

Welsh Government

Celtic Lakes NGED Substation

30-Year Habitat Management and Monitoring Plan

Reference: CLS-ARP-EAC-XX-RP-OE-000003

V3 | 26 May 2026



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Job number 293651

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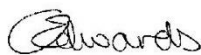
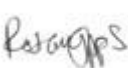
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			Prepared by	Checked by	Approved by
		Name	Debbie Brown	Charlotte Phillips/Chelsea Edwards	Pippa Wood
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			Prepared by	Checked by	Approved by
		Name	Rosemary Cripps	Claire Pooley	Claire Pooley
		Signature			

Issue Document Verification with Document



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1. Introduction

1.1 Purpose of this Document

This Habitat Management and Monitoring Plan (HMMP) has been prepared by Ove Arup and Partners Ltd. (Arup) for the Welsh Government (WG) to support the delivery of the Celtic Lakes substation development ('the Proposed Development') located southeast of Imperial Business Park, Coedkernew, Newport. It is intended to be used by the client and their contractors for all aspects of habitat management and monitoring at the site throughout construction, and post-construction for a period of 30 years. This is an adaptive HMMP which will allow for remedial actions and changes in the management prescriptions should they be shown through monitoring to be failing to deliver on target conditions as provided within this HMMP.

Planning permission was received for the development on 7th February 2024 (planning reference 23/0878). The HMMP has been prepared in response to Planning Condition 6 which states:

'No development shall commence until a plan for the provision, management and maintenance of the dormouse habitat features has been submitted to and approved by the Local Planning Authority. The habitat management plan shall build upon the principles and commitments for protected species mitigation and compensation contained within the documents 'Landscape and Ecological Management Plan (LEMP) and SSSI Grassland Management Strategy Reference: 293651-ARP-XX-XX-RP-YE-0002 Rev 3 dated 12 December 2023' and 'Dormouse Conservation Strategy Reference: 293651-ARP-XX-XX-RP-YE-0004 Rev 2 dated 12 December 2023', and shall include:

- *Details of habitats and ecological features present or to be created on and off site, including planting schedules¹;*
- *Details of the desired conditions of habitats (present and to be created) on and off site;*
- *Details of short- and long-term management, monitoring and maintenance of new and existing habitats at the site, to deliver and maintain the desired condition;*
- *Details of scheduling and timing of activities;*
- *Measures to restrict human access to habitat creation areas;*
- *Details of monitoring of ecological features;*
- *Details of replacement measures should any landscape or environmental features die, be removed or become seriously damaged or diseased within years of completion of development;*
- *Details of management and maintenance responsibilities;*
- *Details of measures to eradicate invasive non-native species, including *Cotoneaster* spp.;*
- *Details of timescales, length of plan, the method to review and update plans (informed by monitoring) at specific intervals as agreed.*

A written report on the delivery of the habitat management plan shall be submitted to the LPA at the completion of construction, and thereafter at 5-year intervals post construction. The report shall include an updated habitat management plan which incorporates recommended changes arising from the monitoring and the 5-yearly review.

¹ Schedules provided for information only, particularly with reference to species compositions. Plant and seed numbers and areas have changed throughout the construction phases since these were produced

The habitat management plan shall be carried out in accordance with the approved details.

REASON: A habitat management plan should be submitted to ensure necessary habitat management measures are agreed prior to commencement and implemented to ensure the site's habitat features are adequately managed long term in accordance with Policy GP5 of the Newport Local Development Plan 2011 - 2026 (Adopted January 2015).'

This document sets out the proposed habitat creation, management and enhancement measures as well as specifying how these measures will benefit species of conservation concern and biodiversity more widely. The document also details the monitoring requirements to ensure the habitats reach their desired condition within the appropriate timeframe and function as intended. This has been informed by the Ecological Impact Assessment (EcIA) produced by Arup². It builds on the information provided within the Landscape and Ecology Management Plan (LEMP), Site of Special Scientific Interest (SSSI) Grassland Management Plan³ and the Dormouse Conservation Strategy (DCS)⁴ which were submitted with the planning application to ensure that the landscape proposals⁵ are successfully delivered on site and establish to the desired condition over the intended management period. The DCS has been developed into Dormouse Licence Method Statements which have been secured through two Natural Resources Wales (NRW) Dormouse Licences. One for the Celtic Lakes substation development site and its Dormouse Compensation Area (most recent amendment valid from 2 January 2025 reference S093767/2)⁶, and one for the off-site Grassland Compensation Area (most recent amendment valid from 16 October 2025 reference S095506/3)⁷, which must also be adhered to (along with any subsequent amendments to the method statement or drawings) throughout the lifetime of this HMMP.

Vegetation clearance method statements^{8,9} have been prepared for the initial vegetation clearance required prior to construction, to ensure legislative compliance regarding the habitats and species present at the site and will be updated by the contractor for any further vegetation clearance that may be required.

The management prescriptions set out in this document cover the period from 'early planting', which was undertaken in April 2024, throughout construction and for a period of 30 years post-construction. These will need to be adaptive to allow for remedial actions and changes in management prescriptions should they be shown through monitoring to be failing to deliver on target conditions as set out in this HMMP. The HMMP will need to be reviewed at least every 5 years to ensure that the measures reflect the biodiversity conservation aims of the wider area and that management of the retained and created habitats are still appropriate. After the 30-year period the management should continue but will need reviewing against

² Celtic Lakes NGED Substation Ecological Impact Assessment Issue 002. Document reference 293651-XX-XX-RP-YE-0001 (Arup, 12 December 2023).

³ Celtic Lakes NGED Substation Landscape and Ecology Management Plan and Site of Special Scientific Interest Grassland Management Plan Rev 3. Document reference 293651-XX-XX-RP-YE-0002 (Arup, 12 December 2023).

⁴ Celtic Lakes NGED Substation Dormouse Conservation Strategy Issue 2. Document reference 293651-XX-XX-RP-YE-0004 (Arup, 12 December 2023).

⁵ Shown in the Landscape General Arrangement (see Drawing 293651-LD-XX-DR-0001 rev 6 and 293651-LD-XX-DR-402 v6, Appendix B) and Planting Schedule (293651-ARP-XX-SP-LD-0001, Appendix C), as well as more detailed landscape drawings (293651-LD-XX-DR-0002 rev 3, 293651-LD-XX-DR-503 v1 and 293651-LD-XX-DR-0404 in Appendix B).

⁶ Celtic Lakes NGED Substation Dormouse Licence Method Statement V3. Document reference 293651-XX-XX-RP-YE-0006 (Arup, 10 December 2024).

⁷ Celtic Lakes NGED Substation. Grassland Compensation Area. Dormouse Licence Method Statement V1. Document reference 293651-XX-XX-RP-YE-0096 and drawing 293651-LD-XX-DR-0403 titled 'Figure 3 - Grassland Compensation Area Habitat Management Proposals, revision 7 dated 11/09/2025.

⁸ Arup (2023). Celtic Lakes NGED Substation. Vegetation Clearance Method Statement. This document was prepared for planning

⁹ Arup (2023). Celtic Lakes NGED Substation. Precautionary Method of Working and Vegetation Clearance Method Statement. Document reference CLS-ARP-EAC-XX-RP-OE-000002, revision 2 issued 26 August 2025. This document provides more detail to the one provided by planning.

legislation, climate and industry standards at that time. Roles and responsibilities for the HMMP, including update revisions, are detailed in Section 1.3.

1.2 Version Control

The version control table below (Table 1) is to be used for updates to the content of the HMMP. Details of any changes or updates to the HMMP will be included in this table each time the management plan is altered both within the construction period, for example following ongoing discussions with NRW relating to the Grassland Compensation Area, and throughout the management and monitoring period in order to refine and implement any remedial actions.

Table 1: Version control table

Version Number	Revision Date	Details	Author(s)
V1	July 2024	First iteration - informed by the Ecological Impact Assessment (EcIA) produced by Arup ² . It builds on the information provided within the Landscape and Ecology Management Plan (LEMP), Site of Special Scientific Interest (SSSI) Grassland Management Plan ³ and the Dormouse Conservation Strategy (DCS) ⁴ .	Debbie Brown & Dr Pippa Wood (Arup)
V2	August 2024	Minor revisions and clarifications following comments from NRW.	Debbie Brown & Jenny Singh (Arup)
V3	May 2026	Updated to include updates to programme and figures following receipt of GCA dormouse licence (S095506/3) on 16 October 2025, and to align with information submitted with the Section 73 (293651-ARP-XX-XX-RP-YE-0006) on 14 Jan 2026	Rosemary Cripps (Arup)

1.3 Roles and Responsibilities

The contractor's aftercare maintenance period starts immediately following planting. The contractor shall carry out maintenance and monitoring for the habitat and landscaping works from the date of habitat creation, throughout construction and up to 5 years post construction completion, with WG responsible for actions from this point of handover up to 30 years post construction.

- WG will be responsible for the implementation and management of all existing and newly planted habitats as well as biodiversity features, including the appointment of one or more landscape contractors directly or through a main contractor.
- WG is responsible for the long-term management of habitats as well as all of the biodiversity features: dormouse boxes; dormouse dead-hedging; and reptile hibernacula.
- WG is responsible for the implementation of required remediation measures.
- WG is responsible for coordinating communication to and from the Local Planning Authority.
- As the current landowner and applicant, WG will be responsible for the initial habitat implementation and aftercare (as set out above), with any transfer of land and/or management agreements to include clauses and/or conditions for commitments to undertake the management prescriptions for the 30-year period, in line with the adaptive HMMP.
- All management is to be carried out as set out in Section 3 below and in accordance with good horticultural practices. All people employed to carry out maintenance operations shall be suitably experienced, qualified and licensed as appropriate, including use of botanical specialists to advise on the species required to achieve target condition for the grassland, and botanical monitoring of habitat establishment and condition.

- WG is responsible for the implementation of all the required habitat and species monitoring.
- All ecological checks and monitoring will be undertaken by a suitably experienced and competent Ecological Clerk of Works (ECoW), with a dormouse survey licence as required for the dormouse monitoring.

Details of the responsible persons and organisation(s) for delivering this management plan are provided in Table 2 and will be updated as the contract is reviewed.

Table 2: HMMP responsible persons and organisation(s)

Ecologist or Other Professional Responsible for HMMP				
Name or Initials		Dr Pippa Wood and Rosemary Cripps		
Organisation		Ove Arup and Partners		
Responsibility	Start Date:	April 2024	End Date:	TBC
Production of the HMMP and updates as required. Co-ordination of ECoW resource and ecological monitoring visits as directed by WG. Co-ordination of green hay harvesting. Reporting on habitat condition targets and remedial actions required, as recommended by specialist surveyors.				
Statement of Competency				
Full Member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and Chartered Ecologist. All ecological checks and monitoring will be undertaken by a suitably experienced and competent Ecological Clerk of Works (ECoW), with a dormouse survey licence as required for the dormouse monitoring and including use of botanical specialists to advise on the species required to achieve target condition for the grassland, and invertebrate specialist to monitor habitat for invertebrates.				
Landowner or Land Manager				
Name or Initials		Amanda Jex-Green (or other designated Welsh Government representative)		
Organisation		Welsh Government		
Responsibility	Start Date:	April 2024	End Date:	TBC
Arranging the implementation and management of all existing and newly planted habitats as well as biodiversity features, including the appointment of one or more landscape contractors directly or through a main contractor. Arrangement of long-term management of habitats as well as all of the biodiversity features: dormouse boxes; dormouse dead-hedging; and reptile hibernacula.				

Arrange implementation of required habitat and species monitoring and required remediation measures. Coordinating communication to and from the Local Planning Authority. Co-ordination of green hay harvesting. Any transfer of land and/or management agreements to include clauses and/or conditions for commitments to undertake the management prescriptions for the 30-year period, in line with the adaptive HMMP.				
Statement of Competency				
Property Management Surveyor with over 30 years in the property industry including Inward investment (Pan Wales) and marketing/promotion of commercial land and property across Wales. Direct management of the WG land and property portfolio across South East Wales as part of the WG Asset Management Team. ICQ Level 3 Facilities Management.				
Management Organisation(s) Responsible for Implementing the HMMP				
Name or Initials		Gethin Bowes		
Organisation		TR33 Ltd.		
Responsibility	Start Date:	April 2024	End Date:	TBC
Responsible for the initial habitat planting and aftercare (as set out above). Co-ordination of green hay harvesting.				
Statement of Competency				
Consultancy Manager with over 25 years arboricultural experience. Recently elected to be Vice Chair for the board of Trustees at our industry body, the Arboricultural Association.				
LPA or Responsible Body for Reviewing HMMP				
Name or Initials		Matthew Harris (Ecologist)		
Organisation		Newport City Council		
Responsibility	Start Date:	June 2024	End Date:	TBC
Reviewing HMMP and version updates. Auditing of construction completion and 5-yearly monitoring reports. Co-ordination of green hay harvesting.				

2. Project Background

2.1 Site Location and Context

An overview of the site details is provided in Table 3. The site is currently undeveloped land within the Local Development Plan (LDP) allocated for employment use. The site is owned by the WG and located southeast of the existing Imperial Business Park, Newport. Imperial Park is a priority development site and is significant in economic development terms for the future development of the semiconductor and tech cluster in West Newport. Celtic Lakes is part of the wider Imperial Park development site. The wider plot, which is owned by WG, is shown in blue in Figure 1 (Appendix A). The site is shown in red.

The site is bound by undeveloped land and Dyffryn Lane to the west, consented development and industrial units to the north; undeveloped land and residential dwellings along Bronllys Mews to the east; and undeveloped grassland, reens and field ditches to the south, with the Gwent Levels St Brides SSSI immediately to the south. The National Grid Imperial Park electricity substation is also located south of the site and within the SSSI.

The site area equates to approximately 4.25 ha.

Table 3: Site Overview

Site Details	
Development Name and Address	Plot southeast of Imperial Business Park, Coedkernew, Newport
Author Organisation	Arup
Landowner	Welsh Government
Land Manager	Welsh Government
Responsible person/organisation for creating or enhancing the habitat	Contractor during construction and for 5 years post-construction Welsh Government from 6 to 30 years post-construction
Period covered by this management plan	The Construction phase is proposed to last from April 2024 until 2027. Post-construction is to be undertaken over a 5-year period between 2027 (Year 1) and 2031 (Year 5) inclusive. Long-term management and monitoring is proposed so that habitat management continues for 30 years post-construction. This long-term management and monitoring covers the remaining 25 years of this management plan (2032-2056 inclusive).
Planning authority	Newport City Council
Planning reference	23/0878
Central OS grid reference	National Grid Reference (NGR) ST 28490 84045

2.2 Baseline Ecological/Environmental Information

The below sections provide a high-level summary of the ecological/environmental baseline conditions at the site. Full details are provided within the EcIA² (and as updated within the Section 73 ecological assessment¹⁰), and environmental documents as listed in Table 4.

The ecological and environmental constraints and considerations identified below and in the EcIA (and as updated within the Section 73 ecological assessment documents¹⁰) need to be considered when conducting any of the activities associated with the HMMP. Absence of consideration could lead to an illegal offence or undesirable ecological impacts occurring, which could lead to environmental fines and penalties.

2.2.1 Designated Sites

The Gwent Levels St Brides SSSI is located immediately to the south of the site (see Figure 2 in Appendix A) and is hydrologically connected via the existing attenuation ponds drainage into the reed and ditch network. This SSSI is designated for its reed and ditch network and the aquatic flora and invertebrates it supports, as well as for shrill carder bee (*Bombus sylvarum*) which relies on flower rich grasslands and reed and ditch banks. **The SSSI features and functions must be considered throughout the delivery of this HMMP.**

The site contains LG Duffryn Site 2 Site of Importance for Nature Conservation (SINC), as shown in Figure 3 (Appendix A). This SINC is designated for neutral grassland adjacent to the Gwent Levels, although this has been subject to gradual natural surrounding scrub encroachment. **The retained, restored and created areas of SINC grassland (or that of SINC quality) must be considered throughout the delivery of this HMMP.**

2.2.2 Habitats

A total of four habitats were identified within the Celtic Lakes Substation Development site boundary during the Extended Phase 1 Habitat Survey in 2021 as shown on Figure 46 (Appendix A); dense scrub, semi-improved neutral grassland, standing water and hard-standing. To the east of the site is dense scrub and an area of broadleaved plantation woodland/scrub-woodland which makes up the Dormouse Compensation Area.

The Grassland Compensation Area to the southwest of the site is within the Gwent Levels St Brides SSSI and consists of semi-improved neutral grassland, similar to the grassland assemblages within the site, with dense and scattered scrub encroachment throughout the grassland as identified during the Phase 1 Habitat Survey in 2026 as shown on Figure 3a (Appendix A).

2.2.3 Protected and Notable Species

Surveys for protected species were undertaken at the site between 2021 and 2023 as reported within the EcIA. A summary of the results is provided below.

Bats The ground level roost assessment conducted in 2023 found two potential roost sites, one within a mature oak tree (low potential) at the south-western edge of the site boundary (reference T16 within Figure 1 ‘Tree Retention and Removal Plan’ of the Arboricultural Impact Assessment¹¹) and one building (high potential) located approximately 20m south of the site. A stone wall approximately 130m east of the site was also identified as having low bat roost potential (the locations of both of these structures are provided in Figure 4, Appendix A.5 of the EcIA²). **These features should be considered as having the potential to support roosting bats;** however, they are unlikely to be affected by the proposed construction or habitat

¹⁰ Celtic Lakes NGED Substation. Section 73 Ecological Assessment. (293651-ARP-XX-XX-RP-YE-0006). Arup June 2025.

¹¹ Ecus (2023) Celtic Lakes Power – Arboricultural Impact Assessment. Welsh Government.

management works and as such, further surveys have not been undertaken. High levels of bat activity were recorded during transect and automated (static) bat surveys undertaken in 2021. Seven species were identified through activity or recordings onsite, the most frequently recorded was common pipistrelle (*Pipistrellus pipistrellus*), with Annex II species greater horseshoe (*Rhinolophus ferrumequinum*) only recorded twice within the survey period.

Dormice The site supports 1.73ha of scrub habitat suitable for dormice (*Muscardinus avellanarius*). Surveys undertaken in 2021 within the study area (Plots 1 and 2, as shown in Figure 1, Appendix A) recorded dormouse nests within 34 nest tubes and boxes (see Figure 2 in Appendix A.6 of the EcIA for full details). No dormouse nests were recorded within the 25 nest tubes within the planning boundary, but six nest tubes immediately adjacent to the boundary contained dormouse nests. **It is assumed that dormice are present across the site within the scrub and woodland habitats and all suitable surrounding habitats and compliance with the site dormouse licence is required for all habitat management.**

Water vole No signs of water vole (*Arvicola amphibius*) were recorded in any of the waterbodies within the wider study area, including the site, during the presence/absence surveys undertaken in 2021 and 2023. **However, there is the potential for water vole to move into this area, and due consideration of this species is required for the delivery of this HMMP.**

Otter In 2021 a total of 17 waterbodies were surveyed; two were assessed as having high suitability for otter (*Lutra lutra*), three moderate suitability, one had low to moderate suitability, five had low suitability, two had low to negligible and four were inaccessible/dry. The presence/absence surveys conducted in September 2021 found one potential otter sign (otter footprint) at the eastern attenuation pond within the site. The repeated survey in 2023 found two potential otter laydown areas and one mammal trail, all being over 150m from the site to the south and south-east. Pre-construction surveys were undertaken for riparian mammals during early 2024, including the deployment of camera traps. No signs of otter or their resting sites were recorded within 30m of the works during the surveys. **However, there is the potential for otter to move into this area, and due consideration of this species is required for the delivery of this HMMP.**

Badger Habitat suitable for badger (*Meles meles*) was identified during surveys in August 2021, comprising the areas of grassland, scrub, dry ditches and woodland. However, no signs of badger have been recorded within the site or within over 50m of any proposed works. A pre-construction check has been undertaken in February 2024 prior to vegetation clearance to determine whether this species is present within the area to be cleared or within 50m. No setts were recorded, however badger signs were recorded during the pre-construction checks and suitable foraging habitat is present, therefore a precautionary method of working with regard to badgers is to be adopted during construction. **Due consideration of this species is required for the delivery of this HMMP.**

Other mammals During the other ecological surveys, signs of rabbit (*Oryctolagus cuniculus*) were found throughout the site, particularly in the grassland. Signs of mole (*Talpa europaea*) and other small mammals were also noted. Additionally, the habitats present are likely to support European polecat (*Mustela putorius*) and west European Hedgehog (*Erinaceus europaeus*). **The safeguarding of other mammals must be considered throughout the delivery of this HMMP.**

Birds The only species recorded within the study area that is named as a qualifying assemblage feature of the Severn Estuary Special Protection Area (SPA) and Ramsar site was mallard (*Anas platyrhynchos*), eight of which were recorded during the survey periods, with the peak count of four in November. Surveys in 2023 recorded Cetti's warbler (*Cettia cetti*) as the only Wildlife and Countryside Act 1981 (as amended) Schedule 1 species breeding within the site. The site was also of breeding importance for four species of principal importance on Section 7 of the Environment Wales Act 2016, being linnet (*Linaria cannabina*), bullfinch (*Pyrrhula pyrrhula*), dunnoek (*Prunella modularis*) and song thrush (*Turdus philomelos*). **Breeding birds must be considered throughout the delivery of this HMMP.**

Great crested newts Great crested newt (GCN) (*Triturus cristatus*) surveys were undertaken from April to June 2023 at four waterbodies, two of which were within the site. All other waterbodies were excluded from the survey due to access limitations and/or low water levels. GCN were not recorded at any of the surveys, as such it is considered GCN are likely absent from the site. Smooth newt (*Lissotriton vulgaris*) was recorded

within all four waterbodies as well as possible palmate newt (*Lissotriton helveticus*) within the eastern pond and the other two waterbodies surveyed outside the site boundary. **Amphibians will need to be considered during any works affecting the ponds, ditches and reens and surrounding habitat on site.**

Reptiles The survey results from 2023 found the site to support a low population of grass snake (*Natrix helvetica*) (peak count of one), and the Extended Survey Area to the south of the site was found to support a good, bordering exceptional, population of grass snake (peak count of 10) and a low population of slow worm (*Anguis fragilis*) (peak count of two). A baseline of ‘good’ population of grass snake for the site is assumed. **Reptiles must be considered throughout the delivery of this HMMP.**

Fish The Extended Phase 1 Habitat Survey noted that the network of field ditches and reens within the site and wider area are likely to support common fish species such as stickleback (*Gasterosteus aculeatus*) and perch (*Perca fluviatilis*). The ephemeral nature of the smaller field ditches means they would regularly dry out, so are unlikely to support fish. The larger reens are likely to be permanently wet and have more diverse aquatic vegetation. Despite no biological records of European eel (*Anguilla anguilla*) within 2km of the site within the last 10 years, the reen network within the Gwent Levels is known to support a large population, which dominate the fish stocks in these features. Additionally, during draindown of the pond at Celtic Lakes Substation during construction 115 eels were translocated along with six pike and a stickleback (*pers comm* from contractor). As such, it is assumed that a population of European eel are present throughout the reens and wet field ditches within the study area. Furthermore, whilst the site is poorly connected to lamprey (*Petromyzontiformes* sp.) spawning grounds (small stones and gravel in rivers), there is potential for juvenile lamprey to be present. **Fish will need to be considered during any works affecting the ponds, ditches and reens and surrounding habitat on site.**

Invertebrates The mosaic of different terrestrial and aquatic habitats across the site offers a diverse range of habitats for invertebrates. Invertebrate surveys found brown banded carder bee on the grassland within the site. Shrill carder bee was not recorded within the site, however low numbers were recorded within grasslands to the southeast, south and southwest of the site. These species are listed on Section 7 of the Environment (Wales) Act 2016 and are features of the SSSI (shrill carder bee) and SINC (brown-banded carder bee). **Invertebrates, particularly the life stages and potential habitat associated with shrill carder bee and those associated with the SSSI designation, must be considered throughout the delivery of this HMMP.**

Invasive Non-Native Species (INNS) No INNS flora species were identified within the site boundary during the ecological baseline surveys, however during the vegetation clearance undertaken in April/May 2024, INNS cotoneaster species were identified within the site boundary including Himalayan cotoneaster (*Cotoneaster simonsii*) and wall cotoneaster (*Cotoneaster horizontalis*) noted to date. Nuttall’s waterweed (*Elodea nuttallii*) has been noted in the reens around the Grassland Compensation Area. Within the Dormouse Compensation Area, variegated yellow archangel (*Lamiastrum galeobdolon* subsp. *argentatum*), Himalayan cotoneaster, wall cotoneaster and entire-leaved cotoneaster (*Cotoneaster integrifolius*) have been identified. In the wider study area further INNS were recorded: false Virginia creeper (*Parthenocissus inserta*), Himalayan balsam (*Impatiens glandulifera*), New Zealand pigmyweed (*Crassula helmsii*), Canadian pondweed (*Elodea canadensis*) and Japanese knotweed (*Reynoutria japonica*). The locations of these INNS are provided on Figure 5 (Appendix A). **INNS must be considered throughout the delivery of this HMMP.**

Other relevant environmental information that will need to be considered during the implementation and delivery of this HMMP is detailed within the documents referenced in Table 4.

Table 4: Site Baseline, Environmental Information and Associated Impacts Checklist

Baseline Information	Document Reference or Reason if not included
Statutory and Non-statutory Designated Sites	EcIA (reference 293651-XX-XX-RP-YE-0001)
Protected and Notable Species	EcIA (reference 293651-XX-XX-RP-YE-0001)

Baseline Information	Document Reference or Reason if not included
Invasive Non-Native Species (INNS)	EcIA (reference 293651-XX-XX-RP-YE-0001) and Figure 5 (Appendix A) of this HMMP
Baseline Habitats Survey	EcIA (reference 293651-XX-XX-RP-YE-0001) and the Section 73 Application and its amended documents submitted on 14 January 2026.
Public Access	There is currently unauthorised public access to the site through gaps in the existing perimeter fencing. It is proposed that the construction site and habitat mitigation areas are fenced securely in the long term, through a combination of new fencing and repairs to the existing fencing as appropriate, to prohibit antisocial activities including fly-grazing which may damage newly created habitats and features. Fencing will be provided during construction and permanent fencing will be installed around the perimeter of the site including all new and retained habitats as shown on 'Celtic Lakes Fencing Mark Up' in Appendix B.
Climate	Climate change impacts have been considered within the proposed planting schedule ¹ and are not expected to affect the long-term management of retained and created habitats; however, monitoring will inform the need for any change to the plant species mix and management.
Geology and Topography	There will be no significant adverse effect on the geological interest of the site. The site includes an existing mound which has developed as a result of the construction of the existing attenuation basins.
Agricultural Land Status	The land is not managed for agriculture.
Soils and Substrates	The soft landscape plan on Drawing 293651-LD-XX-DR-0402 v7 (Appendix B) provides the specification for ground preparation and planting; planting season; plant protection; watering of newly planted stock; and mulching. Specification of soils will meet BS8601:2013 for subsoil (including remediation of compacted soils) and BS3882:2015 for topsoil, with soil supply professionally tested and recommendations implemented to ensure successful establishment of planting.
Contaminated Land	The site consists of Made Ground or Topsoil with thicknesses between 0m and 0.5m underlain by granular River Terrace Deposits (RTD), comprising gravels and sands with occasional interbedded thin layers of clay. If materials are deemed contaminated through GI and chemical testing during construction and are above specific thresholds, then unsuitable materials would be removed off site. <i>If, during the course of construction (including, site clearance, demolition and ground works) contamination not previously identified is found to be present at the site then no further development (unless otherwise agreed in writing with the Local Planning Authority) shall be carried out until a remediation strategy detailing how this unsuspected contamination shall be dealt with has been submitted to and approved in writing by the Local Planning Authority. The remediation strategy shall be carried out in accordance with the agreed details (Planning Condition 5).</i> Geotechnical and Geoenvironmental Interpretative Report reference 293651-ARP-ZZ-XX-RP-CG-0001.

Baseline Information	Document Reference or Reason if not included
Hydrology and Drainage	Marginal and aquatic planting and seeding is proposed to the slopes of the reconfigured drainage pond to the south of the substation. Surface water runoff generated by hardstanding areas will be intercepted by a channel drain, prior to outfalling to a drainage ditch and then subsequently to the attenuation basin. A petrol interceptor is proposed on the outlet of the compound which will provide treatment and resilience against potential oil spillage from the electrical apparatus. Surface water runoff from the access road will be treated by a drainage ditch and subsequently in the attenuation basin prior to outfalling to the watercourse.
Flood Risk Zones	The area is considered to be low flooding risk.
Landscape Character and Designations	Due to the site's location within the urban boundary and employment area, it is not subject to the level of environmental constraints afforded to the countryside, the Newport and Cardiff Green Wedge or the Wentloog Levels Special Landscape Area (SLA).
Historic Land Use	Implementation of a Written Scheme of Investigation (WSI) detailing a watching brief during any requisite ground intrusion works. WSI reference: GGAT report P2237 2023/048 September 2023.
Historic Environment and Earth Heritage	The site is located adjacent to the Gwent Levels Registered Historic Landscape. The Proposed Development is not envisaged to impact the setting of these historic assets due to the significant amount of residential and industrial development located between both sites, therefore removing any intervisibility between the historic assets and the application site.
Other – underground services	No underground services are located within the construction area. There is an overlap with the newly installed VDC cable route within the habitat mitigation areas at the south of the site which has been addressed through the proposed planting mix.

2.3 Proposed Development Overview

The Proposed Development will include 1no. National Grid Electricity (NGED) substation (measuring approximately 96 x 70m) and associated vehicular and pedestrian access, landscaping and drainage.

These works form part of the WG's future aspirations for the site's development in line with its allocation in the LDP for employment use. The proposals are also required to support the operations of the existing development and consented development north of the site, within the Imperial Business Park.

The planning application red line boundary is shown in Figure 1 in Appendix A; and layout of the development is provided in Drawing 293651-LD-XX-DR-0001 v6 (Appendix B).

2.3.1 Drainage

It is proposed to use the western attenuation basin to attenuate the flow prior to outfalling to the reen network. The existing basin in the southwest of the site and its contributing catchment have been modelled in the 1 in 100-year return period storm event to test the current basin capacity. This indicated that there is some spare capacity in the basin, and it is proposed to extend the basin to provide attenuation for the Proposed Development in storm events up to and including the 1 in 100 year + 40% climate change return

period. It is proposed to retain the existing flow control and therefore the existing restriction on discharge from the site. As a result, there will be no additional flow from this Proposed Development into the reën.

2.3.2 Physical Land-take and Earthworks

No areas of land take are expected to be required outside the site boundary.

Access to the site will be via existing roads and a hardstanding track which runs to the west of the development. The development (substation) footprint, associated access and utilities will be located within the northern part of the site, and the western attenuation basin will be subject to improvement to increase its capacity. The development will involve the partial removal of the earth bund (along the northern-facing aspect) which is located within the centre of the site running east to west. No piling is required for the construction works. The substation layout has been designed to minimise habitat loss, particularly of trees and scrub, which are known to support dormice.

2.3.3 Landscape Design

These landscape measures were designed to break up and soften views in and to integrate the Proposed Development into the landscape, in addition to considering the ecological context and sensitivities of the site. The proposed landscaping is designed to reinforce and connect green and blue infrastructure corridors around the Proposed Development.

Measures introduced to mitigate landscape and visual effects include the following:

- Protect, retain and enhance vegetation and habitats on the site's eastern and southern boundaries;
- Hedgerow planting around the compound to soften views into the development and provide connectivity for species movement;
- Informal mixed native tree planting, particularly to the west of the compound to filter views into the Proposed Development from Duffryn Lane;
- Native scrub and woodland planting around the substation to further screen and soften views into the development and to replace valuable habitats lost as a result of the works; and
- Marginal and aquatic planting and seeding to the slopes of the reconfigured drainage pond to the south of the substation. This will help soften the shape of the pond and provide a wetland habitat feature over time.

2.3.4 Ecological Design

The ecological design, including the habitat creation and enhancements and their associated management and monitoring detailed within this HMMP, were informed and developed in relation to the potential ecological impacts identified within the EcIA (reference 293651-XX-XX-RP-YE-0001), as well as the requirement to achieve net benefits for biodiversity.

The EcIA identified a range of potential indirect and direct impacts to designated sites, habitats and species. Direct and permanent impacts to designated sites, habitats and species have been avoided and minimised, where possible, and then mitigated and compensated, following the Mitigation Hierarchy¹² and the step-wise approach in Planning Policy Wales¹³. In situations where avoidance and minimisation was not possible,

¹² CIEEM (2022). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.2. Chartered Institute of Ecology and Environmental Management, Winchester.

¹³ Welsh Government Planning Policy Wales 12. February 2024. (gov.wales)

measures were embedded into the design to both mitigate and compensate the impacts, these including the following:

- Locating the substation and associated infrastructure away from the St Brides SSSI and large areas of dormouse habitat, to avoid direct impacts, resulted in the substation being situated within grasslands of the LG Duffryn Site 2 SINC. This SINC has declined in quality since it was first designated so species for which it was designated are no longer abundant and as such were not picked up in the NVC surveys in 2021 and 2023. Grass vetchling (*Lathyrus nissolia*) was the only Contributory Species (CS) for Wildlife Site selection recorded within the grassland in 2021, and additional CS species, bee orchid (*Ophrys apifera*), pyramidal orchid (*Anacamptis pyramidalis*) and yellow-wort (*Blackstonia perfoliata*) were recorded in 2023, no Primary Species were recorded. With the results of the NVC surveys analysed, the grassland on-site is considered a 'relatively species-rich' neutral grassland as there are eight species present indicative of unimproved neutral grasslands as per the "Guidelines for the Selection of Wildlife Sites in South Wales". There were also eight calcareous grassland indicator species and 18 post-industrial land (brownfield) indicators recorded during both of the NVC surveys undertaken. Embedded designs ensured that the retained and reinstated grasslands (1.38ha) within the SINC are enhanced through re-seeding, planting and appropriate long-term management to achieve a species-rich sward which is of County significance and suitable to support brown-banded and shrill carder bee. Details of the reinstatement, enhancement, seeding and management of these on-site grasslands are provided below within this HMMP in Section 3.4.
- Further grassland compensation is proposed within an off-site area (the Grassland Compensation Area) approximately 100m southwest of the Proposed Development. The total area of this site is 2.28ha, with 0.63ha of successional ruderal and 0.24ha low diversity scrub proposed to be removed over a four year period and managed as grassland, and 0.07ha of existing grassland to be enhanced through improved management, totalling 0.94ha of grassland compensation/enhancement. This Grassland Compensation Area is within the St Brides SSSI, and the grassland has been unmanaged for a number of years resulting in bramble scrub encroachment and areas of tall ruderal habitat developing. The enhancement of the grassland will be achieved through appropriate long-term management to reduce scrub/ruderal encroachment and achieve a species-rich sward which is of County significance and suitable to support brown-banded and shrill carder bee. Details of the management activities required to enhance the Grassland Compensation Area are provided below within this HMMP in Section 3.5, and associated offsite habitat management for dormouse will be provided in Section 3.7.
- Dormouse habitat will be impacted by vegetation clearance on-site for the substation, and as such compensatory planting will be provided on-site, including 0.79 ha of newly created diverse scrubby broadleaved woodland and 406m of species-rich hedgerow with species suitable for dormice. Further diversification planting (comprising 26No. hazel trees (*Corylus avellana*) across an area of 0.28ha) is also proposed within the grassland zone of the Dormouse Compensation Area. Details of the planting mixes and onward management are provided in Section 3.6. This has been designed to result in an overall habitat replacement ratio of 1.15:1 (gain vs loss) for habitat suitable for dormouse in terms of extent (excluding the hazel diversification planting). However, the habitats being lost and created have the potential for differing carrying capacities and thus support differing population densities at a ratio of 2:1.
- The existing attenuation pond will be enlarged, and marginal habitat and seeding will be planted. The pond edges will be gently sloping to allow species such as amphibians to access the water, as well as provide habitat for marginal aquatic planting. Species to be included within the marginal and aquatic planting include; marsh marigold (*Caltha palustris*), yellow flag iris (*Iris pseudacorus*), water mint (*Mentha aquatica*), purple loosestrife (*Lythrum salicaria*) and ragged robin (*Silene flos-cuculi*). Plug planting of species associated with the SSSI would also be incorporated, such as arrowhead (*Sagittaria sagittifolia*). Scattered broadleaved trees will be planted around the pond's periphery, and a suitable grassland mix will be sown on the slopes. Details of the management activities required to enhance the attenuation pond and wetland features are provided below within this HMMP in Section 3.8.

- Enhancement features for reptiles were designed to provide safe habitats during construction and to enhance the ecological features and niches for these species, as detailed in Section 3.10.
- Management of INNS to be undertaken throughout construction and habitat management as detailed in Section 3.9.

2.3.5 Vegetation Clearance and Planting Quantities

Vegetation clearance and planting of new habitats will be divided into three areas staged over several years. These areas are the Celtic Lakes substation development site¹⁴, the Dormouse Compensation Area to the east of it and the off-site Grassland Compensation Area to the south west as shown on Figure 1 in Appendix A. Details of the vegetation clearance and planting is provided below. In summary this includes:

- The restoration/improvement (in terms of diversity and condition) of 1.38ha of grassland to be retained and/or reinstated within the grassland within the Celtic Lakes Substation Development site, through re-seeding, planting and appropriate long-term management to achieve a species-rich sward (of greater diversity than present) that is of County significance and suitable to support brown-banded carder bee and shrill carder bee.
- The enhancement of 0.94ha of off-site grassland within the Grassland Compensation Area, located within the SSSI, through appropriate long-term management to reduce scrub/ruderal encroachment and achieve a species-rich sward which is of County significance and suitable to support brown-banded carder bee and shrill carder bee.
- The creation of 0.79ha of new areas of native scrub-woodland and scrub within the Celtic lakes substation site with hazel at 25% of the mix to support dormice.
- The creation of 406m (0.06ha) of species-rich hedgerow around the perimeter of the NGED sub-station and along the eastern boundary of Dyffryn lane which marks the western site boundary, connecting to the wider scrub and scrub-woodland features within the site.
- The diversification within an area of 0.28 ha of grassland with a naturally developing native broadleaved woodland along the eastern boundary of the NGED substation and into the Dormouse Compensation Area. This developing woodland which lacks hazel, will be planted with 26 hazel trees to diversify and enhance the area for foraging and nesting dormice.
- The creation of a larger pond feature (0.17 ha) within the south-west of the site and associated native mixed marginal planting (0.09 ha) and aquatic plug planting (0.08 ha).

The planting schedule¹ for these habitats is provided in Appendix C.

2.3.5.1 Celtic Lakes Substation Development Site

No vegetation clearance will occur within the retained area along the south and east of the Celtic Lakes substation development site (see Landscape Drawing 293651-LD-XX-DR-0002 v3). However, early planting comprising 0.44ha of diverse scrubby broadleaved woodland was undertaken within this area in spring 2024 (see Landscape Proposal Planting Schedules¹ 293651-ARP-XX-SP-LD-0001 in Appendix B).

Within the construction area there has been 0.58ha of scrub clearance, undertaken in accordance with the single stage clearance in April/May 2024 and September 2024 as set out in the Vegetation Clearance Method Statement⁸ and dormouse licence S093767/2.

¹⁴ This is the area shown within the 'Site Boundary' on Figure 1 in Appendix A

Planting will also comprise sowing or plug planting of 1.38ha of grassland, 0.79ha of scrubby broadleaved woodland and planting of 406m of mixed native hedgerow post-earthworks in Drawing 293651-LD-XX-DR-0001 v6 (Appendix B).

2.3.5.2 Dormouse Compensation Area for Celtic Lakes Substation Development

The Dormouse Compensation Area comprises two distinct zones; a grassland zone and a scrub zone. The grassland zone comprises grassland with scattered trees that have been planted or self-seeded. The scrub zone is predominantly tall dense bramble scrub with woody species towards the east, where it transitions to plantation broadleaved woodland as shown on Figure 1 in Appendix A.

Planting within the Dormouse Compensation Area is restricted to the inclusion of 26No. hazel trees within the grassland zone at the western extent of the Dormouse Compensation Area to provide further diversification within the 0.28ha plot. This area is shown on Figure 1 in Appendix A by the 'dormouse woodland habitat protection, hazel planting and enhancement area' polygon. This planting was undertaken in April 2024 along with the installation of 30No. dormouse boxes which were placed within the scrub zone of this area as well as directly east within the 'dormouse compensation area (box installation)' polygon. Planting and box locations are also indicated on Landscape Drawing 293651-LD-XX-DR-0001 v6 in Appendix B.

The woodland within the Celtic lakes substation Dormouse Compensation Area (box installation) polygon will be managed according to the prescriptions in Section 3.6 below and in accordance with the Dormouse Licence (reference S093767/2) and any amendments to it. This includes developing woodland within the scrub zone of the 'dormouse woodland habitat protection, hazel planting and enhancement area' polygon shown on Figure 1 in Appendix A and therefore the named ecologist on the dormouse licence will be required to ensure any management operations do not conflict with the dormouse boxes which have been installed in this area.

2.3.5.3 Grassland Compensation Area

The current proposal involves vegetation clearance to restore the SSSI grassland to take place over four years, with the aim to achieve favourable grassland condition as detailed in Section 3.3.2. Currently the grassland condition is unfavourable as evidenced by recent surveys identifying scrub, reed and ruderal encroachment over a large area of this grassland. In the first year, 0.61ha of reed and ruderal will be removed and overseeded with the approved seed mix or green hay. Then over the period of four years (starting in the same year as the removal of 0.61ha of reed and ruderal removal) approximately 0.06ha of scrub will be removed each year from within the eastern or western SSSI fields, progressing west to east to dissuade any dormice, should they be present, into retained and enhanced habitat further east and northeast. An additional 0.02ha ruderal will also be removed over the 4 years. The existing area of 0.07ha of grassland in poor condition will be mown annually and the area of mowing will increase each year corresponding to the annual scrub removal. Tall, more mature scrub and trees that is connected to other areas of suitable habitat will be retained to provide habitat connections for dormice in the wider area. Before the 4-year clearance starts, a total of 30 dormouse boxes will be placed in retained habitat. Clearance areas and phasing, along with the locations of the dormouse boxes are shown on Drawing 293651-LD-XX-DR-0503 in Appendix B.

2.3.6 Key Stages of the Site Clearance, Planting and Construction Programme

The construction programme will take account of the ecological considerations at the site; the construction of the NGED substation will commence in September 2024 and be completed in February 2026.

An indicative programme is provided in Table 5 below, with status updates to be completed as the scheme progresses. Although the works are indicated from April 2024 to March 2027, there will not be constant activity on-site.

Table 5: Construction Programme Overview

Task name	Duration	Start	Finish	Status
Construction				
Early planting of scrub within retained and protected areas of the site and diversification planting for dormice comprising 26 No. hazel trees (<i>Corylus avellana</i>) (within the grassland zone of the Dormouse Compensation Area)	2 months	March 2024	April 2024	Completed April 2024.
Tree planting in the Celtic Lakes substation development site retained habitat areas	2 months	March 2024	April 2024	Completed April 2024.
Celtic Lakes substation development site single-staged clearance	2 months	April 2024	May 2024	Completed October 2024.
Bund relocation	4 months	September 2024	December 2024	Completed January 2025.
Access road	4 months	September 2024	December 2024	Completed March 2025.
Drainage	4 months	September 2024	December 2024	Completed January 2025.
<i>Handover of site to NGED</i>	<i>Milestone</i>	<i>January 2025</i>	<i>January 2025</i>	Completed March 2025
Civils and building works	17 months	October 2024	February 2026	Site works commenced April 2025.
Construction Year 1. Management and Monitoring of created, restored and enhanced habitats in the Celtic Lakes Substation Development area	9 months	April 2024	December 2024	ECoW reports and dormouse licence return (S093767-2) recorded activities undertaken and completed, and remedial measures required within the planting periods. No works within Grassland Compensation Area due to delay receiving the Grassland Compensation Area dormouse licence.
Construction Year 2. Management and Monitoring of created, restored and enhanced habitats in the Celtic Lakes Substation Development area	9 months	April 2025	December 2025	Construction Year 2 and habitat monitoring completed December 2025
Construction Year 2. Year 1 of scrub, reed and ruderal clearance, mowing and grass	2 months	September 2025	October 2025	Max of 0.06ha scrub per year, and also 0.61ha of reed and ruderal cleared in the first year (2025).

Task name	Duration	Start	Finish	Status
seeding in Grassland Compensation Area				Clearance completed September to October 2025. Seeding of Grassland Compensation Area carried out in April 2026.
Switchgear installations	4 months	March 2026	October 2026	
Cable terminations	2 months	November 2025	September 2026	
Construction Year 3. Management and Monitoring of created, restored and enhanced habitats in the Celtic Lakes Substation Development area and Grassland Compensation Area	9 months	September 2026	May 2027	
Construction Year 3. Year 2 of scrub/ruderal clearance, mowing and grass seeding in Grassland Compensation Area	2 months	September 2026	October 2026	Max of 0.06ha scrub per year (September or October 2026). Approx 24m2 of ruderal removal
Commission and energise transformers	12 months	October 2026	February 2027	
Post-construction				
Year 3 of scrub clearance, mowing and grass seeding in Grassland Compensation Area	2 months	September 2027	October 2027	Max of 0.06ha scrub per year (September or October 2027) Approx 100m2 of ruderal removal
Year 4 of scrub clearance, mowing and grass seeding in Grassland Compensation Area	2 months	September 2028	October 2028	Max of 0.06ha scrub per year (September or October 2028). Approx 88m2 of ruderal removal

Initial aftercare of newly created habitats will be undertaken by the contractor during the construction period (March 2024 to Feb 2027). Following the construction period, the landscape maintenance will be undertaken by the contractor over a period of 5-years (during 2027, 2028, 2029, 2030 and 2031). This will be followed by the long-term maintenance to be undertaken by the landowner ensuring the total duration of habitat management at the site will be undertaken over a 30 year period post-construction. Under these proposals this longer-term maintenance will be undertaken from 2032 (Year 6) to 2056 (Year 30) inclusive, see Table 3 for further details.

3. Management and Monitoring Plans

3.1 Overview

This section provides the management and monitoring plans for each of the habitat types to be protected, restored, enhanced and created.

The areas under management by this HMMP are shown on Figure 1 in Appendix A, along with the wider area owned by WG but not included within this HMMP. These areas have been divided into on-site HMMP areas and off-site HMMP areas as these differ due to objectives, as well as scheduling and timing of activities.

The on-site and off-site areas under management are described as follows:

- *Celtic Lakes Substation Development (on-site HMMP area)*. This is the area on-site where the substation has been built, and its landscaping includes native mixed scrub planting, native species rich grassland, two ponds with aquatic and marginal native seeding and planting, along with some areas of retained scrub and grassland. It also includes two grass snake egg laying heaps and five reptile hibernaculum. All habitats in this area require management and maintenance under this HMMP.
- *Grassland Compensation Area (GCA) (off-site HMMP area)*. This is the area off-site used for grassland compensation. This area comprises retained scrub, ruderal and patches of willow, and landscaping includes phased removal of scrub and ruderal which is then seeded and managed as a native species rich grassland. Some planting of hazel is required to diversify areas for dormice. It also includes 19 dormouse boxes within retained scrub or willow to provide additional nesting habitat for dormouse. All habitats in this area require management and maintenance under this HMMP, and the dormouse boxes are to be maintained and monitored.
- *Dormouse Compensation Area (box installation) for Celtic Lakes Substation Development Dormouse Licence S093767/2*. This area contains 30 dormouse boxes which have been installed to provide additional nesting habitat for dormouse. The only habitats in this area to be actively managed are those that also fall within the 'Dormouse woodland habitat protection, hazel planting and enhancement area' boundary as described below. Natural habitats outside of this boundary are retained but not actively managed, and the dormouse boxes are maintained and monitored.
- *Dormouse woodland habitat protection, hazel planting and enhancement area for Celtic Lakes Substation Development Dormouse Licence S093767/2 (on-site HMMP area)*. This on-site area includes planting of hazel trees and habitat management to enhance the existing scrub for dormice.
- *Dormouse Compensation Area (box installation) for GCA Dormouse Licence S095506/3*. This area contains 11 dormouse boxes which have been installed to provide additional nesting habitat for dormouse. Natural habitats in this area are retained but not actively managed, and the dormouse boxes are maintained and monitored.

A summary of the overarching requirements for habitat management and monitoring for the Celtic Lakes Substation scheme are provided in Table 6 below, followed by the individual plans which set out the following (where applicable):

- Avoidance and Protection – these relate to measures to protect existing habitats and safeguard habitat creation/enhancement areas;
- Implementation – detailing methods to be employed to create and enhance the habitats (these may also be remedial measures where habitats are failing to deliver against the condition targets);
- Planting Schedules¹ – detailing the species mixes, specifications and densities for each habitat type and specific area;

- Scheduling and Timing of Activities – outlines the timing requirements of the specific requirements within the plan;
- Condition Targets and Remedial Measures – detailing the condition targets for the specific habitat and remedial measures that will be required if triggered through the specified trigger;
- Initial Aftercare and Maintenance (during construction and Years 1-5 post construction) – detailing specific aftercare and maintenance requirements from the date of planting until 5 years post construction;
- Initial Monitoring (during construction and Years 1-5 post construction) – detailing specific habitat and species monitoring requirements from the date of planting until 5 years post construction, relating to the condition targets and any remedial measures that may be required;
- Long-term Maintenance (Year 6 onwards) – detailing specific maintenance requirements for the longer-term management and maintenance for at least 30 years post-construction; and
- Long-term Monitoring (Year 6 onwards) - detailing specific habitat and species monitoring requirements from Year 6 post-planting until at least 30 years post-construction.

Roles and responsibilities of the successful delivery of this HMMP are provided in Section 1.3.

Table 6: Summary of Management and Monitoring Plan

Habitats to be Retained, Created and Enhanced
In summary, the habitat retention, creation and enhancement proposed includes: • Retained areas of woodland/scrub (Dormouse Compensation Areas of the Celtic Lakes Substation Development and Grassland Compensation Areas) and grassland around the Celtic Lakes substation development site to maintain connectivity for protected species including dormouse. • Enhancement of grassland through removal of scrub/ruderal, re-seeding, planting and appropriate long-term management to support brown banded carder bee and shrill carder bee (on-site and within the Grassland Compensation Area); • Creation of hedgerows to connect the wider scrub and scrub-woodland features within the site; • Creation of scrubby-broadleaved woodland, providing habitat opportunities and increased carrying capacity for dormouse; • Creation of scrub habitat to increase habitat connectivity and support dormouse; • Creation of scattered broadleaved trees and diversification planting alongside scrub to provide additional foraging and nesting opportunities for dormouse; • Creation of reptile hibernaculum and grass snake egg laying heaps; and • Creation of a larger pond feature and associated marginal vegetation. These habitat enhancements and creation are part of the embedded biodiversity design to mitigate potential impacts of the Proposed Development.
Timescales for Actions
This HMMP is intended to cover the entire construction and post-construction period from implementation until the end of the monitoring period. The Construction phase is proposed to last from 2024 until early 2027. Post-construction up to 5 years is proposed to be between 2027 and 2031.

Long-term management and monitoring is proposed up to 30 years (2032-2056).
Monitoring Requirements
During construction the newly created habitats will be monitored regularly throughout the growing season, relative to their habitat requirements, by the ECoW or LCoW. This will be undertaken as per the management and monitoring plan for Years 1-5. Annual monitoring of the retained and newly created habitats will be undertaken from the date of planting, during the construction period and for a period of 5 years post construction. Following this the habitats will be monitored every 5 years or as required following revision of this HMMP.
Required Consents and Licences
Planning permission has been granted for the development (reference 23/0878). A Section 73 Application was submitted on 14 January 2026 and was approved. A dormouse licence for the Celtic Lakes substation development site has been issued, valid from 2 January 2025, end of licensable works 28 February 2026 and licence expiry 15 October 2055 (S093767/2). A dormouse licence for the Grassland Compensation Area has been issued, valid from 16 October 2025, end of licensable works 31 October 2028 and licence expiry 31 October 2031 (S095506/3). A separate SSSI assent is not required as the planning permission for the site covers all ongoing works relating to the SSSI.
Funding
Funding has been secured by WG to deliver the HMMP, as part of the overall development. Welsh Government have a statutory duty to maintain and enhance biodiversity under Section 6 of the Environment Wales Act (2016) to maintain and enhance biodiversity so far as is consistent with the proper exercise of their functions, and in so doing, promote the resilience of ecosystems, and as such it will be their duty to ensure the HMMP delivers on target conditions and net benefits for biodiversity as prescribed within the EcIA², and as updated within the Section 73 application (and associated updated ecological assessment), and within this HMMP.
Legal Agreement
Delivery of the HMMP is a condition of the planning permission for the substation and will be secured through the planning system.

This HMMP does not repeat the standard best practice construction techniques and methods employed to avoid and mitigate the risk of potential impacts on habitats and species during the construction phase of the

substation. These methods are detailed in the outline Construction Environmental Management Plan (CEMP)¹⁵ and the Vegetation Clearance Method Statement¹⁶.

The CEMP will also detail the requirement and timing required for pre-construction surveys for protected species (including badger, bats, otters, water vole and breeding birds), an Ecological Clerk of Works (ECoW) to, for example, oversee management of ecological issues as they arise, and to educate site personnel in ecological issues where needed. This will include Toolbox Talks provided by a suitably experienced and competent ecologist to all site personnel to inform them of ecological features at the site including INNS, protected and notable species prior to the commencement of construction works. An associated registry of attendance will be signed and kept as a record and a copy of the toolbox talk left at the site office.

If any protected species or signs of protected species such as an otter holt, or other ecological features including new occurrences or increase in extent of INNS are encountered during the works, all work in the vicinity must stop immediately and a suitably experienced and competent ecologist contacted as soon as possible for advice.

3.2 Monitoring Purpose

The purpose of the monitoring for each habitat is outlined below, and will inform whether any remedial actions are required to their management in accordance with the ‘triggers for action’ outlined in each management and monitoring plan:

- Grassland monitoring is required to ensure that the enhanced and created grassland are achieving optimal conditions, particularly for shrill carder bee.
- Terrestrial invertebrate monitoring will determine and monitor the establishment and distribution of invertebrate species and of new invertebrate habitat (this does not include construction phase monitoring, which will be formally secured by the CEMP).
- The scrub and woodland habitats planted for dormice will be monitored to ensure the habitat is establishing and providing suitable conditions for foraging and nesting dormice.
- Dormouse monitoring requirements are detailed in the dormouse licence S093767/2 and S095506/3, to ensure that the Favourable Conservation Status of dormouse is maintained.
- Aquatic habitat monitoring is required to ensure that the both the enlarged attenuation pond and the retained pond are establishing and are being maintained in an optimal condition. This does not include water quality monitoring or construction phase monitoring, which will be formally secured by the CEMP.
- Aquatic invertebrate monitoring surveys will determine and monitor the establishment and distribution of invertebrate species and of new invertebrate habitat (this does not include construction phase monitoring, which will be formally secured by the CEMP).
- Reptile habitat monitoring will be undertaken to provide feedback on the effectiveness of the newly created reptile habitats.

3.3 Adaptive Management

Adaptive management is a systematic approach to natural resource management that involves monitoring and evaluating the effectiveness of management actions then adjusting as necessary to improve outcomes

¹⁵ Arup (2024) Welsh Government Celtic Lakes Outline CEMP V2, CLS-ARP-EGN-XX-RP-OE-000001. 15th May 2024.

¹⁶ Arup (2024) Welsh Government Celtic Lakes Precautionary Method of Working and Vegetation Clearance Method Statement Issue 001, CLS-ARP-EAC-XX-RP-OE-000001. 3rd April 2024.

over time. It is an iterative process in which management actions are followed by targeted monitoring outcomes. These, in turn, inform the ongoing management.

Monitoring results will inform necessary management changes to promote achieving the targets stated in the HMMP. The monitoring can pick up any unexpected, external influences e.g. dealing with a new plant disease; invasive species; or changes to site access due to site flooding.

Observations and notes from day-to-day management are important for delivering adaptive management. This information will be captured and fed into changes in management prescriptions, then through to subsequent monitoring reports and is the responsibility of the maintenance contractor.

3.3.1 Potential Remedial Actions

Where habitats are not establishing as expected, remedial actions are to be determined by an ECoW and experienced botanist in liaison with the land manager and client. Potential remedial actions could include additional seeding and replanting of failed grassland or hedgerow and woodland habitat, additional cuts/changes in timing of cutting, changes to the watering regime as well as more intensive surveillance monitoring if the reasons for unfavourable conditions are unclear.

3.3.2 SSSI Grassland Management Plan Aims (Off-site Grassland Compensation Area)

Restoration management proposals for the Grassland Compensation Area, within the St Brides SSSI, are proposed in response to the summary of development impact and mitigation described in Section 2.3. The restoration and enhancement of the grassland will be achieved through appropriate long-term management to reduce scrub/ruderal encroachment and achieve a species-rich sward which is of County significance and suitable to support brown-banded and shrill carder bee. It is proposed that a long-term management and monitoring programme will be undertaken for at least 30 years. The management plan for this area will remain adaptive throughout the 30-year period, to allow for management changes and remedial measures to ensure the habitats work towards contributing to relevant SSSI condition and suitability for the SSSI feature species that are present within the site.

The outline management prescriptions outlined in Section 3.5 below will be agreed with NRW, following a period of consultation. Grassland restoration and enhancement will focus on management techniques to improve the diversity and sward structure such as hay meadow cutting, with arisings removed, and scrub management. Remedial measures would be considered later in the management to assist establishment of a species rich grassland supporting a range of invertebrate species, particularly those of national importance such as shrill carder bee. Measures already agreed with Newport City Council include seeding areas of the SSSI using locally sourced green hay from NCC land within the SSSI to the east. Measures in the future could include supplementary planting with seeds of local provenance or plug planting.

3.4 Grassland On-Site Management and Monitoring Plan

	Grassland On-Site (Celtic Lake Substation Development area¹⁷) Objective: <i>The retained and reinstated grasslands (1.38ha) within the SINC onsite are enhanced through re-seeding, planting and appropriate long-term management to achieve a species-rich sward which is of County significance and suitable to support brown-banded and shrill carder bee.</i>
Avoidance & Protection	
Areas of SINC grassland will be avoided and protected during construction works through the installation of Heras fencing. Refer to the Construction Environmental Management Plan (CEMP) for further details relating to best practice guidance and pollution prevention measures^{18,19} to avoid and reduce dust deposition, pollution events and sediment run-off; these measures, where relevant, will need to be adhered to throughout all management and maintenance activities within the site. Access to the working areas will be via designated tracks only, and storage of materials will be at pre-agreed locations to be advised by the ECoW, on existing hardstanding and/or low value grassland areas within the site which will be enhanced, post construction. Habitat creation and enhancement areas will be protected by permanent fencing to restrict human and incidental animal grazing access to the site, as shown on ‘Celtic Lakes Fencing Mark-up 30 April 2024’ in Appendix B.	
Implementation - Creation and Enhancement	
Drawing 293651-LD-XX-DR-0402 v7 in Appendix B shows all areas for grassland over-seeding (identified as ‘<i>Grassland to be retained where possible and replaced and enhanced where necessary</i>’; and ‘<i>Grassland to be protected and retained</i>’), using green hay or a seed mix and/or plug planting. It also shows all areas of created grassland (‘<i>Proposed mixed native species rich grassland reinstatement</i>’). Appropriate species to provide grassland Primary and Contributory species for Wildlife Site selection²⁰ (mix to be confirmed with the supplier), as well as species that support shrill carder bee are detailed in the Planting Scheule (see below) and in the indicator species of the condition targets (see below). Cutting and harrowing is to be undertaken as necessary to provide suitable conditions for seed planting, by reducing the nutrient input to the soil and creating patches of bare ground for seeds to establish, as follows: • First cutting is to be undertaken in early spring or late summer when most existing vegetation is mature but before it sets seed, to help reduce competition from aggressive species. Cut vegetation to a height of 5-10 cm to reduce biomass and allow more light to reach the soil surface (essential for seed germination). • Use a mower, strimmer, or scythe depending on the size of the area. Remove all arisings. • Harrow the area immediately after the initial cut to create patches of bare soil (disturbance is essential for the germination of wildflower seeds) using a chain harrow or power harrow to lightly disturb the top 1-2 cm of soil. Ensure not to overwork the soil to avoid burying seeds too deeply. • Harrow in multiple directions to create a heterogeneous surface with plenty of exposed soil patches. Over-seeding, preferentially using green hay, or seeds and/or plug planting of local provenance will follow the methodology outlined below: • All seeds will be produced for the relevant growing season in which it is to be used. Seed material older than two years shall not be used.	

¹⁷ As shown on Figure 1 in Appendix A

¹⁸ Natural Resources Wales (NRW), the Northern Ireland Environment Agency (NIEA), Scottish Environment Protection Agency (SEPA) (2018). Guidance for Pollution Prevention – Works or maintenance in or near water: GPP5 v1.2 Feb 2018. <http://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf>

¹⁹ CIRIA C741 ‘Environmental Good Practice on Site’; Fourth Edition (2015).

²⁰ The individual species are listed as ‘Primary Species’ and ‘Contributory Species’ in the Wildlife Sites Guidelines. (A Primary Species is significant in a county context, while sites supporting 5 or more Contributory Species are considered significant in a county context). Wales Biodiversity Partnership (2008). Guidelines for the Selection of Wildlife Sites in Wales.



© Buglife

Grassland On-Site (Celtic Lake Substation Development area¹⁷)

Objective: *The retained and reinstated grasslands (1.38ha) within the SINc onsite are enhanced through re-seeding, planting and appropriate long-term management to achieve a species-rich sward which is of County significance and suitable to support brown-banded and shrill carder bee.*

- All seed mixes shall conform to the requirements set out in Annex 7 of the Guide to Seed Certification Procedures in England and Wales²¹. The seed must be supplied in sealed container with a pink certification label.
- Wildflower seed shall be sown during the period 1st March to 31st May or 1st September to 31st October unless agreed otherwise with the ECoW and/or the Landscape Architect.
- No fertilisers or pesticides will be used in the grasslands. Should herbicide use be necessary (e.g. to deal with invasive species or other undesirable species such as injurious weeds²²), the remedial actions would be limited to spot treatment.

Discussions with the Newport City Council (NCC) Ecologist are ongoing to agree a regime for providing green hay from a local meadow site, with a suitable seed mix for the site. This process is to be managed by the landscape contractor in liaison with the NCC Ecologist to agree suitable timings and frequency of this operation.

Planting Schedule

The Planting Schedule¹ within Appendix C provides details on the seed mixes and plug plants.

NOTE: The following species are **not suitable** for the Gwent Levels and will not be included within any selected seed mix: great burnet (*Sanguisorba officinalis*), yellow oat-grass (*Trisetum flavescens*), lady’s bedstraw (*Galium verum*), water avens (*Geum rivale*) and common quaking grass (*Briza media*).

Scheduling and Timing of Activities

The management and monitoring prescriptions will commence on the completion of planting in each planting year.

Wildflower Seeding	Year 1	Year 2 - 5	Year 6 onwards
1st March to 31st May or 1st September to 31st October	Newly created and enhanced grassland cut March/April. Cutting will then occur every 2 months or when the sward height reaches 15cm, until June/August. Variation to this depending on species and ecologists’ advice through monthly monitoring during the spring and summer (April to September) as detailed below.	Grasslands will be cut to 5-10cm in March/April and in September/early October to encourage a range of later-flowering species for foraging shrill carder bee. Variation to this depending on species and ecologists’ advice through biannually monitoring during the spring and summer as detailed below.	Cut at the end of September or into October, with all arisings removed, and over a 2-3 year cycle. Variation to this depending on species and ecologists’ advice through monitoring carried out every 5 years from Year 6 – 30 as detailed below.

Conditions Targets and Remedial Measures

Condition Type & Risk Factor	Condition Target & Trigger for Remedial Measure	Remedial Measure
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²¹ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/380702/seed-certification-procedures.pdf

²² Invasive Alien Species (Enforcement and Permitting) Order 2019.



Grassland On-Site (Celtic Lake Substation Development area¹⁷)

Objective: *The retained and reinstated grasslands (1.38ha) within the SINC onsite are enhanced through re-seeding, planting and appropriate long-term management to achieve a species-rich sward which is of County significance and suitable to support brown-banded and shrill carder bee.*

Indicator species Risk: <i>Composition of species not establishing to specification</i>	The green hay, seed mix and/or plug planting will be designed to provide grassland Primary and Contributory species for Wildlife Site selection²³ (mix to be confirmed with the supplier). The mix will also include species which support shrill carder bee, such as red clover, birds foot trefoil, meadow vetchling, red bartsia, common knapweed and field scabious. Triggers: i) <i>Less than 8 species²⁴ typical of neutral grassland observed over the whole area during botanical surveys from Year 2 onwards.</i> ii) <i>None of the species that support shrill carder bee observed within the grassland over the whole area during the botanical surveys from Year 3 onwards.</i> iii) <i>No Primary or Contributory species observed within the grassland over the whole area during the botanical surveys from Year 4 onwards.</i> iv) <i>Need for at least 1 Primary species and/or 5 Contributory species for grassland Wildlife Site section being observed during botanical surveys over the whole area from Year 5 onwards.</i>	To be agreed with the botanical specialist and LPA but could include: • Supplementary seeding with agreed seed mix; • Plug planting; or • Green hay application in affected areas. As specified above in Implementation.
Sward height Risk: <i>Height of sward does not show variation</i>	Sward height is varied creating microclimates which provide opportunities for insects, birds and small mammals to live and breed. Greater than 20% of the sward should be less than 7cm and 20% should be over 7cm, with areas of tussocky grass, bare ground and mounds creating additional structural diversity. Triggers: i) <i><20% of the sward is less than 7cm; and <20% is more than 7cm from Year 3 onwards.</i> ii) <i>Habitat structural diversity not achieved by Year 5: tussocky grasses, bare ground, or variation in vegetation height.</i>	To be agreed with the botanical specialist and LPA but could include: • Mowing to be undertaken to achieve the required sward height variation (as specified in Initial Aftercare and Maintenance section below). • Modify mowing regime to promote structural heterogeneity, introduce physical disturbances (e.g. rotavating patches), and enhance microhabitat features such as woodpiles using site-won materials.
Bare ground Risk: <i>Area of bare ground is too high or too low.</i>	Cover of bare ground is between 1% and 5%²⁰, including localised areas, for example, rabbit warrens. Trigger: i) <i>Cover of bare ground is <1%; or >5% from Year 2 onwards.</i>	To be agreed with the botanical specialist and LPA but could include: • Create bare ground by removing vegetation where necessary; or • Provide supplementary planting and irrigation to remove bare ground. As specified in Implementation section above.
Presence of negative indicator species Risk: <i>Growth/encroachment of negative indicator species (bracken and bramble)</i>	Cover of bracken (<i>Pteridium aquilinum</i>) is less than 20% and cover of scrub (including bramble <i>Rubus fruticosus</i> agg.) is less than 5%²⁰. Prevention of a serious weed infestation such as dock (<i>Rumex</i> sp.) Trigger: i) <i>Cover of bracken >20%; and Cover of scrub (including bramble) is >5% from Year 2 onwards.</i> ii) <i>Serious weed infestation (to be defined by botanical specialist), such as dock, noted from Year 2 onwards.</i>	To be agreed with the botanical specialist and LPA but could include: • Remove encroaching species mechanically, in accordance with timings set out for protected species and in accordance with dormouse licence/precautionary method of working where required. As specified in the Vegetation Clearance Method Statement.

²³ The individual species are listed as ‘Primary Species’ and ‘Contributory Species’ in the Wildlife Sites Guidelines. (A Primary Species is significant in a county context, while sites supporting 5 or more Contributory Species are considered significant in a county context). Wales Biodiversity Partnership (2008). Guidelines for the Selection of Wildlife Sites in Wales.

²⁴ Based on UKHab description for g3c Other neutral grassland; <8 species per m² including forbs, grasses, sedges and rushes.



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Grassland On-Site (Celtic Lake Substation Development area¹⁷)

Objective: *The retained and reinstated grasslands (1.38ha) within the SINCC onsite are enhanced through re-seeding, planting and appropriate long-term management to achieve a species-rich sward which is of County significance and suitable to support brown-banded and shrill carder bee.*

Damage to habitat Risk: <i>Unauthorised access by humans/vehicles resulting in damage to grassland</i>	Combined cover of species indicative of suboptimal condition and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities). Trigger: <i>i) Physical damage accounts for more than 5% of total area from Year 2 onwards.</i>	To be agreed with the botanical specialist and LPA but could include: • Repair/restore areas as necessary to ensure successful growth of habitat through reseedling and green hay application as required. As specified in above in Implementation.
Presence of invasive non-native species Risk: <i>Growth of invasive non-native plants may dominate the grassland</i>	If any invasive non-native plant species (as listed on Schedule 9 of WCA) are present, this criterion is automatically failed. Trigger: <i>i) Any presence of any invasive non-native plant species (as listed on Schedule 9 of WCA), in any year of monitoring.</i>	To be agreed with the INNS specialist and LPA but could include: • Remove species or commence appropriate treatment regime in accordance with the INNS Management Plan.
Terrestrial invertebrates Risk: <i>Habitat does not provide suitable conditions for target invertebrate species</i>	Increased diversity and abundance of species compared to the baseline surveys, particularly those of national importance. Trigger: <i>i) Noticeable decline in terrestrial invertebrate and abundance of species from the baseline surveys, particularly those of national importance, by Year 3.</i>	To be agreed with the invertebrate specialist and LPA but could include targeted habitat enhancements, such as: • Leaving areas of tussocky grassland uncut to create additional nesting / hibernation sites; • Planting nectar-rich flowers; or • Adjusting mowing regimes to provide better habitat structure and diversity.

Initial Aftercare and Maintenance (Years 1-5 post planting)

First flushes of certain seeded grassland species can dominate, largely depending on the prevailing climatic conditions, and as such more regular management may be required during the establishment period. The exact management of this habitat will be determined through monitoring with the objective of providing a good range of suitable forage species for shrill carder bee. The requirement for remedial actions would be advised by an experienced botanist.

- For first year management only, newly created and enhanced grassland will be cut to 5-10 cm in March/April to deter vigorous grasses. Cutting will then occur every 2 months or when the sward height reaches 15cm, until June/August, if (through monitoring by an experienced botanist) this is determined to be required, to encourage a range of later-flowering species for foraging shrill carder bee. If the target assemblage/forage species for shrill carder bee and other bumblebee species are attained during the first year this cutting frequency will be reduced with a later cut in late-September/October in line with long-term management for this habitat. Arisings are to be removed from the site to prevent the build-up of nutrients and maintain low nutrient status for species richness. If rainfall is insufficient, the area will be watered lightly to keep the soil moist until the seeds germinate and establish.
- Year 2 – 5 grasslands will be cut to 5-10 cm in March/April to deter vigorous grasses, if determined necessary by the experienced botanist. The grassland will then be cut late season in September/early October to encourage a range of later-flowering species for foraging shrill carder bee.

Within the grassland, areas identified by the botanist or invertebrate specialist as having good assemblage of foraging species, and/or nesting potential for shrill carder bee post-establishment (as determined through monitoring as described below) will instead be cut at the end of September or into October, with all arisings removed, and over a 2-3 year cycle, so that the grassland remains viable for late foraging shrill carder bee and that some of grassland remains undisturbed in any single year. Tussocky habitat will be encouraged by leaving an uncut buffer strip of at least 2m to provide suitable nesting and hibernating habitat for shrill carder bee wherever possible, with further consideration to be given to the provision of south-facing slope habitat for nesting and north-facing habitat for creation of hibernation features.

No fertilisers or pesticides will be used in the grasslands. Should herbicide use be necessary (e.g. to deal with invasive species or other undesirable species), the remedial actions would be limited to spot treatment.

Initial Monitoring (Years 1-5 post planting)



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Grassland On-Site (Celtic Lake Substation Development area¹⁷)

Objective: *The retained and reinstated grasslands (1.38ha) within the SINc onsite are enhanced through re-seeding, planting and appropriate long-term management to achieve a species-rich sward which is of County significance and suitable to support brown-banded and shrill carder bee.*

Grassland

First year monitoring of the species composition and condition will be undertaken monthly during the spring and summer (April to September) by an experienced botanist in accordance with the Condition Targets above and using Common Standards Monitoring (CSM) Guidance for Lowland Grassland Habitats. The experienced botanist will advise on any remedial actions including removal of any injurious weeds, non-native or invasive species. Management and irrigation will be undertaken by the landscape contractor as required.

Following the first year, monitoring will be undertaken biannually during the spring (April/May) and summer (July/August) from Year 2 – 5 by an experienced botanist in accordance with the Condition Targets above and using Common Standards Monitoring (CSM) Guidance for Lowland Grassland Habitats in order to help determine the level of success of establishment and enhancement, and the potential need for remedial measures such as additional seeding or changes to management.

The monitoring of target species for shrill carder bee will be included, as several of the negative indicator species for lowland grasslands are important food sources for shrill carder bee.

The following methods will inform the monitoring:

- Undertake quadrat sampling to identify the habitat type that is establishing and then count the number of species per m².
- Estimate percentage of bare ground, bramble and bracken cover.
- Collect a botanical species list across grassland to check against the target species list, as provided in the Implementation section.

Monitoring of grasslands during the construction period will also be undertaken regularly by the ECoW, in terms of ensuring no unauthorised disturbance is occurring, the protective fencing remains fit for purpose, and where any significant issues are occurring during the first year of grassland creation/enhancement. The ECoW will inform the client team and identified specialist botanist of any potential issues and risks to grassland creation and enhancement to determine if remedial actions are required.

Terrestrial Invertebrates

Survey for shrill carder bee and other notable invertebrates will be undertaken in accordance with standard best practice. Monitoring surveys will determine and monitor the establishment and distribution of terrestrial invertebrate species and of the existing and any new enhanced habitats suitable for terrestrial invertebrates. Sampling will be conducted along pre-determined transects, to allow for repeatability and comparison. One survey visit is to be undertaken in the summer in each of Year 1, 2, 3, 5, and every 5 years thereafter until year 30 of the management plan. Potential remedial actions are to be determined by the invertebrate specialist.

Long-term Maintenance (Year 6 onwards)

Areas identified within the grassland areas, by the botanist or invertebrate specialist, as having good assemblage of foraging species and/or nesting potential for shrill carder bee post-establishment (as determined through monitoring as described above and below) will instead be cut at the end of September or into October, with all arisings removed, and over a 2-3 year cycle, so that the grassland remains viable for late foraging shrill carder bee and that some of grassland remains undisturbed in any single year.

Tussocky habitat will be encouraged by leaving an uncut buffer strip of at least 2m to provide suitable nesting and hibernating habitat for shrill carder bee wherever possible, with further consideration to be given to the provision of south-facing slope habitat for nesting and north-facing habitat for creation of hibernation features. Any areas identified for shrill carder bee nesting and hibernation potential (which may include the more tussocky grass edges) will be managed on a 2-3 year rotation.

Monitoring reports should inform subsequent management of grasslands, including plans to demonstrate which areas are to be cut and when, clearly marking areas that are to be left for shrill carder bee.

No fertilisers or pesticides will be used in the grasslands. Should herbicide use be necessary (e.g. to deal with invasive species or other undesirable species), the remedial actions would be limited to spot treatment and would need to be agreed with the specialist botanist and the LPA.

Monitoring and Adaptive Management: The species composition and abundance will be monitored as above and adjustments in management practices made as necessary to promote desired species. If the sward becomes too dense, patches will be lightly harrowed every few years to create new opportunities for seedling establishment.

Long-term Monitoring (Year 6 onwards)



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Grassland On-Site (Celtic Lake Substation Development area¹⁷)

Objective: *The retained and reinstated grasslands (1.38ha) within the SINC onsite are enhanced through re-seeding, planting and appropriate long-term management to achieve a species-rich sward which is of County significance and suitable to support brown-banded and shrill carder bee.*

Grassland

Monitoring of the grassland habitat will be carried out every 5 years from Year 6 – 30 post construction by an experienced botanist using Common Standards Monitoring (CSM) Guidance for Lowland Grassland Habitats in June/July in order to help determine the level of success of establishment and enhancement, and the potential need for remedial measures such as additional seeding or changes to management.

The monitoring of target species for the shrill carder bee will be included, as several of the negative indicator species for lowland grasslands are important food sources for shrill carder bee.

The following methods will inform the monitoring:

- Undertake quadrat sampling to identify the habitat type that is establishing and then count number of species per m².
- Estimate percentage of bare ground, bramble and bracken cover.
- Collect a botanical species list across grassland to check against target species list as provided in the Implementation section.

Terrestrial Invertebrates

A survey for shrill carder bee and other notable invertebrates will be undertaken in accordance with standard best practice every 5 years for the duration of the management plan from Year 6 - 30.

3.5 Grassland Off-Site Management and Monitoring Plan

 © Gwent Wildlife Trust	Grassland Off-Site (Grassland Compensation Area¹⁷) Objective: <i>An off-site area of existing grassland (2.28ha) approximately 100m southwest of the Proposed Development and within the St Brides SSSI is enhanced through appropriate long-term management to reduce scrub encroachment and achieve a species-rich sward which is of County significance and suitable to support brown-banded and shrill carder bee, through re-seeding and management</i>
Avoidance and Protection	
The habitats surrounding the areas to be cleared from scrub and/or overseeded and enhanced for grassland are likely to contain dormice (within the scrub and scrubby woodland habitats). As such, these areas will need to be clearly mapped and marked during the works. No fencing is proposed in this area.	
Implementation – Scrub, Reed and Ruderal Clearance, and Grassland Restoration and Enhancement	
Areas for Enhancement and Creation: Drawing 293651-LD-XX-DR-0503 v1 and Drawing 293651-LD-XX-DR-0402 v7 Appendix B shows the area for scrub, reed and ruderal removal and over-seeding, using a seed mix and/or green hay, or plug planting that provides grassland Primary and Contributory species for Wildlife Site selection²⁵ (mix to be confirmed with the supplier), as well as species that support shrill carder bee. Methodology: • Reed and Ruderal removal will be undertaken in the first year. • Scrub clearance is to be undertaken on an annual basis in accordance with the Dormouse Licence for the Grassland Compensation Area over 4 years, along with small areas of ruderal clearance • Cutting and harrowing is to be undertaken as necessary to provide suitable conditions for seed planting, by reducing the nutrient input to the soil and creating patches of bare ground for seeds to establish, as follows: ○ First cutting is to be undertaken in early spring or late summer when most existing vegetation is mature but before it sets seed, to help reduce competition from aggressive species. Cut vegetation to a height of 5-10 cm to reduce biomass and allows more light to reach the soil surface (essential for seed germination). ○ Use a mower, strimmer, or scythe depending on the size of the area. Remove all arisings. ○ Harrow the area immediately after the initial cut to create patches of bare soil (disturbance is essential for the germination of wildflower seeds) using a chain harrow or power harrow to lightly disturb the top 1-2 cm of soil. Ensure not to overwork the soil to avoid burying seeds too deeply. ○ Harrow in multiple directions to create a heterogeneous surface with plenty of exposed soil patches. • Over-seeding, preferentially using green hay, or seeds and/or plug planting of local provenance and following the methodology outlined below: ○ All seeds will be produced for the relevant growing season in which it is to be used. Seed material older than two years shall not be used. ○ All seed mixes shall conform to the requirements set out in Annex 7 of the Guide to Seed Certification Procedures in England and Wales. The seed must be supplied in sealed container with a pink certification label. ○ Wildflower seed shall be sown during the period 1st March to 31st May or 1st September to 31st October unless agreed otherwise with the ECoW and/or the Landscape Architect. ○ No fertilisers or pesticides will be used in the grasslands. Should herbicide use be necessary (e.g. to deal with invasive species or other undesirable species such as injurious weeds), the remedial actions would be limited to spot treatment. • The NCC Ecologist has agreed in principle to the spreading of green hay on areas of the site that require seeding, with the hay being sourced from a local meadow site. This process is to be managed by the landscape contractor in liaison with the NCC Ecologist to agree suitable timings and frequency of this operation. • A transitional ecotone will be created between the grassland and edge of the scrub area to create further botanical and structural heterogeneity providing biodiversity benefits, avoiding encroachment of scrub into the grassland area while also avoiding development of a hard edge between the two habitat areas.	

²⁵ The individual species are listed as ‘Primary Species’ and ‘Contributory Species’ in the Wildlife Sites Guidelines. (A Primary Species is significant in a county context, while sites supporting 5 or more Contributory Species are considered significant in a county context). Wales Biodiversity Partnership (2008). Guidelines for the Selection of Wildlife Sites in Wales.



Grassland Off-Site (Grassland Compensation Area¹⁷)

Objective: An off-site area of existing grassland (2.28ha) approximately 100m southwest of the Proposed Development and within the St Brides SSSI is enhanced through appropriate long-term management to reduce scrub encroachment and achieve a species-rich sward which is of County significance and suitable to support brown-banded and shrill carder bee, through re-seeding and management

Planting Schedules¹: Appendix B Drawing 293651-LD-XX-DR-0402 v7 details the seed mixes for any remedial actions required. Any species to be used that are different to that in the seed mix would need to be agreed with the NCC ecologist.

NOTE: The following species are **not suitable** for the Gwent Levels and will not be included within any selected seed mix: great burnet (*Sanguisorba officinalis*), yellow oat-grass (*Trisetum flavescens*), lady’s bedstraw (*Galium verum*), water avens (*Geum rivale*) and common quaking grass (*Briza media*).

Scheduling and Timing of Activities

The management and maintenance prescriptions will commence on the completion of planting in each planting year.

Wildflower Seeding	Year 1	Year 2 - 5	Year 6 onwards
1st March to 31st May or 1st September to 31st October	Scrub clearance over winter (timings to be confirmed with Dormouse licence for grassland area). Newly created and enhanced grassland cut March/April. Cutting will then occur every 2 months or when the sward height reaches 15cm, until June/August. Variation to this depending on species and ecologists’ advice through monthly monitoring during the spring and summer (April to September) as detailed below.	Scrub clearance over winter (timings to be confirmed with Dormouse licence for grassland area). Grasslands will be cut to 5-10cm in March/April and in September/early October to encourage a range of later-flowering species for foraging shrill carder bee. Variation to this depending on species and ecologists’ advice through biannually monitoring during the spring and summer as detailed below.	Scrub clearance over winter (timings to be confirmed with Dormouse licence for grassland area). Cut at the end of September or into October, with all arisings removed, and over a 2-3 year cycle. Variation to this depending on species and ecologists’ advice through monitoring carried out every 5 years from Year 6 – 30 as detailed below.

Conditions Targets and Remedial Measures

Condition Type & Risk Factor	Condition Target & Trigger for Remedial Measure	Remedial Measure
Indicator species Risk: <i>Composition of species not establishing to specification</i>	The green hay, seed mix and/or plug planting will be designed to provide grassland Primary and Contributory species for Wildlife Site selection²⁶ (mix to be confirmed with the supplier). The mix will also include species which support shrill carder bee, such as red clover, birds foot trefoil, meadow vetchling, red bartsia, common knapweed and field scabious. Triggers: i) <i>Less than 8 species²⁷ typical of neutral grassland observed during botanical surveys from Year 2 onwards.</i> ii) <i>None of species to support shill carder bee observed within the grassland during the botanical surveys from Year 3 onwards.</i> iii) <i>None of the Primary or Contributory species observed within the grassland during the botanical surveys from Year 4 onwards.</i>	To be agreed with the botanical specialist and LPA but could include: • Supplementary seeding with agreed seed mix; • Plug planting; or • Green hay application in affected areas. As specified above in Implementation.

²⁶ The individual species are listed as ‘Primary Species’ and ‘Contributory Species’ in the Wildlife Sites Guidelines. (A Primary Species is significant in a county context, while sites supporting 5 or more Contributory Species are considered significant in a county context). Wales Biodiversity Partnership (2008). Guidelines for the Selection of Wildlife Sites in Wales.

²⁷ Based on UKHab description for g3c Other neutral grassland; <8 species per m² including forbs, grasses, sedges and rushes.



Grassland Off-Site (Grassland Compensation Area¹⁷)

Objective: An off-site area of existing grassland (2.28ha) approximately 100m southwest of the Proposed Development and within the St Brides SSSI is enhanced through appropriate long-term management to reduce scrub encroachment and achieve a species-rich sward which is of County significance and suitable to support brown-banded and shrill carder bee, through re-seeding and management

	iv) Need for at least 1 Primary species and/or 5 Contributor species for grassland Wildlife Site section being observed during botanical surveys from Year 5 onwards.	
Sward height Risk: Height of sward does not show variation	Sward height is varied creating microclimates which provide opportunities for insects, birds and small mammals to live and breed. Greater than 20% of the sward should be less than 7cm and 20% should be over 7cm²⁴, with areas of tussocky grass, bare ground and mounds creating additional structural diversity. Triggers: i) <20% of the sward is less than 7cm; and <20% is more than 7cm from Year 3 onwards. ii) Habitat structural diversity not achieved by Year 5: tussocky grasses, bare ground, or variation in vegetation height.	To be agreed with the botanical specialist and LPA but could include: Mowing to be undertaken to achieve the required sward height variation (as specified in Initial Aftercare and Maintenance section below). Modify mowing regime to promote structural heterogeneity, introduce physical disturbances (e.g. rotavating patches), and enhance microhabitat features such as woodpiles.
Bare ground Risk: Area of bare ground is too high or too low.	Cover of bare ground is between 1% and 5%, including localised areas, for example, rabbit warrens²⁴. Trigger: i) Cover of bare ground is <1%; or >5% from Year 2 onwards.	To be agreed with the botanical specialist and LPA but could include: - Create bare ground by removing vegetation where necessary; or - Provide supplementary planting and irrigation to remove bare ground. As specified in Implementation section above.
Presence of negative indicator species Risk: Growth/encroachment of negative indicator species (bracken and bramble)	Cover of bracken (<i>Pteridium aquilinum</i>) is less than 20% and cover of scrub (including bramble <i>Rubus fruticosus</i> agg.) is less than 5%²⁰. Prevention of a serious weed infestation such as dock (<i>Rumex</i> sp.) Trigger: i) Cover of bracken >20%; and Cover of scrub (including bramble) is >5% from Year 2 onwards. ii) Serious weed infestation (to be defined by botanical specialist), such as dock, noted from Year 2 onwards.	To be agreed with the botanical specialist and LPA but could include: Remove encroaching species mechanically, in accordance with timings set out for protected species and in accordance with dormouse licence/precautionary method of working where required. As specified in the Vegetation Clearance Method Statement.
Damage to habitat Risk: Unauthorised access by humans/vehicles resulting in damage to grassland	Combined cover of species indicative of suboptimal condition and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities). Trigger: i) Physical damage accounts for more than 5% of total area.	To be agreed with the botanical specialist and LPA but could include: Repair/restore areas as necessary to ensure successful growth of habitat through reseedling and green hay application as required. As specified in above in Implementation.
Presence of invasive non-native species Risk: Growth of invasive non-native plants may dominate the grassland	If any invasive non-native plant species (as listed on Schedule 9 of WCA) are present, this criterion is automatically failed. Trigger: i) Any presence of any invasive non-native plant species (as listed on Schedule 9 of WCA) in any year of monitoring.	To be agreed with the INNS specialist and LPA but could include: Remove species or commence appropriate treatment regime in accordance with the INNS Management Plan.
Terrestrial invertebrates Risk: Habitat does not provide suitable conditions for target invertebrate species	Increased diversity and abundance of species compared to the baseline surveys, particularly those of national importance. Trigger: i) Noticeable decline in terrestrial invertebrate and abundance of species from the baseline surveys, particularly those of national importance, by Year 3.	To be agreed with the invertebrate specialist and LPA but could include targeted habitat enhancements, such as: Leaving areas of tussocky grassland uncut to create additional nesting/hibernation sites;



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Grassland Off-Site (Grassland Compensation Area¹⁷)

Objective: An off-site area of existing grassland (2.28ha) approximately 100m southwest of the Proposed Development and within the St Brides SSSI is enhanced through appropriate long-term management to reduce scrub encroachment and achieve a species-rich sward which is of County significance and suitable to support brown-banded and shrill carder bee, through re-seeding and management

- Planting nectar-rich flowers; or
- Adjusting mowing regimes to provide better habitat structure and diversity.

Initial Aftercare and Maintenance (Years 1-5 post planting)

First flushes of certain seeded grassland species can dominate, largely depending on the prevailing climatic conditions, and as such more regular management may be required during the establishment period. The exact management of this habitat will be determined through monitoring with the objective of providing a good range of suitable forage species for shrill carder bee. The requirement for remedial actions would be advised by an experienced botanist.

- For first year management only, newly created and enhanced grassland will be cut to 5-10 cm in March/April to deter vigorous grasses. Cutting will then occur every 2 months or when the sward height reaches 15cm, until June / August, if (through monitoring by an experienced botanist) this is determined to be required, to encourage a range of later-flowering species for foraging shrill carder bee. If the target assemblage/forage species for shrill carder bee and other bumblebee species are attained during the first year this cutting frequency will be reduced with a later cut in late-September/October in line with long-term management for this habitat. Arisings are to be removed from the site to prevent the build-up of nutrients and maintain low nutrient status for species richness. If rainfall is insufficient, the area will be watered lightly to keep the soil moist until the seeds germinate and establish.
- Year 2 – 5 grasslands will be cut to 5-10 cm in March/April to deter vigorous grasses, if determined necessary by the experienced botanist. The grassland will then be cut late season in September/early October to encourage a range of later-flowering species for foraging shrill carder bee.

Within the grassland, areas identified by the botanist or invertebrate specialist as having good assemblage of foraging species, and/or nesting potential for shrill carder bee post-establishment (as determined through monitoring as described below) will instead be cut at the end of September or into October, with all arisings removed, and over a 2-3 year cycle, so that the grassland remains viable for late foraging shrill carder bee and that some of grassland remains undisturbed in any single year. Tussocky habitat will be encouraged by leaving an uncut buffer strip of at least 2m to provide suitable nesting and hibernating habitat for shrill carder bee wherever possible, with further consideration to be given to the provision of south-facing slope habitat for nesting and north-facing habitat for creation of hibernation features.

No fertilisers or pesticides will be used in the grasslands. Should herbicide use be necessary (e.g. to deal with invasive species or other undesirable species), the remedial actions would be limited to spot treatment.

Initial Monitoring (Years 1-5 post planting)

Grassland

First year monitoring of the species composition and condition will be undertaken monthly during the spring and summer (April to September) by an experienced botanist in accordance with the Condition Targets above and using Common Standards Monitoring (CSM) Guidance for Lowland Grassland Habitats. The experienced botanist will advise on any remedial actions including removal of any injurious weeds, non-native or invasive species. Management and irrigation will be undertaken by the landscape contractor as required.

Following the first year, monitoring will be undertaken biannually during the spring (April/May) and summer (July/August) from Year 2 – 5 by an experienced botanist in accordance with the Condition Targets above and using Common Standards Monitoring (CSM) Guidance for Lowland Grassland Habitats in order to help determine the level of success of establishment and enhancement, and the potential need for remedial measures such as additional seeding or changes to management.

The monitoring of target species for the shrill carder bee will be included, as several of the negative indicator species for lowland grasslands are important food sources for shrill carder bee.

The following methods will inform the monitoring:

- Undertake quadrat sampling to identify the habitat type that is establishing and then count number of species per m².
- Estimate percentage of bare ground, bramble and bracken cover.
- Collect a botanical species list across grassland to check against target species list as provided in the Implementation section.

Monitoring of grasslands during the construction period will also be undertaken regularly by the ECoW, in terms of ensuring no unauthorised disturbance is occurring, the protective fencing remains fit for purpose, and where any significant issues are occurring during the first year of grassland creation/enhancement. The ECoW will inform the client team and identified specialist botanist of any potential issues and risks to grassland creation and enhancement to determine if remedial actions are required.



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Grassland Off-Site (Grassland Compensation Area¹⁷)

Objective: An off-site area of existing grassland (2.28ha) approximately 100m southwest of the Proposed Development and within the St Brides SSSI is enhanced through appropriate long-term management to reduce scrub encroachment and achieve a species-rich sward which is of County significance and suitable to support brown-banded and shrill carder bee, through re-seeding and management

Terrestrial Invertebrates

Survey for shrill carder bee and other notable invertebrates will be undertaken in accordance with standard best practice. Monitoring surveys will determine and monitor the establishment and distribution of terrestrial invertebrate species and of the existing and any new enhanced habitats suitable for terrestrial invertebrates. Sampling will be conducted along pre-determined transects, to allow for repeatability and comparison. One survey visit is to be undertaken in the summer in each of Year 1, 2, 3, 5, and every 5 years thereafter until year 30 of the management plan. Potential remedial actions are to be determined by the invertebrate specialist.

Long-term Maintenance (Year 6 onwards)

Areas identified within the grassland areas, by the botanist or invertebrate specialist as having good assemblage of foraging species, and/or nesting potential for shrill carder bee post-establishment (as determined through monitoring as described above and below) will instead be cut at the end of September or into October, with all arisings removed, and over a 2-3 year cycle, so that the grassland remains viable for late foraging shrill carder bee and that some of grassland remains undisturbed in any single year.

Tussocky habitat will be encouraged by leaving an uncut buffer strip of at least 2m to provide suitable nesting and hibernating habitat for shrill carder bee wherever possible, with further consideration to be given to the provision of south-facing slope habitat for nesting and north-facing habitat for creation of hibernation features. Any areas identified for shrill carder bee nesting and hibernation potential (which may include the more tussocky grass edges) will be managed on a 2-3 year rotation.

Monitoring reports should inform subsequent management of grasslands, including plans to demonstrate which areas are to be cut and when, clearly marking areas that are to be left for shrill carder bee.

No fertilisers or pesticides will be used in the grasslands. Should herbicide use be necessary (e.g. to deal with invasive species or other undesirable species), the remedial actions would be limited to spot treatment.

Monitoring and Adaptive Management: The species composition and abundance will be monitored as above and adjustments in management practices made as necessary to promote desired species. If the sward becomes too dense, patches will be lightly harrowed every few years to create new opportunities for seedling establishment.

Long-term Monitoring (Year 6 onwards)

Grassland

Monitoring of the grassland habitat will be carried out every 5 years from Year 6 – 30 post construction by an experienced botanist using Common Standards Monitoring (CSM) Guidance for Lowland Grassland Habitats in June/July in order to help determine the level of success of establishment and enhancement, and the potential need for remedial measures such as additional seeding or changes to management.

The monitoring of target species for shrill carder bee will be included as several of the grassland negative indicator species for lowland grasslands are important food sources for shrill carder bee.

The following methods will inform the monitoring:

- Undertake quadrat sampling to identify the habitat type that is establishing and then number of species per m².
- Estimate percentage of bare ground, bramble and bracken cover.
- Collect a botanical species list across grassland to check against target species list as provided in the Implementation section.

Terrestrial Invertebrates

A survey for shrill carder bee and other notable invertebrates will be undertaken in accordance with standard best practice every 5 years for the duration of the management plan.

3.6 Trees, Hedgerow, Scrub and Woodland On-Site Management and Monitoring Plan

	Trees, Hedgerow, Scrub and Woodland On-Site (Celtic Lakes Substation Development area and Dormouse woodland habitat protection, hazel planting and enhancement area¹⁷) Objective: <i>To provide suitable habitat and connectivity for the dormouse population at the site, by creating a resilient network of woodland/scrub across the site.</i>
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Avoidance & Protection	
Note: All works described here will need to be conducted in accordance with the Dormouse Licence (reference S093767/2) and any amendments to it. Tree Protection Plans and measures are described in the CEMP and include: • The implementation of the Arboricultural Method Statement (AMS) and Tree Protection Plan (TPP) in line with the British Standard BS5837:2012 as outlined within the Arboricultural Impact Assessment²⁸ submitted with the planning application. • Existing retained woodland, scrub and trees will be protected during construction with a suitable barrier, such as post and wire fencing, to prevent accidental incursions or material storage onto root protection zones. • Access to the working areas will be via designated tracks only. The construction access will be created using the methods outlined within the Arboricultural Impact Assessment, to reduce impacts to the root protection areas of adjacent retained trees. Storage of materials will be at pre-agreed locations, on existing hardstanding and/or grassland areas within the site as advised by the ECoW (which will be enhanced following construction as per the above grassland management plan in Section 3.4). The lighting during construction will be directional and aim to avoid and minimise illumination in areas that contain ecologically sensitive habitats, such as adjacent woodland, hedgerows and scrub, in order to protect commuting/foraging bats and other nocturnal/crepuscular species. Where there is light spill onto the peripheral habitats of the buffer area, these will not be greater than 0.5 Lux. Habitat creation and enhancement areas will be protected by permanent fencing to restrict human access and any unintentional grazing/fly-grazing, as shown on ‘Celtic Lakes Fencing Mark-up 30 April 2024’ in Appendix B.	
Implementation - Creation and Enhancement	
Note: All works described here will need to be conducted in accordance with the Dormouse Licence (reference S093767/2) and any amendments to it. Areas for Enhancement and Creation: Landscape Drawing 293651-LD-XX-DR-0001 v6 in Appendix B shows the areas of on-site woody habitats which are being retained and enhanced, including the Dormouse Compensation Area woodland. Methodology: Hedgerow Only • The species-rich hedgerow will comprise a range of species suitable for the local area and designed for foraging and nesting requirements for dormice. The planting schedules¹ in Appendix C provide further details including row density and offset of planting. Woodland Only • New scrubby broadleaved woodland areas will be created within the site using native flowering and fruiting shrub and broadleaved tree species which, will provide woodland and scrub habitat for dormouse, with hazel at 25% of the mix. The planting schedule¹ in Appendix C provides further details. • Planting will not be on a grid pattern. Plants will be stationed in species groups of 3, 5, and 7, to be arranged in a naturalistic pattern where existing habitat allows planting. Woodland planting is proposed for diversification planting within the grassland zone of the Dormouse Compensation Area; the existing species composition will inform the locations and groupings of hazel trees to be planted, to enhance the foraging and nesting opportunities for dormice. The planting schedules¹ in Appendix C provide further details. • Enhancement of woodland within the Dormouse woodland habitat protection and enhancement area (see Figure 1 Appendix A) will be achieved through targeted management, including selective tree removal (focussing on non-native tree species) to enhance the shrub layer within the woodland and align with canopy cover and understorey targets detailed below for woodland habitat.	

²⁸ Ecus (2023) Arboricultural Survey Report, of proposed development at Celtic Lakes, Newport.



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Trees, Hedgerow, Scrub and Woodland On-Site (Celtic Lakes Substation Development area and Dormouse woodland habitat protection, hazel planting and enhancement area¹⁷)

Objective: To provide suitable habitat and connectivity for the dormouse population at the site, by creating a resilient network of woodland/scrub across the site.

Tree, Hedgerow, Scrubby Broadleaved Woodland Planting

Retained areas of woodland and scrub within the Celtic Lakes Substation Development area and to the east in the Dormouse woodland habitat protection and enhancement area (see Figure 1 Appendix A) will be subject to ongoing management to support the local dormouse population. This will include encouraging further development of the shrub layer through thinning of the canopy layer (by no more than 10%), cutting patches in a sequence that encourages new coppice adjacent to old, permitting access to hazel crops and easy recolonisation by dormouse and to ensure diverse age structure of the woodland and letting light in for ground flora.

- All plant stock shall be of UK provenance, as local as possible to the Gwent Levels. A Provenance Certificate shall be provided to confirm origin and provenance of all native tree species used prior to the commencement of landscaping works.
- All transplants shall be protected with a 400mm high biodegradable spiral rabbit guard supported by a stake or cane up to 750mm in height dependent on the specimen if required.

Planting Schedules¹:

Appendix C provides details of the species mix and densities.

Scheduling and Timing of Activities

Note: All works described here will need to be conducted in accordance with the Dormouse Licence (reference S093767/2) and any amendments to it.

The management and monitoring prescriptions will commence on the completion of planting in each planting year.

Planting	Year 1-5	Year 6 onwards
To be undertaken between October to March unless agreed by the appointed Landscape Architect.	Carry out a minimum of 4no. routine maintenance visits per year, with additional visits if required, especially watering visits during periods of warm weather. Management of trees, scrub and hedgerows to be undertaken between December and February, with the exception of any disturbance or removal of roots or stumps which must be avoided over-winter when dormice are hibernating. Variation to this depending on species and ecologists’ advice through monthly monitoring during the spring and summer (April to September) as detailed below.	Carry out annual maintenance visit in February/March. Management of trees, scrub and hedgerows to be undertaken between December and February, with the exception of any disturbance or removal of roots or stumps which must be avoided over-winter when dormice are hibernating. Variation to this depending on species and ecologists’ advice through monthly monitoring during the spring and summer (April to September) as detailed below.

Conditions Targets and Remedial Measures

Condition Type & Risk Factor	Condition Target / Trigger for Remedial Measure	Remedial Measure - Note: All works described here will need to be conducted in accordance with the Dormouse Licence (reference S093767/2) and any amendments to it.
Woodland		
Connectivity to other dormouse habitats Risk: Habitats not establishing to link retained and created habitats together	Develop and subsequently maintain connectivity to existing woodland, hedgerows and scrub. Trigger: i) Gaps greater than 2m by Year 5.	To be agreed with the botanical specialist, the dormouse licence holder and NRW (through the licence) but could include: • Planting of appropriate species to fill in any gaps, as determined by the ecologist and species list provided in the planting schedules ¹ in Appendix C (unless otherwise advised by the ecologist or the LPA).



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Trees, Hedgerow, Scrub and Woodland On-Site (Celtic Lakes Substation Development area and Dormouse woodland habitat protection, hazel planting and enhancement area¹⁷)

Objective: *To provide suitable habitat and connectivity for the dormouse population at the site, by creating a resilient network of woodland/scrub across the site.*

Quality and extent of broadleaved woodland: canopy layer Risk: <i>Habitats not establishing to create diversity of woodland structure</i>	Presence of at least 3no. native canopy species across all woodland areas, including the Dormouse Compensation Area, as shown on Landscape Drawing 293651-LD-XX-DR-0001 v6 within Appendix B (noting small areas and further diversity in understory) comprising a mix of field maple (<i>Acer campestre</i>), oak (<i>Quercus sp</i>), birch (<i>Betula sp.</i>), ash (<i>Fraxinus excelsior</i>) and larger specimens of hazel and hawthorn (<i>Crataegus monogyna</i>). Trigger: <i>i) Under 40-70 % canopy cover achieved by Year 15.</i>	To be agreed with the botanical specialist, the dormouse licence holder and NRW (through the licence) but could include: Planting of appropriate species to fill in any gaps, as determined by the ecologist and species list provided in the planting schedules¹ in Appendix C (unless otherwise advised by the ecologist or the LPA).
Extent of successful new planting Risk: <i>Individual plants failing due to factors including water availability, browser pressure, and disease</i>	Presence of all species and proportion in accordance with original planting specification; with annual fruit/seed production. Any failed specimens will be replaced within the next available planting season and the failure percentage will not be allowed to accumulate beyond 10% over the five-year period. Trigger: <i>i) Over 10% planting failure up to Year 5. The 10% threshold is to be assessed annually, ensuring that each year's failure does not contribute to an overall total of more than 10% by the end of the five years.</i>	To be agreed with the botanical specialist, the dormouse licence holder and NRW (through the licence) but could include: Undertake planting as required, replacing failed specimens on a like-for-like basis in the next available planting season during the establishment period (up to 5 years post-planting). Planting failures are to be managed annually, and any necessary replacements are made promptly to maintain habitat integrity.
Diversity of age classes to create a resilient woodland of high value to dormice Risk: <i>Habitats not establishing to create diversity of woodland structure</i>	10 % saplings or young trees (< 10 years old). 60 % understorey species (shrub layer). 40-70 % semi mature/mature trees (canopy layer). 10 % decaying or dead trees. Note the woodland structure is formed of different layers, therefore total cover will exceed 100%. Trigger: <i>i) By Year 15 the above structure should have been achieved. Monitoring should be targeted to ensure that growth and structural diversity are on the way to being achieved.</i>	To be agreed with the botanical specialist, the dormouse licence holder and NRW (through the licence) but could include: Canopy thinning, coppicing or planting to be undertaken, in accordance with timings set out for protected species and in accordance with dormouse licence/precautionary method of working where required.
Proportion of impenetrable dormouse habitat Risk: <i>Habitats not establishing to create optimal dormouse habitat</i>	50% - 60% of the woodland shrub layer extent is made up of dense bramble, hazel or other native shrubs (such as hawthorn and wayfaring tree). Trigger: <i>i) Under 50% dormouse understorey habitat is present by Year 15. Monitoring should be targeted to ensure that growth and structural diversity are on the way to being achieved.</i>	To be agreed with the botanical specialist, the dormouse licence holder and NRW (through the licence) but could include: Planting of appropriate species to fill in any gaps, as determined by the ecologist and species list provided in the planting schedules¹ in Appendix C (unless otherwise advised by the ecologist or the LPA).
Presence of negative indicator species Risk: <i>Non-native species growth reducing habitat quality</i>	No more than 5% of canopy forming trees are non-native including naturalised species such as sycamore. No more than 5% of the shrub layer are non-native. Trigger: <i>i) >5% non-native species recorded during any monitoring year.</i>	To be agreed with the botanical specialist, the dormouse licence holder and NRW (through the licence) but could include: Remove encroaching species mechanically, in accordance with timings set out for protected species and in accordance with dormouse licence/precautionary method of working where required.



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Trees, Hedgerow, Scrub and Woodland On-Site (Celtic Lakes Substation Development area and Dormouse woodland habitat protection, hazel planting and enhancement area¹⁷)

Objective: To provide suitable habitat and connectivity for the dormouse population at the site, by creating a resilient network of woodland/scrub across the site.

Grazing/browsing pressure Risk: Young plants becoming damaged by grazing animals	No visible evidence of a browse line on trees and shrubs. Trigger: i) Evidence of wildlife/unauthorised grazing affecting >5% trees and shrubs in any monitoring year.	To be agreed with the botanical specialist, the dormouse licence holder and NRW (through the licence) but could include: • Ensure permanent fencing (around the perimeter of the site) is intact and repair as necessary. Consider further deterrent to reduce impact of grazing on establishing habitats.
Scrub		
Connectivity to woodland Risk: Habitats not establishing to link retained and created habitats together	Develop and subsequently maintain connectivity with scrubby woodland and hedgerows onsite. No gaps greater than 2m. Trigger: i) Gaps greater than 2m by Year 5.	To be agreed with the botanical specialist, the dormouse licence holder and NRW (through the licence) but could include: • Planting of appropriate species to fill in any gaps, as determined by the ecologist and species list provided in the planting schedules¹ in Appendix C (unless otherwise advised by the ecologist or the LPA).
Extent of scrub Risk: Habitats not establishing to provide optimal dormouse habitat	To be maintained in accordance with the landscape plan. Any failed specimens will be replaced within the next available planting season and the failure percentage will not be allowed to accumulate beyond 10% over the five-year period. Trigger: i) Over 10% planting failure up to Year 5. The 10% threshold is to be assessed annually, ensuring that each year's failure does not contribute to an overall total of more than 10% by the end of the five years.	To be agreed with the botanical specialist, the dormouse licence holder and NRW (through the licence) but could include: • Undertake planting as required, replacing failed specimens in the next available planting season on a like-for-like basis during the establishment period (up to 5 years post-planting). Planting failures are to be managed annually, and any necessary replacements are made promptly to maintain habitat integrity.
Species diversity Risk: Habitats not establishing to provide optimal dormouse habitat	At least 8no. target species to be present in each identified area as shown on Landscape Drawing 293651-LD-XX-DR-0001 v6 within Appendix B (noting small areas may not achieve this number). Target species include hazel, hawthorn, honeysuckle (<i>Lonicera periclymenum</i>), blackthorn (<i>Prunus spinosa</i>), elder (<i>Sambucus nigra</i>), bird cherry (<i>Prunus padus</i>), guelder rose (<i>Viburnum opulus</i>) and dogwood (<i>Cornus sanguinea</i>). Trigger: i) Less than 8no. target species in accordance with the landscape plan in any year of monitoring.	To be agreed with the botanical specialist, the dormouse licence holder and NRW (through the licence) but could include: • Undertake planting as required, replacing failed specimens in the next available planting season on a like-for-like basis during the establishment period (up to 5 years post-planting). Planting failures are to be managed annually, and any necessary replacements are made promptly to maintain habitat integrity.
Presence of negative indicator species Risk: Non-native species growth reducing habitat quality	No more than 5% of the shrub layer are non-native. Trigger: i) >5% non-native species recorded during monitoring in any year of monitoring.	To be agreed with the botanical specialist, the dormouse licence holder and NRW (through the licence) but could include: • Remove encroaching species mechanically, in accordance with timings set out for protected species and in accordance with dormouse licence/precautionary method of working where required.
Grazing/browsing pressure Risk: Young plants becoming damaged by grazing animals	No visible evidence of a browse line on trees and shrubs. Trigger: i) Evidence of wildlife/unauthorised grazing affecting >5% trees and shrubs in any year of monitoring.	To be agreed with the botanical specialist, the dormouse licence holder and NRW (through the licence) but could include: • Ensure permanent fencing (around the perimeter of the site) is intact and repair as necessary. Consider further deterrent to reduce impact of grazing on establishing habitats.



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Trees, Hedgerow, Scrub and Woodland On-Site (Celtic Lakes Substation Development area and Dormouse woodland habitat protection, hazel planting and enhancement area¹⁷)

Objective: *To provide suitable habitat and connectivity for the dormouse population at the site, by creating a resilient network of woodland/scrub across the site.*

Hedgerow		
Connectivity to woodland Risk: <i>Habitats not establishing to link retained and created habitats together</i>	Develop and subsequently maintain connectivity with other hedgerows, scrubby broadleaved woodland and tall dense scrub onsite. No gaps greater than 2m after Year 5. Trigger: <i>i) Any gaps greater than 2m by Year 5.</i>	To be agreed with the botanical specialist, the dormouse licence holder and NRW (through the licence) but could include: Planting of appropriate species to fill in any gaps, as determined by the ecologist and species list provided in the planting schedules¹ in Appendix C (unless otherwise advised by the ecologist or the LPA).
Extent of successful diversification planting Risk: <i>Habitats not establishing to provide optimal dormouse habitat</i>	Minimum 90% planting survival per year up to Year 5, then as recommended by the botanical and dormouse specialists. To be maintained in accordance with the landscape plan: species and proportion in accordance with original planting specification; with annual fruit/seed production. Any failed specimens will be replaced within the next available planting season and the failure percentage will not be allowed to accumulate beyond 10% over the five-year period. Trigger: <i>i) Over 10% planting failure per year up to Year 5. The 10% threshold is to be assessed annually, ensuring that each year's failure does not contribute to an overall total of more than 10% by the end of the five years.</i>	To be agreed with the botanical specialist, the dormouse licence holder and NRW (through the licence) but could include: Undertake planting as required, replacing failed specimens in the next available planting season on a like-for-like basis during the establishment period (up to 5 years post-planting). Planting failures are to be managed annually, and any necessary replacements are made promptly to maintain habitat integrity.
Height of hedgerow Risk: <i>Growth of hedgerow is stunted by lack of water or nutrients</i>	Minimum 2-3m high by Year 5. Annual monitoring should demonstrate that the hedgerow is on its way to achieving target condition. Trigger: <i>i) Hedgerow growth is slower than expected, or <2m height by Year 5 and subsequently.</i>	To be agreed with the botanical specialist, the dormouse licence holder and NRW (through the licence) but could include: - Allow to grow for a longer period before resuming management activities but also ensure that hedgerow does not become leggy. - Light pruning may still be required.
Width of hedgerow Risk: <i>Hedgerow growth is not achieving target condition</i>	Minimum 2m wide at its base by Year 5. Annual monitoring should demonstrate that the hedgerow is on its way to achieving target condition. Trigger: <i>i) Hedgerow width is <2m by Year 5.</i>	To be agreed with the botanical specialist, the dormouse licence holder and NRW (through the licence) but could include: - Allow to grow for a longer period before resuming management activities, but also ensure that hedgerow does not become leggy and sparse. - Light pruning may still be required to maintain thickness of hedge.
Species composition – positive indicators Risk: <i>Habitats not establishing to provide optimal dormouse habitat</i>	Presence of at least 5no species comprising a mix of hazel, hawthorn, bramble, blackthorn, goat willow, dogwood, honeysuckle or elder over 90% of the length of the hedgerow. Trigger: <i>i) Less than 5no. target species in accordance with the landscape plan in any year of monitoring.</i>	To be agreed with the botanical specialist, the dormouse licence holder and NRW (through the licence) but could include: Planting of appropriate species to replace failing specimens.
Species composition – Negative indicators	<10% non-native woody or herbaceous species. Trigger: <i>i) >10% non-native woody or herbaceous species present within the hedgerow in any year of monitoring.</i>	To be agreed with the botanical specialist, the dormouse licence holder and NRW (through the licence) but could include:



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Trees, Hedgerow, Scrub and Woodland On-Site (Celtic Lakes Substation Development area and Dormouse woodland habitat protection, hazel planting and enhancement area¹⁷)

Objective: To provide suitable habitat and connectivity for the dormouse population at the site, by creating a resilient network of woodland/scrub across the site.

Risk: Non-native species growth reducing habitat quality		Remove encroaching species mechanically, in accordance with timings set out for protected species and in accordance with dormouse licence/precautionary method of working where required.
Grazing/browsing pressure Risk: Young plants becoming damaged by grazing animals	Any grazing/browsing to not reduce the quantity of hedgerows onsite. Trigger: i) Evidence of wildlife/unauthorised grazing affecting >5% trees and shrubs in any year of monitoring.	To be agreed with the botanical specialist, the dormouse licence holder and NRW (through the licence) but could include: Ensure permanent fencing (around the perimeter of the site) is intact and repair as necessary. Consider further deterrent to reduce impact of grazing on establishing habitats.

Initial Aftercare and Maintenance (Years 1-5 post planting)

Note: All works described here will need to be conducted in accordance with the Dormouse Licence (reference S093767/2) and any amendments to it.

Woodland - Tree Planting

- Carry out a minimum of 4no. routine maintenance visits per year, with additional visits if required (especially watering visits), comprising the following operations:
 - Carry out twice annual inspections and adjustments to tree ties and staking/guying systems and after high winds;
 - Maintain mulched tree surrounds in a weed free condition and allow for topping up mulch when required e.g. after two years;
 - Water during prolonged dry spells to prevent tree deaths, during first two years following planting. Allow 50L/tree at each operation; and
 - Prune to ensure appropriate habit and form, and encourage desired shape for suitable flowering/fruiting using best practice horticultural knowledge.
- Inspections to monitor health of trees and to remove dead, dying or diseased wood – 2no. visits per annum or as required;
- Replace any dead/damaged trees that die within 5 years of planting in next available planting season; and
- Remove tree stakes and ties in Year 5, or when no longer required.

Woodland - Dormouse Compensation Area woodland habitat protection and enhancement area

Retained areas of woodland will be subject to ongoing management to support the local dormouse population. This will include encouraging further development of the shrub layer through thinning of the canopy layer (by no more than 10%), cutting patches in a sequence that encourages new coppice adjacent to old, permitting access to hazel crops and easy recolonisation by dormouse and to ensure diverse age structure of the woodland and letting light in for ground flora. These habitats will be subject to condition survey in addition to areas of created habitat, with habitat management adapted accordingly.

Carry out one visit per year in February or March, or as required. Trimming, pruning and selective tree removal (to enhance the shrub layer) will not be carried out during the active season for dormice (April to November inclusive). The named ecologist on the dormouse licence will be required to ensure these management operations do not conflict with the dormouse boxes which have been installed in this area. Each visit will include the following actions:

- Selective tree removal (focussing on non-native species) to create variation in canopy cover and light levels to benefit ground flora diversity, allowing bramble to grow and provide diverse habitat for other wildlife;
- Pile deadwood to create habitat piles in situ;
- Removal of inappropriate weed species including climbers (with exception of honeysuckle), dandelion, dock, thistle, nettles, and ragwort by hand excavation and/or pulling. or with spot treatment of herbicide as specifically required for the weed species;
- Plant understorey species including hazel as required to ensure a dense vigorous woodland screen is established; and
- Remove litter at each visit.



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Trees, Hedgerow, Scrub and Woodland On-Site (Celtic Lakes Substation Development area and Dormouse woodland habitat protection, hazel planting and enhancement area¹⁷)

Objective: *To provide suitable habitat and connectivity for the dormouse population at the site, by creating a resilient network of woodland/scrub across the site.*

Scrub

Retained areas of scrub will be subject to ongoing management to support the local dormouse population. This will include encouraging further development of the shrub layer through thinning of the canopy layer (by no more than 10%), cutting patches in a sequence that encourages new coppice adjacent to old, permitting access to hazel crops and easy recolonisation by dormouse and to ensure diverse age structure of the woodland and letting light in for ground flora. These habitats will be subject to a condition survey in addition to areas of created habitat, with habitat management adapted accordingly.

- Maintenance of newly created broadleaved scrub habitat and diversification within the grassland zone of the Dormouse Compensation Area will be carried out in compliance with the NRW dormouse licence (reference S093767/2).
- Carry out a minimum of 4-6 no. routine maintenance visits per year, with additional visits if required, comprising the following operations:
 - Re-firm plants after high winds and frosts;
 - Maintain mulched surrounds with top up mulch if necessary, e.g. after two years;
 - Maintain plant surrounds for a diameter of 500mm, in a weed free condition. In the interests of wildlife, hand weeding or careful mechanical cutting, where feasible, should take precedence over the use of herbicides. Where herbicide is the most effective measure this should be by selective application of an approved herbicide in July-August, in accordance with the manufacturer’s instructions. Ensure that herbicide application is carried out by a suitably trained person, only in periods of low winds, and with careful directional application to ensure no spray/drift onto tree/shrub species. Use only suitable herbicide products under current regulations. Where work is near water, comply with the Defra 1995 ‘Guidelines for the use of herbicides on weeds in or near water courses and lakes’. Observe all precautions recommended by the manufacturer and remove containers from site immediately after they have been emptied or are no longer required;
 - Maintain the inside of tree/shrub guards if used in a weed free condition by hand weeding;
 - Water as necessary during prolonged dry spells to prevent plant deaths, during first two years following planting;
 - Check the planting in spring as the buds burst and replace any dead plants immediately to avoid gaps forming in the hedge. Replacements should be true to type, of native origin, and of a similar size to existing plants and the time of re-planting;
 - Check/replace stakes, ties and guards if used. Adjust periodically and after high winds to ensure that they properly support and protect the tree;
 - Remove stakes and planting accessories if used at Year 5, or when no longer required; and
 - Remove litter at each visit.

Hedgerow

- Carry out a minimum of 4-6 no. routine maintenance visits per year, with additional visits if required, comprising the following operations:
- Re-firm plants after high winds and frosts;
- Maintain mulched surrounds with top up mulch if necessary, e.g. after two years;
- Maintain plant surrounds for a diameter of 500mm, in a weed free condition. In the interests of wildlife, hand weeding or careful mechanical cutting, where feasible, should take precedence over the use of herbicides in hedgerows. Where herbicide is the most effective measure this should be by selective application of an approved herbicide in July-August, in accordance with the manufacturer’s instructions. Ensure herbicide application is carried out by a suitably trained person, only in periods of low winds, and with careful directional application to ensure no spray/drift onto tree/shrub species. Use only suitable herbicide products under current regulations. Where work is near water, comply with the Defra 1995 ‘Guidelines for the use of herbicides on weeds in or near water courses and lakes’. Observe all precautions recommended by the manufacturer and remove containers from site immediately after they have been emptied or are no longer required;
- Maintain the inside of tree/shrub guards in a weed free condition by hand weeding;
- Hedges should initially be cut annually (between December and February) to help establish a broad hedge growth form and to maintain a height of 2-3m and by cutting each side in alternate years to retain foraging habitat/berries for wildlife each year and to minimise the risk of the hedge becoming gappy, leggy or excessive size in the long-term;
- Water during prolonged dry spells to prevent plant deaths, during the first two years following planting;



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Trees, Hedgerow, Scrub and Woodland On-Site (Celtic Lakes Substation Development area and Dormouse woodland habitat protection, hazel planting and enhancement area¹⁷)

Objective: *To provide suitable habitat and connectivity for the dormouse population at the site, by creating a resilient network of woodland/scrub across the site.*

- Check the hedge in spring as the buds burst and replace any dead plants immediately to avoid gaps forming in the hedge. Replacements should be true to type, of native origin, and of a similar size to existing plants and the time of re-planting;
- Check/replace stakes, ties and guards if used. Adjust periodically and after high winds to ensure that they properly support and protect the tree;
- Remove stakes and planting accessories if used at Year 5, or when no longer required; and
- Remove litter at each visit.

Initial Monitoring (Years 1-5 post planting)

Note: All works described here will need to be conducted in accordance with the Dormouse Licence (reference S093767/2) and any amendments to it.

Over and above the routine maintenance visits per year (a minimum of 4no.) and associated watering, weeding, tree replacement planting, as described above, the scrub and woodland habitats planted for dormice will be monitored to ensure the habitat is establishing and providing suitable condition for foraging and nesting dormice in accordance with the dormouse licence. Annual habitat monitoring will be undertaken in autumn to ensure that the woodland and scrub habitats planted are to establishing to the desired condition, replacing any failed plants as appropriate, and confirming condition of any retained scrub/woodland habitat within the Dormouse Compensation Area. Population monitoring of dormouse boxes across the site will be undertaken by licensed dormouse surveyors twice per year in May and September for a period of five years, with annual box maintenance to be undertaken in January/February.

Habitat condition monitoring of the scrub and woodland habitats planted for dormice will be undertaken by the dormouse specialist on an annual basis for the first five years post-planting as per the conditions set out within the NRW dormouse licence. This will consist of annual habitat monitoring to ensure that the woodland and scrub habitats planted, have established or on their way to establishing to the desired condition and be reported via an NRW compliance audit in years 2025, 2026, 2027, 2028, 2029. The results of the survey will identify any remedial actions required, which would be agreed between Welsh Government and NRW.

Long-term Maintenance (Year 6 onwards)

Note: All works described here will need to be conducted in accordance with the Dormouse Licence (reference S093767/2) and any amendments to it.

Woodland - Tree Planting

Carry out one visit per year in February or March, or as required, to undertake the following maintenance:

- Prune to ensure appropriate habit and form;
- Inspections to monitor health of trees and to remove dead, dying or diseased wood; and
- Where trees form a line of trees, trees should be maintained to ensure a continuous canopy cover along the tree line length.

Woodland - Dormouse Compensation Area woodland habitat protection and enhancement area (Existing Woodland)

Carry out one visit per year in February or March, or as required. Trimming, pruning and selective tree removal will not be carried out during the active season for dormice (April to November inclusive). The named ecologist on the dormouse licence will be required to ensure these management operations do not conflict with the dormouse boxes which have been installed in this area. Each visit will include the following actions:

- Selective tree removal to create variation in canopy cover (thinning the canopy cover by no more than 10% overall) and light levels to benefit ground flora diversity, allowing bramble to grow and provide diverse habitat for other wildlife;
- Coppicing, trimming, crown thinning or formative pruning to encourage healthy thriving growth of new plants will be carried out for the duration of the management plan (as required depending on growth and determined by monitoring) to maintain their shape and remove any dead wood, crossing branches and suckers. Pile deadwood to create habitat piles in situ;
- Thinning and coppicing will be undertaken on rotation (maximum 20% every 5 years to year 30, if determined appropriate through monitoring), cutting patches in a sequence that encourages new coppice adjacent to old, permitting access to hazel crops and easy recolonisation by dormice and to ensure diverse age structure of the woodland and letting light in for ground flora. This includes areas of existing and created habitat within the Dormouse Compensation Area (refer to Section 3.7 below).



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Trees, Hedgerow, Scrub and Woodland On-Site (Celtic Lakes Substation Development area and Dormouse woodland habitat protection, hazel planting and enhancement area¹⁷)

Objective: *To provide suitable habitat and connectivity for the dormouse population at the site, by creating a resilient network of woodland/scrub across the site.*

- Removal of inappropriate weed species including climbers (with exception of honeysuckle), dandelion, dock, thistle, nettles, and ragwort by hand excavation and/or pulling. or with spot treatment of herbicide as specifically required for the weed species;
- Replant/bulk up as required to ensure a dense vigorous woodland screen is established; and
- Remove litter at each visit.

Scrub

Maintenance within Dormouse Compensation Area will be carried out in compliance with the Dormouse Conservation Strategy and NRW dormouse licence.

Management of the scrub around the attenuation ponds will be maintained to the area specified within the Landscape General Arrangement (Appendix B), to avoid over-shadowing of the pond.

Carry out one visit per year in February or March, or as required. Trimming and pruning will not be carried out during the active season for dormice (April to November inclusive). Each visit will include the following actions:

- Remove any remaining tree guards and stakes;
- Thin canopy layer by no more that 10% to create variation in canopy cover and light levels to benefit ground flora diversity, allowing bramble to grow and provide diverse habitat for other wildlife;
- Coppice hazel within the shrub layer, cutting patches of less than 0.3ha and in total less than 10% of the total woodland area in any one year on a coupe rotation of no less than 15 to 20 years , with new coppice adjacent to old. This will permit access to hazel crops producing hazelnuts for dormice, and ensure diverse age structure of the woodland;
- Pile deadwood to create habitat piles in situ;
- Removal of inappropriate weed species including climbers (with exception of honeysuckle), dandelion, dock, thistle, nettles, and ragwort by hand excavation and/or pulling. or with spot treatment of herbicide as specifically required for the weed species;
- Replant/bulk up as required to ensure a dense vigorous woodland screen is established; and
- Remove litter at each visit.

Hedgerow

Maintenance within Dormouse Compensation Area will be carried out in compliance with the Dormouse Conservation Strategy and NRW dormouse licence.

Carry out one visit per year in February or March, or as required, to undertake the following maintenance:

- Removal of undesirable invasive species by hand excavation and/or pulling or with spot treatment of herbicide as specifically required for the weed species;
- Once established, no more than 30% of hedges should be cut in any 3-5 year period (or as required when targets for condition are not met). Cuts should aim to maintain a height of 2-3m, only cutting a single side of individual hedges in any one year to retain foraging habitat/berries for wildlife, maintain a dense form and to minimise the risk of the hedge becoming gappy, leggy or excessive size in the long-term;
- Replant/bulk up as required to ensure a dense vigorous screen is retained; and
- Remove litter at each visit.

Long-term Monitoring (Year 6 onwards)

Over and above the routine maintenance visits per year (if required) and associated coppicing, cutting, weed removal as described above, the scrub and woodland habitats planted for dormice will be monitored by the dormouse specialist every 5 years in accordance with the licence to ensure the habitat is establishing and providing suitable conditions for foraging and nesting dormice. Habitat condition monitoring of the scrub and woodland habitats planted for dormice will be undertaken every five years up to 30 years as per the conditions set out within the NRW dormouse licence. This will consist of annual visits to ensure that the woodland and scrub habitats planted, have established or on their way to establishing to the desired condition and be reported via an NRW compliance audit in years 2030, 2035, 2040, 2045, 2050 and 2055. The results of the survey will identify any remedial actions required, which would be agreed between Welsh Government and NRW.

3.7 Scrub Off-Site Management and Monitoring Plan

 © People's Trust for Endangered Species	Scrub Off-Site (Grassland Compensation Area¹⁷) Objective: <i>To provide suitable habitat and connectivity for the dormouse population at the site, by creating a resilient network of woodland/scrub across the site.</i>
Avoidance & Protection	
Note: All works described here will need to be conducted in accordance with the Dormouse Licence (reference S095506/3) and any amendments to it. Fencing is not proposed to be used as the only access to this area will be the landscape contractor with all works undertaken under supervision by the named ecologist and/or their accredited agents on the licence. Access to the working areas will be via the designated access route only.	
Implementation - Creation and Enhancement	
Note: All works described here will need to be conducted in accordance with the Dormouse Licence (reference S095506/3) and any amendments to it. Areas for Enhancement and Creation: Landscape Drawing 293651-LD-XX-DR-0503 v1 and Drawing 293651-LD-XX-DR-0402 v7 in Appendix B show the areas of bramble scrub and willow scrub which are being retained and enhanced or managed. Methodology: Willow Scrub - Enhancement of willow scrub areas within the Grassland Compensation Area for dormouse will be achieved through targeted management, including selective tree removal (focussing on non-native tree species or species less suitable for dormouse such as willow) to enhance the shrub layer within the willow scrub habitats and move towards the canopy cover and understorey targets detailed below for developing woodland habitat. - Deadwood will be retained on site from this operation to create habitat piles in situ. Bramble Scrub - A transitional ecotone will be created between the grassland and edge of the scrub area under the direction of the ecologist to create further botanical and structural heterogeneity providing biodiversity benefits, avoiding encroachment of scrub into the grassland area while also avoiding development of a hard edge between the two habitat areas. - Ivy <i>Hedera helix</i>, Honeysuckle and guelder rose will be planted on the edge of the bramble to provide supporting habitats for both dormice and shrill carder bee. - Hazel <i>Corylus avellana</i> will be planted within areas of existing ruderal vegetation or where willow scrub has been removed. - All plant stock shall be of UK provenance, as local as possible to the Gwent Levels. A Provenance Certificate shall be provided to confirm origin and provenance of all hazel used prior to the commencement of landscaping works. - All transplants shall be protected with a 400mm high biodegradable spiral rabbit guard supported by a stake or cane up to 750mm in height dependent on the specimen if required. Planting Schedules¹: Appendix C provides details of the species mix and densities.	
Scheduling and Timing of Activities	
Note: All works described here will need to be conducted in accordance with the Dormouse Licence (reference S095506/3) and any amendments to it. The management and monitoring prescriptions will commence on the completion of planting in each planting year.	



Scrub Off-Site (Grassland Compensation Area¹⁷)

Objective: To provide suitable habitat and connectivity for the dormouse population at the site, by creating a resilient network of woodland/scrub across the site.

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Planting		
Year 1-5		Year 6 onwards
To be undertaken between October to March unless agreed by the appointed Landscape Architect.		Carry out annual maintenance visit in February/March. Management of trees and scrub to be undertaken between December and February, with the exception of any disturbance or removal of roots or stumps which must be avoided over-winter when dormice are hibernating. Variation to this depending on species and ecologists’ advice through monthly monitoring during the spring and summer (April to September) as detailed below.
Carry out annual maintenance visit in February/March. Management of trees and scrub to be undertaken between December and February, with the exception of any disturbance or removal of roots or stumps which must be avoided over-winter when dormice are hibernating. Variation to this depending on species and ecologists’ advice through monthly monitoring during the spring and summer (April to September) as detailed below.		
Conditions Targets and Remedial Measures		
Condition Type & Risk Factor	Condition Target / Trigger for Remedial Measure	Remedial Measure - Note: All works described here will need to be conducted in accordance with the Dormouse Licence (reference S095506/3) and any amendments to it.
Scrub		
Connectivity to woodland Risk: Habitats not establishing to link retained and created habitats together	Develop and subsequently maintain connectivity with scrubby woodland and hedgerows onsite. No gaps greater than 2m. Trigger: <i>i) Gaps greater than 2m by Year 5.</i>	To be agreed with the botanical specialist, the dormouse licence holder and NRW (through the licence) but could include: Planting of appropriate species to fill in any gaps, as determined by the ecologist and species list provided in the planting schedules¹ in Appendix C (unless otherwise advised by the ecologist or the LPA).
Extent of scrub Risk: Habitats not establishing to provide optimal dormouse habitat	To be maintained in accordance with the landscape plan. Any failed specimens will be replaced within the next available planting season and the failure percentage will not be allowed to accumulate beyond 10% over the five-year period. Trigger: <i>i) Over 10% planting failure up to Year 5. The 10% threshold is to be assessed annually, ensuring that each year's failure does not contribute to an overall total of more than 10% by the end of the five years.</i>	To be agreed with the botanical specialist, the dormouse licence holder and NRW (through the licence) but could include: Undertake planting as required, replacing failed specimens in the next available planting season on a like-for-like basis during the establishment period (up to 5 years post-planting). Planting failures are to be managed annually, and any necessary replacements are made promptly to maintain habitat integrity.
Species diversity Risk: Habitats not establishing to provide optimal dormouse habitat	At least 8no. target species to be present in each identified area as shown on Landscape Drawing 293651-LD-XX-DR-0402 v7 and 293651-LD-XX-DR-0503 v1 within Appendix B (noting small areas may not achieve this number). This includes the ecotone areas. Target species include hazel, hawthorn, honeysuckle, blackthorn, elder, bird cherry, guelder rose and dogwood. Trigger: <i>i) Less than 8no. target species in accordance with the landscape plan in any year of monitoring.</i>	To be agreed with the botanical specialist, the dormouse licence holder and NRW (through the licence) but could include: Undertake planting as required, replacing failed specimens in the next available planting season on a like-for-like basis during the establishment period (up to 5 years post-planting). Planting failures are to be managed annually, and any necessary replacements are made promptly to maintain habitat integrity.
Presence of negative indicator species	No more than 5% of the shrub layer are non-native. Trigger:	To be agreed with the botanical specialist, the dormouse licence holder and NRW (through the licence) but could include:



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Scrub Off-Site (Grassland Compensation Area¹⁷)

Objective: To provide suitable habitat and connectivity for the dormouse population at the site, by creating a resilient network of woodland/scrub across the site.

Risk: Non-native species growth reducing habitat quality	i) >5% non-native species recorded during monitoring in any year of monitoring.	Remove encroaching species mechanically, in accordance with timings set out for protected species and in accordance with dormouse licence/precautionary method of working where required.
Grazing/browsing pressure Risk: Young plants becoming damaged by grazing animals	No visible evidence of a browse line on trees and shrubs. <i>Trigger:</i> i) Evidence of wildlife/unauthorised grazing affecting >5% trees and shrubs in any year of monitoring.	To be agreed with the botanical specialist, the dormouse licence holder and NRW (through the licence) but could include: Ensure permanent fencing (around the perimeter of the site) is intact and repair as necessary. Consider further deterrent to reduce impact of grazing on establishing habitats.

Initial Aftercare and Maintenance (Years 1-5 post planting)

Note: All works described here will need to be conducted in accordance with the Dormouse Licence (reference S095506/3) and any amendments to it.

Scrub

Carry out one visit per year in February or March, or as required. Trimming, pruning and selective tree removal (to enhance the shrub layer) will not be carried out during the active season for dormice (April to November inclusive). The named ecologist on the dormouse licence will be required to ensure these management operations do not conflict with the dormouse boxes which have been installed in this area. Each visit will include the following actions:

- Pruning and tree removal as necessary;
- Pile deadwood to create habitat piles in situ;
- Plant understorey species including hazel as required to ensure a dense vigorous woodland screen is established;

Areas of willow scrub within the Grassland Compensation Area will be subject to selective tree removal (focussing on species less suitable for dormouse such as willow) to create variation in canopy cover and light levels to benefit flora diversity, allowing a more diverse species mix to grow and to provide structural heterogeneity for dormouse and other wildlife. Deadwood will be retained on site from this operation to create habitat piles in situ. Areas of remaining ruderal vegetation will be selectively cut to provide a space for planting of hazel.

- In the Grassland Compensation Area maintenance of retained scrub habitat and the adjacent ecotone will be carried out in compliance with the NRW dormouse licence (**reference S095506/3**).
- In the Grassland Compensation Area removal of inappropriate weed species including climbers (with the exception of honeysuckle), dandelion, dock, thistle, nettles and ragwort will be undertaken from within scrub habitat as advised by the suitably experienced ecologist. Following this, understorey species including hazel will be planted as required to ensure a dense vigorous woodland screen is established.
- In the Grassland Compensation Area a graduated ecotone buffer with late flowering species such as bramble will be created between the retained scrub and grassland, along with planting of hazel, ivy, honeysuckle and guelder rose to provide supporting habitats for both dormice and shrill carder bee.
- Carry out a minimum of 4-6 no. routine maintenance visits per year, with additional visits if required, comprising the following operations:
 - Water as necessary during prolonged dry spells to prevent plant deaths, during first two years following planting;
 - Check the planting in spring as the buds burst and replace any dead plants immediately to avoid gaps forming. Replacements should be true to type, of native origin, and of a similar size to existing plants and the time of re-planting; and
 - Remove litter at each visit.

Initial Monitoring (Years 1-5 post planting)

Note: All works described here will need to be conducted in accordance with the Dormouse Licence (reference S095506/3) and any amendments to it.



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Scrub Off-Site (Grassland Compensation Area¹⁷)

Objective: *To provide suitable habitat and connectivity for the dormouse population at the site, by creating a resilient network of woodland/scrub across the site.*

Over and above the routine maintenance visits per year (a minimum of 4no.) and associated watering, weeding, replacement planting, as described above, the scrub and woodland habitats planted for dormice will be monitored to ensure the habitat is establishing and providing suitable condition for foraging and nesting dormice in accordance with the dormouse licence. Annual habitat monitoring will be undertaken in autumn to ensure that the woodland and scrub habitats planted are to establishing to the desired condition, replacing any failed plants as appropriate, and confirming condition of any retained scrub/woodland habitat. Population monitoring of dormouse boxes across the site will be undertaken by licensed dormouse surveyors twice per year in May and September for a period of five years, with annual box maintenance to be undertaken in January/February.

Habitat condition monitoring of the scrub and woodland habitats planted for dormice will be undertaken by the dormouse specialist on an annual basis for the first five years post-planting as per the conditions set out within the NRW dormouse licence. This will consist of annual habitat monitoring to ensure that the woodland and scrub habitats planted, have established or on their way to establishing to the desired condition and be reported via an NRW compliance audit in years 2026, 2027, 2028, 2029 and 2030. The results of the survey will identify any remedial actions required, which would be agreed between Welsh Government and NRW.

Long-term Maintenance (Year 6 onwards)

Note: All works described here will need to be conducted in accordance with the Dormouse Licence (reference S095506/3) and any amendments to it.

Existing Woodland

Carry out one visit per year in February or March, or as required. Trimming, pruning and selective tree removal will not be carried out during the active season for dormice (April to November inclusive). The named ecologist on the dormouse licence will be required to ensure these management operations do not conflict with the dormouse boxes which have been installed in this area. Each visit will include the following actions:

- Selective tree removal to create variation in canopy cover (thinning the canopy cover by no more than 10% overall) and light levels to benefit ground flora diversity, allowing bramble to grow and provide diverse habitat for other wildlife;
- Coppice hazel within the shrub layer, cutting patches of less than 0.3ha and in total less than 10% of the total woodland area in any one year on a coupe rotation of no less than 15 to 20 years, with new coppice adjacent to old. This will permit access to hazel crops producing hazelnuts for dormice, and ensure diverse age structure of the woodland;
- Pile deadwood to create habitat piles in situ;
- Removal of inappropriate weed species including climbers (with exception of honeysuckle), dandelion, dock, thistle, nettles, and ragwort by hand excavation and/or pulling. or with spot treatment of herbicide as specifically required for the weed species;
- Replant/bulk up as required to ensure a dense vigorous woodland screen is established; and
- Remove litter at each visit.

Scrub

Maintenance within the Grassland Compensation Area will be carried out in compliance with the NRW dormouse licence.

Carry out one visit per year in February or March, or as required. Trimming and pruning will not be carried out during the active season for dormice (April to November inclusive). Each visit will include the following actions:

- Remove any remaining tree guards and stakes;
- Thin canopy layer by no more that 10% to create variation in canopy cover and light levels to benefit ground flora diversity, allowing bramble to grow and provide diverse habitat for other wildlife;
- Coppice hazel within the shrub layer, cutting patches of less than 0.3ha and in total less than 10% of the total woodland area in any one year on a coupe rotation of no less than 15 to 20 years , with new coppice adjacent to old. This will permit access to hazel crops producing hazelnuts for dormice, and ensure diverse age structure of the woodland;
- Pile deadwood to create habitat piles in situ;
- Removal of inappropriate weed species including climbers (with exception of honeysuckle), dandelion, dock, thistle, nettles, and ragwort by hand excavation and/or pulling. or with spot treatment of herbicide as specifically required for the weed species;
- Replant/bulk up as required to ensure a dense vigorous woodland screen is established; and



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Scrub Off-Site (Grassland Compensation Area¹⁷)

Objective: *To provide suitable habitat and connectivity for the dormouse population at the site, by creating a resilient network of woodland/scrub across the site.*

- Remove litter at each visit.

Long-term Monitoring (Year 6 onwards)

Over and above the routine maintenance visits per year (if required) and associated coppicing, cutting, weed removal as described above, the scrub and woodland habitats planted for dormice will be monitored by the dormouse specialist every 5 years in accordance with the licence to ensure the habitat is establishing and providing suitable conditions for foraging and nesting dormice. Habitat condition monitoring of the scrub and woodland habitats planted for dormice will be undertaken every five years up to 30 years as per the conditions set out within the NRW dormouse licence. This will consist of annual visits to ensure that the woodland and scrub habitats planted, have established or on their way to establishing to the desired condition and be reported via an NRW compliance audit in years 2030, 2035, 2040, 2045, 2050 and 2055. The results of the survey will identify any remedial actions required, which would be agreed between Welsh Government and NRW.

3.8 Attenuation Ponds (On-Site) and Reen Network (hydrologically connected) Management and Monitoring Plan

	Attenuation Pond On-Site (within the Celtic Lakes Substation Development area¹⁷) and Reen Network (hydrologically connected) Objective: <i>To create a watercourse network with suitable habitats to support key invertebrate species.</i>
Avoidance & Protection	
Construction activities may lead to pollution and run-off affecting watercourses (including reens and ditches of the SSSI) and therefore damage habitats which are hydrologically connected to the site. The CEMP includes site-specific methods to ensure that all site activities in proximity to watercourses are controlled and follow relevant legislation. Additional measures such as silt fencing may prevent contaminants effecting the watercourse. The Proposed Development will not directly impact any field ditches or reens, as construction activities are all over 7m and 12.5m away, respectively. The lighting during construction will be directional and aim to avoid and minimise illumination in areas that contain ecologically sensitive habitats, such as adjacent waterbodies, in order to protect commuting/foraging otter and other nocturnal/crepuscular species. Where there is light spill onto the peripheral habitats of the buffer area, these will not be greater than 0.5 Lux. Habitat creation and enhancement areas will be protected by permanent fencing to restrict human and fly-grazing access, as shown on ‘Celtic Lakes Fencing Mark-up 30 April 2024’ in Appendix B. Reens and ditches: • All reens and ditches are to be retained. All construction will be over 7m from the nearest ditch and 12.5m from the nearest reen. • Pollution control measures will be fully described in the CEMP but will include: - o The proposed drainage strategy comprises increasing the capacity of an existing attenuation pond by 1,500m³ within the site to treat and store the surface water flow from the proposed hardstanding. - o The surface water during operation will discharge to the Percoed West Reen, west of the proposed hardstanding via an existing outfall. The outfall will continue to discharge as existing, retaining the 16.7l/s restriction. - o Adherence to the Guidelines for Pollution Prevention 5 (GPP5) – Works or maintenance in or near water and CIRIA C741 will be undertaken throughout construction. - o Field ditches will not be subject to any increase in shading from mitigation and enhancements including the diversification of hedgerows or woodland within the site, with all woodland planting at least 7m from the ditch embankments. - o Any INNS will be dealt with by the contractor who will need to produce an INNS management plan. - o The Contractor will prepare a Biosecurity Risk Assessment to evaluate potential risks at each location and relevant biosecurity precautions. The transfer of amphibian and fish diseases as well as INNS should be minimised by undertaking cleaning and disinfection of equipment in accordance with best practice.	
Implementation - Creation and Enhancement	
Areas for Enhancement and Creation: Drawing 293651-LD-XX-DR-0001 v6 in Appendix B shows the area for habitat creation associated with the attenuation pond. Methodology: Attenuation Pond (marginal planting) • The western of the two existing ponds will be increased in size to accommodate the required increase in surface water flow. • The pond edges will be gently sloping to allow species such as amphibians to access the water, as well as provide habitat for marginal aquatic planting. Appropriate species mixes for aquatic and marginal planting are provided in the planting schedule¹ in Appendix C. • It is acknowledged that the following species are not suitable for the Gwent Levels and will not be included within any selected seed mix: great burnet, yellow oat-grass, lady’s bedstraw, water avens and common quaking grass.	

 Attenuation Pond On-Site (within the Celtic Lakes Substation Development area¹⁷) and Reen Network (hydrologically connected) Objective: <i>To create a watercourse network with suitable habitats to support key invertebrate species.</i> © Phoenix Amenity								
All plant stock shall be UK provenance, as local as possible to the Gwent Levels. A Provenance Certificate shall be provided to confirm origin and provenance of all native tree species used prior to the commencement of landscaping works. Planting Schedules¹: Appendix C provides details of the planting specification.								
Scheduling and Timing of Activities								
The management and monitoring prescriptions will commence on the completion of planting in each planting year. <table> <tr> <th>Planting</th><th>Year 1-30 maintenance</th><th>Year 1-30 monitoring</th></tr> <tr> <td>To be undertaken April-June or as advised by the Landscape Architect.</td><td>Annual maintenance visit to manage vegetation growth and scrub encroachment as required in November to February. Variation to this depending on species and ecologists’ advice as detailed below.</td><td>Botanical monitoring will be undertaken once per year in years 1, 2, 3, 5, 10 post-construction and every 10 years thereafter until year 30. Surveys will be undertaken between mid-May and the end of July, with the optimum period being between late June and early July. Aquatic invertebrate sampling will be conducted along the banks of both attenuation ponds, to allow for repeatability and comparison, once per year between July and September in Years 1, 2, 3, 5, 10 post-construction; and every 10 years thereafter until Year 30. Variation to this depending on species and ecologists’ advice as detailed below.</td></tr> </table>			Planting	Year 1-30 maintenance	Year 1-30 monitoring	To be undertaken April-June or as advised by the Landscape Architect.	Annual maintenance visit to manage vegetation growth and scrub encroachment as required in November to February. Variation to this depending on species and ecologists’ advice as detailed below.	Botanical monitoring will be undertaken once per year in years 1, 2, 3, 5, 10 post-construction and every 10 years thereafter until year 30. Surveys will be undertaken between mid-May and the end of July, with the optimum period being between late June and early July. Aquatic invertebrate sampling will be conducted along the banks of both attenuation ponds, to allow for repeatability and comparison, once per year between July and September in Years 1, 2, 3, 5, 10 post-construction; and every 10 years thereafter until Year 30. Variation to this depending on species and ecologists’ advice as detailed below.
Planting	Year 1-30 maintenance	Year 1-30 monitoring						
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Conditions Targets and Remedial Measures								
Condition Type & Risk Factor	Condition Target / Trigger for Remedial Measure	Remedial Measure						
Water quality Risk: <i>Pollution reducing water quality of the pond</i>	The pond is of good water quality, with clear water (low turbidity) indicating no obvious signs of pollution. Trigger: <i>i) Evidence of pollution e.g. oil film, discoloured water or species mortality in any monitoring year.</i>	To be agreed with the botanical specialist and LPA but could include: Identify possible pollution source and provide mitigation to avoid the pathway between the source and the pond.						
Surrounding habitat Risk: <i>Habitat is not establishing</i>	There is semi-natural habitat (moderate distinctiveness or above) completely surrounding the pond, for at least 10m from the pond edge for its entire perimeter. Trigger: <i>i) Area of planted vegetation is failing to establish as per Landscape specification by Year 2.</i>	To be agreed with the botanical specialist and LPA but could include: Replanting as per Landscape specification.						
Emergent species/macrophyte cover	Less than 10% of the water surface is covered with duckweed <i>Lemna</i> spp. or filamentous algae. Emergent, submerged or floating plants (excluding duckweed) cover at least 50% of the pond area which is less than 3m deep. Species planted as per planting specification establishing.	To be agreed with the botanical specialist and LPA but could include: - Remove weed species or commence appropriate treatment regime. - Replant emergent vegetation as required.						

 © Phoenix Amenity Attenuation Pond On-Site (within the Celtic Lakes Substation Development area¹⁷) and Reen Network (hydrologically connected) Objective: <i>To create a watercourse network with suitable habitats to support key invertebrate species.</i>		
Risk: <i>Habitat not establishing to specification</i>	Trigger: <i>i) Greater than 10% duckweed or filamentous algae cover in ant monitoring year.</i> <i>ii) Less than 50% emergent vegetation in pond area <3m depth by Year 3.</i> <i>iii) Planting establishing as per specification including at least one SSSI species by Year 5.</i>	
Presence of invasive non-native species Risk: <i>Habitat becomes dominated by invasive species</i>	There is an absence of non-native plant and animal species listed on Schedule 9 of the WCA. Trigger: <i>i) Any presence of any invasive non-native plant species (as listed on Schedule 9 of WCA) in any monitoring year.</i>	To be agreed with the INNS specialist and LPA but could include: Remove species or commence appropriate treatment regime in accordance with INNS management plan.
Overshading Risk: <i>Pond vegetation may not receive sufficient light to grow</i>	The pond surface is no more than 50% shaded by adjacent trees and scrub. Trigger: <i>i) >50% scrub or tree shading over water surface in any monitoring year.</i>	To be agreed with the botanical specialist and LPA but could include: Remove encroaching species mechanically, in accordance with timings set out for protected species and in accordance with dormouse licence/precautionary method of working where required.
Aftercare and Maintenance (Years 1-30 post planting)		
Attenuation Pond (marginal planting) - Carry out one visit per year, or as required to ensure the following list is considered (as advised by an ECoW): - Ensure macrophytes do not dominate more than 2/3 of the pond surface water area. Once a year in autumn, selectively remove any dominating macrophytes and leave on the pond edge before removal the next day – to allow invertebrates and any amphibians time to move back into the water. - Remove invasive scrub species annually (November-February inclusive). - Remove INNS species in accordance with an INNS management plan and biosecurity procedures. - By hand or using hand-tools, remove any filamentous algae or duckweed to <10% cover in autumn. - Ensure ponds are not completely shaded by overhanging vegetation; selectively prune any adjacent scrub. - Replace planting as required to maintain the integrity of the system, actions taken as a result of findings at annual inspection. - Remove litter and inspection of inlets and outlets at each visit.		
Monitoring (Years 1-30 post planting)		
Botanical Survey Surveys will follow the methodology detailed within the EcIA baseline survey reports (based on guidance for pond flora monitoring). Surveys for vegetation will be conducted along the banks of the attenuation ponds, to allow for repeatability and comparison.		



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Attenuation Pond On-Site (within the Celtic Lakes Substation Development area¹⁷) and Reen Network (hydrologically connected)

Objective: *To create a watercourse network with suitable habitats to support key invertebrate species.*

Once per year in years 1, 2, 3, 5, 10 post-construction and every 10 years thereafter until year 30.

Surveys will be undertaken between mid-May and the end of July, with the optimum period being between late June and early July.

Aquatic Invertebrate Survey

Aquatic invertebrate survey methodology will follow that detailed within the EcIA and in accordance with the NRW guidelines (CCW, 1996²⁹; 2004³⁰).

Aquatic invertebrate sampling will be conducted along the banks of both attenuation ponds, to allow for repeatability and comparison, once per year between July and September in Years 1, 2, 3, 5, 10 post-construction; and every 10 years thereafter until Year 30.

²⁹ Countryside Council for Wales (CCW 1996) General guidance: Monitoring of Physical Developments within the Gwent Levels Site of Special Scientific Interest (SSSI). Interim Guidance Note 1.

³⁰ Countryside Council for Wales (CCW 2004) Invertebrate Monitoring on the Gwent Levels Sites of Special Scientific Interest. Interim Guidance Note 3, Updated June 2004.

Welsh Government

CLS-ARP-EAC-XX-RP-OE-000003 V2 | 28 August 2024 | Ove Arup & Partners Limited

Celtic Lakes NGED Substation

30-Year Habitat Management and Monitoring Plan

3.9 Invasive Non-Native Species (INNS) Management and Monitoring Plan (On-Site and Off-Site)

	Invasive Non-Native Species (INNS) (within all areas) Objective: <i>To avoid spread or dominance of any INNS plant species at the site and mitigation areas</i>
Avoidance & Removal	
No INNS flora species were identified within the site boundary during the ecological baseline surveys, however during the vegetation clearance undertaken in April/May 2024, INNS cotoneaster species were identified within the site boundary including Himalayan cotoneaster, wall cotoneaster (<i>Cotoneaster horizontalis</i>) noted to date. Nuttall’s waterweed has also been noted in the reens around the Grassland Compensation Area, with Himalayan cotoneaster, wall cotoneaster and entire-leaved cotoneaster also identified within the Dormouse Compensation Area. In the wider area the further INNS were recorded: false Virginia creeper; Himalayan balsam; New Zealand Pigmyweed; Canadian pondweed and Japanese knotweed. The locations of these INNS are provided on Figure 5. Under the Environmental Protection Act 1990, Schedule 9 INNS and those listed on the Invasive Alien Species Order are considered controlled waste and therefore have to be disposed of safely at a licensed landfill if they need to be removed during construction and any management and maintenance works. A cotoneaster management plan has been prepared for the plants found during the vegetation clearance³¹. A specialist INNS Management Plan will need to be developed by the contractor as part of the detailed CEMP for the treatment and/ or avoidance of any other of these species identified during construction. All equipment and footwear will be cleaned thoroughly before entering the site with a suitable disinfectant. In addition, all equipment and footwear will be thoroughly cleaned and disinfected when leaving site, particularly in areas where INNS have been located.	
INNS Management and Monitoring Plan (Year 1 – 30)	
Updated INNS surveys will be required which will be undertaken as part of the botanical monitoring at the site during lifetime of the management plan. This information will be used to update the INNS management plan as required, to ensure that INNS plant species do not out-compete the native species planting at the site. Himalayan cotoneaster and wall cotoneaster have been identified at the site, including within the Grassland Compensation Area (off-site), as shown on Figure 5. INNS of cotoneaster within the Celtic Lakes Substation development site area have been removed in accordance with the INNS Management Plan. A bund was created with the potentially contaminated material and soils, and is subject to ongoing treatment as specified within the INNS Management Plan. The bund is located at ST 28486 83857 and as shown on Figure 1 in Appendix A. INNS within retained habitats at the site, including within the Dormouse Compensation Areas are not proposed to be treated or removed. Condition targets relating to INNS and associated remedial actions are provided within each of the habitat management and monitoring plans above, and these should be conducted under the guidance of an adaptive INNS Management Plan.	

³¹ TR33 Limited Client Advice Report: Invasive Non-native Plant (INNP) Management Plan Version 1 30th May 2024. Advanced Invasives.

3.10 Artificial Habitat Features Creation and Management (On-Site and within Dormouse Compensation Areas)



Artificial Habitat Features (within the Celtic Lakes Substation Development area and dormouse compensation areas¹⁷)

Objective: *To provide artificial habitat features to provide additional habitat and safe areas for protected species.*

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Dormouse Boxes

As detailed within the dormouse conservation strategy, thirty dormouse boxes will be installed by an experienced ecologist within the existing woodland to the east of the development site, within Dormouse Compensation Area for Celtic Lakes Substation Development (Figure 1, Appendix A). Dormouse boxes will be installed on mature trees within the woodland, roughly 1.5m above ground in trees where there is good connective understorey, in agreement with the named ecologist or an accredited agent on the licence. They will be installed before any vegetation clearance commenced to provide additional carrying capacity within this undisturbed area of woodland during construction and additional nesting habitats until the woodland and scrub reach their target condition (which is anticipated to be between five and 30 years). Picture 1 below shows the numbering of the boxes.



Picture 1: Location and numbering of dormouse boxes within Celtic Lakes Substation Development Dormouse Compensation Area

In the Grassland Compensation Area, a further 30 dormouse boxes will be installed to provide mitigation for habitat loss in this area within the Dormouse Compensation Area for the GCA (Figure 1, Appendix A and 293651-LD-XX-DR-0503, Appendix B. Picture 2 below shows the numbering of the boxes.



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Artificial Habitat Features (within the Celtic Lakes Substation Development area and dormouse compensation areas¹⁷)

Objective: To provide artificial habitat features to provide additional habitat and safe areas for protected species.



Picture 2: Location and numbering of dormouse boxes within the GCA Dormouse Compensation Area

These boxes will be monitored in accordance with the dormouse licence by the named ecologist or accredited agents on the licence and replaced as necessary if any are damaged or lost. Boxes would be checked by licensed dormouse surveyors in May and September each year between 2026 and 2031 and every 5 years thereafter, in line with the National Dormouse Monitoring Programme (NDMP) methodology. Annual dormouse box maintenance will also be undertaken in January/February. Note that box 0 on the plans above was installed during vegetation clearance works to translocate dormice and is not part of the monitoring programme. It may be relocated or removed as appropriate if unoccupied under supervision of the dormouse licenced ecologist.

The scrub habitat within the main construction area will undergo single-stage clearance (Section 4.3 of the Vegetation Clearance Method Statement). The arisings from Stage 1 of the clearance will be used to create dead hedging within the main development site to allow dormice to disperse towards the Dormouse Compensation Area. Dead hedges comprise brash interwoven between upright stakes up to 1.5m in height. The location of the dead hedging will be determined by the named ecologist on the dormouse licence.

Reptile Features

Five reptile hibernaculum and two grass snake egg laying heaps will be constructed within the retained grassland on-site. Five reptile hibernaculum (see Picture 3) will be created within suitable habitats in the site; optimal locations will be edge habitats between open areas of grassland and woodland/scrub. They should provide opportunities for shelter as well as hibernation; therefore, they will need to be located on higher areas of ground, unlikely to flood and which are positioned on a south facing aspect in full or partial sun. Picture 4 indicates a minimum size, but they may be larger if materials and space allow.



© Arup

Artificial Habitat Features (within the Celtic Lakes Substation Development area and dormouse compensation areas¹⁷)

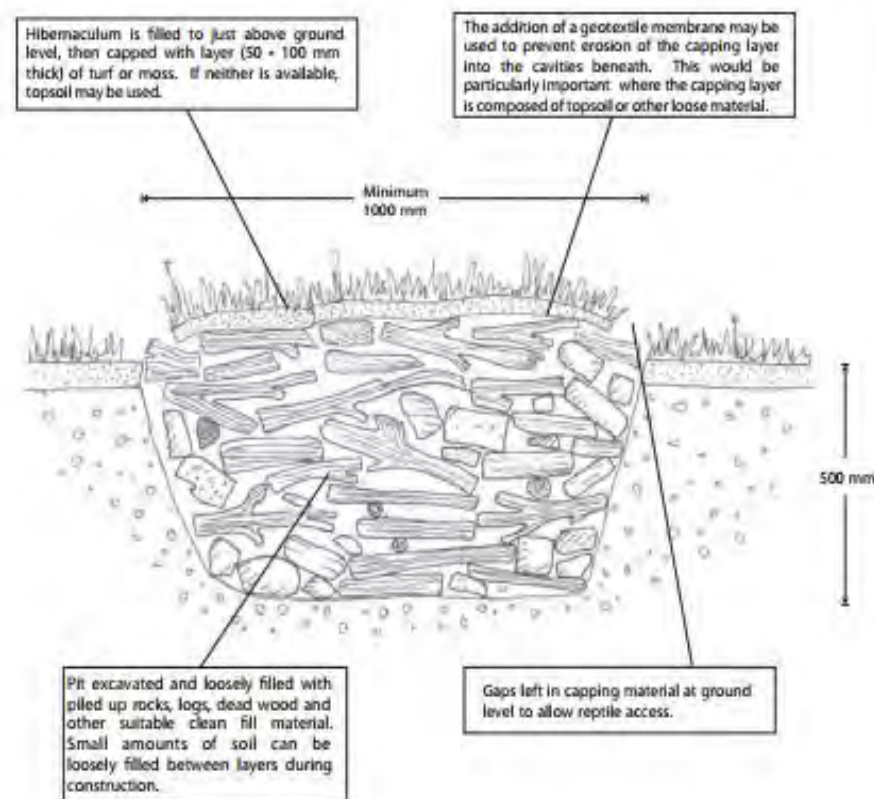
Objective: To provide artificial habitat features to provide additional habitat and safe areas for protected species.

Reptile hibernacula will be produced using a range of materials such as cut timber, brash, inert hard core, bricks, rocks, grubbed up tree roots etc, placed in a sheltered sunny area which is well connected to other suitable reptile habitat. The hibernacula will have a diverse structure for example creating a compacted core, with more loose outer layers, ensuring that larger cavities are filled with smaller materials such as wood chippings or topsoil.

Materials that decompose should not be placed beneath heavy components, to avoid risk of collapse. Access points will be located around the edges for example by ensuring timber protrudes from the sides. Turf (or vegetated topsoil) will be used to cover the final construction or where this is not possible, will be sown with a grass/flower seed mix. If additional drainage is needed, this can be facilitated through the addition of gravel and slotted pipes within the structure.

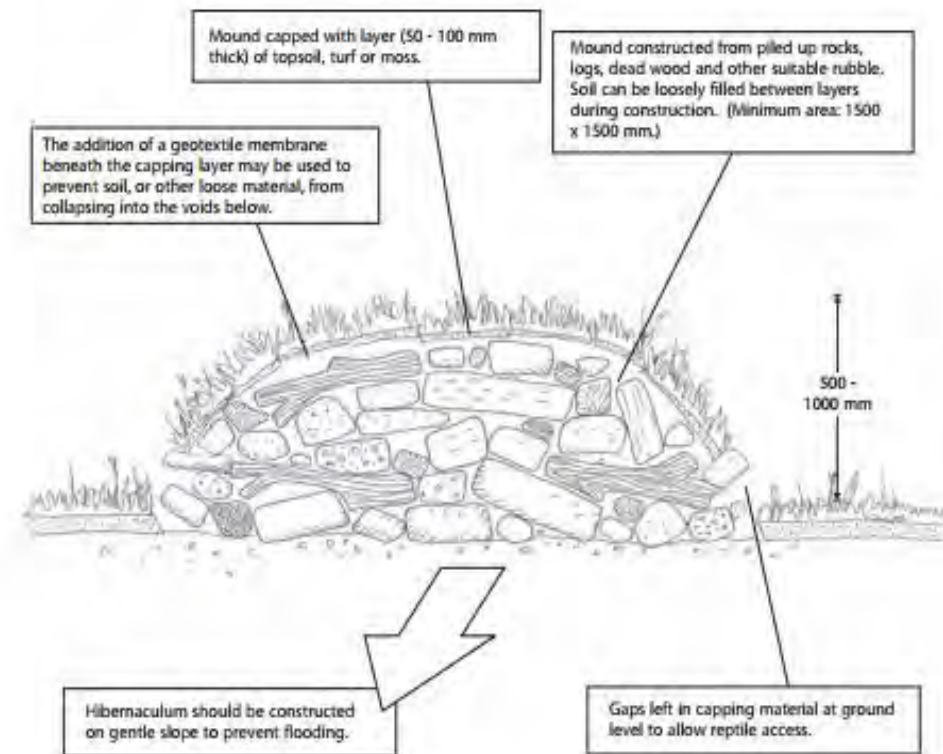
Hibernaculum on free-draining ground

Where ground conditions allow, the hibernaculum should be incorporated into a shallow pit. This design is more likely to remain frost-free, and will be less obtrusive and thus unlikely to be subject to interference.



Hibernaculum on impermeable ground

Where ground conditions are impermeable, then an 'above-ground' or mounded design should be utilised in order to prevent the hibernaculum from flooding. This design should also be used if it is not possible to excavate a pit for any other reason.



Picture 3: Reptile refugia design³²

Two grass snake egg laying heaps will be located in a sunny spot, adjacent to tall vegetation (scrub/trees) and within 400m of a waterbody. Picture 4 below described further requirements for the creation of grass snake egg laying heaps.

³² DMRB Volume 10 Section 4 Part 7 (HA 116/05) Environmental design and management. The good roads guide - Nature conservation. Nature conservation advice in relation to reptiles and roads (Withdrawn).



© Arup

Artificial Habitat Features (within the Celtic Lakes Substation Development area and dormouse compensation areas¹⁷)

Objective: To provide artificial habitat features to provide additional habitat and safe areas for protected species.

How to create a grass snake egg-laying heap



- **Where:** In a sunny spot, adjacent to tall vegetation, away from busy roads and no more than 400m from a water body. Female grass snakes become habituated to using a successful heap for several years, so when refreshing a heap, ensure you always use the same location.
- **When:** Mid-March to late April
- **Materials:**
 - One third fresh horse manure
 - One third vegetation (leaves, clippings) or compost
 - One third large sticks or branches
- **Instructions:**
 - Clear the ground where you want the heap
 - Create a base layer of leaves and clippings
 - Lay the largest sticks/branches on top of this
 - Place half of the horse manure on top of the sticks and branches.
 - Add another layer of smaller sticks.
 - Mix the remaining manure with the vegetation/compost and add this to the heap. Add some branches and smaller sticks to keep these layers well ventilated.
 - Ensure that the egg-laying heap is not too compacted, so the animals can easily get into it, and to prevent it from overheating.

Picture 4: Grass snake egg laying heaps³³

Site-won materials will be used to create the reptile hibernacula and egg laying heaps. If there is insufficient sized logs and materials from the vegetation clearance, consideration will be given to sourcing logs/materials for the hibernacula and egg laying heaps from other locally felled areas.

Picture 5 below shows the location of the reptile hibernaculum.

³³ RAVON, ARG UK. Creating grass snake egg-laying heaps. Available at: https://www.ravon.nl/Portals/2/Bestanden/Publicaties/Brochures/Brochure_ringslang_EN.pdf [Accessed June 2023]



Artificial Habitat Features (within the Celtic Lakes Substation Development area and dormouse compensation areas¹⁷)

Objective: *To provide artificial habitat features to provide additional habitat and safe areas for protected species.*

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Picture 5: Location of reptile hibernaculum

Each hibernacula/egg-laying heap feature will be subject to inspection by an ECoW during the 30 year period to ensure function is maintained. It is likely that specific measures such as vegetation control, opening up entrances or replenishment of materials periodically during the HMMP period will be required. This will be determined by monitoring and remedial measures determined by the ecologists. Monitoring of the features will occur once per year in years 1, 2, 3, 5, 10 post-construction; and every 10 years thereafter until year 30.

3.11 Species Monitoring – Summary

Table 7: Species Monitoring Methods and Intervals

Species	Monitoring Methods	Monitoring Interval and Timing
Dormice	Dormouse nest boxes will be installed at the beginning of the vegetation clearance programme to provide nesting habitats until the woodland and scrub reach their target condition (which is anticipated to be between five and 30 years). The boxes will be inspected in accordance with the NRW dormouse licences opposite. The results of these monitoring surveys will be reported annually to NRW in accordance with the licence.	Celtic Lakes Substation Development dormouse licence S093767-2. Boxes would be checked biannually by licensed dormouse surveyors during the active season in May and September each year between 2025 and 2030 and every 5 years thereafter until Year 30, in line with the National Dormouse Monitoring Programme (NDMP) methodology. Annual dormouse box maintenance will also be required in January/February.
		GCA dormouse licence S095506-3. Boxes would be checked biannually by licensed dormouse surveyors during the active season in May and September each year between 2026 and 2031 and every 5 years thereafter until Year 30, in line with the National Dormouse Monitoring Programme (NDMP) methodology. Annual dormouse box maintenance will also be required in January/February.
Terrestrial invertebrates	Terrestrial invertebrate survey methodology will follow that detailed within the baseline survey report EcIA Appendix A.14 and in accordance with the NRW guidelines (CCW, 1996; 2004). Terrestrial invertebrate sampling will be conducted within grassland on-site and within the off-site Grassland Compensation Area, to allow for repeatability and comparison.	Once per year between July and September in Years 1 (2027), 2 (2028), 3 (2029), 5 (2030) post-construction; and every 5 years thereafter until Year 30.
Aquatic invertebrates	Aquatic invertebrate survey methodology will follow that detailed within the baseline survey report EcIA Appendix A.14 and in accordance with the NRW guidelines (CCW, 1996; 2004). Aquatic invertebrate sampling will be conducted along the banks of both attenuation ponds, to allow for repeatability and comparison.	Once per year between July and September in Years 1 (2027), 2 (2028), 3 (2029), 5 (2030) 10 (2036) post-construction; and every 10 years thereafter until Year 30.
Reptiles	Each hibernacula/egg-laying heap feature will be subject to inspection by an ECoW	Once per year in years 1 (2027), 2 (2028), 3 (2029), 5 (2031), 10 (2036) post-construction; and every 10 years thereafter until year 30.

Species	Monitoring Methods	Monitoring Interval and Timing
	during the 30 year period to ensure function is maintained. It is likely that specific measures such as vegetation control, opening up entrances or replenishment of materials periodically during the HMMP period will be required.	

4. Reporting

4.1 Habitats

Each habitat will be surveyed, and the results will be presented in an end of monitoring year report post each monitoring period/year. Reports will include:

- A list of key target species and abundances recorded at each monitoring location;
- A comparison of results with previous results from the same monitoring location and, where relevant, from other monitoring location elsewhere within the site;
- An evaluation of enhancement measures/management practices with regard to their impact on plant species; and
- Recommendation for ongoing management, remedial action and further monitoring, if required.

4.2 Invertebrates

Results of the terrestrial and aquatic invertebrate surveys will be presented in end of monitoring year reports, post each monitoring period/year. Reports will include:

- A list of all invertebrate species and abundances of species recorded at each monitoring location;
- The conservation status of each species recorded;
- A comparison of results with previous results from the same monitoring location and , where relevant, from other monitoring locations elsewhere within the same mitigation area;
- An evaluation of mitigation measures/management practices with regard to their impact on invertebrate species; and
- Recommendation for ongoing management and further monitoring, if required.

4.3 Dormice

The results of the dormouse monitoring surveys will be reported annually to NRW post each monitoring period/year in accordance with the licence. The results of the surveys and monitoring would identify any remedial actions required, which would be agreed between Welsh Government (or any subsequent landowner/management company) and NRW.

4.4 Reptile Features

Results of the reptile features checks/monitoring will be presented in end of monitoring year reports, post each monitoring period/year. Reports will include:

- A description of the suitability of the features to be used by reptile, including photographs; and
- Recommendation for remedial measures, such as such as vegetation control, opening up entrances or replenishment of materials.

4.5 Monitoring Report Responsibilities

Responsibilities for submitting the monitoring reports; receiving and reviewing the reports are detailed below.

Organisation Responsible for Submitting the Monitoring Reports	Organisation Receiving and Responsible for Reviewing Reports
WG	NCC; in accordance with planning permission requirements (<i>'A written report on the delivery of the habitat management plan shall be submitted to the LPA at the completion of construction, and thereafter at 5-year intervals post construction. The report shall include an updated habitat management plan which incorporates recommended changes arising from the monitoring and the 5-yearly review'</i>). NRW; in accordance with dormouse licence requirements. NRW; in accordance with SSSI management plan.

4.6 Monitoring Report Schedule

Details of when the monitoring surveys and reports will be undertaken and submitted are provided below, to be updated as required. Dormouse licence reporting will be managed by the licensed ecologist through the compliance audit process, with reports submitted to the client and NRW.

Project Year	Month Report to be Submitted	Month Management Plan to be reviewed	Comments
Construction Year (CY) 1 (2024)	November	December-January	Interim report on results of initial grassland and scrub creation measures, habitat protection and removal. Scrub creation measures, habitat protection and removal reported on within 2025 Celtic Lakes Substation Development dormouse licence S093767-2 dormouse return and ECoW site reports. No initial grassland creation in 2024 due to a programme change as referenced within the Section 73 application.
CY2 (2025)	November	December-January	Interim report on grassland and scrub creation, and pond and aquatic/marginal planting. Species monitoring reports (dormouse, and reptile hibernaculum).
CY3 (2026)	November	December-January	Interim report on grassland and scrub creation. Species monitoring reports (dormouse, and reptile hibernaculum).

Project Year	Month Report to be Submitted	Month Management Plan to be reviewed	Comments
CY4 (2027)	June	May	End of construction report to NCC. Report on grassland and scrub creation. Species monitoring reports (dormouse, and reptile hibernaculum).
Post Construction Year (PCY) 1 (2027)	November	December-January	Report on grassland and scrub creation. Species monitoring reports (dormouse, terrestrial invertebrates, aquatic invertebrates, reptiles).
PCY2 (2028)	November	December-January	Report on grassland and scrub creation. Species monitoring reports (dormouse, terrestrial invertebrates, aquatic invertebrates, reptiles).
PCY3 (2029)	November	December-January	Report on grassland and scrub creation. Species monitoring reports (dormouse, terrestrial invertebrates, aquatic invertebrates, reptiles).
PCY4 (2030)	November	December-January	Report on grassland and scrub creation. Species monitoring reports (dormouse only)
PCY5 (2031)	November	October	5 year report to NCC. Species monitoring reports (dormouse, terrestrial invertebrates, aquatic invertebrates, reptiles). Update HMMP.
PCY10 (2036); PCY15 (2041); PCY20 (2046); PCY25 (2051); and PCY30 (2056)	November	October	5 year report to NCC. Species monitoring reports for dormice and terrestrial invertebrates. Species monitoring reports for aquatic invertebrates and reptiles required in Years 10, 20 and 30 only. Update HMMP.

Appendix A – Preconstruction Ecological Baseline Figures

Figure 1: HMMP Management and Compensation Areas

Figure 2: Statutory Designated Sites within 2km

Figure 3: Non-Statutory Designated Sites within 1km, and Ancient Woodland Inventory (AW) sites within 500m

Figure 4: Plot C2 Phase 1 Habitat Plan January 2026

Figure 5: Invasive species identified during National Vegetation Classification (NVC) Survey 2021

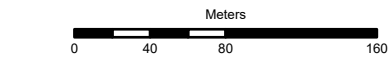
Figure 6: Phase 1 Habitat Plan 2021



Legend

- Celtic Lakes Substation Development (on-site HMMP area)
- Welsh Government Land
- Grassland Compensation Area (GCA) (off-site HMMP area)
- Dormouse Compensation Area (box installation) for Celtic Lakes Substation Development Dormouse License S093767/2
- Dormouse woodland habitat protection, hazel planting and enhancement area for Celtic Lakes Substation Development Dormouse License S093767/2 (on-site HMMP area)
- Dormouse Compensation Area (box installation) for GCA Dormouse License S095506/3
- INNS cotoneaster bund - under monitoring and treatment

Coordinate System: British National Grid



P03	02/11/2026	EH	RC	--	--
Rev	Date	By	Chkd	Appd	Authd

ARUP

13 Fitzroy Street
London W1T 4BO
Tel +44 20 7636 1531
www.arup.com

Client

The Welsh Government

Project Name

Celtic Lakes Substation
Development HMMP

Drawing Title

HMMP Management and
Compensation Areas

Scale at A3

1:4,000

Role

LE

Suitability

For Information

Project Number

293651-00

Drawing Number

Figure 1

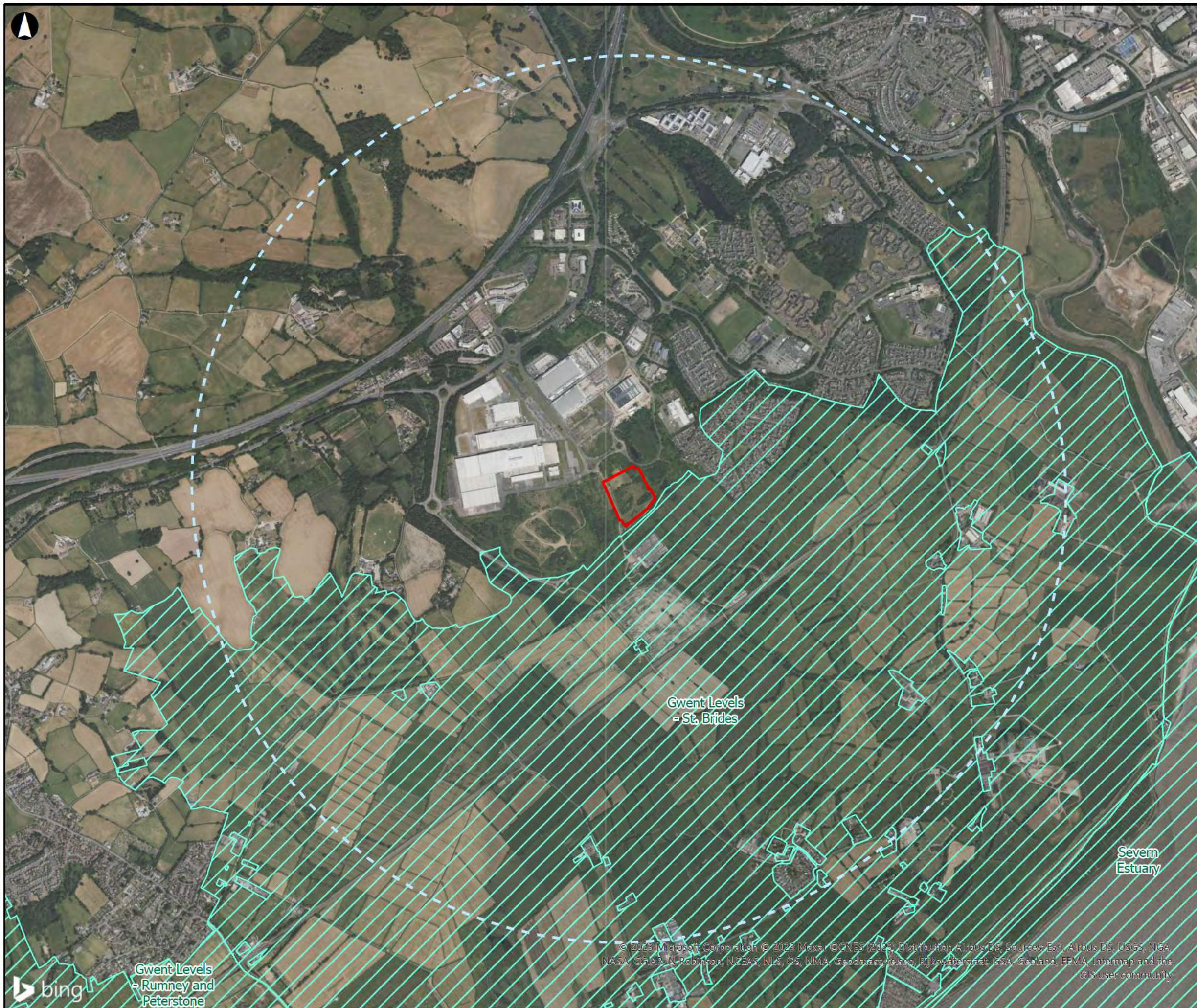
Rev

P03

A3

5/11/2026 1:55 PM

Microsoft, Vantor



Legend

- Site Boundary
- 2km Buffer
- Sites of Special Scientific Interest (SSSI)

Coordinate System: British National Grid

P02	08-09-2023	EH	CP	PW	PW
Rev	Date	By	Chkd	Appd	Authd

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Client

Welsh Government

Project Name

Celtic Lakes

Drawing Title

**Statutory Designated Sites within
2km (National)**

Scale at A3

1:17,000

Role

LE

Suitability

For Information

Project Number
293651-00

Rev
P02

Drawing Number
Figure 2

A3

20/09/2023 09:56



- A3
- Legend

Site Boundary

500m buffer

1km buffer

Sites of Important Nature Conservation (SINC)

Ancient Woodland Inventory (AWI)

Coordinate System: British National Grid



P02	08-09-2023	EH	CP	PW	PW
Rev	Date	By	Chkd	Appd	Authd

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Client

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Project Name

Celtic Lakes

Drawing Title

Non- Statutory Designated Sites
within 1km, and Ancient Woodland
Inventory (AWI) sites within 500m

Scale at A3

1:9,500

Role

LE

Suitability

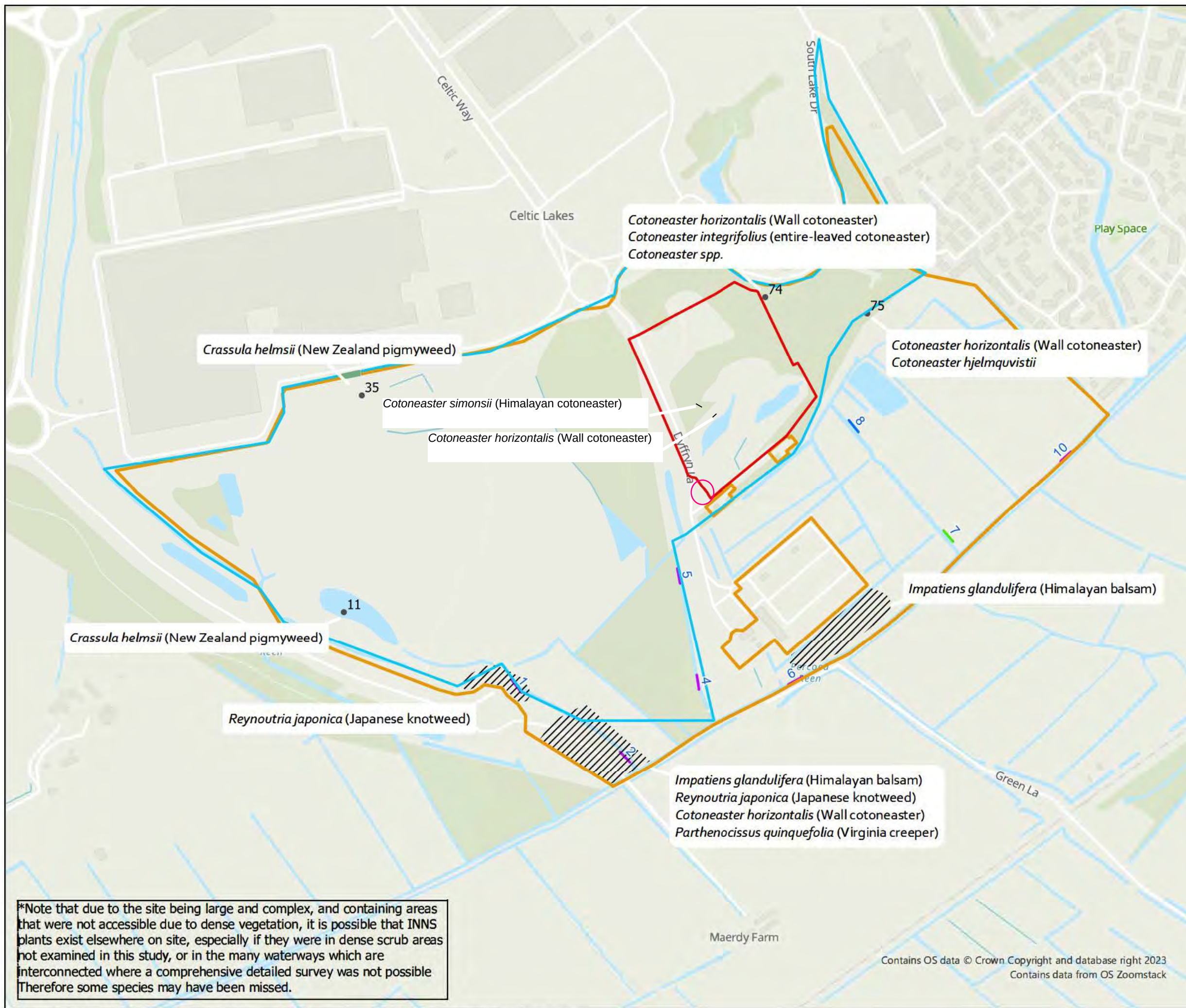
For Information

Project Number	Rev
293651-00	P02

Drawing Number

Figure 3





Site Boundary

Welsh Government Land

Area Surveyed (2021)

Indicative locations of INNS*

Quadrats with INNS*

Surveyed reed sections with INNS*

Elodea canadensis (Canadian pondweed)

Elodea nuttallii (Nuttall's waterweed)

Elodea nuttallii (Nuttall's waterweed) and Elodea canadensis (Canadian pondweed)

Proposed location of cotoneaster contaminated soil bund*, to be micrositied in accordance with the Invasive Non-native Species Management Plan

*Note: Invasive cotoneaster spp found within the redline boundary will be removed in accordance with an approved Invasive Non-native Species management plan. Contaminated soil will be re-located, banded, monitored and treated in strict accordance with the plan

Coordinate System:
British National Grid

Metres
0 65 130 260

01	19-03-2024	NW	RC		
Rev	Date	By	Chkd	Appd	Authd

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Project Name
Celtic Lakes

Drawing Title
Invasive species identified during National Vegetation Classification (NVC) Survey 2021

Scale at A3
1:5,000

Role
Ecology
Sustainability

For Information
Project Number
293651-00
Drawing Number
Figure 5

Rev
01

*Note that due to the site being large and complex, and containing areas that were not accessible due to dense vegetation, it is possible that INNS plants exist elsewhere on site, especially if they were in dense scrub areas not examined in this study, or in the many waterways which are interconnected where a comprehensive detailed survey was not possible. Therefore some species may have been missed.

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I:\global\Europe\Cardiff\Jobs\281000\281823-00\4 Internal Project Data\4-80 GIS\4-82 Working Data\ENV_Environment\Designated Sites\Celtic Lakes Designated Sites\Celtic Lakes Designated Sites.aprx

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A3

Legend

Site Boundary

Area Surveyed (2021)

A3.1 Scattered Broadleaved Trees

A3.3 Scattered Mixed Trees

G2 Running Water

J2.4 Fence

J2.6 Dry Ditch

A1.1.2 Plantation Broadleaved Woodland

A2.1 Dense Scrub

A2.2 Scattered Scrub

B2.2 Semi-improved Neutral Grassland

B5 Marshy Grassland

C3.1 Tall Ruderal

F1 Swamp

G1 Standing Water

I2.2 Spoil Heap

J1.3 Ephemeral/ Short Perennial

J3.6 Buildings

J5 Hardstanding

Dormouse Compensation Area

Dormouse Compensation Area (Woodland)

Grassland Compensation Area

Coordinate System: British National Grid

Metres

0

75

150

300

P03	12-12-2023	EH	CP	PW	PW
Rev	Date	By	Chkd	Appd	Authd

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Client

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Project Name

Celtic Lakes

Drawing Title

Phase 1 Habitat Plan 2021

Scale at A3

1:5,250

Role

LE

Suitability

For Information

Project Number	Rev
293651-00	P02
Drawing Number	
Figure 6	

Appendix B – Landscape General Arrangements and Habitat Management Drawings

CELTIC LAKES: FENCING MARK-UP

27 AUGUST 2024



Existing fence line to be repaired (like-for-like) where gaps have been cut/opened up to restrict future access (example in photo above).

- KEY
- Gap-fill existing fencing
 - Remove existing fencing
 - Fencing not required/feasible
 - Install new fencing
 - Gap-fill existing fencing (along Dyffryn Lane)
 - Existing fencing (no change)
 - Vantage cable route (indicative)



Existing fencing in this section has multiple gaps/damage and cuts through the areas of mitigation planting either side of it. This fencing will be removed and replaced with new fencing along purple line.

Mature and impenetrable vegetation is present in front of the fence line, with no evidence of public access. Gaps in fence to be infilled (to be accessed through the site to avoid vegetation clearance). Note location is indicative due to scale of screenshot.

Gaps in existing perimeter fence to be repaired and fencing upgraded (where appropriate), avoiding impacts to vegetation as far as practicable, to minimise the risk of public access. Examples of existing gaps provided in photos below.



Mature and impenetrable vegetation is present in front of the fence line along the majority of this section, with evidence of public access restricted to areas where vegetation is less dense. Gaps in existing perimeter fence to be infilled and fencing upgraded (where appropriate) where public access has been noted, avoiding impacts to vegetation as far as practicable.



Woodland is immediately bordered by hardstanding. The installation of a fence line would require the removal of suitable dormouse habitat. As the existing vegetation is mature and largely impenetrable, with no evidence of public access, it is considered that the installation of fencing is not required along this section.



Gaps in the existing fence line to be repaired (like-for-like). Planting that has been installed along the vantage cable line cannot be fenced as this would restrict maintenance access.



Scrub and woodland adjacent to vantage cable planting is mature and impenetrable, acting as a barrier to trespass/grazing, with no evidence of public access. It is considered that the installation of fencing not required along this section.

Existing fencing to be retained. Gate to be closed and padlocked in between use to act as a barrier to public access. No visible gaps present.



Existing Western Power 11kV

Other existing utilities

Planning boundary

SINC boundary

SSSI area

Proposed 132kV cable

Proposed utility corridor

Proposed drainage ditch

Proposed drainage pipe

Proposed security perimeter fence line

Proposed access road

Existing

Grassland to be retained where possible and replaced and enhanced where necessary - 4,735sqm

Existing low bramble scrub cleared on site and left to regenerate - 19m2

Grassland to be protected and retained - 2,833sqm

Tall dense scrub to be protected and retained - 5,388sqm

Low bramble scrub to be protected and retained - 6,373sqm

Existing pond and associated habitats to be protected and retained

Existing hard surface

Proposed

Proposed mixed native species rich grassland reinstatement - 6,276sqm

Proposed mixed native dormouse habitat scrub planting with hazel at 25% of the mix - 4,377sqm

Proposed mixed native dormouse habitat scrub planting with hazel at 25% of the mix. Planted in year 2 post completion of the main site works - 3,493sqm

Proposed mixed native feathered hazel trees - 26no.

Proposed mixed native hedgerow planting - 406 lin.m

Proposed mixed native marginal seeding - 943sqm

Proposed aquatic plug planting - 755sqm

Proposed open water pond - Varies - 1,700sqm

Proposed dormouse woodland habitat protection and enhancement area, to include limited planting of 26 hazel trees in grass areas - 4,923sqm

Proposed off-site grassland mitigation and enhancement area to include 30no. dormouse boxes- 23,295sqm

Dormouse compensation area to include 30no. dormouse boxes in undisturbed woodland and scrub - 12,959sqm

6	04/06/25	LP	BO	PW
5	12/12/23	LP	NM	BO
4	11/12/23	LP	NM	BO
3	29/09/23	LP	NM	BO
2	13/09/23	SL	PW	BO
1	25/07/23	LP	CP	BO
Rev	Date	By	Chkd	Appd

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Client
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Project Title
Celtic Lakes
NGED Substation

Drawing Title
Figure 4. Proposed Landscape and
Habitat General Arrangement

Scale at A1
1:1000

Role
Landscape

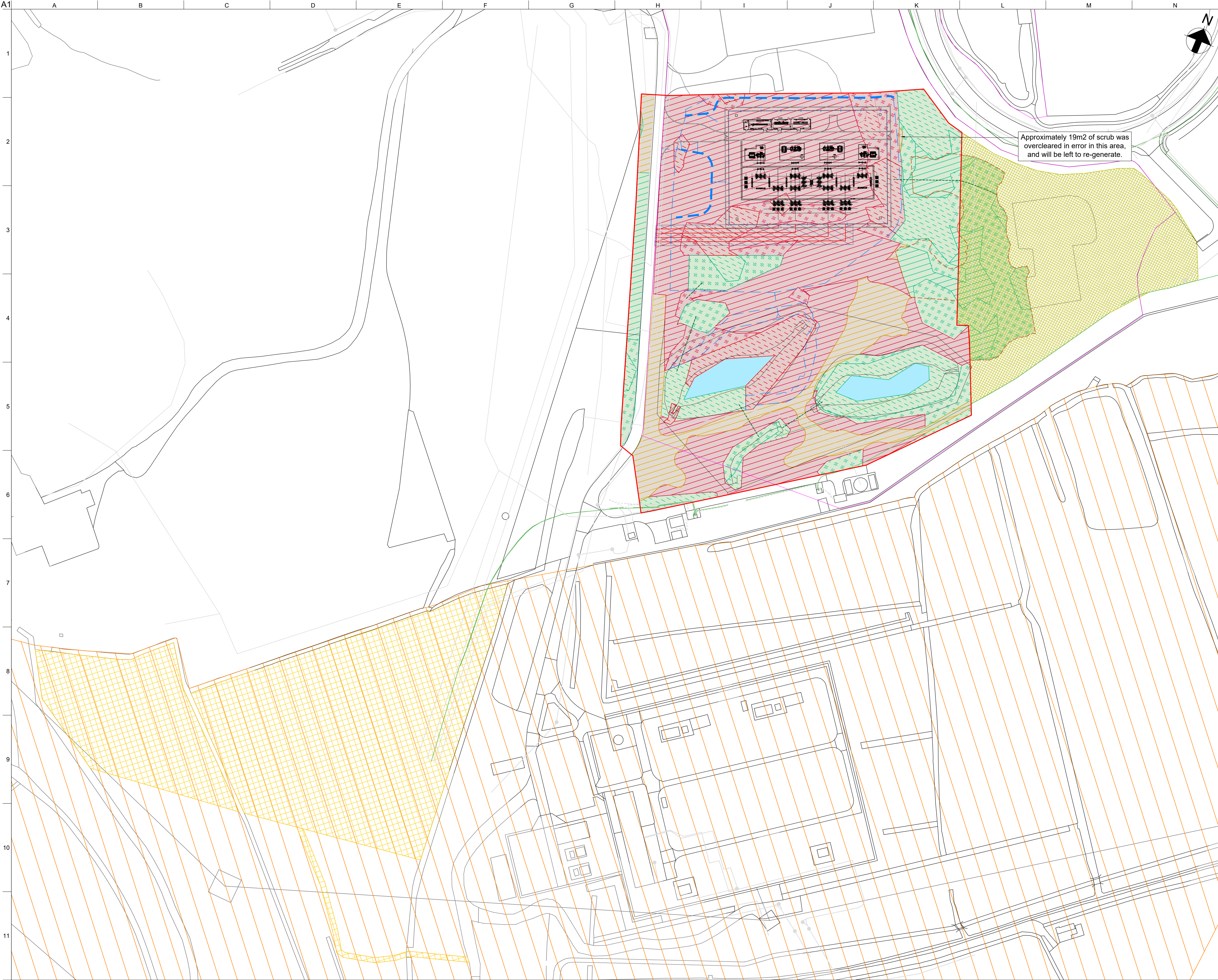
Suitability
S73

Arup Job No
293651

Rev
6

Do not scale

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- Existing Western Power 11kV
- Other existing utilities
- Planning boundary
- SINC boundary
- SSSI area
- Proposed 132kV cable
- Proposed utility corridor
- Proposed drainage ditch
- Proposed drainage pipe
- Proposed security perimeter fence line
- Existing open water pond
- Existing habitat to be removed
 - Grassland - 18,263sqm
 - Tall dense scrub - 3,220sqm
 - Low bramble scrub - 2,581sqm
- Existing habitat to be retained and enhanced where possible
 - Grassland - 4,735sqm
 - Existing low bramble scrub cleared on site and left to regenerate - 19m2
 - Dormouse woodland habitat protection and enhancement area* - 4,923sqm
- Existing habitat to be protected
 - Grassland - 2,833sqm
 - Tall dense scrub - 5,388sqm
 - Low bramble scrub - 6,373sqm
- Proposed
 - Indicative locations for dead hedging using site won brash to aid dormouse movement
 - Proposed off-site grassland mitigation and enhancement area - 23,295sqm
 - Dormouse compensation area to include 30no. dormouse boxes in undisturbed woodland and scrub - 12,959sqm

Notes:
*For further detail on landscape and habitat proposals refer to Proposed Landscape and Habitat General Arrangement 293651-LD-XX-DR-0001

3	04/06/25	LP	BO	PW
2	12/12/23	LP	NM	BO
1	11/12/23	LP	CE	BO
Rev	Date	By	Chkd	Appd

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The Welsh Government

Project Title
Celtic Lakes
NGED Substation

Drawing Title
Figure 5. Existing Conditions and
Vegetation Lost and Retained

Scale at A1
1:1000
Role
Landscape
Suitability
S73

Arup Job No 293651	Rev 3
Name 293651-LD-XX-DR-0002	

Grassland Compensation Area seeding and management specification

1.0 General

1.1 60 no. dormouse boxes should be off the shelf supplied product: <https://www.nestbox.co.uk/products/ dormouse-nest-box> or similar acceptable and approved by a licensed Ecologist provided by Arup. 30 no. of the boxes shall be installed in the Substation Dormouse Compensation Area, ahead of any vegetation clearance. A further 11 no. of the boxes shall be installed within the area indicated north of the Grassland Compensation Area, with the remaining 19 no. of the boxes being installed within the retained scrub in the eastern and western fields.

1.2 All landscape soft works are to be carried out in accordance with BS 4428: 1989 ' Code of practice for general landscape operations (excluding hard surfaces)', BS3936:1992 'Recommendations for cultivation and planting in the Advance Nursery Stock category' and BS8545:2014 'Trees: from nursery to independence in the landscape'.

1.3 Works should be carried out at the appropriate season and only in appropriate weather conditions.

2.0 Species Rich Wildflower Seeding

General

2.1 Please refer to the seeding species mix table in the bottom right corner of this drawing.

2.2 Seed species will be seasonally dependent, and it is advised that the contractor speaks to the seed supplier (e.g. Landlife Wildflowers - 01205 281 902. Or Emorsgate Seeds, Mark@emorsgateseeds.com) to source the best seed.

2.3 Any difficulties with or variation to this specification should be discussed with the Scheme's Landscape architect and ecologist.

2.4 Note: if selecting alternative mix, it cannot contain the following species:

- great burnet (Sanguisorba officinalis),
- yellow oat-grass (Trisetum flavescens),
- lady's bedstraw (Galium verum),
- water avens (Geum rivale) and,
- common quaking grass (Briza media).

2.5 Areas of Grass seeding shall be cultivated to their full depth or a 150mm minimum prior to seeding.

2.6 Leave soil surface regular and even, removing all humps and hollows and remove all debris and stone over 50mm diameter.

2.7 Ensure that soil surfaces marry into existing levels and all adjoining features (including hard edges and service covers), with finished levels set slightly proud to allow for settlement.

2.8 No fertiliser shall be applied within SINC/SSSI areas. Pre-seeding herbicide shall not be used, except for agreed targeted spot treatment of invasive or problem species.

2.9 Firm and rake to prepare seedbed. Supply and sow specified grass seed mix at schedule rate, two equal sowings in transverse directions. Roll and water.

2.10 SRG Seeding Option 1 (preferred)

2.11 Green hay harvesting. Subject to timings, logistics and agreement between Newport City Council and the design team to come up with a suitable solution to use green hay won from the nearby fields to seed the site in autumn. Subject to agreement with Newport City Council - Matthew Harris of matthew.harris@newport.gov.uk, or Philip Evans: Philip.Evans@newport.gov.uk

2.12 Subject to agreement with Newport City Council the green hay would be cut in late summer / early autumn (normally July). From two fields approximately 200m to the southeast of the Main site. The Contractor would be responsible for separating and preparing the seed for seeding in the same autumn or the following spring. Guidance on Green Hay Harvesting can be found on the DEFRA Website here: <https://defra.farming.blog.gov.uk/harvest-seeds-or-take-green-hay-to-restore-other-grassland-sites/>

2.13 SRG Seeding Option 2

2.14 Selected seed mix from Celtic Wildflowers or another South Wales provider. Celtic Wildflowers Celtic Wildflowers (Barry Stewart) 07730 50 27 38. sales@celticwildflowers.co.uk. (See Table 1 in the bottom right corner).

2.15 This option is a back up to Option 1 where if for any reason we are unable to use the Green Hay option in a year, the contractor will seek a Welsh source of seed to import.

2.16 The design team have had limited success engaging with Celtic Wildflowers Ltd. The only successful contact made was by the contractor in February 2024 and no contact since. Design Team's landscape architect will persist in trying to support the contractor with the sourcing of Welsh provenance seed.

2.17 SRG Seeding Last resort Option 3

2.18 This option is the back stop where if the Green Hay and Welsh seed options fail, subject to the agreement of the client and design team, the contractor could seek the same or a very similar mix to that proposed, but from another national supplier, such as Emorsgate Seeds or other Welsh or similar reputable National Supplier (e.g. Landlife Wildflowers - 01205 281 902. Or Emorsgate Seeds, Mark@emorsgateseeds.com) (See Table 1 in the bottom right corner).

3.0 Transitional Ecotone

3.1 A transitional ecotone will be created between the grassland and edge of the scrub area to create further botanical and structural heterogeneity providing biodiversity benefits, avoiding encroachment of scrub into the grassland area while also avoiding developments of a hard edge between the two habitat areas. 4 No. Ivy Hedera helix, 4 No. Honeysuckle Lonicera periclymenum and 4 No. guelder rose Viburnum opulus will be planted on the edge of the bramble to provide supporting habitats for both dormice and shrill carder bee.

4.0 Aftercare Maintenance

4.1 All areas shall be subject to a minimum two year Maintenance programme which shall include the replacement of failed seed at the time of completion and in each following year during the planting season. For detailed operations refer to accompanying Landscape and Ecological Management Plan (HMMP CLS-ARP-EAC-XX-RP-OE-000003).

4.2 Watering shall be undertaken as frequently as required to ensure the healthy growth and establishment of all planted and seeded areas.



Table 1 Seed Mix for Seeding Option 2 and 3				
Grass species 10%				
Ref	Species	Common Name	Form	Percentage Mix
PM1	Arrhenatherum elatius	False oat grass	Seed	12.5
	Alopecurus pratensis	Meadow Foxtail (w)	Seed	3.75
	Dactylis glomerata	Cock's-foot	Seed	32.5
	Deschampsia cespitosa	Tufted Hair-grass (w)	Seed	2.5
	Festuca arundinacea	Tall fescue	Seed	3.75
	Festuca pratensis	Meadow Fescue	Seed	3.75
	Festuca rubra	Red Fescue	Seed	35
	Holcus lanatus	Yorkshire fog	Seed	6.25
Wildflower species 90%				
Ref	Species	Common Name	Form	Percentage Mix
PM 1	Ballota nigra	Black horehound	Seed	10
	Centaurea nigra	Common Knapweed	Seed	5
	Lathyrus pratensis	Meadow vetchling	Seed	10
	Lotus corniculatus	Birds-foot trefoil	Seed	10
	Odontites verna	Red bartsia	Seed	25
	Scabiosa	Scabious	Seed	5
	Stachys sylvatica	Hedge woundwort	Seed	10
	Trifolium Pratense	Red clover	Seed	5
	Lamium album	White dead-nettle	Seed	5
	Lathyrus sylvestris	Narrow-leaved everlasting pea	Seed	5
	Vicia cracca	Tufted Vetch	Seed	10

- Existing Western Power 11kV

Other existing utilities

Planning boundary

SINC boundary

SSSI area

Proposed 132kV cable

Proposed utility corridor

Proposed drainage ditch

Proposed drainage pipe

Proposed security perimeter fence line

Proposed access road

Existing

Grassland to be retained where possible and replaced and enhanced where necessary - 4,735sqm

Existing low bramble scrub cleared on site and left to regenerate - 19m2

Grassland to be protected and retained - 2,833sqm

Tall dense scrub to be protected and retained - 16,328sqm. Enhancement required in specific areas in accordance with dormouse licence S095506-3 and S093767-2

Low bramble scrub to be protected and retained - 6,373sqm. Enhancement required in specific areas in accordance with dormouse licence S095506-3 and S093767-2

Existing pond and associated habitats to be protected and retained

Existing hard surface

Willow scrub to be retained and managed - 2,513sqm. Enhancement required in specific areas in accordance with dormouse licence S095506-3 and S093767-2

Sedge Bed to be retained - 433sqm

Ruderal to be retained and managed - 530sqm

Proposed

Proposed mixed native species rich grassland reinstatement - 15,098sqm

Reed and ruderal removed and overseeded with the approved seed mix or green hay- 6,000sqm

Proposed mixed native dormouse habitat scrub planting with hazel at 25% of the mix - 4,377sqm

Proposed mixed native dormouse habitat scrub planting with hazel at 25% of the mix. Planted in year 2 post completion of the main site works - 3,463sqm

Indicative locations proposed mixed native feathered hazel trees - 34no. Tbc with ecologist on site

Proposed mixed native hedgerow planting - 406 lin.m

Proposed mixed native marginal seeding - 943sqm

Proposed aquatic plug planting - 755sqm

Proposed open water pond - Varies - 1,700sqm

Proposed dormouse woodland habitat protection and enhancement area, to include limited planting of 26 hazel trees in grass areas - 4,923sqm

Grassland compensation area dormouse mitigation including 11 dormouse boxes in undisturbed woodland and scrub and a further 19 dormouse boxes within retained thick scrub of the eastern and western fields - 9,497sqm

Substation dormouse compensation area to include 30no. dormouse boxes in undisturbed woodland and scrub - 12,959sqm
- | | | | | |
|-----|----------|-----|------|------|
| 7 | 13/05/26 | NJM | RC | BO |
| 6 | 19/03/26 | NJM | RC | BO |
| 5 | 25/01/24 | LP | PW | BO |
| 4 | 21/12/23 | LP | NM | BO |
| 3 | 17/11/23 | LP | NM | BO |
| 2 | 09/11/23 | LP | NM | BO |
| 1 | 02/11/23 | LP | NM | BO |
| Rev | Date | By | Chkd | Appd |
- ARUP

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Client
The Welsh Government

Project Title
Celtic Lakes
NGED Substation

Drawing Title
Figure 2. Proposed Landscape and
Habitat General Arrangement

Scale at A1
1:1000

Role
Landscape

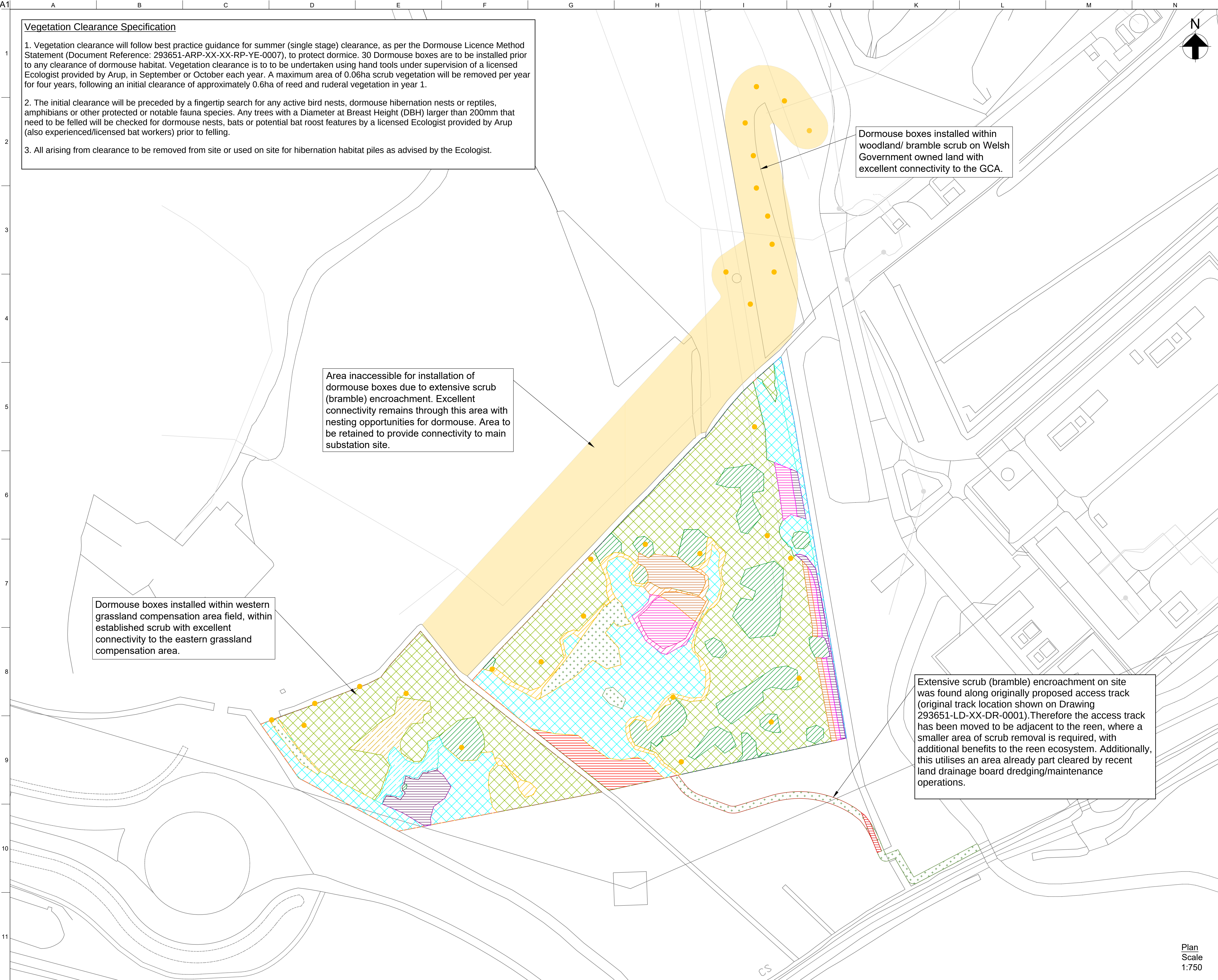
Suitability
N/A

Arup Job No
293651

Rev
7

Name
293651-LD-XX-DR-0402

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Vegetation Clearance Specification

1. Vegetation clearance will follow best practice guidance for summer (single stage) clearance, as per the Dormouse Licence Method Statement (Document Reference: 293651-ARP-XX-XX-RP-YE-0007), to protect dormice. 30 Dormouse boxes are to be installed prior to any clearance of dormouse habitat. Vegetation clearance is to be undertaken using hand tools under supervision of a licensed Ecologist provided by Arup, in September or October each year. A maximum area of 0.06ha scrub vegetation will be removed per year for four years, following an initial clearance of approximately 0.6ha of reed and ruderal vegetation in year 1.

2. The initial clearance will be preceded by a fingertip search for any active bird nests, dormouse hibernation nests or reptiles, amphibians or other protected or notable fauna species. Any trees with a Diameter at Breast Height (DBH) larger than 200mm that need to be felled will be checked for dormouse nests, bats or potential bat roost features by a licensed Ecologist provided by Arup (also experienced/licensed bat workers) prior to felling.

3. All arising from clearance to be removed from site or used on site for hibernation habitat piles as advised by the Ecologist.

Dormouse boxes installed within woodland/ bramble scrub on Welsh Government owned land with excellent connectivity to the GCA.

Area inaccessible for installation of dormouse boxes due to extensive scrub (bramble) encroachment. Excellent connectivity remains through this area with nesting opportunities for dormouse. Area to be retained to provide connectivity to main substation site.

Dormouse boxes installed within western grassland compensation area field, within established scrub with excellent connectivity to the eastern grassland compensation area.

Extensive scrub (bramble) encroachment on site was found along originally proposed access track (original track location shown on Drawing 293651-LD-XX-DR-0001).Therefore the access track has been moved to be adjacent to the reen, where a smaller area of scrub removal is required, with additional benefits to the reen ecosystem. Additionally, this utilises an area already part cleared by recent land drainage board dredging/maintenance operations.

Legend

- Other existing utilities
- SSSI area
- Proposed grassland compensation area boundary - 22,835sqm
- Willow scrub to be retained and managed - 2,513sqm
- Ruderal to be retained and managed - 530sqm
- Dense scrub to be retained and managed - 11,001sqm
- Sedge Bed to be retained - 433sqm
- Indicative area for Dormouse nest box installation

Annual scrub clearance*

- Eastern grassland compensation area
- Year 1 - Approx. 565sqm (completed)
- Year 2 - Approx. 600sqm
- Year 3 - Approx. 600sqm
- Year 4 - Approx. 600sqm

Total scrub clearance (4 years) = Approx. 2,365sqm

Annual reedbed and ruderal, or sedge clearance

- Reedbed and ruderal vegetation to be removed sequentially under supervision of a dormouse licenced ecologist with consideration for other species which may be present.
- Year 1 - Approx. 264sqm (completed)
- Year 2 - Approx. 24sqm
- Year 3 - Approx. 100sqm
- Year 4 - Approx. 88sqm

Total reedbed and ruderal and sedge clearance (4 years) = Approx. 6,334sqm

Total vegetation clearance (4 years) = Approx. 8,699sqm

Annual grass mowing**

- Year 1 - 665sqm***

Mown grassland area to increase per year, corresponding to annual scrub removal.

- Year 2 - 7,352sqm
- Year 3 - 7,976sqm
- Year 4 - 8,676sqm

Note: *Including low bramble and tall dense scrub habitat within the grassland compensation area boundary and access track.

**The mowing regime for the cleared areas in the grassland compensation area and track will follow the prescriptions in Section 3.5 of the Habitat Management and Monitoring Plan (Document Reference: CLS-ARP-EAC-XX-RP-OE-000003)

***Mown grassland area to include tall herb mosaic, semi-improved grassland mosaic and marshy grassland mosaic habitats.

A transitional ecotone will be created between the grassland and edge of the scrub area to create further botanical and structural heterogeneity providing biodiversity benefits, avoiding encroachment of scrub into the grassland area while also avoiding development of a hard edge between the two habitat areas.

2	14/05/26	RC	RC	CP
1	20/04/26	NJM	RC	JP
Rev	Date	By	Chkd	Appld

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Client
The Welsh Government

Project Title
Celtic Lakes
NGED Substation

Drawing Title
Figure 6
Grassland Compensation Area Habitat
Management Proposals updated April
2026. Covering Yr 1 (2025) to Yr 4 (2028)

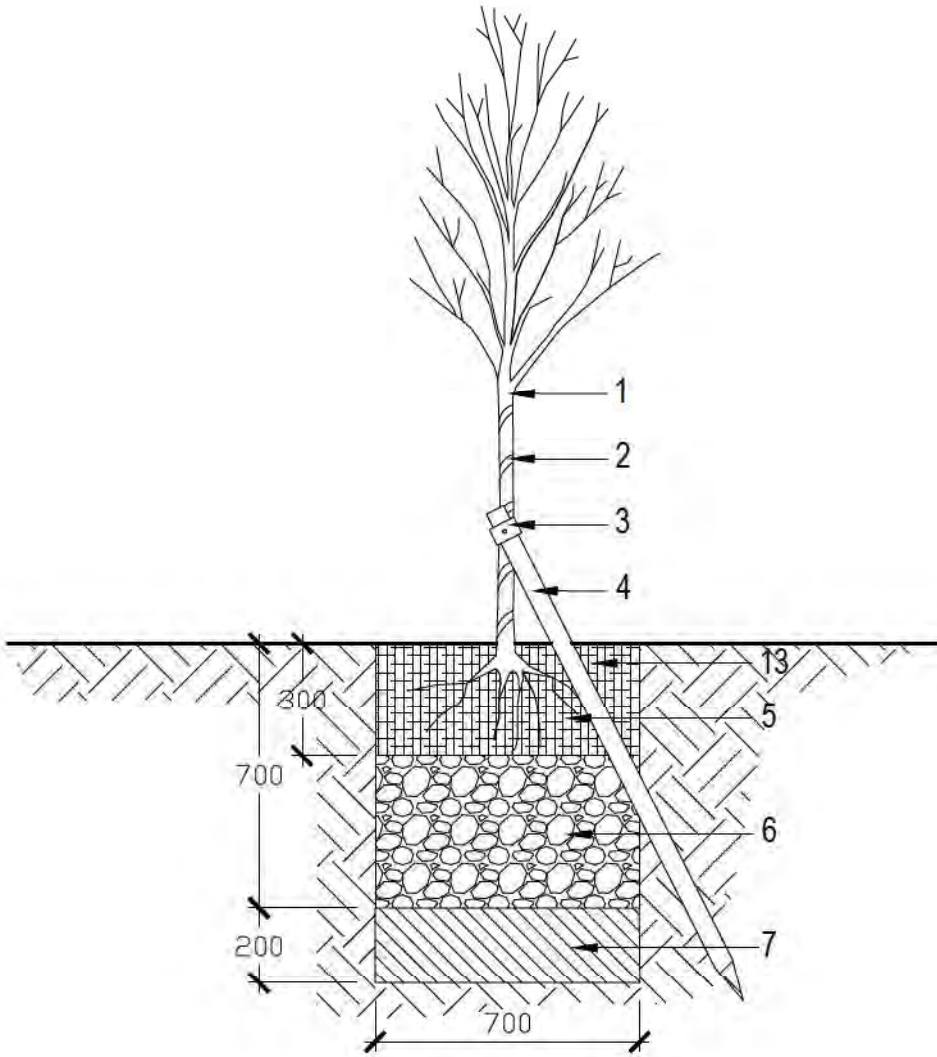
Scale at A1 1:750

Role Landscape

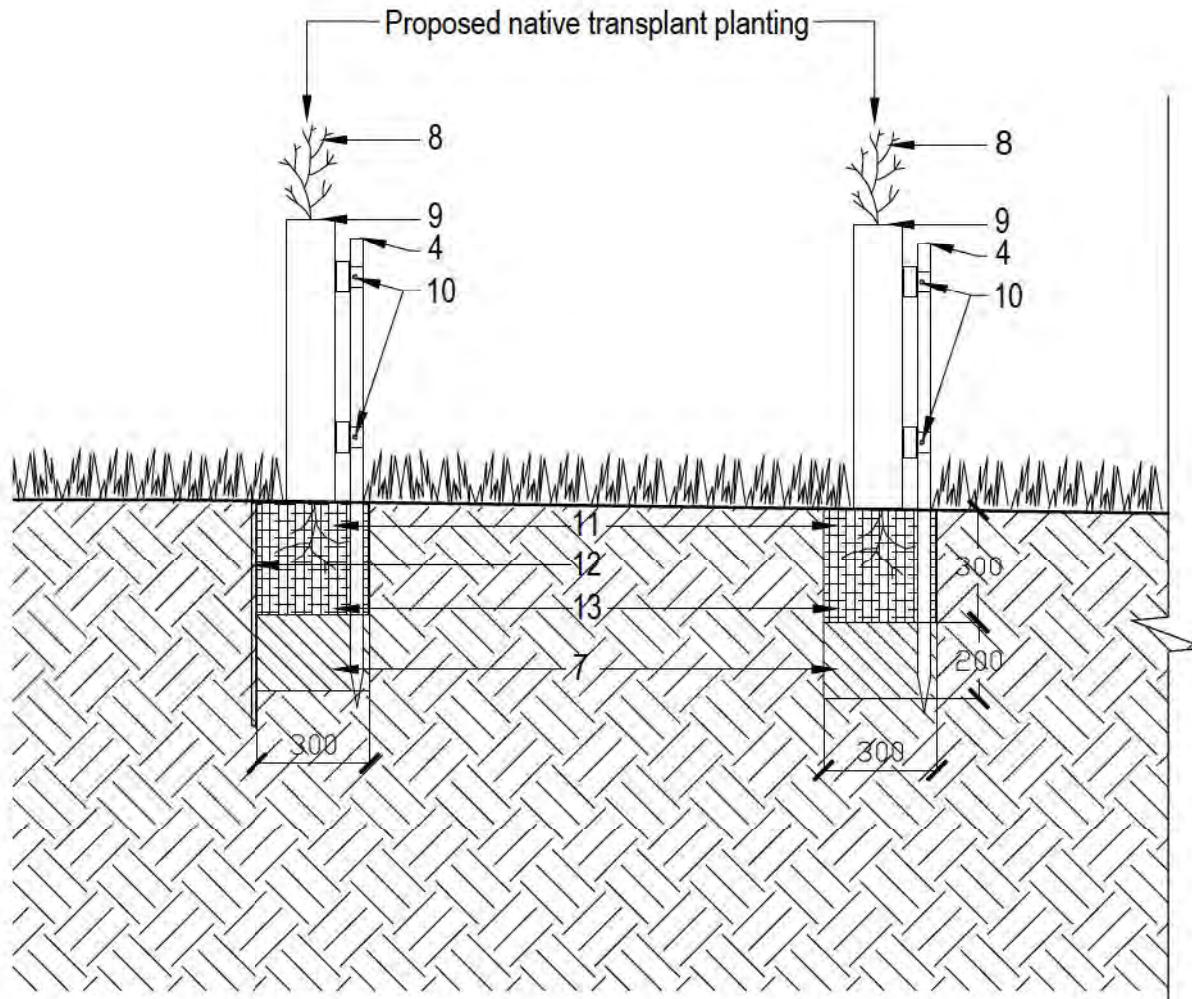
Suitability N/A

Arup Job No 293651	Rev 1
Name 293651-LD-XX-DR-0503	

Plan
Scale
1:750



Detail 01 - Feathered tree planting
Scale 1:20



Detail 02 - Tree pit
Scale 1:20

Legend

- 1 - Feathered tree, bare root. To be supplied and planted by Landscape Contractor in accordance with the Specification on 293651-LD-XX-DR-0402.
- 2 - Spiral tree guard
- 3 - Tree tie and spacer secured to stake with galvanised nail.
- 4 - FSC timber tree stake, to be sufficient length to ensure stability. Standard tree: Tree stakes to be pressure treated softwood, Sweet Chestnut or Larch 2000mm length, 85mm dia. Tree stakes to be driven into ground prior to planting
- 5 - Feathered tree: Min 700 x 700 wide x 800mm deep. Remove arisings and spread evenly across surrounding area. Topsoil backfill to be laid as per specification and with a mixture of topsoil (80%) and compost (20%) where needed
- 6 - General purpose site-won subsoil, free draining and free from compaction
- 7 - Cultivate and break up base of pit to ensure free draining
- 8 - Shrub transplant/whip bare root and in accordance with accompanying planting schedule 293651-ARP-XX-SP-LD-0002 and National Plant Specification
- 9 - Recycled HDPE & LDPE photodegradable, olive green colour shelters, 750mm height x 80-110 dia. Set 25mm below ground level
- 10 - 2 no pre-fitted ties
- 11 - Planting pit to be min 300 x 300 wide and 300mm deep. Remove arisings and spread evenly across surrounding areas. Backfill with a mixture of topsoil (80%) and compost (20%)
- 12 - Where there is risk of conflict with nearby drainage pipework and utilities use RER800A ReRoot 800 with root deflecting ribs. Install with ribs facing the tree. Installed along the upper 600mm of the tree pit, on just two sides. No growing medium over top of barrier
13. Planting pits to be hand dug or through careful use of small excavator for feathered tree pits in the Dormouse and Grassland Compensation Areas. Planting pits within the main site can be machine dug supervised by a licensed Ecologist or Landscape Architect provided by Arup.

3	17/11/23	LP	NM	BO
2	09/11/23	LP	NM	BO
1	02/11/23	SL	LP	BO
Rev	Date	By	Chkd	Appd

ARUP

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Client
The Welsh Government

Project Title
Celtic Lakes
NGED Substation

Drawing Title
Figure 4
Landscape Details

Scale at A3
1:20

Role
Landscape

Suitability
Preliminary

Arup Job No
293651

Drawing No
LD-XX-DR-0404

Rev
3

Appendix C – Planting Schedule

Planting schedules are provided for historic information on species mixes only and are now superseded by up to date contractor instructions. Do not rely upon for design and contact the landscape architect for the most up to date schedule.

PLANT SCHEDULE

Client: Welsh Government
Project: Celtic Lakes
Location: Celtic Lakes Wales
Schedule name: **2023-09-15 293651 Celtic Lakes SL**
Document ref: 293651-ARP-XX-SP-LD-0002
Revision: 3

Date: 21/12/23
Created by: Lauren Pilton
Schedule no.: 0002



Abbrev.	Name	Girth/Dia. cm	Height cm	Root Zone	Specification	Mix %	No./m²	m Ctrs	Area m²	Number
Native Scrub Mix - Year 1										
C san	Cornus sanguinea		60-80	B	1+1; Transplant - seed raised; branched; 3 brks	5				42
C av	Corylus avellana		40-60	B	1+1; Transplant - seed raised; branched; 2 brks	15				126
C av	Corylus avellana		125-150	45-65L	Multi-stem; bushy; 5 stems min.	10				84
C mon	Crataegus monogyna		200-250	B	2x; Feathered; 5 brks	5				42
P pad	Castanea sativa		200-250	B	2x; Feathered; 5 brks	5				42
L per	Lonicera periclymenum	RC4	20-40	150cc min.	1+0; Seedling; cell grown	10				84
P pad	Prunus padus		80-100	B	1+1; Transplant - seed raised	10				84
P sp	Prunus spinosa		40-60	B	1+1; Transplant - seed raised; branched; 2 brks	10				84
Q r	Quercus robur	6-8	250-300	RB	2x; Feathered; 5 brks	5				42
S ni	Sambucus nigra		60-80	B	1+1; Transplant - seed raised; branched; 3 brks	10				84
V op	Viburnum opulus		40-60	B	1+1; Transplant - seed raised; branched; 2 brks	15				126
Sub-totals						100%		2.5	5251	840

Native Scrub Mix - Year 2 (post competition of main site construction works)

C san	Cornus sanguinea		60-80	B	1+1; Transplant - seed raised; branched; 3 brks	5				21
C av	Corylus avellana		40-60	B	1+1; Transplant - seed raised; branched; 2 brks	15				62
C av	Corylus avellana		125-150	45-65L	Multi-stem; bushy; 5 stems min.	10				41
C mon	Crataegus monogyna		200-250	B	2x; Feathered; 5 brks	5				21
P pad	Castanea sativa		200-250	B	2x; Feathered; 5 brks	5				21
L per	Lonicera periclymenum	RC4	20-40	150cc min.	1+0; Seedling; cell grown	10				41
P pad	Prunus padus		80-100	B	1+1; Transplant - seed raised	10				41
P sp	Prunus spinosa		40-60	B	1+1; Transplant - seed raised; branched; 2 brks	10				41
Q r	Quercus robur	6-8	250-300	RB	2x; Feathered; 5 brks	5				21
S ni	Sambucus nigra		60-80	B	1+1; Transplant - seed raised; branched; 3 brks	10				41
V op	Viburnum opulus		40-60	B	1+1; Transplant - seed raised; branched; 2 brks	15				62
Sub-totals						100%		2.5	2585	413

Dormouse Compensation Area - Grassland

Abbrev.	Name	Girth/Dia. cm	Height cm	Root Zone	Specification			m Ctrs		Number
C av	Corylus avellana		40-60	B	1+1; Transplant - seed raised; branched; 2 brks			Counted		13
C av	Corylus avellana		125-150	45-65L	Multi-stem; bushy; 5 stems min.			Counted		13
Sub-totals										26

Grassland Compensation Area - Grassland seed mix

Abbrev.	Name	Supplier / Description	Specification	g./m²		Area m²	total Kg
Native Species Rich grassland Seed Mix							
LWBP	All Things Bright and Beautiful Bee & Butterfly Wildflower Seeds (or acceptable equivalent) Note: if selecting alternative mix, it cannot contain the following species: • great burnet (Sanguisorba officinalis), • yellow oat-grass (Trisetum flavescens), • lady's bedstraw (Galium verum), • water avens (Geum rivale) and, • common quaking grass (Briza media).	NB seed mix now out of date Landlife Wildflowers; https://www.wildflower.co.uk/products/wildflower-seed-mixtures/lwb-butterfly-bee-100.html	As per suppliers recommendations on min 150mm cultivated subsoil. Through agreement with the supplier, This mix is to be augmented with grass vetchling (Lathyrus nissolia) and red bartsia (Odontites vernus) each at a rate of an additional 3% by weight to the mix. Availability of these seed species will be seasonally dependent and it is advised that the contractor speaks to the seed supplier (e.g. Landlife Wildflowers - 01205 281 902. Or Emorsgate Seeds, Mark@emorsgateseeds.com) to source the best seed. Any difficulties with or variation to this specification should be discussed with the Scheme's Landscape architect and ecologist.	3		10,306	30.92

Sept to April = optimum planting period; excludes Dec to Feb
1+0 = 1 year seedling not transplanted
1+1 = 2 year seedling transplanted after the first year
2x = Number of times transplanted e.g. twice

FILE PATH: plantpartner.co.uk/Arup/Schedules/2023-09-15 293651 Celtic Lakes SL

NOTEPAD: This export enables the calculation of the increased Quantities, Areas and Costs as a result of changing the Gradient, as well as Mix percentages if present, Areas, Centres and Densities.
Regarding plant mixes, it may be helpful to include accompanying text along the lines of 'to be planted in species groups,with 3-5 plants per group' or similar'.
Prices are ex VAT and ex-nursery.

Planting schedules are provided for historic information on species mixes only and are now superseded by up to date contractor instructions. Do not rely upon for design and contact the landscape architect for the most up to date schedule.

PLANT SCHEDULE

Client: Welsh Government
Project: Celtic Lakes NGED Substation
Location: Newport, South Wales
Schedule name: 293651 Celtic Lakes SL
Drawing ref.: 293651-ARP-XX-SP-LD-0001
Revision: P02

Date: 11/12/2023
Created by: Bristol Office
Schedule no.: 0001



PLANTING

Abbrev.	Name	Girth/Dia. cm	Height cm	Root Zone	Specification	Mix %	No./m²	m Ctrs	Area m²	Number
Native Scrub Mix										
C san	Cornus sanguinea		60-80	B	1+1; Transplant - seed raised; branched; 3 brks	5				63
C av	Corylus avellana		40-60	B	1+1; Transplant - seed raised; branched; 2 brks	15				188
C av	Corylus avellana		125-150	45-65L	Multi-stem; bushy; 5 stems min.	10				125
C mon	Crataegus monogyna		200-250	B	2x; Feathered; 5 brks	5				63
P pad	Castanea sativa		200-250	B	2x; Feathered; 5 brks	5				63
L per	Lonicera periclymenum	RC4	20-40	150cc min.	1+0; Seedling; cell grown	10				125
P pad	Prunus padus		80-100	B	1+1; Transplant - seed raised	10				125
P sp	Prunus spinosa		40-60	B	1+1; Transplant - seed raised; branched; 2 brks	10				125
Q r	Quercus robur	6-8	250-300	RB	2x; Feathered; 5 brks	5				63
S ni	Sambucus nigra		60-80	B	1+1; Transplant - seed raised; branched; 3 brks	10				125
V op	Viburnum opulus		40-60	B	1+1; Transplant - seed raised; branched; 2 brks	15				188
Sub-totals						100%		2.5	7836	1253

Native Trees

C av	Corylus avellana		125-150	45-65L	Multi-stem; bushy; 5 stems min.			Counted		26
Sub-totals										26

Native Hedgerow Mix

A ca	Acer campestre		125-150	B	2x; Feathered; 3 brks	20				411
C av	Corylus avellana		40-60	B	1+1; Transplant - seed raised; branched; 2 brks	25				514
L per	Lonicera periclymenum	RC4	20-40	150cc min.	1+0; Seedling; cell grown	10				206
P sp	Prunus spinosa		40-60	B	1+1; Transplant - seed raised; branched; 2 brks	10				206
C mon	Rosa canina		40-60	B	1+1; Transplant - seed raised; branched; 2 brks	10				206
P av	Prunus avium		125-150	B	2x; Feathered; 3 brks	10				206
I aq	Ilex aquifolium		40-60	3L	Bushy; 3 brks	5				103
S ni	Sambucus nigra		60-80	B	1+1; Transplant - seed raised; branched; 3 brks	10				206
Length m : No. of rows : Offset m		411	1		Sub-totals	100%	5			2058

Aquatic Planting

C p	Caltha palustris			50cc min.	Plug; established root 2-3 months min.; Sept to April planting; British native-origin	14				816
C ac	Carex acutiformis			50cc min.	Plug; established root 2-3 months min.; Sept to April planting; British native-origin	14				816
I p	Iris pseudacorus			50cc min.	Plug; established root 2-3 months min.; Sept to April planting; British native-origin	14				816
L sa	Lythrum salicaria			50cc min.	Plug; established root 2-3 months min.; Sept to April planting; British native-origin	14				816
M aq	Mentha aquatica			50cc min.	Plug; established root 2-3 months min.; Sept to April planting; British native-origin	14				816
R l	Ranunculus lingua			50cc min.	Plug; established root 2-3 months min.; Sept to April planting; British native-origin	15				875
S sa	Sagittaria sagittifolia			B	Clump; 3 buds; min. 1 year old; British native-origin	15				875
Sub-totals						100%	8		729	5830

SEEDING

Abbrev.	Name	Supplier / Description	Specification	g./m²		Area m²	total Kg
Native Species Rich grassland Seed Mix							
LWBP	All Things Bright and Beautiful Bee & Butterfly Wildflower Seeds (or acceptable equivalent) Note: if selecting alternative mix, it cannot contain the following species: • ight burnet (Sanguisorba officinalis), • ellow oat-grass (Trisetum flavescens), • lady's bedstraw (Galium verum), • water avens (Geum rivale) and, • common quaking grass (Briza media).	NB seed mix now out of date Landlife Wildflowers; https://www.wildflower.co.uk/products/wildflower-seed-mixtures/lwb-butterfly-bee-100.html	As per suppliers recommendations on min 150mm cultivated subsoil. Through agreement with the supplier, This mix is to be augmented with grass vetchling (Lathyrus nissolia) and red bartsia (Odontites vernus) each at a rate of an additional 3% by weight to the mix. Availability of these seed species will be seasonally dependent and it is advised that the contractor speaks to the seed supplier (e.g. Landlife Wildflowers - 01205 281 902. Or Emorsgate Seeds, Mark@emorsgateseeds.com) to source the best seed. Any difficulties with or variation to this specification should be discussed with the Scheme's Landscape architect and ecologist.	3		6113	18.339

Native Marginal Seed Mix

LW6M	Wetland and Pond Edge Wildflower Seeds (or acceptable equivalent)	Landlife Wildflowers; https://www.wildflower.co.uk/products/wildflower-seed-mixtures/80-20-wildflower-meadows-seed-mixtures/lw6-wetland-pond-edge-80-20.html	As per suppliers recommendations on min 150mm cultivated subsoil. Contractor to agree omission of the following species from the specified mix. • 1.2% lady's bedstraw (Galium verum), and • 0.6% water avens (Geum rivale), Alternatively the contractor can source suitable alternative bespoke marginal seed mix to be agreed, but that does not include the following species deemed by NRW to be unsuitable to seeding on the Gwent Levels: • ight burnet (Sanguisorba officinalis), • ellow oat-grass (Trisetum flavescens), • lady's bedstraw (Galium verum), • water avens (Geum rivale) and, • common quaking grass (Briza media). Any difficulties with or variation to this specification should be discussed with the Scheme's Landscape architect and ecologist.	5		1819	9.095
------	--	--	---	---	--	------	-------

- KEY:
- B = Bare-rooted and bagged
 - brk = Minimum number of breaks or shoots
 - cc = Root volume in cubic centimetres
 - L = Container size in litres
 - RB = Root-balled
 - RC = Root Collar minimum diameter in millimetres
 - Sept to April = optimum planting period; excludes Dec to Feb
 - 1+0 = 1 year seedling not transplanted
 - 1+1 = 2 year seedling transplanted after the first year
 - 2x = Number of times transplanted e.g. twice

FILE PATH: plantpartner.co.uk/Arup/Schedules/2023-09-15 293651 Celtic Lakes SL

NOTEPAD: This export enables the calculation of the increased Quantities, Areas and Costs as a result of changing the Gradient, as well as Mix percentages if present, Areas, Centres and Densities. Regarding plant mixes, it may be helpful to include accompanying text along the lines of 'to be planted in species groups,with 3-5 plants per group' or similar'. Prices are ex VAT and ex-nursery.

- TIPS:
- Click the yellow 'Enable' button just below the Excel menu to enable calculations.
 - Amend numbers in the coloured cells only. This will keep the in-built formula intact in the non-coloured cells.
 - Check formula by clicking on a cell then view in the formula bar below the top menu bar.
 - For hedging, if not previously set then an offset of 0.5m, being the distance between rows has been provided.
 - For a seed mix, a default value of 0.10 has been provided for the unit cost.
 - To display 2 decimal places for total costs, click column header **G** to highlight, right-click and select

Planting schedules are provided for historic information on species mixes only and are now superseded by up to date contractor instructions. Do not rely upon for design and contact the landscape architect for the most up to date schedule.

PLANT SCHEDULE

Client: Welsh Government
Project: Celtic Lakes NGED Substation
Location: Newport, South Wales
Schedule name: 293651 Celtic Lakes SL
Drawing ref.: 293651-ARP-XX-SP-LD-0004
Revision: P01

Date: 25/04/2024
Created by: Bristol Office
Schedule no.: 0001



PLANTING

Abbrev.	Name	Girth/Dia. cm	Height cm	Root Zone	Specification	Mix %	No./m²	m Ctrs	Area m²	Number
Native Hedgerow Mix										
A ca	Acer campestre		125-150	B	2x; Feathered; 3 brks	20				411
C av	Corylus avellana		40-60	B	1+1; Transplant - seed raised; branched; 2 brks	25				514
L per	Lonicera periclymenum	RC4	20-40	150cc min.	1+0; Seedling; cell grown	10				206
P sp	Prunus spinosa		40-60	B	1+1; Transplant - seed raised; branched; 2 brks	10				206
C mon	Rosa canina		40-60	B	1+1; Transplant - seed raised; branched; 2 brks	10				206
P av	Prunus avium		125-150	B	2x; Feathered; 3 brks	10				206
I aq	Ilex aquifolium		40-60	3L	Bushy; 3 brks	5				103
S ni	Sambucus nigra		60-80	B	1+1; Transplant - seed raised; branched; 3 brks	10				206
Length m : No. of rows : Offset m						411	1			
Sub-totals						100%	5			2058

Aquatic Planting

C p	Caltha palustris			50cc min.	Plug; established root 2-3 months min.; Sept to April planting; British native-origin	14				812
C ac	Carex acutiformis			50cc min.	Plug; established root 2-3 months min.; Sept to April planting; British native-origin	14				812
I p	Iris pseudacorus			50cc min.	Plug; established root 2-3 months min.; Sept to April planting; British native-origin	14				812
L sa	Lythrum salicaria			50cc min.	Plug; established root 2-3 months min.; Sept to April planting; British native-origin	14				812
M aq	Mentha aquatica			50cc min.	Plug; established root 2-3 months min.; Sept to April planting; British native-origin	14				812
R l	Ranunculus lingua			50cc min.	Plug; established root 2-3 months min.; Sept to April planting; British native-origin	15				870
S sa	Sagittaria sagittifolia			B	Clump; 3 buds; min. 1 year old; British native-origin	15				870
Sub-totals						100%	8		725	5800

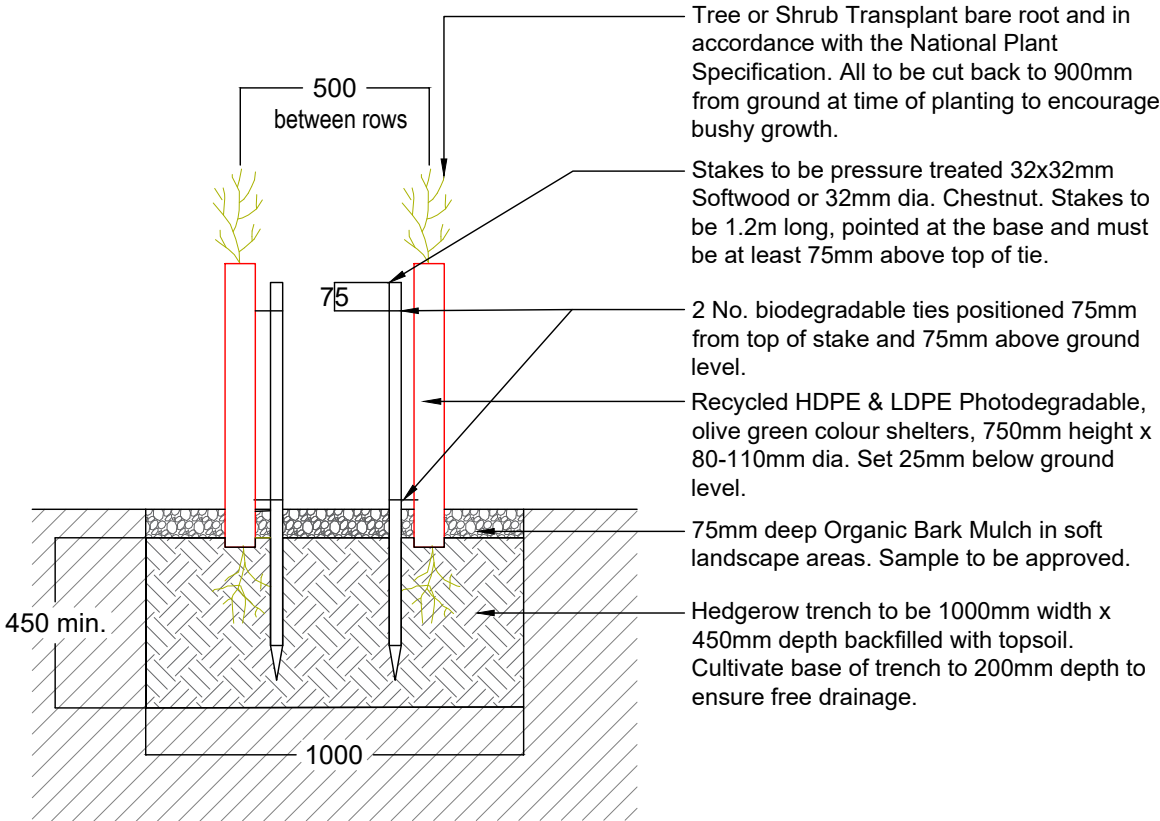
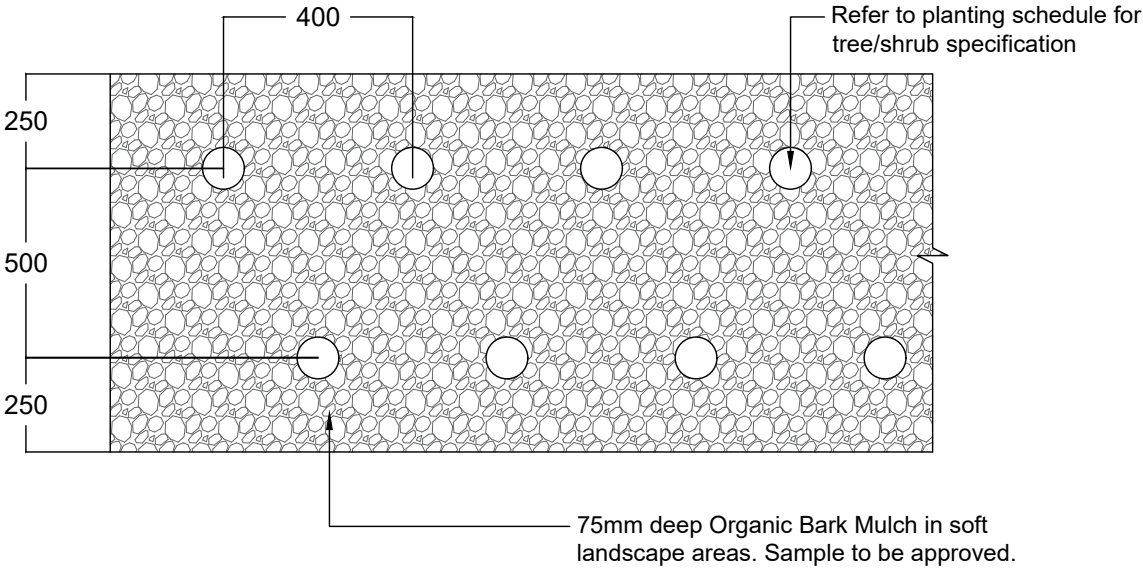
SEEDING

Abbrev.	Name	Supplier / Description	Specification	g./m²		Area m²	total Kg
Native Species Rich grassland Seed Mix							
SRG 1	Species Rich Grassland Seed Mix	Preferred option 1 - Green Hay Harvesting from nearby fields subject to agreement with Matthew Harris of Newport City Council matthew.harris@newport.gov.uk Option 2 Celtic Wildflowers Celtic Wildflowers (Barry Stewart 07730 50 27 38. 'sales@celticwildflowers.co.uk. Backstop Option 3 Emorsgate or other Welsh or similar reputable National Supplier (e.g. Landlife Wildflowers - 01205 281 902. Or Emorsgate Seeds, Mark@emorsgateseeds.com)	Seed mix is specified in Section 8 of the Landscape Specification Availability of theSeed mix is specified in Section 8 of the Landscape Specification se seed species will be seasonally dependent and it is advised that the contractor speaks to the seed supplier (e.g. Landlife Wildflowers - 01205 281 902. Or Emorsgate Seeds, Mark@emorsgateseeds.com) to source the best seed. Any difficulties with or variation to this specification should be discussed with the Scheme's Landscape architect and ecologist. Note: if selecting alternative mix, it cannot contain the following species: • great burnet (Sanguisorba officinalis), • yellow oat-grass (Trisetum flavescens), • lady's bedstraw (Galium verum), • water avens (Geum rivale) and, • common quaking grass (Briza media).	3		6112	18.336

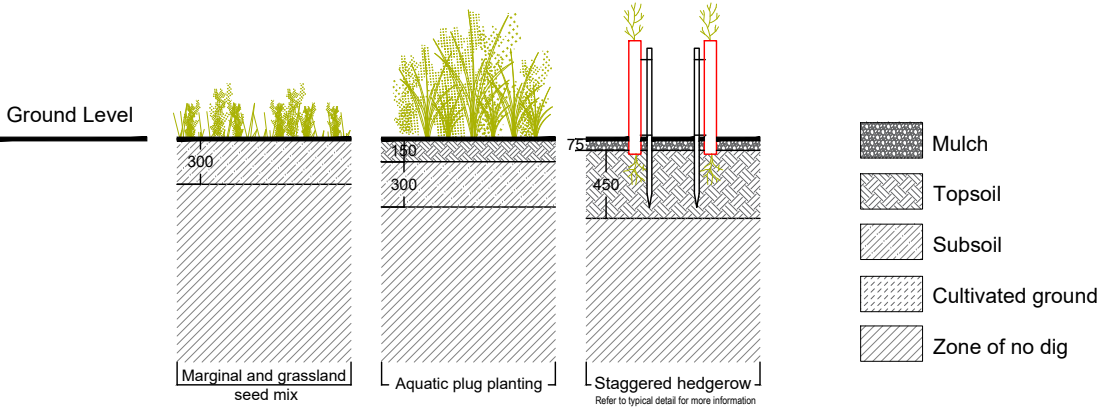
Native Marginal Seed Mix							
MSM 1	Marginal Seed Mix	Option A Celtic Wildflowers Celtic Wildflowers (Barry Stewart 07730 50 27 38. 'sales@celticwildflowers.co.uk. Option B Emorsgate or other Welsh or similar reputable National Supplier (e.g. Landlife Wildflowers - 01205 281 902. Or Emorsgate Seeds, Mark@emorsgateseeds.com)	Seed mix is specified in Section 9 of the Landscape Specification Alternatively the contractor can source suitable alternative bespoke marginal seed mix to be agreed, but that does not include the following speceices deemed by NRW to be unsuitable to seeding on the Gwent Levels: • great burnet (Sanguisorba officinalis), • yellow oat-grass (Trisetum flavescens), • lady's bedstraw (Galium verum), • water avens (Geum rivale) and, • common quaking grass (Briza media). Any difficulties with or variation to this specification should be discussed with the Scheme's Landscape architect and ecologist.	5		1086	5.43

- KEY:
- B = Bare-rooted and bagged
 - brk = Minimum number of breaks or shoots
 - cc = Root volume in cubic centimetres
 - L = Container size in litres
 - RB = Root-balled
 - RC = Root Collar minimum diameter in millimetres
 - Sept to April = optimum planting period; excludes Dec to Feb
 - 1+0 = 1 year seedling not transplanted
 - 1+1 = 2 year seedling transplanted after the first year
 - 2x = Number of times transplanted e.g. twice

FILE PATH: plantpartner.co.uk/Arup/Schedules/2023-09-15 293651 Celtic Lakes SL



Detail 01 - Staggered hedgerow
Scale 1:20



Detail 02 - Depth of soils
Scale 1:50

3	29/08/24	LP	BO	BO
2	10/05/24	MV	BO	BO
1	26/04/24	MV	BO	BO
Rev	Date	By	Chkd	Appd

ARUP

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Client
The Welsh Government

Project Title
Celtic Lakes
NGED Substation

Drawing Title
Figure 7
Landscape Details
Hedgerow and Depth of Soils

Scale at A3
1:20

Role
Landscape

Suitability
A7 - Authorized and accepted

Arup Job No 293651	Rev 3
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Drawing No
293651-LD-XX-DR-0004

Welsh Government

Celtic Lakes

Celtic Lakes WS2 - Soft Landscape Specification

Reference: 293651-ARP-XX-SP-LD-0005

02 | 10 May 2024



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This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 293651-00

Ove Arup & Partners Limited

4 Pierhead Street
Capital Waterside

Cardiff
CF10 4QP
United Kingdom

arup.com

Document Verification

Project title Celtic Lakes
Document title WS2 - Soft Landscape Specification
Job number 293651-00
Document ref 293651-ARP-XX-SP-LD-0005
File reference

Revision	Date	Filename	WS2 - Soft Landscape Specification		
01	02/05/2024	Description			
			Prepared by	Checked by	Approved by
		Name	MV	BO	BO
		Signature			
02	10/05/2024	Filename	WS2 - Soft Landscape Specification		
		Description			
			Prepared by	Checked by	Approved by
		Name	MV	BO	BO
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			

Issue Document Verification with Document ☒

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1. General

All landscape soft works are to be carried out in accordance with BS 4428: 1989 'Code of practice for general landscape operations (excluding hard surfaces)', BS3936:1992 'Recommendations for cultivation and planting in the Advance Nursery Stock category' and BS8545:2014 'Trees: from nursery to independence in the landscape'.

Works should be carried out at the appropriate season and only in appropriate weather conditions.

All vehicles and plant machinery are to be thoroughly cleaned before moving between Site areas to prevent the potential transfer of Invasive and non-native species between sites. A plan for this has been developed on the behalf of the contractor by a third party.

1.1 Notice and Liaison

The Contractor shall give reasonable notice (no less than 48 hours') to the Landscape Architect or Ecological Clerk of Works (ECoW) of the intention to commence any of the following operations:

- Subsoil treatment.
- Topsoil cultivations.
- Grass or wildflower seeding or turfing.
- Arrival of planting stock from nurseries.
- Planting.
- Mulching.
- Tree felling.
- Arboricultural works.
- Application of pesticides.
- Works outside the scheme boundary.

1.2 Peat

Peat is not to be used including plant stock from the supplying nurseries except with the written agreement of the LCoW.

1.3 Bird Nesting Season

All vegetation clearance (including areas used for access) shall be undertaken outside the bird nesting season (March to August inclusive), unless agreed otherwise with the Ecological Clerk of Works and appropriate mitigation is put in place, such as breeding bird checks, undertaken no more than 24 hours prior to any vegetation clearance commencing, by a qualified ecologist appointed by the Contractor. If nests are found, an exclusion zone, as advised by a qualified ecologist, must be set up until all chicks have left the nest.

2. Soil

Tree pits to be backfilled with site-won topsoil and subsoil where possible.

If by exception topsoil needs to be imported, it shall comply with BS3882 and BS4428 and shall be approved by the landscape architect.) Topsoil's and subsoils (as defined in BS 3882 and BS 8601 respectively) should be stacked separately, and strict precautions must be taken to prevent mixing and contamination of soils.

The contractor shall ensure imported soils are tested and certified by an approved soil scientist and shall provide evidence to the Welsh Government's design team landscape architect. All imported subsoil to comply with BS 8601:2013

Where required, site-won soils should be split into type and stored separately in un-trafficked mounds of no more than 2m high, in a well-drained part of the site. Soils should be re-used as soon as practicable in order to minimise the amount of time for which they are stored. Stripping handling, storage and spreading of soils to be undertaken in accordance with DEFRA code, BS 3882 and BS 8601.

All soil, whether re-used or imported will be shown to fit for their intended purpose via physical and chemical analysis (in accordance with BS 3882:2015 & BS 8601:2013). Prior to planting, percolation tests should be carried out to ensure that soils are fit for purpose and there must be no ameliorants (compost, fertiliser, etc) unless specifically required following soil analysis.

At the point of re-use, all soils should be dry, friable, free of contaminants and in a physical condition to promote sufficient aeration, drainage, and root growth of all planting.

Prior to any other landscape works including topsoil spread, all areas of soft landscaping shall be cultivated / ripped to alleviate any compaction prior to topsoiling and ensure adequate drainage. In all areas where trees are specified, supply and spread a minimum depth of 300mm of clean topsoil. In grass and ornamental planting areas spread 150mm minimum. Allow 10-15 cubic meters of topsoil + subsoil for each tree pit preparation. Subsoil to be shown to be fit for purpose, remedial works may not be effective.

2.1 Subsoil Surface Preparation

Under any soft landscape areas, break up any existing compacted topsoil using a ripping tine or subsoil plough. The minimum depth of treatment shall be 450 mm of subsoil to loosen, aerate and breakup subsoil. Ensure Compacted subsoil is broken up to a maximum size of 50mm and remove all debris and large clumps.

Prior to grading to the required profiles and levels, excavate and/or place fill to the following depths:

- Light and non-cohesive subsoils: when ground conditions are reasonably dry, loosen thoroughly to a depth of 300mm.
- Stiff clay and cohesive subsoils: when ground conditions are reasonably dry, loosen thoroughly to a depth of 450mm.
- Rock subgrades: lightly scarify to promote free drainage.

Immediately before spreading subsoil, remove any stones larger than 50mm, arising's, contaminants, and debris. Remove from site to a licensed tip.

3. Weed control

3.1 Management Aims:

To maintain all planting areas free from weeds.

3.2 Maintenance Operations General (Ongoing):

Beds, fence lines and hard surfaces shall be kept free from annual and perennial weeds by manual and / or chemical methods.

Invasive Non-Native Species Removal

3.3 Injurious Weeds

All areas for planting, seeding or hard landscape works shall be prepared and fully weed free prior to landscaping works taking place.

Control of injurious weeds within all landscape planting and grassed areas shall be carried out three times during the growing season for weeds in March, April and June unless otherwise agreed with the LCoW and EnCoW. Injurious weeds are those identified in the current version of Schedule 9 of the Wildlife and Countryside Act 1981. These include the following:

- Broad leafed dock.
- Curled dock.
- Common ragwort.
- Creeping thistle.
- Spear thistle.
- Himalayan Balsam.
- Giant Hogweed.
- Japanese knotweed.

Weed killing shall achieve total die-back of weeds and in the case of total weed control shall not allow any significant re-growth (less than 5%) within 6 months of application. In the case of selective weed control there shall be not more than 5% re-growth during the season.

Weed control shall be carried out during the active growing season for weeds on hard surfaces at the direction of the LCoW and EnCoW. For site preparation as follows:

- 750mm diameter circle at each planting station in grassed areas.
- 600mm wide strip along hedge trenches.
- Areas to be grass seeded.
- Other areas were directed by or agreed with the LCoW and EnCoW.

If in the opinion of the LCoW, weed control methods have not been carried out effectively, including any herbicide applications, the Contractor will be required to return between planned maintenance visits to carry out further weed control measures at his own expense within 7 days of notification and will be expected to submit a completed Maintenance Schedule Sheet.

Persistent weeds shall be forked out, including roots, unless damage will be caused to shrubs, in which case chemical control may be used, applied with a weed wipe or similarly controlled non-sprayed applicator. All weeds over 200mm height to be removed by hand operation.

Where the programme allows, weeding shall be carried out twice during the active growing season for weeds before planting. Timing of operations is to be agreed with the EnCoW.

The use of any herbicide shall be deemed to be included within tendered rates for maintenance. All herbicides shall have an approved dye added to indicate coverage.

For site preparation, on topsoil heaps and in planted beds, a non-residual translocated herbicide approved for total weed control shall be applied in accordance with the manufacturer's instructions, three times or as necessary during the active growing season to keep all areas totally weed free prior to soiling and then totally weed free during the active growing season until final seeding/planting is carried out.

Weed control in and around the waterbodies and all associated inlets and outlets should be managed in accordance with section 8.6. Hand weeding by pulling and cutting are preferred methods, but with approved safe herbicides as a last resort.

3.4 Selective Weed Control in Grass

Selective control of broadleaved weeds using herbicides in landscape planting and grass areas shall be carried out 3 times per year in March, April and June. Note: no application of selective herbicide to grassed areas until 4 months after sowing.

3.5 Weed Control by Spot Application of Herbicide

Selective herbicide spot treatment of broadleaved weeds shall be carried out to all grassed areas 3 times per year at times, April, July and September, or as appropriate to prevent infestation.

3.6 Weed Control by Pulling/Hand Weeding

Hand weeding by digging or forking and pulling of weed plants and their roots shall be used for the control of weeds twice per year at the direction of the ECoW in grass and planted areas where a spray herbicide cannot be applied without damaging the vegetation to be retained.

3.7 Weed Control by Cutting

Where present, Japanese knotweed over 1.5m tall before September shall be cut down prior to spraying of regrowth. Disposal must take place in a disposal site registered by the Environment Agency.

3.8 Arisings from Weed Control Operations

All arisings from weeding operations are to be removed from site and disposed of appropriately to a suitably licensed tip.

The Contractor shall ensure that their Biosecurity Risk Assessment complies with the plant health requirements specified in the EAP and manage biosecurity issues throughout the contract period as a priority.

4. Planting and Seeding Stock

All seeds and plant stock shall be UK provenance, as local as possible to Newport, this is confined to provenance area codes as follows in order of preference; 303, 304, 404 and 403. A Provenance Certificate shall be provided to confirm origin and provenance of all native tree and shrub species used prior to the commencement of landscaping works.

4.1 Planting Stock Quality

All plants shall be obtained from a Horticultural Trades Association (HTA) accredited Nursery in the Nursery Certification Scheme and registered with the Animal and Plant Health Agency (APHA). Plants which do not have a health certificate will only be accepted where this is not necessary due to the type of plant, all others will be deemed unacceptable.

The Contractor shall arrange a visit to the preferred nursery(ies) with the LCoW to inspect and select all planting stock. All selected stock shall be tagged and set aside in the nursery until ready for delivery to Site.

Any plants which are not available at time of supply shall be substituted with similar alternative species, certified as grown in the UK (UK provenance) and from a UK nursery stock list. The alternative species shall be approved by the landscape architect or LCoW.

The LCoW shall be notified when planting stock is due to arrive on Site as soon as practicable and with at least 48hrs notice prior to arrival. All planting stock shall be inspected by the LCoW on arrival from the nursery. Any plants not acceptable in the opinion of the LCoW shall be removed from Site by the Contractor and replacement plants sourced by the Contractor at their own expense.

All plants shall be lifted, packed, and handled in accordance with BS 3936, BS 4043 and the HTA publication, the National Plant Specification 10.2 Handling and Establishing Landscape Plants.

4.2 Replacement of Failed or Defective Plants

The Contractor shall maintain all planting as shown on the drawings in accordance with the Landscape Specification until all planting works are established and certified as completed.

For the duration of the maintenance period (5 years) from completion of the landscape mitigation planting the Contractor shall replace all plants within the contract areas which are missing, have died, or which in the opinion of the LCoW are failing to make satisfactory extension growth.

The Contractor shall arrange annual inspection with the Contractor, ECoW, Landscape Architect with invitation extended to the Biodiversity Officer at Newport City Council to sign off all Landscape works at the end of the 5-year maintenance period and highlight any ongoing management of biosecurity issues. During this maintenance period the Contractor any plants which have died are failing to make satisfactory extension growth, shall be replaced in the next planting season immediately following the inspection The Contractor shall bear the cost of all such plant replacements.

Each replacement plant shall be an additional year older than specified in the original specification for each year that has elapsed since the original stock was first planted.

Replace any damaged or dead trees, shrubs or other plant material with the same species at the specification, including size and density planting pit size, as originally specified in planting schedule 293651-ARP-XX-SP-LD-0004. All replanting to be agreed with Local Authority.

When replacement planting is undertaken, ground and pit preparation and planting shall be undertaken in accordance with the Landscape Specification. All plants removed shall be taken to a licensed tip off Site. Diseased plants shall be disposed of off Site.

Following replacement planting, any cages, stakes, ties, tubes or guards shall be refixed /replaced, and any mulch or mulch mats shall be reinstated to the Landscape Specification. Watering shall be carried out prior to any mulch reinstatement.

5. Existing Trees and Scrub Habitat

Existing trees to be retained where indicated and protected during construction works via temporary timber post and strained wire fencing. Works to be conducted in accordance with BS 5837:2012 'Trees in relation to design, demolition and construction'. The fencing shall be erected at the commencement of works and maintained in situ until construction has been completed. The following will apply;

- No work shall be permitted within the fenced enclosure;
- No oil, bitumen cement or other bituminous or deleterious material likely to be injurious to a tree shall be kept or discharged within 10.0m of the Root Protection Areas (RPAs);
- No other material shall be kept or stacked within Root Protection Areas (RPAs);
- No tipping or storage of materials nor any concrete mixing shall be carried out within 10.0m of any RPA;
- No fires shall be lit beneath or in close proximity to a tree canopy;
- Notice boards telephone cables or other services shall not be attached to any part of the tree;
- Care shall be exercised when using cranes or other mechanical plant and equipment near the spread of the canopy of the trees; and
- A notice shall be erected on the fence indicating that the area of the tree is a protected area and all activities associated with the works in that area shall be prohibited.

6. Planting

All planting operations shall be carried out in accordance with the relevant sections of BS 4428:1989 and BS8545:2014. Excavate tree pits to accommodate entire root mass. Fork sides and base thoroughly to achieve drainage and remove clay patches. All planting should be carried out during the appropriate planting period between 1st Oct and 31st of March. Outside this period all plants including trees show be source as containerised stock.

All feathered hedgerow trees shall be planted in top/sub soiled pits as shown on drawing 293651-LD-XX-DR-0004. Pits shall allow for natural infiltration. Place tree in pit and backfill with approved topsoil and subsoil. Ameliorate topsoil back fill for planting with 20% compost and fertilizer as necessary to ensure healthy growth of plants. Firm in layers and add water to field capacity. Supply and spread a minimum depth of 75mm bark mulch to top of tree pit.

Plant species shall be as specified in planting schedule (293651-ARP-XX-SP-LD-0004).

Root protection areas for all retained vegetation can be found in the arboricultural impact assessment (Celtic Lakes Power – Arboricultural Impact Assessment Welsh Government - ecus).

7. Seeding General

Areas of Grass seeding shall be cultivated to their full depth or a 150mm minimum prior to seeding.

Leave soil surface regular and even, removing all humps and hollows and remove all debris and stone over 50mm diameter.

Ensure that soil surface marries into existing levels and hard edges, service covers etc, leaving the soil surface 25mm proud to allow for settlement.

Firm and rake to prepare seedbed. Supply and sow specified grass seed mix at schedule rate, two equal sowings in transverse directions. Roll and water.

8. Species Rich Wildflower Seeding

8.1 SRG Seeding Option 1 (preferred)

Green hay harvesting. Subject to timings, logistics and agreement between Newport City Council and the design team to come up with a suitable solution to use green hay won from the nearby fields to seed the site in autumn.

Subject to agreement with Newport City Council the green hay would be cut in late summer / early autumn (normally July). From two fields approximately 200m to the southeast of the Main site. The Contractor would be responsible for separating and preparing the seed for seeding in the same autumn or the following spring. Guidance on Green Hay Harvesting can be found on the DEFRA Website here:
<https://defrafarming.blog.gov.uk/harvest-seeds-or-take-green-hay-to-restore-other-grassland-sites/>

Table 8.1 Seed Mix for Seeding Option 2 and 3

Grass species 10%				
Ref	Species	Common Name	Form	Percentage Mix
PM1	<i>Arrhenatherum elatius</i>	False oat grass	Seed	12.5
	<i>Alopecurus pratensis</i>	Meadow Foxtail (w)	Seed	3.75
	<i>Dactylis glomerata</i>	Cock's-foot	Seed	32.5
	<i>Deschampsia cespitosa</i>	Tufted Hair-grass (w)	Seed	2.5
	<i>Festuca arundinacea</i>	Tall fescue	Seed	3.75
	<i>Festuca pratensis</i>	Meadow Fescue	Seed	3.75
	<i>Festuca rubra</i>	Red Fescue	Seed	35
	<i>Holcus lanatus</i>	Yorkshire fog	Seed	6.25
Wildflower species 90%				
Ref	Species	Common Name	Form	Percentage Mix
	<i>Ballota nigra</i>	Black horehound	Seed	10

PM 1	<u>Centaurea nigra</u>	<u>Common Knapweed</u>	Seed	5
	<i>Lathyrus pratensis</i>	Meadow vetchling	Seed	10
	<i>Lotus corniculatus</i>	Birds-foot trefoil	Seed	10
	<i>Odontites verna</i>	Red bartsia	Seed	25
	<i>Scabiosa</i>	Scabious	Seed	5
	<i>Stachys sylvatica</i>	Hedge woundwort	Seed	10
	<i>Trifolium Pratense</i>	Red clover	Seed	5
	<i>Lamium album</i>	White dead-nettle	Seed	5
	<i>Lathyrus sylvestris</i>	Narrow-leaved everlasting pea	Seed	5
	<u>Vicia cracca</u>	<u>Tufted Vetch</u>	Seed	10

8.2 SRG Seeding Option 2

Selected seed mix from Celtic Wildflowers or another South Wales provider. This option is a back up to Option 1 where if for any reason we are unable to use the Green Hay option in a year, the contractor will seek a Welsh source of seed to import.

The design team have had limited success engaging with Celtic Wildflowers ltd. The only successful contact made was by the contractor in February 2024 and no contact since. Design Team's landscape architect will persist in trying to support the contractor with the sourcing of Welsh provenance seed.

8.3 SRG Seeding Last resort Option 3

This option is the back stop where if the Green Hay and Welsh seed options fail, subject to the agreement of the client and design team, the contractor could seek the same or a very similar mix to that proposed, but from another national supplier, such as Emorsgate Seeds

9. Marginal Seeding

Table 9.1 Marginal Seed Mix For Seeding Option A and B

Grass species 40%				
Ref	Species	Common Name	Form	Percentage Mix
PM2	<u>Agrostis capillaris</u>	Common Bent	Seed	12.5
	<i>Alopecurus pratensis</i>	Meadow Foxtail (w)	Seed	3.75
	<i>Briza media</i>	Quaking Grass (w)	Seed	3.75
	<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass (w)	Seed	3.75
	<u>Cynosurus cristatus</u>	<u>Crested Dogstail</u>	Seed	32.5
	<i>Deschampsia cespitosa</i>	Tufted Hair-grass (w)	Seed	2.5
	<i>Festuca rubra</i>	Red Fescue	Seed	35
	<i>Schedonorus pratensis (Festuca pratensis)</i>	Meadow Fescue	Seed	6.25
Wildflower species 60%				

Ref	Species	Common Name	Form	Percentage Mix
PM 2	<i>Ballota nigra</i>	Black horehound	Seed	10
	<i>Centaurea nigra</i>	Common Knapweed	Seed	5
	<i>Lathyrus pratensis</i>	Meadow vetchling	Seed	10
	<i>Lotus corniculatus</i>	Birds-foot trefoil	Seed	10
	<i>Odontites verna</i>	Red bartsia	Seed	25
	<i>Scabiosa</i>	Scabious	Seed	5
	<i>Stachys sylvatica</i>	Hedge woundwort	Seed	10
	<i>Trifolium Pratense</i>	Red clover	Seed	5
	<i>Lamium album</i>	White dead-nettle	Seed	5
	<i>Lathyrus sylvestris</i>	Narrow-leaved everlating pea	Seed	5
	<i>Vicia cracca</i>	Tufted Vetch	Seed	10

9.1 Marginal Seeding Option A

Selected seed mix from Celtic Wildflowers or another South Wales provider. This option is a back up to Option 1 where if for any reason we are unable to use the Green Hay option in a year, the contractor will seek a Welsh source of seed to import.

The design team have had limited success engaging with Celtic Wildflowers ltd. The only successful contact made was by the contractor in February 2024 and no contact since. Design Team's landscape architect will persist in trying to support the contractor with the sourcing of Welsh provenance seed.

9.2 Marginal Seeding Option B

This option is the back stop where if the Green Hay and Welsh seed options fail, subject to the agreement of the client and design team, the contractor could seek the same or a very similar mix to that proposed, but from another national supplier, such as Emorsgate Seeds

10. Maintenance

All planted areas shall be subject to a minimum five-year Maintenance programme which shall include the replacement of failed plants at the time of completion and in each following year during the planting season 1st Oct and 31st of March.

The Contractor shall maintain all planting as shown on the drawings for five years until all planting works are established and certified as completed.

For the duration of the maintenance period (5 years) from completion of the landscape planting, The Contractor shall maintain trees and planting areas. During this maintenance period the Contractor shall replace any plants which have died, or which in the opinion of the LCoW are failing to make satisfactory extension growth.

At the end of the 5-year maintenance period, the Contractor shall arrange an inspection of the landscape works to sign off all Landscape works and highlight any ongoing management of biosecurity issues. with the Project Manager LCoW, NRW Lead Landscape Architect with invitation extended to the Tree Officer at Newport County Council

In early September of each year for the duration of the relevant maintenance period, the Contractor shall arrange an inspection of each area of new planting works with the LCoW. Where bulbs and shrubs have been planted, the Contractor shall also arrange an inspection of each area of new planting works with the LCoW in the April following completion of the initial planting. All plants which are missing, are damaged, have died, or, in the opinion of the LCoW, are failing to thrive and grow, shall be replaced in the next planting season immediately following the inspection. Replacement plants shall, in all aspects, be the same as the original stock at the time of planting. Failed plants shall be marked with spray paint on stakes/spirals/guards or removed at the time of the inspection.

All replacement planting work shall be carried out in accordance with the landscape drawings and planting schedule. The Contractor shall bear the cost of all plant replacements.

When replacement planting is undertaken, the original specification including ground and pit preparation and planting shall be undertaken as above and shown on the landscape drawings. All plants removed and associated arisings shall be disposed of off-site to a licensed tip.

Following replacement planting, any stakes, ties, tubes or guards shall be refixed / replaced, and any mulch shall be reinstated. Plants shall be watered to field capacity. Watering shall be carried out prior to any mulch reinstatement.

Following extreme weather events such as periods of drought, high winds and excessive rainfall, all planting and seeding areas are to be inspected, for any damage and the contractor shall make good all damage and re-firm all plants and stakes as necessary.

Hedgerow to be cut / trimmed back annually in winter to 1m high to encourage bushy growth.

10.1 Watering

The Contractor shall inspect the site at regular intervals and determine when watering is necessary and on so doing undertake watering if required and as necessary for the continued thriving of all planting.

The Contractor shall be held responsible for any losses incurred due to a failure on his part to undertake a watering visit. This being of key importance during periods of drought.

The Contractor shall include for provision of hoses, bowsers, water carts and sprinkler attachments and any water charges in the price quoted for watering.

Water the beds and tree pits until entire depth of topsoil/backfill mixture is saturated.

The Contractor shall quote at the time of tendering his rate for watering the entire site on the above basis.

Application: Do not damage or loosen plants.

Compacted soil: Loosen or form depressions, to direct water to root zone.

Watering shall be undertaken as frequently as required to ensure the healthy growth and establishment of all planted and seeded areas.

The Contractor shall issue a method statement for watering of plants for acceptance by the Project Manager and ensure all required contents and approvals are in place for the proposed methodology for watering.

10.2 First Year Maintenance for Seeding

10.2.1 General

Mowing should only be carried out when conditions are suitable, and activities will not scar the surface of the land. Ground should be firm, not frozen or waterlogged, but it should also not be cut during periods of drought or when drought is forecast, as the sward matrix is fragile.

10.2.2 Native Species Rich Grassland Seed Mix

Once seedling grasses are established, (typically in good growing conditions about three to four weeks after sowing or towards the end of April in the year after an autumn sowing), lightly roll or tread to firm and level the soil around the grass roots ready for the first cut. (Do not roll however if the ground is saturated with water).

After a few days, when the grass has picked up again, the lawn will be ready for its first cut. Cut with the mower set on a high setting (50mm +), aiming to trim the sown grass back by about one-third of its height and cut back any weeds. Thereafter mow the new lawn regularly as needed, progressively reducing the mowing height over its first spring/summer to the desired height.

A new sown meadow will take a full year or more to reach full strength and ground cover and knit together as a sward. It can be walked on during establishment but avoid heavy use that might cause wear and tear.

The mix is perennial and slow to establish. Soon after sowing there will be a flush of annual weeds, arising from the soil seed bank. These weeds will offer shelter to the sown seedlings and provide a food source and shelter to various species before the year is out. Do not cut annual weeds until mid to late summer. Cut, and remove arisings around early August. This will reveal the young meadow, which can then be kept short by mowing through to the end of March of the following year. Dig out any residual perennial weeds such as docks.

10.2.3 Marginal seeding

In the first year cut early July followed by monthly cuts during August, September, and October. Cut the sward down to approx. 70-100mm.

10.3 Maintenance for seeding – years 2-5

10.3.1 Native Species Rich grassland Seed Mix

The meadow grassland should be cut once in Late April to early May, then not be cut again until late July or August to allow the species mix to fully flower through the summer season. This main summer hay cut should reduce the sward to approximately 50mm. Dependant on the fertility of the soil another similar hay cut should be done in Autumn and early spring to maintain the 50mm height.

10.3.2 Marginal seeding

Cut the sward from mid-July to September. Dependant on whether conditions conduct winter mowing to maintain the sward at 70-100mm until March. Removing the arisings and clippings.