Proposed Nature Reserve at Green Gates East, St Asaph, Denbighshire – Ecological Input to Wetland Design

A report for: Denbighshire County Council

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Report Validity and Confidentiality

This report aims to provide ecological input to a wetland design project at the site of a proposed Nature Reserve at Green Gates East, St Asaph, Denbighshire. This document includes a review of the ecological context of the wetland creation proposals, provides ecological input to the designs, details a protected species Method Statement and a Biosecurity Risk Assessment.

The report has been prepared by Biodiversity Advanced Ltd in line with the scope of works agreed with the client and in accordance with the specified purpose stated and to the applicable cost, time and other constraints. Works have been carried out in accordance with CIEEM guidelines and BS42020:2013. In preparing this report Biodiversity Advanced Ltd have relied upon information from the client / third parties which was not verified by Biodiversity Advanced Ltd except to the extent required by the scope of services, and Biodiversity Advanced Ltd does not accept responsibility for any omissions or inaccuracies in this information. Field data (other than photographs) has not been collected as part of this report, and where the report relies on data collected by others, Biodiversity Advanced Ltd accepts no responsibility for the data or any changes subsequent to its date of collection.

This report has been prepared solely for the use by, and is confidential to the client and Biodiversity Advanced Ltd accepts no responsibility for its use by other persons. This report does not constitute legal advice. This report is valid for a period of 24 months from the date of issue.

Author Profile

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Dr Philip Fermor is a highly qualified and enthusiastic habitat creation specialist with over 30 years experience in the design and delivery of high-quality habitat restoration, rehabilitation and creation schemes throughout England and Wales. With a PhD in ecological engineering related to the creation of wetland habitats within former industrial land, Phil has extensive experience leading client teams towards biodiversity-positive outcomes, whilst ensuring that costs are balanced with sustainable large-scale biodiversity gain opportunities. As a full member of CIEEM, a Chartered Environmentalist (CEnv) and a member of the British Hydrological Society, Phil promotes sustainable habitat design through the application of a detailed understanding of site-specific requirements (sediments, topography, hydrology, and existing biodiversity features) and local biodiversity strategies. His proven ability to work closely with commercial and corporate clients, third-sector organisations and government bodies, as well as having an in-depth understanding of business-needs and the science of the natural environment, is key to delivering successful biodiversity net gains.

Dr Katy Read has over 20 years experience as a professional ecologist and habitat creation expert with a proven record of working closely with clients to achieve biodiversity gains for their projects. She has considerable experience in the hydro-ecological assessment of wetland habitats, and has applied her science-led approach to habitat creation projects including wet woodlands, reedbeds, wet grassland, chalk streams and terrestrial habitats. Katy is a Chartered Ecologist (CEcol) and Chartered Environmentalist (CEnv) who adopts a professional approach to the ecological assessment schemes she works on. She has considerable experience in the production of ecological impact assessments, Habitats Regulations Assessments, and complex ecological mitigation strategies. She has acted as an expert witness at a number of planning appeals including public inquiries. She holds survey and mitigation licences for great crested newts in England and Wales and is a full member of CIEEM. Katy also has a Diploma in Safety Management, which is reflected in her professional approach to health, safety and welfare.

Dr Lynn Besenyei is a botanical specialist, with considerable experience working with ecological consultancies to survey and assess habitat condition within a range of habitats. Lynn's PhD research was focused on grassland creation (specifically using green hay techniques) and management within urban areas. She is an experienced field botanist, holding a BSc Joint Honours in Botany / Zoology from University of Wales. She has a particular specialism in grassland and wetland habitats and has worked with Dr Fermor (Director, Biodiversity Advanced Ltd) for the last 30 years, supporting him with botanical survey skills across a number of sites in England and Wales. Lynn worked for many years as a Senior Lecturer within the School of Sciences at Wolverhampton University, teaching on BSc Animal Behaviour & Wildlife Conservation and MSc Wildlife Conservation. Her research and teaching had a particular focus in habitat management and the role played by plants and animals in different ecological communities.

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Executive Summary

This report has been produced by Biodiversity Advanced Ltd for Denbighshire County Council and provides ecological input to wetland designs at a proposed Nature Reserve at Green Gates East, St Asaph, Denbighshire. The report sets out the ecological context of the site (based on a Preliminary Ecological Appraisal completed by Marches Ecology), provides ecological input to the wetland creation area, includes a Protected Species Reasonable Avoidance Measures (RAMs) Method Statement, and a Biosecurity Risk Assessment. The document has been produced to support Denbighshire County Council's planning application for the site, and should be read in conjunction with an accompanying report produced by Systra.

Marches Ecology carried out a Phase 1 Habitat Survey of the proposed wetland creation area as part of a survey of the whole proposed nature reserve area in March 2023. The ecological context of the site has been reviewed using published data, and desk study, habitat and species data from the Marches Ecology assessment. The proposed wetland creation area sits within a landscape known to support numerous metapopulations of great crested newts, and the wetland area has been designed with this in mind.

The site was visited on 12th April 2023 and the proposed wetland creation works were discussed with Denbighshire County Council representatives during an associated site meeting. The habitat creation works already completed at the site (including pond creation and meadow-habitat establishment) were reviewed in light of the opportunities for habitat colonisation.

This report sets out a proposed approach to habitat creation and vegetation establishment activities for the site, in order for the site to maximise its biodiversity potential. It is recognised that the site also has the opportunity to provide nature-based benefits to respond to the climate emergency, and this report identifies the current thinking in relation to carbon storage opportunities related to different habitat types. The ecological design input has been fed into the pond construction details provided by Systra in their accompanying report.

The document sets out a series of ecological control measures which should be implemented during the wetland habitat creation works. The measures and timetable set out in Chapter 5 will ensure that there is no risk to protected species individuals from the pond creation works. The key protection measures include:

- Habitat creation works should be completed between August 2023 and March 2024.
- If pruning / management works to trees with low bat roost potential are proposed, further preliminary bat survey work may be required (scheduled for completion in August 2023).
- DCC should ensure that the proposed habitat creation works at Green Gates East are included on their 'organisational' great crested newt licence from NRW.
- A two-stage programme of grassland / tall ruderal / scrub vegetation clearance should be implemented prior to the commencement of pond habitat creation works.
- A pre-commencement badger survey and site walkover should be completed.
- Initial soil strip works should be carried out under full-time Ecological Clerk of Works supervision.
- A toolbox talk should be provided to include details of ecological control measures and biosecurity risk assessment control measures.
- All trenches should be covered / backfilled overnight.
- Pollution control measures should be implemented.

A Biosecurity Risk Assessment is included in Chapter 6 which sets out control measures to ensure that the biosecurity risks during both construction and operation of the site are low, and can be minimised through implementation of control measures.

1. Introduction

1.1 Project Introduction

1.1 In March 2023, Biodiversity Advanced Ltd were instructed by Denbighshire County Council to provide ecological input to wetland designs within a proposed Nature Reserve at Green Gates East, St Asaph, Denbighshire. The report includes details of the ecological context of the site, provides ecological design input, details a protected species Method Statement and includes a Biosecurity Risk Assessment and details of control measures to be implemented.

1.2 Denbighshire County Council (DCC) are proposing to create a new 12.15 ha Nature Reserve at a site known as Green Gates East at national grid reference SJ 023 744. DCC have already established a tree nursery at the wider site and are looking to create a new nature reserve which responds to the current climate and biodiversity emergencies, and includes grassland, woodland and pond habitats, with permissive paths for public use. It is understood that the woodland habitats will be planted using trees grown at the on-site tree nursery.

1.3 Within the study site is an area of proposed wetland creation, the area which is the focus of this study. The area totals c.3.5 ha in size, and is located within the eastern part of the proposed Nature Reserve site, at national grid reference SJ 024 743. The wetland creation area is located equidistant between the St Asaph Business Park to the west, and the city of St Asaph to the east.

1.4 The site at St Asaph Business Park, and the adjacent Glascoed Nature Reserve are known to support significant populations of great crested newt *Triturus cristatus*, and the design of the wetland habitats within the new Nature Reserve will provide additional habitat within the wider locality of this well-established and monitored metapopulation of this species.

1.5 The following documents were made available to Biodiversity Advanced Ltd and have been used in production of this document:

- Marches Ecology. (2023). 'Proposed Habitat Creation Works (Nature Reserve), Land at Greengates Farm, Cwttir Lane, St Asaph, Denbighshire – Preliminary Ecological Appraisal'. A report for Denbighshire County Council. Report ref: C507/1.0, March 2023.

1.6 The information presented in this report has been collected through discussions with Denbighshire County Council, project meetings and site visits, desk study reviews, and technical assessment work.

1.7 Throughout this project, Biodiversity Advanced Ltd have worked in partnership with Systra with respect to the wetland creation proposals (see Section 1.3).

1.2 Study Site

1.1 The site at Green Gates East is c.12.15 ha in size and comprises part of a farm, previously used for horse grazing. The study area for this report was identified by Denbighshire County Council as a target area for pond creation (due to constraints within other parts of the site) and totals c.3.5 ha. The study area comprises a series of fields that extend along the eastern side of the wider site.

1.2 Cwttir Lane runs along the eastern boundary of the study area, with a hedgerow extending alongside the road, which is single-track at this location. The walls and fences surrounding an adjacent property form part of the eastern boundary to the study area.

1.3 There are currently no public footpaths within the study site. A public footpath extends from the east towards the site, ending at Cwttir Lane, which runs along the eastern boundary of the site.

1.3 Report Structure

1.4 The following information has been collected by the project team (Biodiversity Advanced Ltd / Systra Ltd). The list below identifies which of the project partners provide information with respect to the wetland design:

- Ecological Design Input – Biodiversity Advanced Ltd
- Protected Species Method Statement – Biodiversity Advanced Ltd
- Biosecurity Risk Assessment – Biodiversity Advanced Ltd
- Soils and Geology – Systra
- Hydrology – Systra
- Topography – Systra
- Services – Systra

1.5 The reports produced by Biodiversity Advanced Ltd and Systra should be read in conjunction.

2. Legislation, Planning Policy and Guidance

2.1 This chapter sets out the context of the ecological legislation, planning policy and best practice guidance which is relevant in Denbighshire County Council's area. A summary of the key elements of relevant legislation, planning policy and best practise guidance is given below.

2.1 LEGISLATION

2.2 Conservation of Habitats and Species Regulations 2017. The Habitat Regulations 2017 (as amended) are the principal means by which the EEC Council Directive 92/43, known as the Habitats Directive, is transposed into English and Welsh law. The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 consolidate and update the Habitats Regulations 2017 (as amended) and apply to the UK after European exit day.

2.3 The Habitats Regulations 2019 continue to place a duty upon the relevant government authority to identify sites of importance to the habitats and species listed in Annexes I and II of the Habitats Directive. Those sites which meet the criteria are designated as Sites of Community Importance (in conjunction with the European Commission) and are then identified as Special Areas of Conservation (SAC). In addition, the regulations place a duty upon the government to maintain a register of European protected sites designated as a result of EC Directive 79/409/EEC on the Conservation of Wild Birds (the Birds Directive). These sites are termed Special Protection Areas (SPA). The SACs and SPAs form a network of sites known as the national site network. The Habitats Directive embodies the precautionary principle which considers that projects can only be permitted after it has been ascertained that there will be no adverse effect on the integrity of the site. Projects may still be permitted if there are no alternatives, and there are imperative reasons of overriding public interest (known as IROPI).

2.4 The Habitats Regulations 2017 (as amended) also provide protection for individual species of fauna and flora of European conservation concern listed in Schedules 2 and 5 respectively. It is an offence to deliberately kill, injure, disturb or trade Schedule 2 species. Schedule 5 plant species are protected from unlawful destruction, uprooting or trade under the regulations.

2.5 The Wildlife and Countryside Act (WCA) 1981 (as amended). This legislation consolidates and amends pre-existing national wildlife legislation in order to implement the Bern Convention and the Birds Directive. It offers protection to a wider range of species, complimenting the Habitats Regulations 2017 (as amended). The Act also provides for the designation and protection of national conservation sites of value for their floral, faunal or geological features, termed Sites of Special Scientific Interest (SSSIs). Lists of protected species, both flora and fauna, are provided in the Schedules of the Act and details of the possible offences that apply to these species are given.

2.6 The Countryside and Right of Way (CRoW) Act 2000. This Act amends and strengthens existing wildlife legislation detailed in the WCA and applies to England and Wales. It provides increased powers for the protection and maintenance of SSSIs and places a duty on government departments to have regard for biodiversity.

2.7 Well-Being of Future Generations (Wales) Act 2015. The Well-being of Future Generations Act became law in April 2015 and is concerned with improving the social, economic, environmental and cultural well-being of Wales. It will make the public bodies in Wales listed in the Act think more about the long-term, work better with people and communities and each other, look to

prevent problems and take a more joined-up approach. To help public bodies achieve the same vision, the Act puts in place seven well-being goals. The Act recognises the importance of nature and its biodiversity and the Resilient Wales' goal will help with nature recovery objectives in Wales:

Resilient Wales' goal '*A nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change)*'.

2.8 The Environment (Wales) Act 2016. This Act sets out the requirement for the 'sustainable management of natural resources' together with new ways of working to achieve this. Part 1 of the Act, including Sections 6 and 7, came into force on May 21, 2016. There are two elements relevant to biodiversity:

- **Section 6 – Biodiversity and resilience of ecosystems duty.** Section 6 introduced an enhanced biodiversity and resilience of ecosystems duty (the S6 duty) for public authorities in the exercise of functions in relation to Wales. The S6 duty requires that public authorities must seek to maintain and enhance biodiversity so far as consistent with the proper exercise of their functions and in so doing promote the resilience of ecosystems.
- **Section 7 - Biodiversity lists and duty to take steps to maintain and enhance biodiversity.** This section replaces the duty in Section 42 of the NERC Act 2006. The Welsh Ministers will publish, review and revise lists of living organisms and types of habitat in Wales, which they consider are of key significance to sustain and improve biodiversity in relation to Wales. The Welsh Ministers must also take all reasonable steps to maintain and enhance the living organisms and types of habitat included in any list published under this section, and encourage others to take such steps.

2.2 PLANNING POLICY

2.2.1 National Planning Policy

2.9 Planning Policy Wales, Edition 11, Feb 2021. Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. PPW, the TANs, MTANs and policy clarification letters comprise national planning policy.

2.10 The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales, as required by the Planning (Wales) Act 2015, the Well-being of Future Generations (Wales) Act 2015 and other key legislation and resultant duties such as the Socio-economic Duty. A well-functioning planning system is fundamental for sustainable development and achieving sustainable places.

2.11 The Key Planning Principles – Achieving the right development in the right place (p.17) include:

"Maximising environmental protection and limiting environmental impact. *Natural, historic and cultural assets must be protected, promoted, conserved and enhanced. Negative environmental impacts should be avoided in the wider public interest. This means acting in the long term to respect environmental limits and operating in an integrated way so that resources and/ or assets are not irreversibly damaged or depleted. The polluter pays principle applies*

where pollution cannot be prevented and applying the precautionary principle ensures cost effective measures to prevent environmental damage."

2.12 Chapter 6 – Distinctive and Natural Places covers environmental and cultural components of placemaking. This chapter sets out the following Duty (p.137):

"Biodiversity and Resilience of Ecosystems Duty (Section 6 Duty)

6.4.5 Planning authorities must seek to maintain and enhance biodiversity in the exercise of their functions. This means development should not cause any significant loss of habitats or populations of species, locally or nationally and must provide a net benefit for biodiversity. In doing so planning authorities must also take account of and promote the resilience of ecosystems, in particular the following aspects:
- *diversity between and within ecosystems;*
- *the connections between and within ecosystems;*
- *the scale of ecosystems;*
- *the condition of ecosystems including their structure and functioning; and*
- *the adaptability of ecosystems.*

6.4.6 In fulfilling this duty, planning authorities must have regard to:
- *the list of habitats and species of principal importance for Wales, published under Section 7 of the Environment (Wales) Act 2016;*
- *the SoNaRR, published by NRW; and*
- *any Area Statement that covers all or part of the area in which the authority exercises its functions.*

6.4.7 Planning Authorities should also refer to up to date ecological survey information (where appropriate)."

2.13 With respect to protected species, PPW (p.143) states that:

"6.4.22 The presence of a species protected under European or UK legislation, or under Section 7 of the Environment (Wales) Act 2016 is a material consideration when a planning authority is considering a development proposal which, if carried out, would be likely to result in disturbance or harm to the species or its habitat and to ensure that the range and population of the species is sustained. Planning authorities should advise anyone submitting a planning application that they must conform with any statutory species protection provisions affecting the site, and potentially the surrounding area, concerned. An ecological survey to confirm whether a protected species is present and an assessment of the likely impact of the development on a protected species may be required in order to inform the development management process. It is considered best practice that screening to determine the presence of protected species should be carried out by a competent ecologist on the basis of data provided by the relevant Local Environmental Record Centre.

6.4.23 Developments are always subject to the legislation covering European protected species regardless of whether or not they are within a designated site. Proposals for which development works would contravene the protection afforded to European protected species require derogations from the provisions of the Habitats Directive. A derogation may only be authorised if there is no satisfactory alternative and if the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in its natural range. The development works to be authorised must be for

the purposes of preserving 'public health or safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment'. Derogations are granted by a licence issued by NRW who should notify planning authorities when a licence application has been granted. Planning authorities are under a duty to have regard to the requirements of the Habitats Directive in exercising their functions. To avoid developments with planning permission subsequently not being granted derogations in relation to European protected species, planning authorities must take the above three requirements for derogation into account when considering development proposals where a European protected species is present."

2.14 Planning Policy Wales Technical Advice Note 5: NATURE CONSERVATION AND PLANNING (September 2009). This Technical Advice Note provides advice about how the land use planning system should contribute to protecting and enhancing biodiversity and geological conservation. It brings together advice on sources of legislation relevant to various nature conservation topics which may be encountered by local planning authorities. Chapter 2 sets out the key principles of planning for nature conservation. Chapter 3 provides advice about the preparation and review of development plans, including the relevant statutory requirements. Chapter 4 addresses nature conservation in development control procedures. Chapter 5 deals with the conservation of internationally and nationally designated sites and habitats and also covers local sites. Chapter 6 deals with the conservation of protected and priority species.

2.15 With respect to protected species, TAN (p.37) states that:

"6.2.1 The presence of a protected species is a material consideration when a local planning authority is considering a development proposal that, if carried out, would be likely to result in disturbance or harm to the species or its habitat. Local planning authorities should consult CCW before granting planning permission. They should consider attaching appropriate planning conditions or entering into planning obligations, under which the developer would take steps to secure the protection of the species and advise developers that they must comply with any statutory species protection requirements that may be relevant."

2.16 A letter from the Welsh Government Minister for Climate Change, dated 22 December 2022, states that:

"Planning Policy Wales (PPW) includes the planning system response to the Section 6 Duty by setting out a framework for planning authorities to maintain and enhance biodiversity in the exercise of their functions (providing a net benefit for biodiversity).

A net benefit for biodiversity, whilst similar in concept to Net Gain, includes a distinct reference to ecosystem resilience and how the site relates to surrounding ecosystems and biodiversity. As such it encourages proposals to pro-actively maintain and enhance biodiversity and ecosystems with a focus on avoidance, minimisation and mitigation of impacts within the context of the site with offsite mitigation seen as a last resort in considering the resilience of ecosystems, their diversity, extent, condition, connectivity and adaptability…
Planning Policy Wales will be amended to further emphasise the importance of net benefit for biodiversity and the resilience of ecosystems, including strengthened protection for SSSIs, trees and woodlands."

2.2.2 Local Planning Policy

2.17 Denbighshire is preparing a new Local Development Plan, as the adopted plan expired in December 2021. It is understood that this plan is currently in production and is unlikely to be adopted until September 2025[1].

2.18 Denbighshire County Council Local Development Plan 2006 - 2021 (Adopted June 2013). This Local Development Plan includes policies specifically related to natural resources, which are relevant to protected species, such as great crested newts. The policy states that:

*"**Policy VOE 5 – Conservation of natural resources**.*
Development proposals that may have an impact on protected species or designated sites of nature conservation will be required to be supported by a biodiversity statement which must have regard to the County biodiversity aspiration for conservation, enhancement and restoration of habitats and species.

Where the overall benefits of a development outweigh the conservation interest of a locally protected nature site, mitigation and enhancement measures in or adjacent to these sites should be an integral part of the scheme.

If necessary, measures required to mitigate likely adverse effects on the qualifying features of statutory designated sites should be put in place prior to the commencement of development. Measures required to offset any likely adverse effects will be secured by planning conditions and/or planning obligations.

Planning permission will not be granted for development proposals that are likely to cause significant harm to the qualifying features of internationally and nationally designated sites of nature conservation, priority habitats, priority species, regionally important geodiversity sites, or to species that are under threat."

2.19 Supplementary Planning Guidance Note – Conservation and Enhancement of Biodiversity, July 2016. This document is one of a series of Supplementary Planning Guidance (SPG) notes amplifying Denbighshire Local Development Plan 2006 – 2021 (LDP) policies in a format which aims to guide the process, design and quality of new development. The Council's SPG notes are not part of the adopted LDP. However, SPGs can be treated as a material planning consideration when LPAs, Planning Inspectors and the WG determine planning applications and appeals. The SPG outlines the Council's expectations with regard to the biodiversity information to be submitted with a planning application, scope and standards of submitted ecological surveys; and briefly points out potential additional legal duties on developers as a result of obtaining planning consent.

2.20 With respect to great crested newts, the SPG (Appendix 5) states that:

"Great crested newts are found in large parts of the County, particularly in the north. The animals themselves, as well as their breeding and resting places, are legally protected. On sites where great crested newts are identified or likely to be present, planning permission will only be granted if it can be demonstrated that the 'Favourable Conservation Status' of the local

[1] See: Denbighshire Replacement Local Development Plan 2018 – 2033 Revised Delivery Agreement December 2022 Webpage. Available: https://www.denbighshire.gov.uk/en/documents/planning-and-building-regulations/ldp/replacement-ldp/denbighshire-replacement-ldp-2018-to2033-revised-delivery-agreement-december-2022a.pdf

population will not be adversely affected. This means that applicants must be able to show that their development proposals will have an overall neutral or positive impact on great crested newts."

2.3 GUIDANCE AND BEST PRACTICE GUIDELINES

2.3 BS42020:2013 Biodiversity – Code of practice for planning and development. This British Standard gives recommendations and guidance for those in the planning and development and land use sectors whose work might affect or have implications for the conservation or enhancement of biodiversity. BS42020:2013 seeks to:

1) promote transparency and consistency in the quality and appropriateness of ecological information submitted with planning applications and applications for other regulatory approvals;
2) give planning authorities and other regulatory bodies greater confidence in the information when they consider proposals for development or land management that potentially affect biodiversity; and
3) encourage proportionality and a good environmental legacy following development.

3. Ecological Context

3.1 Introduction

3.1 This chapter provides an introduction to the ecological context of the wetland habitat creation area at the proposed Nature Reserve at Green Gates East. The ecological context of the site is important in the development of a new nature reserve, as the design of any new habitat areas should contribute towards to Lawton principles of '*bigger, better and more joined*' habitats throughout a landscape.

3.2 Much of the ecological context has been determined by Marches Ecology (2023) in their 'Proposed Habitat Creation Works (Nature Reserve), Land at Greengates Farm, Cwttir Lane, St Asaph, Denbighshire – Preliminary Ecological Appraisal' report and their document should be read in conjunction with this ecological design report. The Marches Ecology (2023) report included the whole of the Green Gates East site, and not just the proposed wetland habitat creation area.

3.2 Nature Conservation Sites

3.3 With respect to nature conservation sites, Marches Ecology (2023) identify that:

- There are no statutory protected sites within 1 km of the survey site.
- The closest statutory nature conservation site is Coedydd ac Ogofau Elwy a Meirchio Site of Special Scientific Interest (SSSI) / Coedwigoedd Dyffryn Elwy/ Elwy Valley Woods Special Area of Conservation (SAC), which is located approximately 2.5 km to the south-west at its closest point.
- There is one non-statutory protected site within 1 km of the survey site: Coed Cord / Coed y Saeson Wildlife Site, which comprises three separate areas located approximately 0.72 km to the south-west of the survey site at the closest point. March Ecology (2023) state that it is assumed that this site is designated for its woodland features.
- The closest area of Ancient Semi-natural Woodland (ASNW) and other associated categorisations (such as Plantation on Ancient Woodland Site – PAWS, and Restored Ancient Woodland Site – RAWS) is located approximately 0.6 km to the south of the survey site.

3.4 Marches Ecology (2023) conclude that "*No statutory or non-statutory protected sites would be directly impacted by the proposed nature reserve/ habitat creation works*".

3.3 Habitats

3.5 The Marches Ecology (2023) report includes the whole of the proposed Green Gates East Nature Reserve area. Using the data from their report, the habitat baseline within the proposed wetland creation area is dominated by improved grassland, understood to have been previously grazed by sheep and / or horses. Marches Ecology (2023) state that:

"The improved grassland fields throughout the survey site were not assessed in detail; however the swards appear to be characterised by a range of grasses such as Perennial Rye-grass, Yorkshire-fog, Alopecurus pratensis (Meadow Foxtail), Common Bent and (lesser amounts of) Cock's-foot. Forbs appear to be limited to characteristic plants such as Creeping Buttercup, Creeping Thistle, Broadleaved Dock, Common Ragwort, Common Dandelion and Common Sorrel. The fields largely appear to be maintained to 0.1/ 0.2 m high, although at field edges

and occasional larger areas throughout the survey site, the sward can be taller/ denser and apparently unmanaged in the recent past."

3.6 Blackthorn-dominated hedgerows were recorded along the eastern boundary adjacent to Cwttir Lane and along the field boundaries extending north-west to south-east through the proposed wetland creation area. Within the field boundary hedgerows occasional scattered trees (mainly mature Pedunculate oaks) were recorded. Pedunculate oak and ash trees were also noted with an area of bramble scrub adjacent to the adjacent property at Bryn Coed.

3.7 Small pockets of dense and scattered scrub were recorded within the proposed wetland creation area.

3.8 A small area of willow and bramble scrub was recorded in the field to the north of the Bryn Coed property. Marches Ecology (2023) state that there was a very small pocket of shaded, very shallow standing water, and a connected area of common nettle dominated tall-herb vegetation with an associated very small stand of reed canary-grass *Phalaris arundinacea*. Marches Ecology (2023) suggest that this is assumed to be the location of a now defunct (previously filled in?) pond.

3.9 Desk study data reviewed by Marches Ecology (2023) identified a record of Cyperus sedge *Carex pseudocyperus* from the desk study data. This species record was from 1981 from a 'dried up field pond'. Marches Ecology (2023) state that Cyperus sedge is listed as 'near Threatened' in Wales, and suggest that the possible location of the species record could be from the in-filled pond detailed above. This location is within the proposed wetland creation area.

3.4 Protected and Notable Species

3.10 Marches Ecology (2023) reviewed desk study data provided by DCC, and carried out an initial assessment of the wider proposed Nature Reserve site to consider the potential for the site to support protected and notable species. This section of the report reviews the information with respect to the proposed wetland creation area.

Badger

3.11 Marches Ecology (2023) state that there are two records of badger of specific relevance to the proposed Nature Reserve site "*a 2021 record from immediately adjacent land to the west (Denbighshire Tree Nursery) ('adult captured on camera trap' plus 'signs also found in surrounding fields') and three 2015 records for dead animals on the A55 within the 1 km grid square SJ0274*".

3.12 No badger setts were recorded within the wider proposed Nature Reserve site, although it was noted that the hedgerows within and surrounding the site could provide sett building opportunities for this species. Confirmed evidence of badger use of the site comprised a small number of guard hairs located at a breach in the fence in the south-western corner of the site (outside of the wetland creation area). Mammal paths and breaches were recorded connected to this breach, which extend from the south-western corner of the proposed wetland creation area.

3.13 Badgers are therefore considered of relevance to the proposed wetland habitat creation works, specifically ensuring that any excavation required to create wetland features does not have an

adverse impact on any badger individuals. Details of proposed control measures are presented in Chapter 5.

Bats

3.14 Marches Ecology (2023) state that there are records of bats from within the 1km search radius for the desk study, and also from the site itself. It is understood that Enfys Ecology (2018; cited by Marches Ecology, 2023) completed static detector, bat activity and bat transect surveys and concluded that the site was of "*moderate suitability for bats based on the foraging and commuting habitat present*". A total of five species of bat were recorded from the wider site between July and October including common and soprano pipistrelle, lesser horseshoe, noctule and Myotis sp. The bats were using the trees and scrub habitats on the western side of the site, and mature trees to the south-east of the site for commuting.

3.15 Marches Ecology (2023) conclude that some of the mature trees within the hedgerows in the proposed wetland creation area could provide at least low bat roost potential.

3.16 Bats will need to be considered further if any felling or pruning works is required to trees with bat roosting potential. If management works are required a Preliminary Roost Assessment (PRA) for bats will need to be completed, to identify any features of value for roosting bats and whether further survey and mitigation is required. Details of proposed control measures are presented in Chapter 5.

Birds

3.17 Marches Ecology (2023) cite a single record of redwing from the study site, and state that numerous other bird records were returned for the 1 km search radius. With respect to the wider study site, Marches Ecology (2023) state that *"Numerous nesting opportunities are provided by the habitats which characterise the survey site, largely scrub, hedgerows and trees; much of this resource currently appears unmanaged – the network of wide/ grown out hedgerows may be of particular value. Ground-nesting birds may use boundary features but are unlikely to utilise the wider grassland fields"*.

3.18 Nesting birds are considered to be of relevance to the proposed wetland habitat creation works, specifically ensuring that any vegetation clearance and / or excavation works required to create wetland features does not have an adverse impact on nesting and nest-building birds. Details of proposed control measures are presented in Chapter 5.

Great Crested Newts

3.19 Great crested newts are known to be present within the wider landscape surrounding the Green Gates East site. In an initial modelling study of the status of great crested newts in Wales, French et al (2014) identified that "*the best areas for great crested newts in Wales correspond to regions with high pond density (particularly the far north east…".*

3.20 With respect to the distribution of great crested newts within Denbighshire county, the Denbighshire Countryside Service 'Denbighshire's Biodiversity – Great Crested Newt' webpage[2] confirms that:

"North East Wales supports some important great crested newt populations. In Denbighshire the species is scattered around the county, with populations around Trefnant, St Asaph, Bodelwyddan, Rhuddlan, Rhyl and in the Clwydian Range around Maeshafn".

3.21 Haysom et al (2018) state that in Denbighshire there were 5642 records of great crested newt up to 2017, based on data from the Amphibian and Reptile Conservation (ARC) Living Archive database, with 169 records of great crested newts within a 1km radius (again up to 2017). Part of the brief for the Haysom et al (2018) study was to provide an assessment of the current conservation status of the species at county levels and relate this to its predicted historic conservation status with particular emphasis on north-east Wales. However, the report states that "*No study analogous to the series of reports described for other Welsh counties has been undertaken for the county of Denbighshire*" and as such, no county-specific assessment is presented.

3.22 Marches Ecology (2023) state that with respect to great crested newt records *"Cofnod provided numerous records for Great Crested Newts for the 1 km search area, mostly for land associated with St Asaph Business Park to the west of the survey site. This includes a 2004 record for a 'juvenile' from the survey site; no other details are provided"*.

3.23 With respect to the habitats at the wider study site, Marches Ecology (2023) conclude that there is currently no suitable aquatic habitat for breeding within the site. However, much of the terrestrial habitat resource would be valuable to the species; the grassland habitats are considered to provide low value dispersal and foraging opportunities; the hedgerow and scrub habitats provide moderate to high value habitats and could act as dispersal, hibernation and refuge features for the species.

3.24 Marches Ecology (2023) consider the proximity of potential GCN breeding ponds to the wider proposed Nature Reserve site and conclude that there may be five waterbodies within c.250m of the wider study site suitable for great crested newts. These include:
"• A cluster of recently created ponds at approximately SJ 0220 7455 associated with the Denbighshire Tree Nursery (on the immediate opposite side of the stream which lies adjacent to the western boundary of the survey site). It is understood (Joel Walley, pers. comm.) that these ponds have been surveyed in the recent past with no Great Crested Newts recorded.
• Two adjacent field ponds at approximately SJ 0235 7402 (approximately 130 m to the south of the survey site on the opposite side of Cwttir Lane). Cofnod have provided a 2008 record from (one of) these ponds for presence.
• Two adjacent ponds at approximately SJ 0194 7417 (approximately 250 m to the west of the survey site on the opposite side of the stream corridor). Cofnod have provided 2018/19 Smooth Newt (Lissotriton vulgaris) records from these ponds."

3.25 Marches Ecology (2023) also state that *"there are distinct clusters of Great Crested Newt records from two locations to the west of the survey site, just outside 250 m at SJ 0191 7439 and SJ 0187 7431"*.

[2] Available at: http://www.denbighshirecountryside.org.uk/great-crested-newt/#:~:text=North%20East%20Wales%20supports%20some%20important%20great%20crested,Rhyl%20and%20in%20the%20Clwydian%20Range%20around%20Maeshafn. Accessed 04-04-2023.

3.26 Great crested newts are known to be present in ponds throughout the St Asaph Business Park, with the closest pond located c.685m west of the proposed wetland creation area (c.475m from the wider proposed nature reserve site). In addition, Glascoed Nature Reserve, located to the west of the Business Park, was designed as a great crested newt mitigation site and includes numerous ponds with rough grassland, scrub, woodland and hedgerows providing optimal habitat for this species.

3.27 Great crested newts are therefore considered to be of relevance both to the design of the proposed wetland habitat creation area (see Chapter 4), due to their stronghold in the local area, but also with respect to ensuring protection of any GCN individuals during habitat creation works (see Chapter 5).

Reptiles

3.28 Marches Ecology (2023) state that desk study data showed eight records for three reptile species, adder *Viparia berus*, common lizard *Zootoca vivipara* and grass snake *Natrix natrix* within the 1 km search radius. No records were returned for the wider study site, or immediately adjacent land.

3.29 Marches Ecology (2023) cite a reptile survey, completed by Enfys Ecology in 2018, which focused on the west and south of the wider proposed nature reserve site. Marches Ecology (2023) state that no reptiles were recorded during this survey.

3.30 Marches Ecology (2023) conclude that the majority of the wider study site (which includes the proposed wetland creation area) provides sub-optimal habitat for reptiles, although they recognise that reptiles may use the hedgerow / scrub habitats along the western part of the wider site for foraging / dispersal / refuge / commuting.

Otter and Water Vole

3.31 Marches Ecology (2023) state that there were three records of otter associated with the Afon Elwy which passes through St Asaph c.850m east of the proposed nature reserve area. One record of water vole (from 2016) was provided from a minor watercourse on the western edge of St Asaph Business Park c.880m from the wider survey area.

3.32 Marches Ecology (2023) conclude that "*there are no watercourses or other features within the survey site which are potentially suitable for either species*". There is a minor watercourse that extends along the western boundary of the wider proposed nature reserve site (west of the proposed wetland creation area). Marches Ecology (2023) consider that this is unsuitable for use by water vole, and may occasionally be used by otter for commuting as part of their territory.

Other Species

3.33 With respect to invertebrates, Marches Ecology (2023) conclude that "*overall, the habitats provided by the survey site are of limited potential value for invertebrates, although the mature trees (especially the abundance of oaks) and the hedgerows maybe of potentially greater value; the wildflower sowing already undertaken in the northern field…will also be a (developing) resource of potential value to a range of invertebrates"*.

3.34 Marches Ecology (2023) state that "*Whilst the habitats present could support hare, hedgehog and polecat, the resource is unlikely to be of any particular value*."

4. Ecological Design Input

4.1 Introduction

4.1 Within the proposed nature reserve at Green Gates East, it is understood that there is an aspiration to create an area of wetland habitats, particularly given the ecological context of the site set out in Chapter 3.

4.2 Some small ponds have been created within the adjacent Tree Nursery (see Plates 4.1 and 4.2), and Marches Ecology (2023) identified the location of a potential former pond within the wetland creation area (see Plate 4.3). This chapter explores the ecological designs associated with the proposed wetland creation area, and should be read in conjunction with the accompanying engineering report produced by Systra.

4.3 The soils within the proposed wetland creation area are considered in greater detail by Systra in their accompanying report. However, initial assessment of Cranfield Soil and Agrifood Institute SoilScapes[3] mapping system suggests that the soils within the study site would be logged as SoilScape 18: slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils.

4.4 Geotechnics (2019) carried out a Site Investigation at part of Green Gates East Farm, which identified layers of topsoil, made ground (in two of the four trial pits), and glacial till which was described as a "*firm to stiff brown occasionally mottled bluish grey or orange slightly sandy to sandy slightly gravelly to gravelly clay*".

4.5 It is understood (Walley, 2023, *Pers. Comm.*) that the creation of the proposed nature reserve at Green Gates East is in part driven by the DCC's aspiration to create nature-rich habitats at the site to respond to both the climate and biodiversity emergencies. This report therefore considers, in part, the potential carbon benefits from habitat creation, based on published data.

4.6 This chapter of the report provides information related to the ecological designs for the proposed wetland creation area.

4.2 Site Visit

4.7 In order to inform the ecological designs and to further understand the ecological context of the proposed wetland creation area, a site visit was completed on 12th April 2023. This site visit was attended by Dr Katy Read (Director, Biodiversity Advanced Ltd), Dr Lynn Besenyei (Botanical Specialist), Tim Dawe (Associate, Systra) and Keith Bennett (Climate Change Project Manager, Denbighshire County Council).

4.8 Photographs were taken during the site visit on 12th April 2023 are included in Figures 4.1 to 4.6.

[3] See: https://www.landis.org.uk/soilscapes/index.cfm

Plate 4.1: Created pond at Tree Nursery at Green Gates

Plate 4.2: Created pond at Tree Nursery at Green Gates

Plate 4.3: Location of infilled pond (shown by willow trees and wetland vegetation) within proposed wetland creation area

Plate 4.4: Potential pond creation area in north-east part of proposed wetland creation area

Plate 4.5: Potential pond creation area in central part of proposed wetland creation area

Plate 4.6: Potential pond creation area in south-east part of proposed wetland creation area

4.3 PONDS

4.9 Anderson and Morris (2021) state that small, well-vegetated ponds can exceed carbon capture expectations and identify the potential for focussed, concentrated carbon capture hot-spots where pond clusters can be created. Anderson and Miller (2021) present data that shows that small well-vegetated ponds can achieve a carbon exchange of between 2.89 and 5.21 $tC0_2e$/ha/year (tonnes of carbon dioxide equivalent per hectare per year), with the amount of total carbon (tC) captured/ha/year between 0.79 and 2.47 tC captured/ha/yr. It is assumed that these figures relate to small, well vegetated ponds which are created within non-peat soils.

4.10 Anderson (2021) recognises that with respect to ponds, the 'restoration' of existing ponds can result in a release of carbon into the atmosphere, as pond habitats can capture significant amounts of organic carbon and accumulate in bottom sediments where it is stored rather than subjected to decay and loss in respiration. She concludes that "*Creating new ponds rather than restoring old ones avoids losing the existing carbon content"* and suggests that the ponds should be designed so that they *"should not be so shallow as to dry out annually as this precipitates loss of the stored carbon*" (Gilbert et al., 2016; cited by Anderson, 2021).

4.11 A series of new ponds will be created within the proposed wetland creation area. The proposed pond layout has been designed by Systra and details of the pond sizes and profiles are given by Systra which incorporates the ecological designs for this element the wetland creation area. Dawe (*Pers. Comm.*, 2023) confirmed that the total area of the new pond habitats within the wetland creation area was c.3000 m^2.

4.12 Design criteria for ponds which provide optimal breeding habitat for great crested newts are set out by English Nature (2001):

- Each pond should be between 100m^2 and 300m^2 in size and should have varying depths, up to 4m deep.
- The ponds should be designed to hold water in at least one summer in every three and pond clusters are preferable to isolated individual ponds.
- Each pond should contain both deeper areas of open water, for courtship, with shelves created to allow growth of marginal and emergent vegetation.
- The ponds should be designed so that they aren't shaded along the southern edge.

4.13 The ponds have been designed to provide optimal amphibian habitat, within the context of the other design considerations (e.g. hydrology, sediments, topography etc) which are detailed in the accompanying Systra report. The ponds have been designed so that 50% of their area contains suitable 'shelves' for the establishment of marginal and emergent vegetation, with the centre water column area being deeper to provide optimal great crested newt 'courtship' areas and allow growth of floating aquatic vegetation.

4.14 A series of swales are proposed to be created as part of the pond design. These will be relatively shallow, linear features, and as such, are proposed to be subject to the same grassland creation work set out in Section 4.4.

4.15 In terms of vegetation establishment for the created ponds, Marches Ecology (2023) recommended that "*the ponds are not planted but rather left to naturally colonise*". This vegetation establishment approach has been used successfully at newly created ponds at the nearby St Asaph Business Park site. However, it should be recognised that there are sources of wetland vegetation in close proximity at the Business Park, which already supports a network

of established and well-vegetated ponds within c.50m of each newly created pond within the site's complex.

4.16 As shown in Figures 4.1 and 4.2, two created ponds within the tree nursery area at Green Gates have adopted a vegetation establishment strategy utilising natural colonisation. Whilst it is recognised that these ponds are relatively shallow (and likely dried out completely during the hot summer of 2022), the colonisation of these features with wetland vegetation has been minimal. One pond contained a thick covering of algae, whilst the other supported almost no vegetation.

4.17 Whilst it is agreed that the use of natural colonisation is the preferred vegetation establishment option for the proposed ponds, it is recognised that monitoring of the developing wetland vegetation will be important. Should this monitoring identify that target wetland vegetation establishment is poor, after a period of 3 years, an alternative strategy could be adopted to vegetate the pond using plug planting.

4.18 Table 4.1 provides a list of native species which could be planted within the ponds to provide optimal habitat for a range of invertebrates and amphibians. If plug planting is used, 30% of the area targeted for wetland vegetation should be planted, using 35ml plugs at a rate of 9 plugs / m^2. If the total area of ponds within the proposed wetland creation area is c.3,000 m^{2*} and 50% is designed to be emergent / marginal vegetation, then planting 30% of this area with plugs @ a rate of 9 plugs / m^2, a total of 4050 wetland vegetation plugs will be required.

4.19 Planting works should be carried out in early May, when water levels in the ponds are high, and the plugs will have a summer's growing season to establish. Plug plants may need to be protected from grazing by wildfowl during their establishment phase using protective fencing. This should be removed once plants have fully established.

Common Name	Scientific Name	Percentage in Each Pond
Marginal / Emergent Species		
Amphibious bistort	*Persicaria amphibia*	10%
Brooklime	*Veronica beccabunga*	15%
Marsh marigold	*Caltha palustris*	10%
Water forget-me-not	*Myosotis scorpioides*	10%
Water plantain	*Alisma plantago-aquatica*	10%
Yellow flag iris	*Iris pseudacorus*	10%
Common water crowfoot	*Ranunculus aquatilis*	15%
Purple loosestrife	*Lythrum salicaria*	10%
Water mint	*Mentha aquatica*	10%
Floating Species / Oxygenators		
Common water starwort	*Callitriche stagnalis*	-
Water milfoil	*Myriophyllum spicatum*	-

Table 4.1: Proposed Aquatic Species for Planting within Ponds if Required

4.20 Once vegetation within each pond is established, 10 to 20% of the emergent vegetation at the water's edge should be removed per year in rotation depending on the rate of establishment.

* Area to be confirmed from earthworks drawing.

4.4 GRASSLAND

4.21 Anderson (2021) suggest that the creation of flower-rich grassland habitats, particularly where the habitats are restored from an improved grassland sward (or an arable habitat) can result in a carbon exchange of between 3.8 and 6.96 $tC0_2e$/ha/year. The total carbon captured as a result of this habitat change could be between 1.04 and 1.89 tC captured/ha/year.

4.22 Of specific relevance to this habitat creation project, is that "*On neutral grasslands, a diverse sward with good red clover (Trifolium pratense) cover was found to offer the greatest carbon capture potential, equivalent to many woodland figures*" (Anderson, 2021). She goes on to state that "*Flower-rich grassland is significantly superior to species-poor swards for carbon capture*".

4.23 Anderson (2021) suggests that long-term experiments at Colt Park meadows (Ingleborough NNR) on moderately fertile brown earths over limestone have shown that adding red clover at high seeding levels (5.2 gm/m^2) to plots with added other species (to increase species-richness) and no fertilization, had a significantly larger effect on carbon capture rates. She concludes that "*red clover cover increased only from 0.4% to 1.6% after seeding, which is much lower than that found in some MG5 grasslands*" and suggests that "*Further research is needed to explore the importance of alternative deeper rooting legumes and changes over time*".

4.24 This was reiterated again in a presentation given by Anderson (2022) at CIEEM's 2022: Autumn Conference 'Delivering a nature positive, carbon negative future' which suggested that high diversity grassland can store 5 times more carbon than grassland monocultures. When adding legumes, especially red clover (which captures nitrogen from the atmosphere), to a species-rich grassland, the habitat could capture 3.17 tC/ha/year.

4.25 During the site visit on 12th April 2023, an area of previously created 'meadow' at the Green Gates East site was visited. It is understood that this area was created using green hay from a local nature reserve. During the site visit in 2023, minimal evidence of wildflowers were noted within this grassland area, which appeared to be very nutrient rich, as evidenced by the height of the sward and its rich green colour. The area of meadow habitat is outside of the proposed pond creation area, however, the lack of visible success with the habitat creation works completed in this area illustrate the need to carefully consider the right vegetation establishment option for the creation of botanically-rich grassland habitats within the pond creation area.

4.26 Within the pond creation area, topsoil will be removed in order to carry out the earthworks necessary to create the appropriate pond profiles and locations (see accompanying Systra report). These works will, in effect, remove the nutrient-rich topsoil, as it will be re-profiled as part of the works, resulting in thinner areas of topsoil being spread back over the habitat creation area.

4.27 Denbighshire County Council may chose to further utilise a green-hay strewing approach around the proposed ponds, once pond creation works have been completed. However, it should be recognised that if this approach was adopted, then there would be a significant time delay between pond creation (which is proposed for September 2023) and grassland vegetation establishment (which could be in mid July 2024), during which time, extant species from the soils' seed bank could establish in the areas surrounding the ponds, and may need to be removed again prior to any green hay strewing activities.

4.28 As there are currently no species-rich grassland habitat within the study site, green hay would need to be sourced from an appropriate local site, which supported a similar soil composition to that found within the habitat creation area (once pond creation works had been completed).

4.29 An alternative approach would be to utilise a wildflower/grass seed mix which was appropriate for the site to introduce species which are currently absent from the proposed nature reserve. Whilst this approach is not always the favoured option, the use of a species-rich grassland mix would ensure that the grassland habitat established well, and potentially provided the maximum carbon benefit available, due to their species-diversity. Using a seed mix would also ensure rapid habitat establishment within the site, on completion of the pond creation works.

4.30 Emorsgate 'Meadow Mixture for Clay Soils'[4], is a mix composed of 20% native wild flowers and 80% slow growing grasses (by weight). Species composition is summarised in Table 4.2. This mixture is currently out of stock via the Emorsgate website and as such, other seed mix options have been investigated. A Wales-based company called Wild Wales Seeds, supply a potentially suitable alternative seed mixture for damp/neutral soils[5]. This seed mix contains 80% low maintenance grasses for neutral soils, and 20% wildflowers as listed in Table 4.3.

4.31 Neither of these seed mixes specifically contain red clover (identified by Anderson, 2021 & 2022, as being a key component in grasslands which may sequester greater quantities of carbon – see discussion above) and it is therefore recommended that if a seed mix is chosen, discussions with the seed-supply company are carried out to identify if this species can be added to the seed mix before sowing.

4.32 Either seed mix should be sown at a rate of 4g / m^2 over the area impacted by the pond habitat creation works, including the created swales (approximately 3 ha[*]).

4.33 Wildflower meadow seeding works should be completed in suitable weather conditions in March / April or late September / October (where there are damp soils but no heavy rain during the seeding works). The success of the seeding establishment will depend on sowing when there are suitable weather conditions prior to, during and after seed has been sown. Seed should be surface sown and can be applied by machine or broadcast by hand. Seed should not be incorporated or covered, but firmed in with a roll, or by treading, to achieve good soil/seed contact.

[4] See: https://wildseed.co.uk/product/mixtures/complete-mixtures/meadow-mixtures-for-specific-soils/meadow-mixture-for-clay-soils/
[5] See: https://www.wildwales-seeds.co.uk/product/neutral-damp-soils/
[*] Area to be confirmed from earthworks drawing.

Percentage	Common Name	Scientific Name
20% Wild Flowers:		
0.20%	Agrimony	*Agrimonia eupatoria*
0.20%	Betony	*Betonica officinalis*
3.00%	Common knapweed	*Centurea nigra*
0.20%	Cowslip	*Primula veris*
0.30%	Wild carrot	*Daucus carota*
0.80%	Meadowsweet	*Filipendula ulmaria*
2.00%	Lady's bedstraw	*Galium verum*
0.80%	Oxeye daisy	*Leucanthemum vulgare*
0.10%	Birdsfoot trefoil	*Lotus corniculatus*
0.50%	Meadow Vetchling	*Lathyrus pratensis*
2.50%	Musk mallow	*Malva moschata*
1.20%	Ragged robin	*Silene flos-cuculi*
4.10%	Ribwort plantain	*Plantago lanceolata*
0.20%	Pepper saxifrage	*Silaum silaus*
1.00%	Glaucous sedge	*Carex flacca*
0.20%	Dandelion	*Taraxacum officinale*
0.70%	Meadow buttercup	*Ranunculus acris*
2.00%	Yarrow	*Achillea millefolium*
80% Grass Species:		
2.40%	Common bent	*Agrostis capillaris*
62.40%	Crested dogstail	*Cynosurus cristatus*
2.00%	Quaking grass (w)	*Briza media*
10.00%	Red fescue	*Festuca rubra*
2.00%	Sweet vernal-grass (w)	*Anthoxanthum odoratum*
1.20%	Yellow oat-grass (w)	*Trisetum flavescens*

Table 4.2: Emorsgate Meadow Mixture for Clay Soils (from Emorsgate Seeds)

Common Name	Scientific Name
20% Wild Flowers:	
Betony	*Betonica officinalis*
Birdsfoot trefoil	*Lotus corniculatus*
Catsear	*Hypochaeris radicata*
Common sorrel	*Rumex acetosa*
Field scabious	*Knautia arvensis*
Knapweed	*Centurea sp.*
Lady's bedstraw	*Galium verum*
Meadow buttercup	*Ranunculus acris*
Oxeye daisy	*Leucanthemum vulgare*
Ragged robin	*Silene flos-cuculi*
Selfheal	*Prunella vulgaris*
St John's wort	*Hypericum sp.*
Tufted vetch	*Vicia cracca*
Yarrow	*Achillea millefolium*
Yellow rattle	*Rhinanthus minor*
80% Grasses:	
Sweet vernal	*Anthoxanthum odoratum*
Slender red fescue	*Festuca rubra litoralis*
Sheep's fescue	*Festuca ovina*
Crested dogstail	*Cynosurus cristatus*
Bent grass	*Agrostis* sp.
Meadow grass	*Poa* sp.

Table 4.3: Wales Wild Seeds Meadow Mixture for Clay Soils (from Emorsgate Seeds)

4.34 During the first year, Emorsgate seeds state that there will likely be a flush of annual weeds, which should not be cut until mid to late summer (early August for example). The annual weeds should then be cut, removed and composted. The young meadow can then be kept short by mowing through to the end of March the following year. Any residual perennial weeds such as docks will need to be dug out.

4.35 Emorsgate Seeds recommend that the best long-term results are usually obtained by traditional meadow management based around a main summer hay cut in combination with autumn and possibly spring mowing or grazing. Meadow grassland should not be cut or grazed from spring through to late July / August to give the sown species an opportunity to flower. After flowering in July or August take a 'hay cut', ie cut back with a scythe, petrol strimmer or tractor mower to c.50mm. The 'hay' should be left to dry and shed seed for 1-7 days then removed from site. Mowing of the re-growth through to late autumn/winter to c.50mm can be done, and again in spring if needed.

4.5 Scrub

4.36 Anderson (2021) states that scrub (once established) is thought to be valuable for carbon storage and accumulation (provided it is not encouraged to grow on already carbon-rich habitats like some grasslands or heathland). However, Gregg et al (2021) suggest that there is little research specifically on its contribution to carbon budgets in British conditions.

4.37 The creation of pockets of scrub will most likely form part of the woodland creation proposed for the central and western part of the site. However, it would be beneficial to create some scrub pockets in the corners of those fields where great crested newt ponds are proposed to provide some refuge / potential hibernation areas for amphibians. Marches Ecology (2022) identify that any scrub planting should utilise native species of local provenance.

4.38 Pockets of scrub totalling 0.2 ha could be created by allowing the blackthorn hedgerows already present at the site to expand into the field corners, with some additional species such as hawthorn *Crataegus monogyna*, hazel *Corylus avellana* and dog rose *Rosa canina* being added to diversify the scrub areas. Scrub planting should utilise 60-80 whips planted within tree tubes at 2m centres within the field corners. Scrub species should be planted during the winter period (November to February inclusive).

4.6 Hedgerows and Trees

4.39 Gregg et al (2021) state that hedgerows have the potential to sequester and store carbon in their biomass, although there has been little research in the UK regarding the role of hedgerows for carbon storage. Gregg et al (2021) suggest that the width and height of hedgerows directly influence the amount of carbon they can store, with hedgerows managed on a less frequent basis, likely to store greater amounts of carbon. Scattered trees are also known to be an above-ground carbon store, although once they reach a very mature age, the losses from respiration and, including decaying wood, balance the carbon uptake (Gregg at al, 2021).

4.40 The proposed wetland creation area already supports a series of hedgerows extending generally north-west to south-east along the edges of the fields. These hedgerows are dominated by blackthorn. Based on the carbon considerations set out in Gregg et al (2021) it is recommended that these hedgerows be managed using a minimal-intervention regime (although some rotational management is likely to be required in order to maintain these features as 'hedgerows' rather than lines of scrub).

4.41 The site offers opportunities for planting of native black poplar *Populus nigra ssp betulifolia* trees within the hedgerow features where suitable gaps exist to incorporate mature trees into the hedgerow feature. It is understood (Walley, *Pers. Comm.,* 2023) that the propagation of native black poplar trees within the tree nursery sites at Green Gates is proposed, and there

should be opportunities for some trees (c.10 no.) to be planted within gaps in the hedgerows that extend through the proposed wetland creation area.

4.7 HIBERNACULA

4.42 In order to provide additional opportunities for both amphibians and reptiles to hibernate within the site, it is proposed that hibernaculum be created in close proximity to the proposed ponds. It is proposed that 1 no. hibernacula be created for each pond that is installed at the site. Of these, it is proposed that 6 no. hibernacula are created at the field corners where scrub habitats are proposed, with the remaining hibernacula incorporated into the earthworks bunds which will be designed to surround some of the ponds (see further details on Systra earthworks drawings).

4.43 Figure 4.1 provides a schematic design for these features from guidelines provided by English Nature (2001). The hibernacula should be created so that the inert, clean infill sits below ground, as long as there is no risk of flooding, as this provides a more constant temperature for hibernating amphibians.

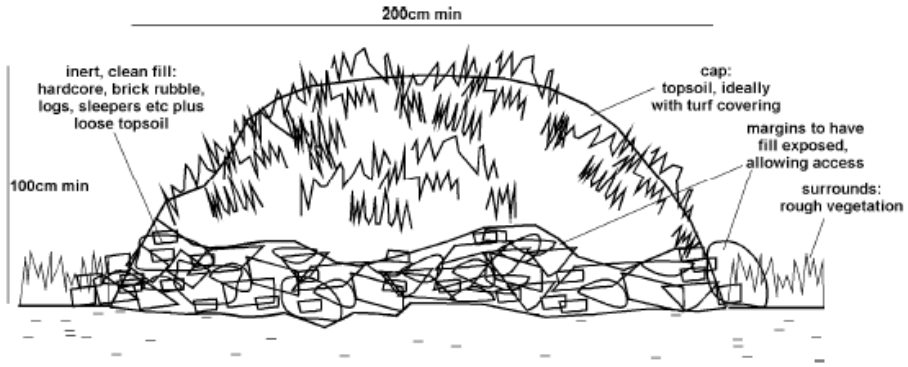

Figure 4.1: Recommended Amphibian and Reptile Hibernaculum Design
(from English Nature, 2001)

4.8 REFUGIA AND BRASH PILES

4.44 In order to provide additional opportunities for both amphibians and reptiles to hibernate within the site, it is proposed that any woody material generated from woodland / scrub / tree management works in the future be used to create refugia and brash piles. These should be placed within the woodland or scrub habitats, but away from the western side of the site (close to Cwttir Lane) due to the risk of road traffic accidents for hedgehogs and other mammals.

5. Protected Species Method Statement

5.1 Introduction

5.1 This section provides details of timing, phasing and duration of habitat creation activities and Reasonable Avoidance Measures (RAMs) in relation to protected species. This information is presented to ensure that any wetland habitat creation works can be carried out in such a way as to ensure that there are no risks to protected or notable species.

5.2 The works set out in Sections 5.2 to 5.7 will be completed. The timetable presented in Section 5.8 details a proposed schedule for the habitat creation works which will ensure adherence with the RAMs and also the proposed pond construction start dates (after planning permission is granted in September) and vegetation establishment timings.

5.2 Badgers and Small Mammals

5.3 As identified in Section 3.5, badgers are known to pass through the wider study site, and may also pass through the proposed wetland creation area. March Ecology (2023) have also identified that the hedgerows and scrub habitats within the wider study site provide suitable sett building habitat for badgers.

5.4 Whilst no badger setts were identified within the proposed wetland creation area during the survey visit by Marches Ecology in February 2023, or during the site visit by Biodiversity Advanced Ltd in April 2023, badgers are a mobile species and whilst there is currently no evidence of badgers using the site, prior to works commencing, a further badger survey should be completed to ensure that no setts have been excavated within 30 m of the proposed wetland creation area.

5.5 If a potential badger sett is found, a badger monitoring survey will be required to establish current use of the sett. If excavation works are required within 30 m of an active badger sett, a badger licence may be required from Natural Resources Wales, prior to any works within the zone of influence of the badger sett.

5.6 If no setts are identified during this pre-commencement survey, works can proceed.

5.7 During pond creation works, all excavations should be closed overnight or a form of egress provided to prevent pitfall danger to badgers, hedgehogs, other small mammals, and amphibians which may pass through the site overnight.

5.3 Bats

5.8 Within the wetland creation area, a number of trees in the surrounding hedgerows have been identified by Marches Ecology (2023) as having low potential to support roosting bats. The trees which are relevant to these works are those at Marches Ecology (2023) target notes:

- 19 (2 no. trees);
- 20 (2 no. trees);
- 22 (1 no. tree); and,
- 24 (some trees).

5.9 The location of these trees are shown on drawings in Marches Ecology (2023) report.

5.10 Marches Ecology (2023) have recommended that any work utilising heavy machinery within 10 m of trees with moderate (or greater) bat roost potential be completed outside of the main bat breeding season (June/July). None of the trees within the proposed wetland creation area are considered to have moderate bat roosting potential.

5.11 If any management works, such as pruning or branch cutting, is required to the trees with low bat roost potential, they should be subject to an inspection by a bat ecologist to consider whether further surveys are required (see Collins, 2016) prior to works commencing.

5.4 BIRDS

5.12 Any vegetation with the potential to support nesting birds (including scrub, tall ruderal and hedgerow sections) should be removed to ground level, between October and February (inclusive) i.e. outside the bird nesting season.

5.13 If vegetation removal works need to take place inside of this period, then prior to the commencement of any activity at the site, a nesting bird survey of the habitat creation area, and the immediately surrounding vegetation will be completed. The nesting bird survey will comprise an early-morning check by an experienced ecologist for nesting birds immediately prior to works commencing. If birds are found to be nesting any works which may affect them would have to be delayed until the young have fledged and the nest has been abandoned naturally, for example via the implementation of an appropriate buffer zone (species dependent) around the nest in which no disturbance is permitted until the nest is no longer in use.

5.14 Should any woody vegetation be cleared to facilitate access to the working area, all materials will be cut up and stored as a eco-pile associated with the hedgerow / dense scrub habitats around the field edges (see Section 4.8).

5.5 AMPHIBIANS AND REPTILES

5.15 Marches Ecology (2023) identify that DCC have had/are re-applying for a Natural Resources Wales (NRW) 'organisational' great crested newt licence which has allowed/will allow movement of GCN when undertaking a range of habitat management and creation works. Marches Ecology (2023) recommended that such a licence is/would be relevant to habitat creation works at this site as it is within 250m of known GCN breeding pond(s).

5.16 Marches Ecology (2023) conclude that the approved method statement associated with the licence would "*include details on controlled vegetation removal, hand-searches etc. (which would be required to precede any physical works), and movement of any located animals outside of works areas, as well as outlining that works would need to be undertaken under the guidance of an accredited agent named on the licence*".

5.17 In addition, it is understood from the Marches Ecology (2023) report that the earthworks contractor utilised for the pond construction works would be "*covered by the ARC Trust licence and* [be] *sufficiently trained in GCN habitat management*".

5.18 The habitat creation works to create the proposed ponds within the southern-most triangular field within the proposed wetland creation area would be within 250 m of a known GCN breeding pond and would therefore need to be carried out in accordance with the licence detailed above.

5.19 Habitat creation works to create proposed ponds within the central and northern part of the proposed wetland creation area would be outside of the 250 m radius from a known GCN breeding pond and would therefore not need to be included on the above licence, however, works will still required Ecological Clerk of Works (ECoW) supervision due to the potential presence of reptiles – see below.

5.20 If one or more great crested newts are found within the area more than 250 m away from a known GCN breeding pond, works must immediately stop and may only resume once a strategy has been agreed with Denbighshire County Council / Natural Resources Wales.

5.21 Any vegetation with the potential to support amphibians, reptiles and small mammals will be removed using a phased approach, prior to any habitat creation works commencing, as set out below:

- To avoid harm to amphibians and reptiles, vegetation clearance should take place between March and mid October when amphibian and reptiles are most active. For vegetation which may support nesting birds (scrub, hedgerows and trees) vegetation removal should take place outside of the bird-nesting season (generally March to September), however, if this is not possible, an nesting bird survey will be carried out prior to vegetation removal (see Section 5.3).
- Suitable vegetation will be strimmed / mowed in two successively shorter cuts; the first to 10-15cm height at least 48 hours prior to the second cut; and, the second cut will take vegetation as close to the ground as possible with all cuttings removed from site.
- Prior to the commencement of any excavation works, the habitat creation area and land immediately adjacent will be subject to a hand-search by the Ecological Clerk of Works to identify any evidence of any protected species, or areas of refugia / log-piles etc which may be used by herpetofauna for hibernation or resting.
- Should any ecologically sensitive areas be identified by the ECoW, these will be marked out and identified to the works contractor, prior to commencement of any activity. Only once it has been agreed between the ECoW and the works contractor that areas can be avoided, will works commence.
- A soil strip will be carried out under the supervision of an Ecological Clerk of Works; a toothed bucket will be used to remove the first few inches of soil thus reducing the risk to amphibians and reptiles that may be present in cracks or in burrows in the ground.
- Any amphibian or reptiles that are captured will be moved outside of the habitat creation area (and in accordance with the NRW 'organisational' GCN licence) to the surrounding retained habitats.

5.22 If any reptiles are found during the works, all works must cease immediately, and an ecologist should be contacted for advice. Works may only resume once a strategy has been agreed with Denbighshire County Council.

5.6 TOOLBOX TALK

5.23 Prior to the commencement of any works, a site induction will be provided to all operatives. This induction will include information related to protected species associated with the proposed wetland creation area, the implementation of ecological control measures, pollution prevention measures, and details of biosecurity control measures (see Chapter 6). All operatives will sign

to confirm that they have received and understood the induction, and will adhere to any ecological control measures identified in relation to their works.

5.7 Pollution Prevention Measures

5.24 Marches Ecology (2023) recommend that general best practice measures should be implemented during any preparatory and pond construction works to avoid any indirect impacts (e.g., dust, diffuse pollution) on adjacent habitat. They suggest that the general advice contained in the Guidance for Pollution Prevention (GPP) leaflets produced by SEPA, EA and the Environment and Heritage Service (Northern Ireland) will be adhered to, particularly the following:

- GPP1: Understanding Your Environmental Responsibilities - Good Environmental Practices.
- GPP5: Works and Maintenance in or Near Water.
- PPG6: Working at Construction and Demolition Sites (withdrawn in 2015, but still providing some useful guidance).

5.8 Proposed Works Timetable

5.25 Table 5.1 sets out the proposed works timetable to ensure ecological protection measures are adhered to, and optimal habitat creation / vegetation establishment activities can be achieved.

5.26 The timetable is based on grant of planning permission for the new nature reserve in September 2023. Should planning permission not be granted by this time, this proposed timetable of works should be reviewed and revised.

5.27 It is understood (Bennett, 2023, *Pers. Comm.*) that the habitat creation works should be completed by the end of March 2024, to accord with Denbighshire County Council's current funding allocation.

Activity	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24
Grant of planning permission		x						
Pre-works badger survey of areas within 30m of excavation zones. If badger setts are found, mitigation strategy will be required for works within 30m zones.		x						
If tree pruning / management works are required for pond works access a pre-works ground-level bat survey of trees with low bat roost potential will be required, and further nocturnal surveys may be necessary. Mitigation strategy will be required if bat roosts are recorded.	x							
Completion of tree pruning / management works (if no bat roosts are identified). Early October.			x					
Two-stage vegetation cutting with arisings removed from the pond creation works area.		x						
Clearance of scrub / hedgerow sections / tall ruderal habitats to facilitate pond creation works. Early October.			x					
Hand search and soil strip of proposed pond creation area under supervision of Ecological Clerk of Works (ECoW) immediately prior to works commencing.		x (late-Sep)	x (early-Oct)					
Toolbox talk to include ecological protection measures and Biosecurity Risk Assessment to be given to contractors prior to commencement of pond excavation works.			x					
Excavation of new ponds and swales. Adherence with pollution prevention measures throughout works.			x					
Use of temporary back-filling or trench covers overnight during pond excavation works to ensure no mammals are trapped in excavations.			x					
Creation of hibernacula as part of earthworks activities.			x					
Allow ponds to fill with water over winter months.				x	x	x	x	
Planting of additional scrub species at field corners (surrounding created hibernacula).					x	x	x	
Planting of aquatic vegetation (if natural succession is not utilised as establishment option).								x (if req'd)
Seeding of wetland habitat creation area (if grassland seeding option is utilised).								x (late Mar-24)

Table 5.1: Proposed Timetable of Works with Ecological Controls

6. Biosecurity Risk Assessment

6.1 Biosecurity considerations aim to reduce the risk of introducing or spreading invasive non-native species (and other harmful organisms such as diseases) in the wild[6]. The Wales Biodiversity Partnership[7] states that Invasive Non-native Species (INNS) are plants, animals, fungi and microorganisms which have been introduced to parts of the world where they would not naturally be found. They have the ability to spread causing damage to the environment, the economy, our health and the way we live. INNS are the second greatest threat to biodiversity after habitat loss and fragmentation. INNS have been estimated to cost the UK economy at least £1.8 billion pounds annually, mainly affecting farming and horticultural sectors but can also affect transport, construction, recreation, aquaculture and utilities.

6.2 Natural Resources Wales[8] state that the Invasive Alien Species (Enforcement and Permitting) Order 2019 gives effect to EU regulations on the prevention and management of the spread of invasive alien species. It lists 66 species which are of special concern of which 14 of the species (see below) are found in Wales. The regulations make it an offence to carry out any of the following activities with listed species, except where a licence, permit or exemption is in place:

- import
- keep
- breed
- transport (except transporting for eradication)
- place on the market
- exchange
- allow to grow, cultivate or permit to reproduce
- release into the environment

6.3 The 14 species identified as being widely spread in England and Wales and requiring management are listed in Table 6.1.

Plants	Animals
Nuttall's waterweed *Elodea nuttallii*	Egyptian goose *Alopochen aegyptiacus*
Chilean rhubarb *Gunnera tinctoria*	Chinese mitten crab *Eriocheir sinensis*
Giant hogweed *Heracleum mantegazzianum*	Muntjac deer *Muntiacus reevesi*
Floating pennywort *Hydrocotyle ranunculoides*	Signal crayfish *Pacifastacus leniusculus*
Himalayan balsam *Impatiens glandulifera*	Grey squirrel *Sciurus carolinensis*
Curly waterweed *Lagarosiphon major*	All subspecies of *Trachemys scripta* otherwise known as "slider terrapins"
American skunk cabbage *Lysichiton americanus*	
Parrot's feather *Myriophyllum aquaticum*	

Table 6.1: Widespread Invasive Alien Species in England and Wales listed on the Invasive Alien Species (Enforcement and Permitting) Order 2019

[6] GB Non-Native Species Secretariate. Biosecurity and Prevention webpage. Accessed: 18-11-21. Available: http://www.nonnativespecies.org/index.cfm?sectionid=119

[7] Wales Biodiversity Partnership. Invasive Non Native Species Group webpage. Accessed: 18-11-21. Available: https://www.biodiversitywales.org.uk/Invasive-Non-Native-Species-Group

[8] Natural Resources Wales. Invasive Alien Species Regulations website. Accessed: 23-04-21. Available: https://naturalresources.wales/permits-and-permissions/species-licensing/invasive-alien-species/invasive-alien-species-regulations/?lang=en

6.4 Table 6.2 sets out the activities which are being assessed in the biosecurity risk assessment.

Description of activities being assessed in this biosecurity risk assessment:	♦ Habitat creation works including pond construction, seeding and hibernacula creation at the proposed Nature Reserve at Green Gates East, St Asaph. Works to be completed using hydraulic excavator, dump truck and hand tools.

Table 6.2: Activities Associated with Wetland Habitat Creation Works at Proposed Nature Reserve at Green Gates East, St Asaph

6.5 Table 6.3 identifies the key invasive species and activities which are of relevance to the wetland habitat creation works at the proposed Nature Reserve at Green Gates East, St Asaph.

Invasive Species	Habitat / Species At Risk
Himalayan Balsam Himalayan Balsam is widely distributed in North Wales and occurs in both lowland and upland localities. The species is thought to have extended its range and abundance, particularly in wetland habitats. Marches Ecology (2023) identify that Himalayan balsam is present along the watercourse outside of the wider Green Gates East site, along the western site boundary.	**Habitats:** Ponds and watercourses
Australian swamp stonecrop *Crassula helmsii* *Crassula helmsii* is known to exist in North Wales. The species is highly invasive and represents one of the principle factors that affect the long term ecological functionality of ponds as breeding sites for amphibians.	**Habitats:** Ponds **Species:** Great crested newt
Water fern *Azolla filiculoides* *Azolla filiculoides* is known to exist in North Wales. The species is highly invasive and can spread rapidly across a pond, shading the water surface and causing problems for pond functioning. Considered to be a high risk non-native invasive species.	**Habitats:** Ponds **Species:** Great crested newt
Other Invasive Non-Native Aquatic Plant Species A range of invasive non-native plant species have been recorded to date in North Wales. The list below reviews risk species: ♦ Parrot's-feather *Myriophyllum aquaticum* – medium risk ♦ Floating pennywort *Hydrocotyle ranunculoides* – high risk ♦ Canadian waterweed *Elodea Canadensis* – medium risk ♦ Curly waterweed *Lagarosiphon major* – medium risk ♦ Nuttall's waterweed Elodea nuttallii – medium risk ♦ Waterweeds (other *Elodea* sp.) *Elodea* spp. – medium risk ♦ Least duckweed *Lemna miniscula* – high risk	**Habitats:** Ponds **Species:** Great crested newt
***Chytrid* (potential)** The Chytrid fungus was identified in Talacre and Johnstown in 2008 and is known to be widespread in Great Britain. This fungus has affected amphibian populations globally and has caused the extinctions of species. ARG-UK Advice Note 4 (March 2017) provides generic guidance in respect of amphibian disease precautions.	**Habitats:** Non affected **Species:** Common toad *Bufo bufo* Great crested newt *Triturus cristatus* Smooth newt *Lissotriton vulgaris* Palmate newt *Lissotriton helveticus*

Table 6.3: Habitats and Species with Specific Biosecurity Considerations for the Wetland Habitat Creation Area at the proposed Nature Reserve at Green Gates East, St Asaph.

6.6 Table 6.4 provides details of the biosecurity risks associated with the wetland habitat creation works at the proposed Nature Reserve at Green Gates East, St Asaph and sets out the control measures which will need to be put in place to ensure that the potential biosecurity risks from the proposed activities are low.

Activity	Risk with Control Measures	Control Measures	Residual Risk
Risk 1 – Amphibians. Site visit by Ecological Clerk of Works who has visited other sites	Medium – Low	1. Ensure all Ecological Clerk of Works are aware of biosecurity control measures. 2. Disinfect and sterilize all equipment including clothing and footwear before and after each visit, including between sites (if applicable). 3. All debris, plant fragments and mud should first be scrubbed off and rinsed with water. Disinfection should comprise soaking in a bleach solution (1 measure of household bleach to 9 measures water) for 15 minutes; or Virkon solution (1 mg/ml) for 1 minute; or fabrics can be washed on a 40°C cycle (with detergent, ensuring sufficient rinsing). 4. All used disinfectants should be disposed of appropriately.	Low
Risk 2 - Amphibians. Use of vehicles which may be carrying material from non-native invasive species. Relevant to Ecological Clerk of Work and contractors.	Medium – Low	1. Wherever possible ensure vehicles should use metalled roads and parking areas. 2. Sterilize wheels if vehicle has visited ponds / wetlands within previous 10 days.	Low
Risk 3 - Amphibians. Use of plant, tools and equipment as part of the wetland habitat creation works.	Medium - Low	1. Ensure all operatives are aware of biosecurity control measures. 2. Where possible, avoid using tools, plant and equipment that has been previously used on sites which are known to contain biosecurity risk species. 3. All debris, plant fragments and mud should first be scrubbed off and rinsed with water before leaving site.	Low
Risk 4 - Amphibians. Habitat creation activities including: grassland and scrub establishment works. This includes management of trees / hedgerow surrounding the plot edge and any habitats on the plot boundaries.	Medium – Low	1. Ensure all operatives are aware of biosecurity control measures. 2. Disinfect and sterilize all equipment including clothing and footwear before and after each visit, including between sites (if applicable). 3. All debris, plant fragments and mud should first be scrubbed off and rinsed with water before leaving site. 4. All used disinfectants should be disposed of appropriately.	Low
Risk 5 – Invasive Non-Native Plants. Spread of Himalayan balsam (or other invasive non-native plants) via earthworks machinery.	Low	1. Ensure contractors and staff know what Himalayan Balsam looks like. If any plants are identified within the works area these should be pulled up and left to dry before the seeds set (July/ August).	Low
Risk 6 – Non Native Invasive Plants. Disposal of plant material from habitat establishment activities.	Medium – Low	1. Ensure all operatives are aware of biosecurity control measures. 2. Dispose of all plant material in accordance with agreed protocols. Any surplus/discarded/disposable stock to be collected into a special container and taken away from the site for disposal (no storage on site). 3. Keep any vegetation establishment areas tidy and clean to minimise risks of plant material escaping unexpectedly.	Low

Table 6.4: Biosecurity Risk Assessment – Wetland Habitat Creation Area at the proposed Nature Reserve at Green Gates East, St Asaph

7. Summary and Recommendations

7.1 **Ecological Design**. The ecological design parameters set out in this report have been utilised in the production of the design details produced by Systra and detailed in their accompanying report. Denbighshire County Council will need to consider the different vegetation establishment options provided, and select the best option given their habitat establishment preferences, budgetary considerations and timescales.

7.2 **Great Crested Newts.** The proposed wetland creation works at Green Gates East nature reserve should be included on Denbighshire County Council's Natural Resources Wales 'organisational' great crested newt licence in order to allow movement of any great crested newts found within the works area during the habitat creation activities. The contractor utilised to carry out the pond creation works should be included on the Amphibian and Reptile Conservation (ARC) Trust's great crested newt licence and be sufficiently trained in GCN habitat management.

7.3 **Ecological Clerk of Works**. Denbighshire County Council should ensure that a licenced and experienced Ecological Clerk of Works is instructed to provide support and supervision where necessary to ensure adherence with the protected species Reasonable Avoidance Measures set out in Chapter 5 of this report. The Ecological Clerk of Works should deliver a tool-box talk to contractors at the start of the pond construction period.

7.4 **Biosecurity.** All works at the site should be carried out in accordance with the Biosecurity Risk Assessment set out in Chapter 6.

7.5 **Habitat Management Plan.** To promote successful habitat establishment and ensure that the habitats reach their biodiversity potential in the longer-term, a detailed Habitat Management Plan for the whole proposed nature reserve should be produced.

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