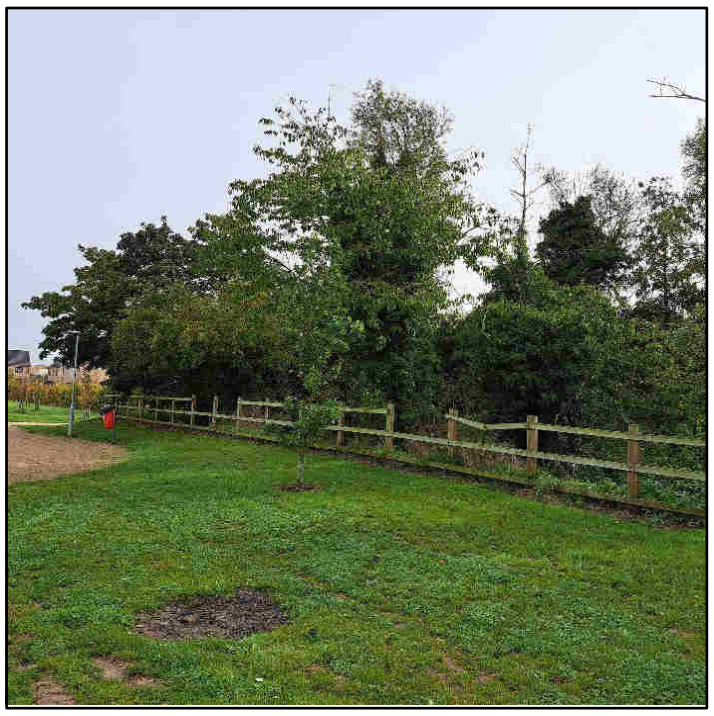
[4] In this context "marginal" species includes non woody species and therefore excludes the alder growth in the pond, and reedmace is considered an emergent rather than marginal species.

Photograph 1: Trees and Fence Surrounding Kingfisher Pond

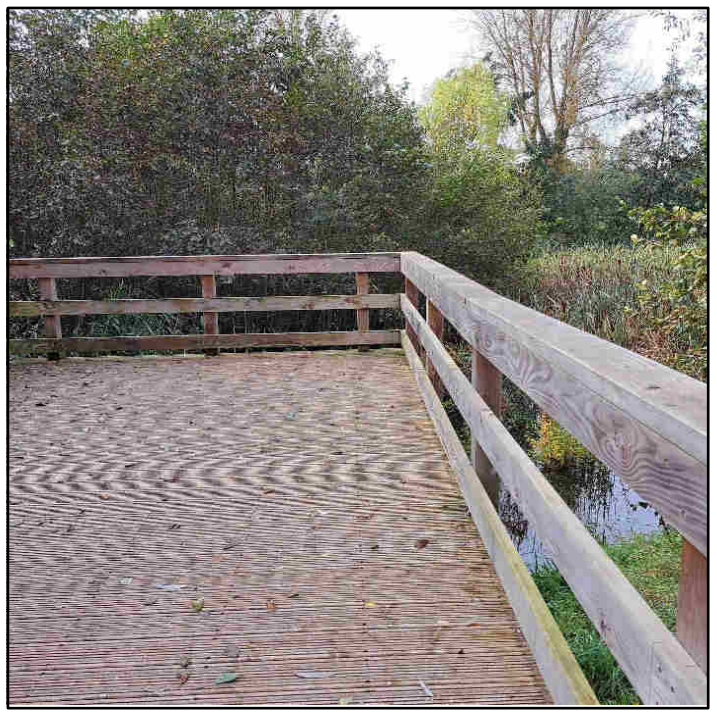
Photograph 2: Fence Around Kingfisher Pond



Photograph 3: Fence Around Kingfisher Pond, Showing Broken Sections



Photograph 4: Viewing Platform



Photograph 5: Deadwood Habitat

Photograph 6: Alder Encroachment

Photograph 7: Reedmace Encroachment

Photograph 8: Encroachment

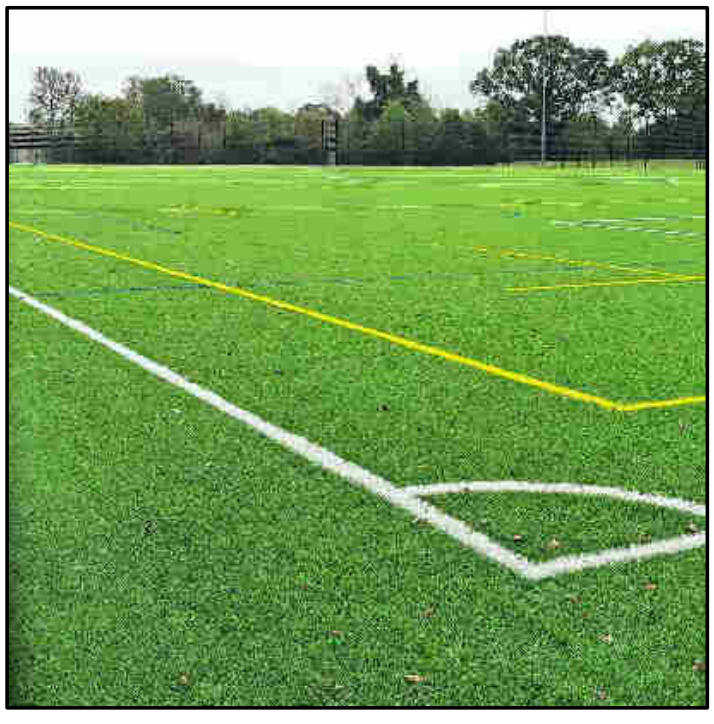
[redacted]

[redacted]

[redacted]

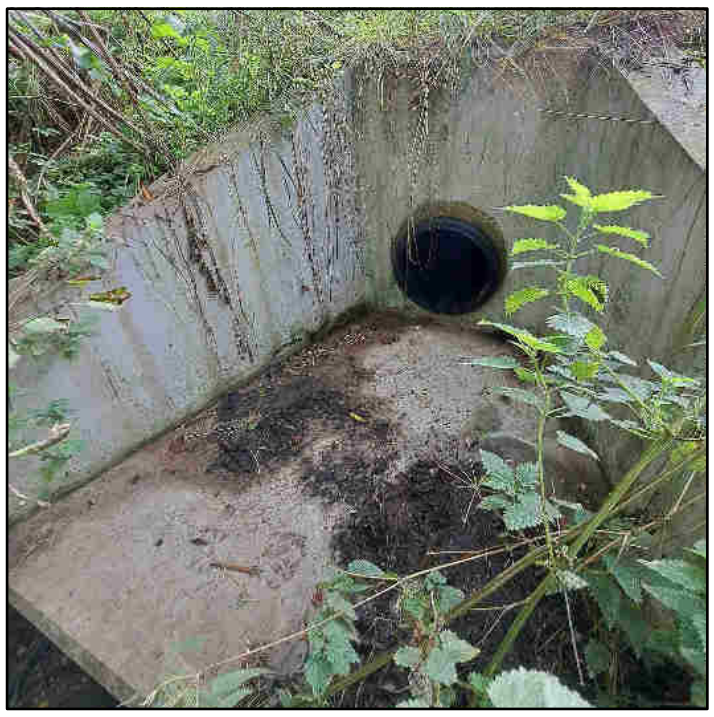
[redacted]

Photograph 9: Artificial Sports Field to West of Kingfisher Pond



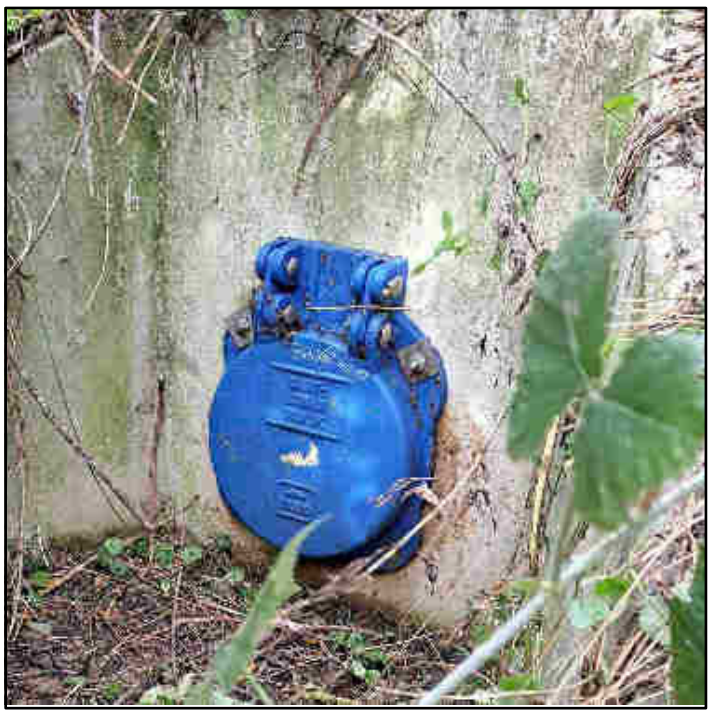
Photograph 10: Drainage Inflow Pipe from Artifical Sports Field

Photograph 11: Pond Overflow Outflow Pipe, showing Lack of Guard



[redacted]

Photograph 15: Backflow Prevention Cover



5. IDENTIFIED ISSUES

Surface water bodies rarely remain constant, and seasonal and annual changes as well as changes in the management of surrounding land and the water body itself can all have temporary and/or long term effects on the condition of a water body. It is therefore anticipated that the size, shape, depth and condition of Kingfisher Pond will have changed over time.

However a small number of factors have been identified which, individually and in combination are likely to have had a significant impact on the condition of Kingfisher Pond.

Those of most importance to the general health of the pond and its longevity are considered to be:

1. Natural successional changes.
2. Water level.
3. Water quality.

The factors are summarised separately below but it should be noted that the effects of one factor will often contribute to and/or exacerbate the impact of another.

The significance of each factor is difficult to prioritise at this time due to the absence of any documented baseline condition for Kingfisher Pond. Consequently, significance is not considered further at this stage and inclusion of the identified factors is based purely on either observations made during the site visit in October 2023, review of documents referenced above and/or on anecdotal information provided by neighbouring residents.

Natural Successional Changes

The size, shape, depth and overall condition of Kingfisher Pond is changing over time as a result of perfectly natural changes to the aquatic habitat.

Wetland and water tolerant plant species, primarily alder and reedmace, have encroached into and across the pond area resulting in a significant loss of water surface area.

In addition, as such encroachment has progressed into and across the pond, the quantity of leaf litter entering the pond will have increased, resulting in increased sedimentation and a shallowing of the pond.

Furthermore the root mass of these encroaching species will have also resulted in a shallowing of the water depth, and with increasing growth of this type the rate of transpiration will have increased too.

While these changes are perfectly natural, and in many instances create additional and complimentary habitats within the broader pond habitat which enhances biodiversity, they ultimately transform the pond through various successional stages to eventually become

dry land. Consequently in the absence of management intervention, the area of Kingfisher Pond will continue to transform and eventually become dry land.

Water Level

There is anecdotal information that the water level within Kingfisher Pond was historically much higher, that the pond now dries out during some/most summers and that the water level dropped as a result of the Northstowe residential development and/or other development work nearby which affected the underlying aquifer.

No data documenting historical pond water levels has been identified so it is not currently possible to ascertain whether, or to what extent the water level has dropped. However, installation of the overflow infrastructure approximately 0.5m above the current water level[6] indicates that the designers did have access to a water level dataset in order to position the overflow pipe and that the historical level could therefore have been higher.

A lower water table will have reduced the water surface area of the pond as well as its depth which could then have facilitated the encroachment of alder and reedmace from shallow margins into and across the majority of the pond area.

Reduced water depth may have contributed to a loss in pond condition if diversity in the pond habitat was also reduced i.e. through simplification of the original pond depth profile. Shallower water also increases the likelihood of complete drying out, resulting in the loss of aquatic species which cannot tolerate such changes.

Water Quality

It is anticipated that the water quality of Kingfisher Pond has degraded as a result of the decomposition of increased amounts of leaf litter entering the pond from bankside and encroaching vegetation. This decomposition of organic matter is likely to have reduced oxygen levels and increased eutrophication within the pond.

In addition, as the pond now receives drainage from the adjacent artificial sports pitches, it is expected to receive pollution in the form of microplastics and leachates washed from the pitch surface. Depending on the type of pitch, this pollution is likely to comprise a mix of Styrene Butadiene rubber (SBR) from recycled car tyres and various plastics. Leachate from these materials has been shown to contain toxic chemicals such as bisphenol A, Poly Aromatic Hydrocarbons (PAHs) and metals such as zinc[7]. There is also emerging evidence that 6PPD (a car tyre preservative) is highly toxic to some aquatic species[8].

[6] Measured on the day of the site visit in October. However, in January 2024 the water level was still significantly lower than the overflow despite several months of apparently high rainfall.

[7] Kolomijeca, A. et al. (2020) “Increased temperature and turbulence alter the effects of leachates from tire particles on fathead minnow (*Pimephales promelas*)” Environmental Science and Technology, Verschoor, A. (2015) “Leaching of zinc from rubber infill on artificial turf (football pitches)”, RIVM report 601774001/2007 and Cheng, H., Hu, Y., & Reinhard, M. (2014). “Environmental and health impacts of artificial turf: a review”. Environmental science & technology, 48(4), 2114-2129. cited by Fidra “Plastic Pitches – The Problem” on website https://www.fidra.org.uk/artificial-pitches/plastic-pitches/

[8] https://ecology.wa.gov/blog/january-2023/saving-washington-s-salmon-from-toxic-tire-dust

6. MANAGEMENT PLAN

6.1. Long Term Ecological Objectives

In order to formulate a successful ecological management plan it is important to confirm the long term objectives for the pond and to define a baseline against which improvements can be measured. However the ecological baseline of Kingfisher Pond is uncertain as no documented baseline has been identified. Therefore recommendations for management action are based the accomplishment of objectives anticipated to be reasonable for a pond of this type and in this setting.

The key long term ecological objectives are to:

1. Restore the extent of the aquatic habitat within Kingfisher Pond.
2. Increase ecological stability within the pond through the creation and maintenance of environmental conditions favourable to long term water retention and maintenance of water quality.
3. Develop a documented data base to more comprehensively characterise the ecology of Kingfisher Pond.
4. Addition of physical structures to provide ecological features of use to a variety of wildlife during part or all of their lifecycle.
5. Introduce measures to avoid harm and disturbance to wildlife.
6. Contribute to an enhanced ecological diversity within the area of Kingfisher Pond.

6.2. Management Responsibilities

It is envisaged that all work recommended will be undertaken or managed by Greenbelt with specific roles delegated as required and determined by the degree of specialism necessary.

It is anticipated that annual and ongoing maintenance of the vegetation will be undertaken by a specialist contractor and that the contract specification and agreement will reference this Ecological Management Plan to ensure completion of work to the required ecological standard.

Specialist ecological advice may also be sought on an *ad hoc* basis should it be deemed necessary or beneficial, for example for the siting of bat roost boxes and bird nest boxes [redacted] etc.

It is recommended that the residents be informed of the biodiversity enhancements being introduced so that they are able to understand and appreciate why certain habitats have been protected, why habitat management will occur, and why such work will follow certain procedures. Such information sharing will hopefully facilitate community engagement with the objectives of the management work.

6.3. Recommendations

Wetland habitats are characteristically quite variable and conditions can vary over time so localized differences may require a targeted approach with iteration in future years. At this stage the following recommendations are made:

1. Locate the original ecology reports for the Northstowe planning application and establish from them an ecological baseline for Kingfisher Pond.

2. Identify if groundwater monitoring boreholes exist in the vicinity of Kingfisher Pond and if an existing groundwater or pond water elevation[9] monitoring dataset exists. Such dataset will assist in understanding the natural ("baseline") water level within Kingfisher Pond and help inform future management work.

3. Undertake a great crested newt (*Triturus cristatus*) survey (if not already undertaken at the pre-application stage, see recommendation 1) to determine the presence or likely absence of this highly protected species. This will dictate the methodologies suitable for in-water management work which could otherwise harm the species (e.g. use of mechanical excavators for de-silting). The environmental DNA (eDNA) method is a suitable and cost effective option for assessing the presence of this species and should be undertaken during its season (15 April to 30 June).

4. Remove all alder and reedmace from the former open water sections of Kingfisher Pond i.e. from all former water holding areas. This should include removal of the alder roots and the reedmace rhizomes right up to the edges of the pond.

   In order to avoid significant disturbance to the pond habitat and its wildlife as well as to avoid excessive disturbance of sediment, this work should be undertaken over a 3 year period during the winter period[10]. Approximately one third of the area of alder, and one third of the area of reedmace should be removed each year.

   The removal should start from the central part of the pond and work towards the banks in order to increase the area of open water early in the management programme and secure biodiversity benefits as soon as possible.

   Ultimately it will be desirable to retain some small, limited areas of reedmace within the pond habitat through annual maintenance work. Similarly some natural growth of alder in the edges of the pond can add biodiversity benefit due to the physical diversity of the aquatic habitat created by its root structure, but this should be kept to a minimum and not be allowed to develop so that it shades open water.

5. To improve sunlight penetration into the aquatic habitat and pond margins, open up parts of the tree belt around the southern bank by selective thinning of overhanging trees and any shrubs and trees causing excessive shade. This can be achieved by coppicing suitable trees.

[9] i.e. this is presumed to have been necessary in order to design the pond overflow infrastructure.
[10] This is a period when sensitive species such as great crested newt (if present), other amphibian and nesting birds are most likely to be absent from the pond. The optimal time may be early winter if pond water levels are at their lowest.

This work should be undertaken intermittently over a 10 year period with annual monitoring of regrowth and of the effect of thinning on aquatic and marginal habitats.

Retain all dead wood in the canopy as valuable habitat for a range of wildlife including bats which may roost in suitable hollows and crevices. Should any deadwood need to be removed for safety reasons, survey for bats should be undertaken prior to removal.

6. Install a water level depth gauge in Kingfisher pond to enable regular recording of the water level by Greenbelt during each of their visits. This will enable seasonal fluctuations and the long term trend in water level to be measured and assessed over time.

   The relationship with groundwater in the underlying River Terrace Gravel aquifer can be assessed if groundwater elevations from boreholes in the vicinity of Kingfisher Pond can be obtained (see recommendation 2).

7. If, following the management works detailed above and the collection of sufficient data, the water level remains below historical levels, it is likely that removal of sediment will be required to improve pond stability and resilience and extent its life. This should follow a bespoke methodology which has been informed by the water level monitoring dataset and the findings of great crested newt surveys (see recommendation 3).

8. Details of the type of artificial sports pitch draining into Kingfisher Pond should be obtained and reviewed to assess whether the risk of pollution from microplastics and leachates exists[11]. The *as built* drainage infrastructure should be reviewed to determine whether or not a suitable filter system has been installed up-stream of the discharge point into Kingfisher Pond.

   Regardless of the type of artificial pitch constructed, a suitable filtration system is highly likely to be required.

9. Some bankside vegetation management may be required to open up areas of the southern bank which anecdotally were historically used by nesting kingfisher (*Alcedo atthis*).

10. Botanical species diversity within Kingfisher Pond should be enhanced through natural colonisation and via the relict seedbank, and via the introduction of a small number of aquatic and margin plants such as wild water lily (*Nymphaea alba*), Pondweed (*Potamogeton natans* and other *Potamogeton spp*.) and marginal species such as marsh marigold (*Caltha palustris*), purple loosestrife (*Lythrum salicaria*) and yellow iris (*Iris pseudacorus*). The source of such plants should be carefully selected to avoid the risk of invasive or undesirable species introductions.

[11] It is currently presumed that such a risk does exist and interventions are required as a result.

11. Bird and bat boxes should be added to selected trees around Kingfisher Pond to increase the number and diversity of physical “structures’ or features available to these species groups.

12. Vegetation clearance should be undertaken and completed outside of the bird breeding season (generally considered to be between March and the end of August/September) to avoid impacts to breeding birds.

    If the work can't be completed outside of these months, then breeding bird checks should be undertaken by a suitably qualified ecologist prior to work starting, with appropriate action being taken to safeguard any nests found until young birds have fledged. The ecologist will specify the action deemed appropriate to the situation at the time.

13. No trees should be felled or limbs removed until a survey to assess bat roost potential has been completed in order to avoid the destruction and loss of bat roosts.

14. Retain cut vegetation within the fenced off area for the creation of habitat piles i.e. for invertebrates, and refuges for amphibians and hedgehogs.

15. Kingfisher Pond is a valuable resource for both wildlife and the local residents but is vulnerable to the detrimental effects of excessive disturbance. Therefore activities such as wild swimming and exercising dogs or toileting by dogs within the encircling fenceline should be prohibited. Dog waste left around the pond will create eutrophic conditions in the soil environment and eventually in the pond itself and dogs entering ponds will displace wildlife[12], disturb sediment and benthic habitats and introduce chemicals (due to the routine use of flea etc treatments[13]) which are highly toxic to aquatic ecosystems.

    Similarly encouragement of wildlife which can have a derogatory impact on the biodiversity of Kingfisher Pond should be avoided. An obvious example is the feeding of ducks (and/or the introduction of islands and duck nest boxes) which can result in an overall degradation of the pond habitat through excessive eutrophication of the aquatic (and marginal terrestrial) habitat, de-oxygenation of the water column and the associated loss of invertebrate and fish life, and the removal of aquatic and marginal plants.

16. [redacted].

[12] The impacts of dogs on wildlife and water quality: A literature review. Compiled by Lori Hennings, Metro Parks and Nature, April 2016.
[13] Preston-Allen, R.G.G., Albini, D., Barron, L., Collins, T., Dumbrell, A., Duncalf-Youngson, H., Jackson, M., Johnson, A., Perkins, R., Prentis, A., Spurgeon, D., Stasik, N., Wells, C. and Woodward, G. (2023). Are urban areas hotspots for pollution from pet parasiticides? Grantham Institute Briefing note #15.

17. An information board should be located on the viewing platform to inform local residents of the wildlife value of Kingfisher Pond and the importance of the restoration work being undertaken. This can be supplemented by periodic mail publications to encourage community engagement with the objectives of the work.

18. Establish an annual monitoring programme to review the progress of the restoration work and identify aspects which require refinement. The monitoring work can be broadened to investigate the biodiversity of Kingfisher Pond and include work such as botanical survey, bird and bat survey, freshwater invertebrate survey, and environmental DNA (eDNA) assessment for example.