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Snowdonia Project

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK.

EXECUTIVE SUMMARY

1. This report describes the methodology and results of botanical surveys carried out by RSK Environment Ltd on behalf of National Grid in July 2016, 2018 and March 2019 in connection with Visual Impact Provision (VIP), Snowdonia Project.
2. The c.108ha Ecological Survey Area near the village of Minffordd, Gwynedd lies between Ordnance Survey grid references SH 5922 3888 and SH 6252 3788 (and is shown on Figure 1 in Section 5 of this report).
3. The majority of the Ecological Survey Area is estuary habitat, with pastures and residential areas, particularly to the west. There are also hedgerows with scattered trees and small pockets of broad-leaved woodland. On a rocky outcrop at the eastern extreme of the Ecological Survey Area, marshy grassland and dense bracken dominates.
4. Habitats were assessed during a Preliminary Ecological Appraisal by AECOM in October and November 2015. This identified area which required further assessment in the form of botanical surveys. This was updated by RSK in July 2018 in the form of a Phase 1 Habitat Survey. A walkover of the east of the estuary was carried out in October 2019.
5. Habitats in the Ecological Survey Area include amenity and agricultural grasslands, ditches, scrub, broad-leaved woodland, ruderal vegetation, bracken, mire, salt marsh, and ponds.
6. Botanical Surveys included National Vegetation Classification Surveys of grasslands and important habitats, as well as Hedgerow Evaluation and Grading System Surveys of a single hedgerow. An Invasive Species Survey was also carried out in 2016 and updated in 2018.
7. Quadrat sampling was used to show that the grasslands in the Ecological Survey Area are generally improved and semi-improved agricultural grasslands.
8. Plant communities typical of mires were identified. The mires in particular have modest to high plant diversity with a number of specialist species and are therefore considered to have value to nature conservation. The mire communities (Quadrat Groups 9, 10, and 11) are listed as UK priority habitats which have some protection under the planning system.

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1 INTRODUCTION

1.1 Purpose of this Report

This report presents the results of terrestrial botanical surveys (Phase 1 Habitat Survey, National Vegetation Classification Survey, Hedgerow Survey and Invasive Species Survey) carried out by RSK Environment Ltd in July 2016, July 2018 and March 2019 on behalf of National Grid for the Visual Impact Provision (VIP), Snowdonia Project (here on referred to as the Proposed Project).

The Proposed Project will make use of a provision of £500 million for electricity transmission owners to mitigate the visual impact of existing electricity infrastructure in nationally protected landscapes in Great Britain. For National Grid, which is the transmission owner in England and Wales, this means mitigating the effects of existing infrastructure on the visual amenity and landscapes of National Parks and Areas of Outstanding Natural Beauty (AONBs). The Proposed Project seeks to underground a 3km stretch of overhead line (OHL) within a cable tunnel.

Ecological surveys were commissioned to provide baseline information on habitats, vegetation and protected species to inform the environmental appraisal (EA) and habitat regulations assessment (HRA) processes.

A Preliminary Ecological Appraisal (PEA), including a Phase 1 Habitat Survey was, originally carried out by AECOM in October and November 2015. The PEA identified areas of the Ecological Survey Area which required more detailed Botanical Surveys. These Botanical Surveys were carried out by RSK Environment Ltd in 2016 and updated where required and as documented in Section 2.

Due to the length of time since the original Phase 1 Habitat Survey and the sub-optimal time of year that the original survey was carried out, an updated Phase 1 Habitat Survey for the Proposed Projects was carried out by RSK Environment Ltd in summer 2018, this was further updated in March 2019 to capture the extent of the evolving design of the Proposed Project.

The results of Botanical Surveys of saltmarsh habitat on the Dwyryd Estuary (2016) are provided in Technical Appendix 16B of the Environmental Appraisal, the results are therefore not duplicated in this report.

1.2 Ecological Context

The c.108ha Ecological Survey Area, which is shown on Figure 1 in Section 5 of this report is between Ordnance Survey grid references SH5922 3888 and SH6252 3788 near the village of Minffordd. Most of the Ecological Survey Area is estuary habitat, with agricultural land and residential areas to the west (including hedgerows with scattered trees and small areas of broad-leaved woodland) and upland bracken and mire habitats (characteristic of the Snowdonia National Park) to the east. There is a road network throughout and this includes the A487 and the A497 in the west.

The OHL to be removed as part of the Proposed Project crosses the Dwyrdd Estuary south of Penrhyndeudraeth, Gwynedd. The estuary and adjacent saltmarsh habitat is within the Pen Llŷn a'r Sarnau Special Area of Conservation (SAC) and the Morfa Harlech Site of Special Scientific Interest (SSSI).

Ecological surveys were not carried out for the over head line works between towers 4ZC026 and 4ZC025, to the east of the site. Works in these areas are not due to take place for 5 years and will involve temporary, short -term light vehicle access only. A walkover of this area will be required prior to the works being carried out to identify any ecological constraints.

2 METHODS

2.1 Phase 1 Habitat Survey

A Phase 1 Habitat Survey was conducted on 19 and 20 July 2018 and 5 March 2019 by Will Holden and Jacob Hall. Will is a principal consultant with over 11 years' experience and a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and Chartered Ecologist. Jacob is a consultant ecologist with three years' experience and is a graduate member of CIEEM. Both are experienced in undertaking Botanical Surveys.

The weather was warm and sunny with some cloud (i.e. suitable for the survey).

The survey updated habitat information from a Phase 1 Habitat Survey described in a PEA prepared by AECOM (2016). The Phase 1 Habitat Survey was based on an approach (Joint Nature Conservation Committee (JNCC) 2010) as extended for use in environmental impact assessment (Institute of Environmental Assessment 1995). This involved the following elements:

- Habitat mapping using a set of standard colour codes to indicate habitat types on a Phase 1 Habitat Map (*Figure 2*).
- Description of features of possible ecological or nature conservation interest in notes relating to numbered locations on the Phase 1 Habitat Map, called 'target notes'. These are provided in *Appendix D*.

Phase 1 Habitat Survey methods are described in JNCC 2010. Limits to the achievable reliability of the method are discussed in Cherrill & McClean (1999). There are no firm guidelines to specify what Extended Phase 1 Habitat Survey involves, but Institute of Environmental Assessment (1995) suggests that it simply involves more extensive and detailed target notes.

Plant nomenclature in this report follows Stace (2010) for vascular plants and Hill et al (2008) for mosses and liverworts. Plant names are given with scientific names first, followed by the English name in brackets. Doubtful identifications are marked by 'cf.' (compare) placed before the specific epithet – it means the plant is very probably that but impossible to distinguish from similar taxa with certainty. Names of vegetation community types follow Rodwell (1991, 1992, 2000).

2.2 National Vegetation Classification Survey

Habitats that were identified as important by AECOM (2016) were subjected to more detailed Botanical Surveys. The National Vegetation Classification (NVC) Survey information presented in this report was completed in 2016. The Phase 1 Habitat Survey in 2018 showed that land use and habitats had not altered significantly between 2016 and 2018, so the NVC Surveys were not updated in 2018.

The grassland NVC Survey was carried out on 21, 22 and 23 June 2016 by Jan Skuriat and Will Holden. Jan is a principal consultant with over 20 years' experience and a full

member of the Chartered Institute of Ecology and Environmental Management (CIEEM) with experience of carrying out NVC Surveys.

2.2.1 Survey Methodology

The PEA prepared by AECOM (2016) was used to identify candidate sites for NVC Survey. Sites were selected on the basis of several factors including the homogeneity of their vegetation, the likelihood of their being affected by the Proposed Project, and the 'naturalness' of their vegetation. In this way inappropriate stands of vegetation were de-selected including:

- non-homogenous stands of vegetation that could not provide five quadrats, and were unlikely to conform to any NVC type;
- stands unaffected by the Proposed Project; and
- artificial habitats such as very species-poor 'Improved' grasslands that could be identified in the field.

The NVC Survey therefore provides results for a total of 11 stands of vegetation.

Plant assemblages were described using the methods of the NVC. NVC types were largely identified in the field from simple observation and experience, but quadrat sampling was carried out to confirm identification of the main NVC type in the NVC Survey.

Quadrat data were collected from homogeneous stands of vegetation following the standard methods for identifying NVC types (Rodwell 2006). In the woodland, the cover of each species in the canopy and shrub-layers was estimated in 50m² quadrats, while 4m squares were used for tall rush-dominated vegetation, and 2m squares for grassland (following Rodwell 1991, 1992, 2006). The cover of each species in each quadrat was estimated by eye and recorded on the Domin Scale (10 - over 90% cover, 9 - 76-90%, 8 - 51-75%, 7 - 34-50%, 6 - 26-33%, 5 - 11-25%, 4 - 5-10%, 3 - under 5% yet frequent, 2 - under 5% and occasional, 1 - under 5% and rare). Five quadrats were recorded for each stand providing the cover for each sample but also frequency estimates for each species.

The data are presented as a floristic table in the style of the definitive NVC tables given in *British Plant Communities* (Rodwell 1991, 1992). Species are ordered by their relative abundance, first by frequency class (class I – 0-20%, II – 21-40%, III -41-60%, IV – 61-80%, V – 81-100%), and then by maximum cover value on the Domin Scale; any remaining species ties are then ordered alphabetically.

Stands of vegetation were identified from quadrat data with the assistance of the computer-program MATCH (Malloch 1999), which computes similarity-coefficients between quadrat data and the published NVC tables in *British Plant Communities* (because these define the NVC communities and sub-communities). This gives only an initial indication of which NVC types the data are most likely to have been drawn from – the highest coefficient does not necessarily indicate a correct NVC diagnosis. It is always necessary to identify the NVC type through careful consideration of the NVC descriptions in *British Plant Communities* (Rodwell 1991, 1992, 1995). In the floristic tables, matching coefficients in bold represent acceptable NVC diagnoses, and those in italics represent

informative but individually unacceptable diagnoses, e.g. cases where a stand of vegetation is transitional to the indicated coefficient.

An eight figure Ordnance Survey Grid Reference was recorded for each of the quadrats surveyed allowing the exact location of the field surveys to be mapped (*Figure 3*).

2.2.2 Survey Constraints

June is the ideal time of year for NVC Survey. The lists of species in the floristic tables presented in Appendix B therefore adequately describe the flora of the site with the proviso that a list from a single site-visit can never be completely exhaustive.

2.3 Hedgerow Surveys

A hedgerow identified as likely to be important in the PEA prepared by AECOM (2016) was surveyed in more detail in 2016 (reported here). The Hedgerow Survey was carried out on 19 July 2016 by Will Holden. As land use and habitats have not altered significantly since 2016, it was not resurveyed in 2018.

2.3.1 Survey Methodology

Hedgerows were assessed using the hedgerow evaluation and grading system (HEGS) (Clements & Toft, 1993). The aim of the assessment is to allow the rapid recording and ecological appraisal of hedgerows to identify those which are likely to be of greatest significance for wildlife.

The method of assessment includes noting down canopy species composition, associated ground flora and climbers, number and species of trees present, structure of the hedgerow including height, width and gaps and associated features such as banks, ditches and grass verges.

Using the HEGS methodology each hedgerow can then be given a grade. The grades are used to assign a nature conservation value to each hedgerow as follows:

- Grade -1, 1, 1+ High to Very High Value;
- Grade -2, 2, 2+ Moderately High to High Value;
- Grade -3, 3, 3+ Moderate Value; and
- Grade -4, 4, 4+ Low Value.

Hedgerows graded -2 or above are suggested as being of nature conservation priority. One hedgerow was identified within the Ecological Survey Area. The remaining field boundaries included slate walls, wire and post fences and lines of semi-mature and mature trees. The location of the hedgerow surveyed is shown in *Figure 2*.

2.3.2 Survey Constraints

No constraints have been identified.

2.4 Invasive Species Survey

A walkover of the Ecological Survey Area (*Figure 1*) was carried out in June 2016, and then repeated in June 2018 by appropriately trained ecologists. Additional areas affected by the evolving design of the Proposed Project were captured in March 2019.

2.4.1 Survey Methodology

A walkover survey was carried out to record the presence of invasive plant species, e.g. *Fallopia japonica* (Japanese Knotweed), *Heracleum mantegazzianum* (Giant Hogweed), *Impatiens glandulifera* (Indian Balsam). Where invasive plant species were seen during the normal course of other surveys they were noted and recorded.

An updated walkover of the Ecological Survey Area was carried out in June 2018 to confirm the presence of invasive plant species at the locations identified in 2016. In addition, during the Phase 1 Habitat Survey on the Ecological Survey Area in 2018, the presence of invasive plant species was noted at locations which had not previously been identified in 2016.

2.4.2 Survey Constraints

June is an optimal time of year for searching for invasive species, therefore no survey constraints were identified.

3 RESULTS

3.1 Phase 1 Habitat Survey

The Phase 1 Habitat Survey identified the following habitats within the Ecological Survey Area:

- agricultural grassland;
- amenity grassland;
- scrub;
- woodland and trees;
- hedgerow;
- ruderal herbs and bracken;
- ditches;
- mire;
- salt marsh; and
- ponds.

3.1.1 Agricultural Grassland

Fields of agricultural grassland cover a significant proportion of the Ecological Survey Area (*Target Notes 1, 2, 3, 5, 7, 11, 12, 14, 15*). Generally speaking, these are either improved or poor semi-improved swards. The swards are typically dense, between 5cm and 10cm high, and regularly grazed. At certain times of the year, the fields at *Target Note 5* are left ungrazed to be harvested as hay. The sward in these fields therefore grows to be c.30cm high.

The fields are typically dominated by *Lolium perenne* (Perennial Rye-grass), although *Agrostis capillaris* (Common Bent), *Dactylis glomerata* (Cock's-foot), *Holcus lanatus* (Yorkshire-fog) were also frequently recorded. Some of the fields are waterlogged in places, and in these areas grasses such as *Alopecurus geniculatus* (Marsh Foxtail) and *Glyceria fluitans* (Floating Sweet-grass) are found.

These grasslands are species-poor, with infrequent forbs restricted to common and widespread species. Typical herb species include *Bellis perennis* (Daisy), *Cerastium fontanum* (Common Mouse-ear), *Ranunculus flammula* (Lesser Spearwort), *Ranunculus repens* (Creeping Buttercup) and *Trifolium repens* (White Clover), with other species such as *Cirsium palustre* (Marsh Thistle), *Galium palustre* (Common Marsh-bedstraw) and *Silene flos-cuculi* (Ragged-Robin) infrequently in marshier areas.

3.1.2 Amenity Grassland

Towards the centre of the Ecological Survey Area there are some areas of amenity grassland surrounding a local business park (*Target Notes 9 and 10*). These are regularly mown and have a short, dense sward of c.10cm tall. They are dominated by the grasses *Festuca rubra* (Red Fescue) and *Lolium perenne* (Perennial Rye-grass); they are

species-poor with forbs generally limited to *Achillea millefolium* (Yarrow), *Bellis perennis* (Daisy), *Plantago lanceolata* (Ribwort Plantain), *Taraxacum* agg. (Dandelion) and *Trifolium pratense* (Red Clover).

3.1.3 Scrub

The field boundaries and edges of woodland include patches of dense scrub. This is typically dominated by *Rubus fruticosus* agg. (Bramble) but there are also dense patches of *Buddleja davidii* (Butterfly-bush), *Crataegus monogyna* (Hawthorn), *Ulex europaeus* (Gorse) and *Prunus spinosa* (Blackthorn). The mire habitat at the east of the estuary is bordered by areas of dense *Pteridium aquilinum* (Bracken), *Rubus fruticosus* agg. (Bramble) and *Salix* sp (Willow) scrub.

3.1.4 Woodland and Trees

There are five sizeable stands of semi-natural broadleaved woodland within the Ecological Survey Area (*Target Note 6*). These are typically dominated by *Acer pseudoplatanus* (Sycamore), *Betula pendula* (Silver Birch), *Fraxinus excelsior* (Ash) and *Quercus robur* (Pedunculate Oak) with an understorey including *Corylus avellana* (Hazel), *Crataegus monogyna* (Hawthorn) and *Salix* spp (Willows). The herb community on the understorey contains some species typical of more mature habitat including *Anemone nemorosa* (Wood Anemone), *Ficaria verna* (Lesser Celandine) and *Hyacinthoides non-scripta* (Bluebell), although *Hedera helix* (Ivy) is the most prominent species in many of these areas.

Elsewhere there are several singular trees across the Ecological Survey Area, primarily associated with field boundaries. These include mature *Fraxinus excelsior* (Ash) and *Quercus robur* (Pedunculate Oak), as well as young *Salix* spp (Willows) and *Betula pendula* (Silver Birch) in more neglected habitats.

3.1.5 Hedgerow

The field boundaries are primarily dry-stone walls or post-and-wire fences (*Target Note 4*). The only hedgerow in the Ecological Survey Area is species-poor and formed of *Corylus avellana* (Hazel), *Crataegus monogyna* (Hawthorn), *Prunus spinosa* (Blackthorn), *Rosa arvensis* (Field-rose) and *Salix* spp (Willows). Its field layer is composed of species typical of the adjacent grassland habitat as well as herbs such as *Filipendula ulmaria* (Meadowsweet), *Lapsana communis* (Nipplewort), *Lathyrus pratensis* (Meadow Vetchling) and *Odontites vernus* (Red Bartsia).

3.1.6 Ruderal Herbs and Bracken

There are frequent areas dominated by tall semi-ruderal herbs and ferns (*Target Notes 7 and 16*). These are mainly towards the edges of the grassland and woodland habitats, as well as bordering roads and railways. Typical species found in these areas include *Chamerion angustifolium* (Rosebay Willowherb), *Silene dioica* (Red Champion) and *Urtica dioica* (Common Nettle). Towards the eastern end of the Ecological Survey Area is a

valley, the eastern slope of which is dominated by dense *Pteridium aquilinum* (Bracken), with frequent *Hyacinthoides non-scripta* (Bluebell) and *Potentilla erecta* (Tormentil).

3.1.7 Ditches

There are c.15 ditches in the Ecological Survey Area with a range of characteristics. Four are dry, and the rest were at least partially wet at the time of the survey, some very deep. Those towards the west of the Ecological Survey Area (*Target Notes 1, 5 and 8*) are fairly shallow to a depth of c.1m. Species such as *Apium nodiflorum* (Fool's Water-cress), *Glyceria fluitans* (Floating Sweet-grass), *Veronica beccabunga* (Brooklime), *Nasturtium officinale* (Water-cress) and *Filipendula ulmaria* (Meadowsweet) are present, as well as dense areas of *Phragmites australis* (Common Reed) where the ditches are deeper.

The two ditches towards the centre of the Ecological Survey Area are well-vegetated, although dry at the time of the survey (*Target Note 9*). Both are being encroached upon by surrounding young trees and grassland, but some typical ditch plants such as *Lycopus europaeus* (Gypsywort) and *Lythrum salicaria* (Purple-loosestrife) are found here.

There are many ditches in fields towards the south of the Ecological Survey Area (*Target Note 12*). These are generally between c.1.5 and 2m in depth and wet although over-managed and grazed. Their vegetation is largely limited to improved grassland species, although some wetland species such as *Alisma plantago-aquatica* (Water-plantain) and *Glyceria fluitans* (Floating Sweet-grass) are present here in small amounts.

Of two c.2m deep ditches towards the east of the survey area, one crosses a field and the other runs alongside an area of mire (*Target Notes 15 and 17*). They belong to the same stream (east-west flowing) which is culverted under a road between the field and the mire. The field ditch is fenced to keep out livestock; it is well-vegetated but strongly dominated by *Phragmites australis* (Common Reed). The mire ditch is more diverse, containing species such as *Glyceria maxima* (Reed Sweet-grass), *Lycopus europaeus* (Gypsywort), *Potamogeton* spp (Pondweed species), *Sparganium erectum* (Branched Bur-reed) and *Typha latifolia* (Bulrush).

3.1.8 Mire

At the east of the Ecological Survey Area a large continuous but heterogeneous area of mire lies in a valley bottom (*Target Note 16*). The substrate is consistently peaty and mosses are the dominant ground cover in the south-western part, with large hummocks of *Polytrichum* and *Sphagnum* species. The eastern areas are grassier, with *Molinia caerulea* (Purple Moor-grass) forming dense tussocks alongside other graminoids such as *Agrostis canina* (Velvet Bent), *Agrostis capillaris* (Common Bent), *Carex echinata* (Star Sedge), *Carex nigra* (Common Sedge), *Eriophorum angustifolium* (Common Cottongrass). This area contains some standing water at the far east and here is dominated by *Phragmites australis* (Common Reed) swamp. The western end is more heavily dominated by rushes, including *Juncus acutiflorus* (Sharp-flowered Rush), *Juncus articulatus* (Jointed Rush) and *Juncus effusus* (Soft-rush). Diverse wetland broad-leaved herbs throughout include *Cirsium palustre* (Marsh Thistle), *Epilobium palustre*

(Marsh Willowherb), *Galium palustre* (Common Marsh-bedstraw), *Hydrocotyle vulgaris* (Marsh Pennywort), *Lythrum salicaria* (Purple-loosestrife), *Ranunculus flammula* (Lesser Spearwort) and *Viola palustris* (Marsh Violet). At the edges are areas of bracken and bramble scrub as well as some dense areas of scrub dominated by *Salix* sp (Willows).

3.1.9 Salt Marsh

Salt marsh is another important habitat in the Ecological Survey Area, at the centre of which a large stretch borders the Dwyryd Estuary (*Target Note 13*). It is grazed by sheep and therefore has a very short sward of c.2 to 5cm comprising salt-tolerant species such as *Aster tripolium* (Sea Aster), *Juncus gerardii* (Saltmarsh Rush) and *Puccinellia maritima* (Common Saltmarsh-grass); one uncommon species here is *Juncus acutus* (Sharp Rush). Natural creeks and pools contain tall graminoids such as *Bolboschoenus maritimus* (Sea Club-rush) and *Phragmites australis* (Common Reed).

3.1.10 Ponds

Two relatively new balancing ponds in the western part of the Ecological Survey Area are c.1.5m deep and treat surface-water runoff from the nearby bypass (*Target Note 19*). Their species-poor vegetation is dominated by tall graminoids such as *Juncus effusus* (Soft-rush), *Iris pseudacorus* (Yellow Iris), *Phragmites australis* (Common Reed) and *Typha latifolia* (Bulrush). Their rocky banks have only sparse vegetation formed by species from the adjacent grassland.

A third c.2m-deep pond towards the centre of the Ecological Survey Area is part of the landscaping for nearby office buildings (*Target Note 20*), being one of a series of ponds in a business park. Around it planted trees include *Alnus glutinosa* (Alder), *Betula pendula* (Silver Birch), *Larix decidua* (European Larch), and *Salix* spp (Willows). The gently sloping banks are well-vegetated with wetland plants such as *Filipendula ulmaria* (Meadowsweet), *Iris pseudacorus* (Yellow Iris), *Lysimachia* spp (Loosestrife species) and *Lythrum salicaria* (Purple-loosestrife).

3.2 National Vegetation Classification

Aside from salt-marsh (see Technical Appendix 16B) the Ecological Survey Area contains the following broad habitat types:

- grazed grasslands, sometimes seasonally flooded;
- grasslands used for hay or silage, sometimes seasonally flooded; and
- mire.

The locations of vegetation samples are provided in *Figure 3*. Descriptions of the sample sets and the floristic tables can be found in *Appendix A*.

3.2.1 Grassland

Floristic tables for grasslands are given in *Tables A1 to A6* in *Appendix A*. The sampled stands vary in three ways:

- origin – whether the sward has been sown or whether it derives from older grassland;
- ongoing management – grazing by sheep or cattle, hay or silage making; and
- soil or other environmental factors affecting species composition.

Many of the grasslands on low-lying ground show signs of agricultural improvement. Often they have a number of species indicative of waterlogging or at least of seasonal inundation. Difficult conditions in the area sometimes limit the success of agricultural improvement techniques. As a result, species counts are frequently higher than those of typical improved and semi-improved swards from less challenging environments. The grassland Quadrat Groups 1-8 are variably assignable to the following NVC communities.

- **MG6b *Lolium perenne-Cynosurus cristatus* grassland, *Anthoxanthum odoratum* sub-community.** This is moderately species-rich semi-improved grassland.
- **MG 6b *Lolium perenne-Cynosurus cristatus* grassland *Alopecurus geniculatus* variant.** This is found on seasonally inundated land.
- **MG7b *Lolium perenne* leys and related grasslands, *Lolium perenne-Poa trivialis* leys sub-community.** These are agriculturally improved swards.
- **Some showing affinities with OV23c *Lolium perenne-Dactylis glomerata* community, *Plantago major-Trifolium repens* sub-community.** This would indicate disturbance or possibly recent sowing of an agricultural ley.
- **MG11a *Festuca rubra-Agrostis stolonifera-Potentilla anserina* grassland, *Lolium perenne* sub-community.** These are found on seasonally inundated land, and may be associated with MG13 (below) but not here with rush-pasture or swamp vegetation types.
- **MG13 *Agrostis stolonifera-Alopecurus geniculatus* grassland** on seasonally inundated land where it is associated with rush-pastures referable to the NVC type **MG10a *Holcus lanatus-Juncus effusus* rush-pasture, typical sub-community** and swamps referable to the NVC type **S19 *Eleocharis palustris* swamp**

3.2.2 Mire

Mire communities include Quadrat Groups 9, 10 and 11. They occur in mosaics with each other but also in distinct areas. They include variations on:

- **M6c *Carex echinata-Sphagnum recurvum/auriculatum* mire, *Juncus effusus* sub-community;**
- **M23 *Juncus effusus/acutiflorus-Galium palustre* rush-pasture ;** and
- **M25c *Molinia caerulea-Potentilla erecta* mire, *Angelica sylvestris* sub-community.**

3.3 Hedgerow Survey

A copy of the Hedgerow Survey form is presented in *Appendix B*. The hedgerow is shown on *Figure 2*. Under HEGS criteria set out in Clements and Tofts (1992), it scored 3 giving

it 'moderate' value (scoring a value of 3). On this inverted scale (from 4 low value to 1 high value) hedges scoring -2 or numerically less are considered to be of nature conservation priority. The hedgerow is not therefore assessed as being of nature conservation priority.

3.4 Invasive Species

There are many stands of invasive species within the Ecological Survey Area, especially in the north- western part. The location of invasive species stands is shown in *Figure 4*. Target notes identifying the species present are given in *Appendix C*. *Fallopia japonica* (Japanese Knotweed) is the most abundant invasive species, but there are also stands of *Crocsmia crocosmiiflora* (Montbretia) and *Impatiens glandulifera* (Indian Balsam) as well as an area of *Parthenocissus quinquefolia* (Virginia-creeper). Just outside the Ecological Survey Area *Crassula helmsii* (New Zealand Pigmyweed) grows in a pond in the Snowdonia Business Park.

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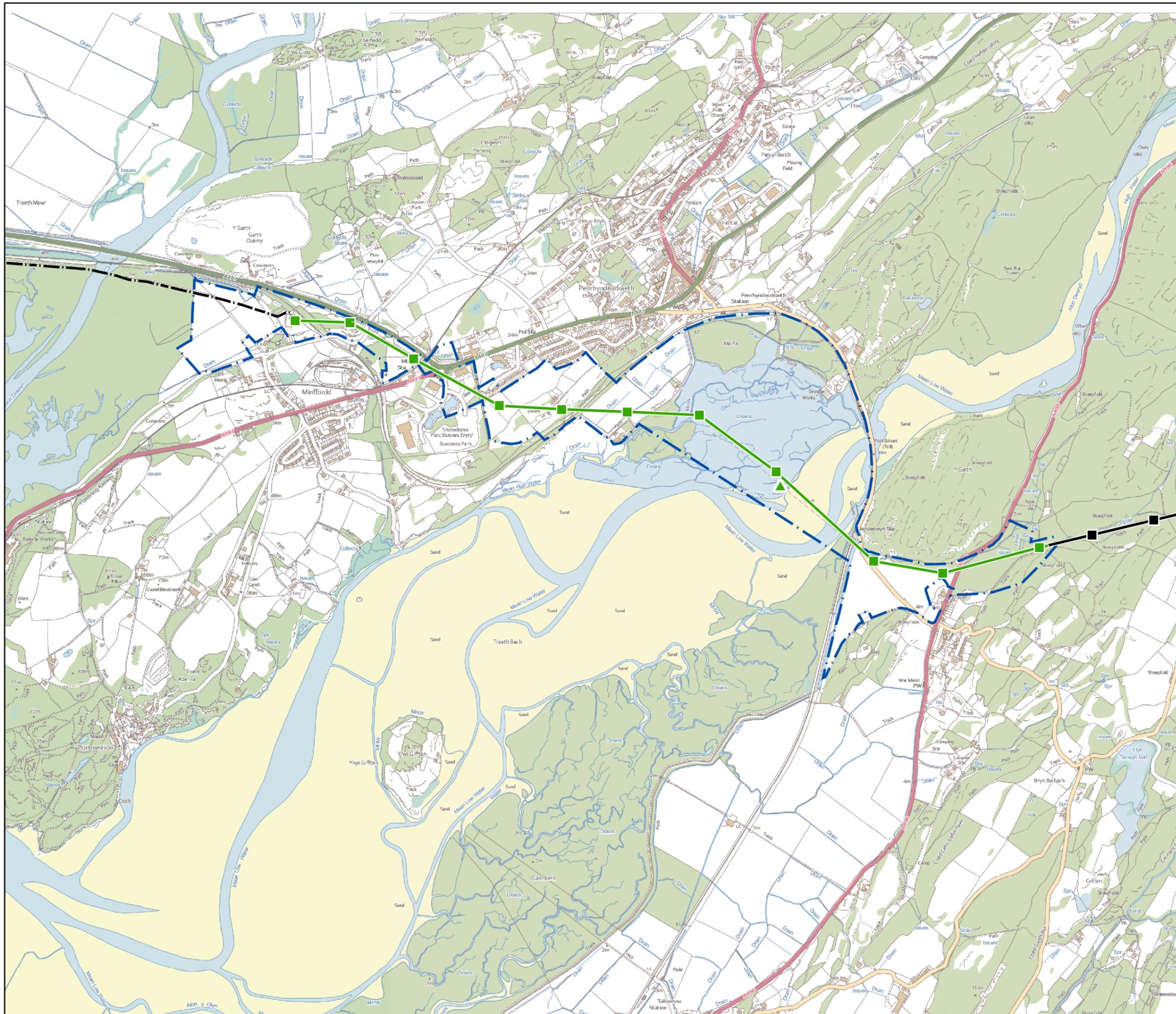
5 FIGURES

Figure 1 – Ecological Survey Area

Figure 2 – Phase 1 Habitat Survey

Figure 3 – National Vegetation Classification Quadrat Locations and Hedgerow Survey

Figure 4 – Invasive Species Survey



- Legend**
- Ecological Survey Area
 - Existing National Grid Underground Cable
 - Overhead Line to be Removed
 - Existing National Grid Overhead Line
 - ▲ Foundation of Former Pylon 4ZC030 to be Removed
 - Existing National Grid Pylon to be Removed
 - Existing National Grid Pylon to be Retained

Source:
Ecology: RSK, 2016.
Study Area: AECOM, 2015, edited Mott MacDonald March 2016.

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Rev	Description	Cre'd	Chk'd	App'd	Date
01	scheme and terminology	NH	WH	WH	29/03/2019
00	First Draft	NH	WH	WH	05/11/2019



Master Scheme No:	Sub-Scheme No:	Site:
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Scheme Name:
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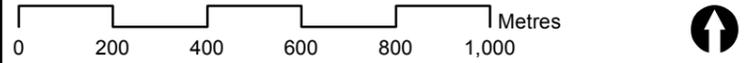
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Ecological Survey Area**

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Overview



Legend

- Area of Search for Permanent and Temporary Works
- Ecological Area of Search
- Existing National Grid Underground Cable
- Overhead Line to be Removed
- Existing National Grid Overhead Line
- Existing National Grid Pylon to be Removed
- Phase 1 Habitat Survey**
- Scattered-Broad-leaved Tree
- Target Note
- Dry Ditch
- Hedgerow
- Running Water
- Wall
- Bracken
- Broad-leaved Plantation Woodland
- Broad-leaved Semi-natural Woodland
- Dense / Continuous Scrub
- Hardstanding/Bare Ground
- Improved Grassland
- Semi-improved Grassland
- Semi-improved Neutral Grassland

Source: Study Area: P6 (with western extension) NG & RSK.Existing Infrastructure - National Grid

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02	updated to reflect site boundary	NH	WH	WH	27/09/2019
01	compund area phase 1	NH	WH	WH	07/03/2019
00	First draft	NH	JH	WH	15/10/2018
Rev	Description	Cre'd	Chk'd	App'd	Date



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Scheme Name: Visual Impact Provision (VIP) Snowdonia Project

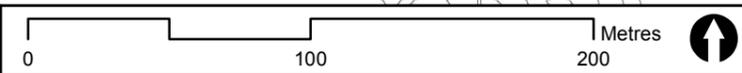
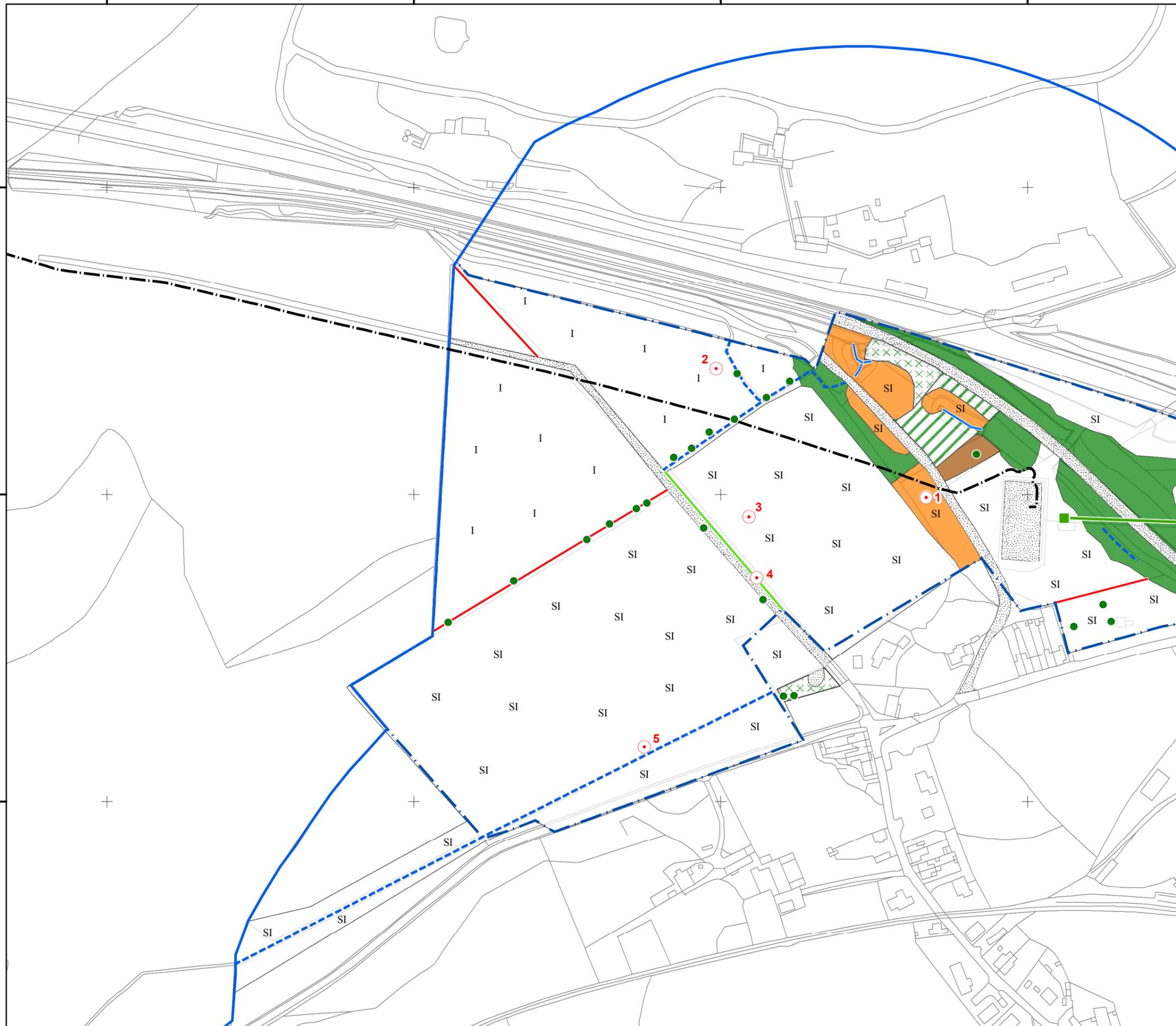
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Figure 2:
Phase 1 Habitat Survey

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Development Eng:	Document Type:	Scale: 1:2,500	Format: A3	Sheet(s): 1 of 7	Rev: 03

National Grid Document Number:
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Overview



Legend

- Area of Search for Permanent and Temporary Works
- Ecological Area of Search
- Overhead Line to be Removed
- Existing National Grid Overhead Line
- Existing National Grid Pylon to be Removed
- Phase 1 Habitat Survey**
- Scattered Scrub
- Scattered-Broad-leaved Tree
- Target Note
- Dry Ditch
- Running Water
- Wall
- Amenity Grassland
- Broad-leaved Plantation Woodland
- Broad-leaved Semi-natural Woodland
- Building
- Dense / Continuous Scrub
- Hardstanding/Bare Ground
- Introduced Shrub
- Semi-improved Grassland
- Semi-improved Neutral Grassland
- Standing Water

Source: Study Area: P6 (with western extension) NG & RSK.Existing Infrastructure - National Grid

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02	updated to reflect site boundary	NH	WH	WH	27/09/2019
01	compund area phase 1	NH	WH	WH	07/03/2019
00	First draft	NH	JH	WH	15/10/2018
Rev	Description	Cre'd	Chk'd	App'd	Date



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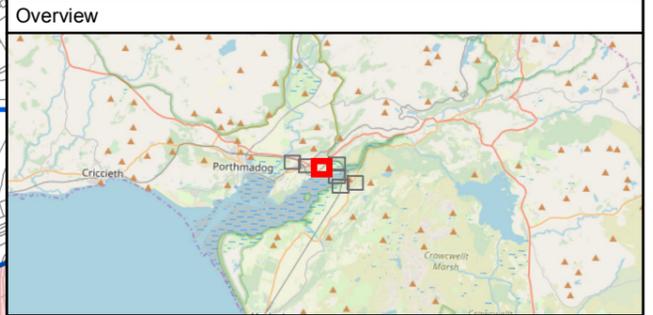
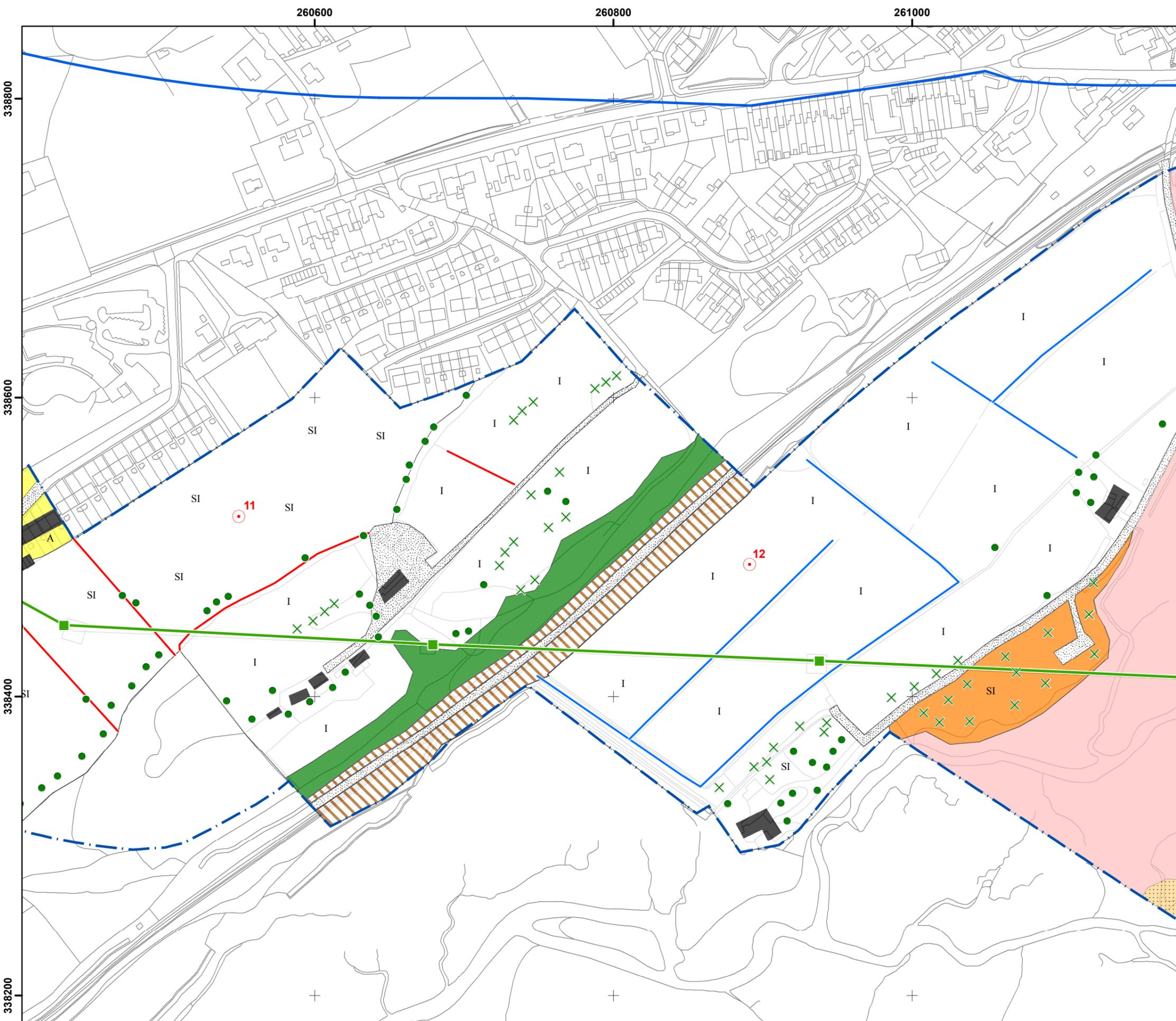
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Development Eng:	Document Type:	Scale: 1:2,500	Format: A3	Sheet(s): 2 of 7	Rev: 03

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Legend

- Area of Search for Permanent and Temporary Works
- Ecological Area of Search
- Overhead Line to be Removed
- Existing National Grid Overhead Line
- Existing National Grid Pylon to be Removed

Phase 1 Habitat Survey

- Scattered Scrub
- Scattered-Broad-leaved Tree
- Target Note
- Running Water
- Wall
- Amenity Grassland
- Broad-leaved Semi-natural Woodland
- Building
- Coastal Saltmarsh
- Hardstanding/Bare Ground
- Improved Grassland
- Mud / Sand
- Semi-improved Grassland
- Semi-improved Neutral Grassland
- Tall Ruderal

Source: Study Area: P6 (with western extension) NG & RSK.Existing Infrastructure - National Grid

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02	updated to reflect site boundary	NH	WH	WH	27/09/2019
01	compund area phase 1	NH	WH	WH	07/03/2019
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Rev	Description	Cre'd	Chk'd	App'd	Date



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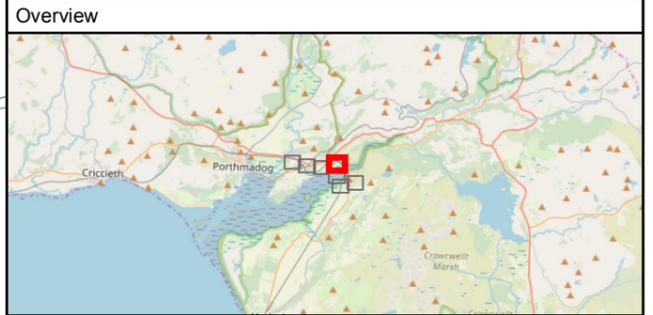
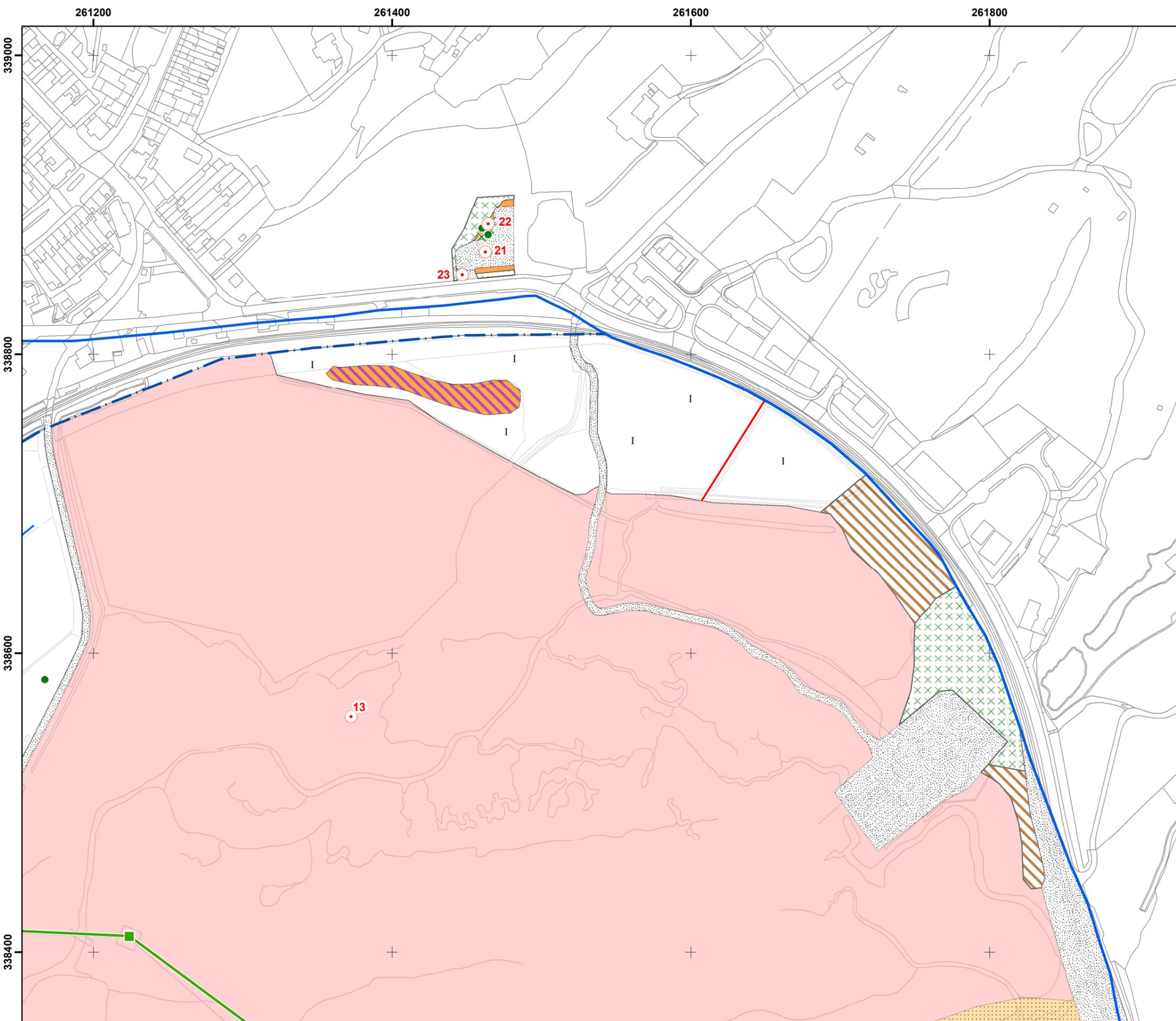
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Phase 1 Habitat Survey**

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- Legend**
- Area of Search for Permanent and Temporary Works
 - Ecological Area of Search
 - Overhead Line to be Removed
 - Existing National Grid Overhead Line
 - Existing National Grid Pylon to be Removed
- Phase 1 Habitat Survey**
- Scattered Scrub
 - Scattered-Broad-leaved Tree
 - Target Note
 - Running Water
 - Wall
 - Coastal Saltmarsh
 - Dense / Continuous Scrub
 - Hardstanding/Bare Ground
 - Improved Grassland
 - Marshy Grassland
 - Mud / Sand
 - Semi-improved Neutral Grassland
 - Tall Ruderal

Source: Study Area: P6 (with western extension) NG & RSK.Existing Infrastructure - National Grid

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00	First draft	NH	JH	WH	15/10/2018
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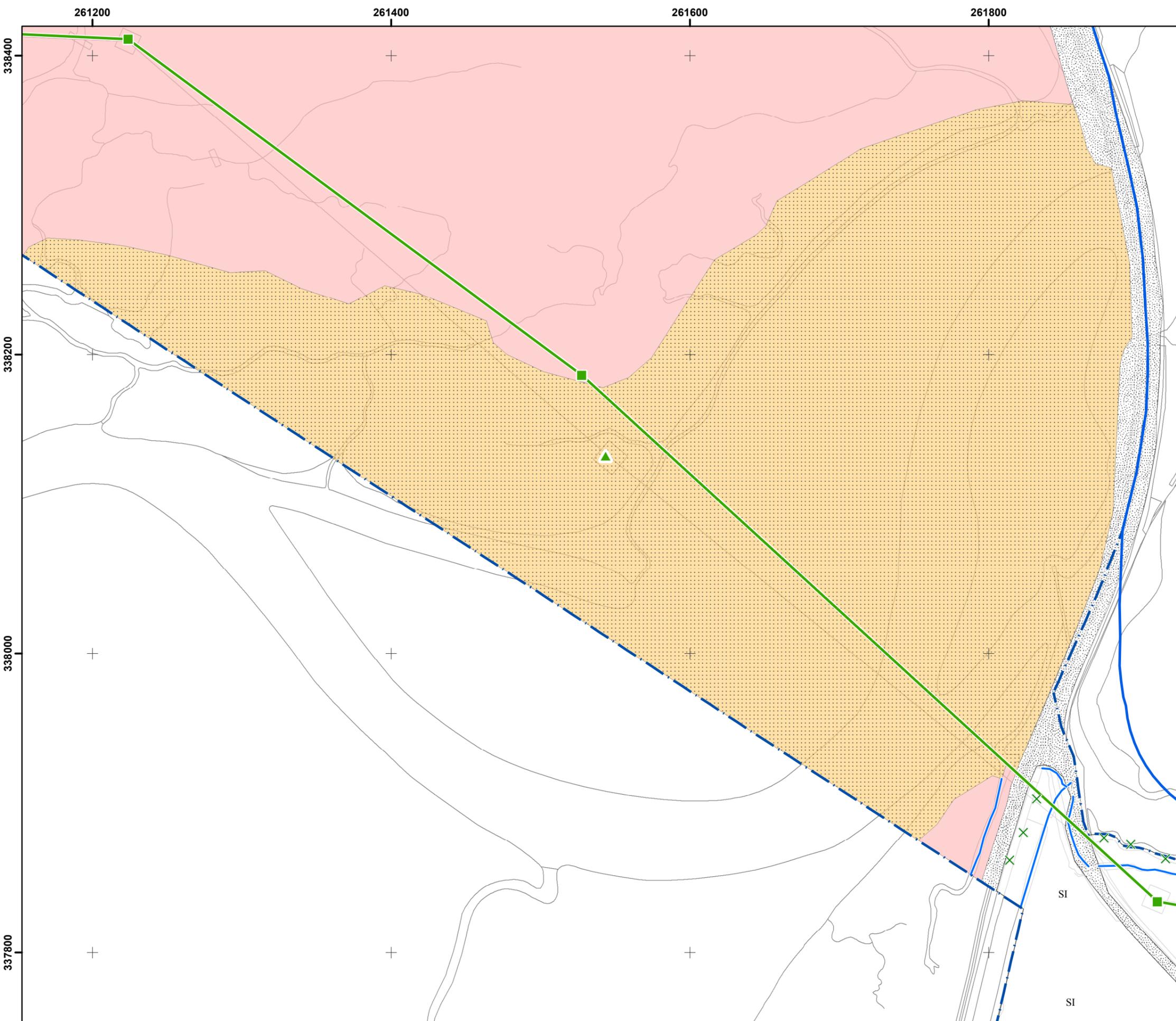
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- Legend**
- Area of Search for Permanent and Temporary Works
 - Ecological Area of Search
 - Overhead Line to be Removed
 - Existing National Grid Overhead Line
 - ▲ Foundation of Former Pylon 4ZC030 to be Removed
 - Existing National Grid Pylon to be Removed
- Phase 1 Habitat Survey**
- X Scattered Scrub
 - Running Water
 - Coastal Saltmarsh
 - Hardstanding/Bare Ground
 - I Improved Grassland
 - Mud / Sand
 - SI Semi-improved Grassland

Source: Study Area: P6 (with western extension) NG & RSK Existing Infrastructure - National Grid

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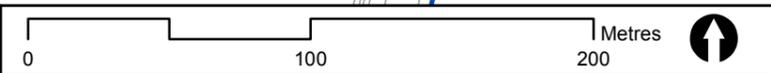
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Phase 1 Habitat Survey**

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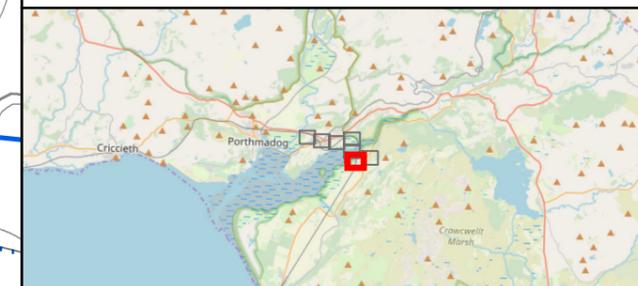
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Overview



Legend

- Area of Search for Permanent and Temporary Works
- Ecological Area of Search
- Overhead Line to be Removed
- Existing National Grid Overhead Line
- Existing National Grid Pylon to be Removed
- Phase 1 Habitat Survey**
- Scattered Scrub
- Target Note
- Running Water
- Coastal Saltmarsh
- Hardstanding/Bare Ground
- Improved Grassland
- Mud / Sand
- Semi-improved Grassland

Source: Study Area: P6 (with western extension) NG & RSK.Existing Infrastructure - National Grid

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01	compund area phase 1	NH	WH	WH	07/03/2019
00	First draft	NH	JH	WH	15/10/2018
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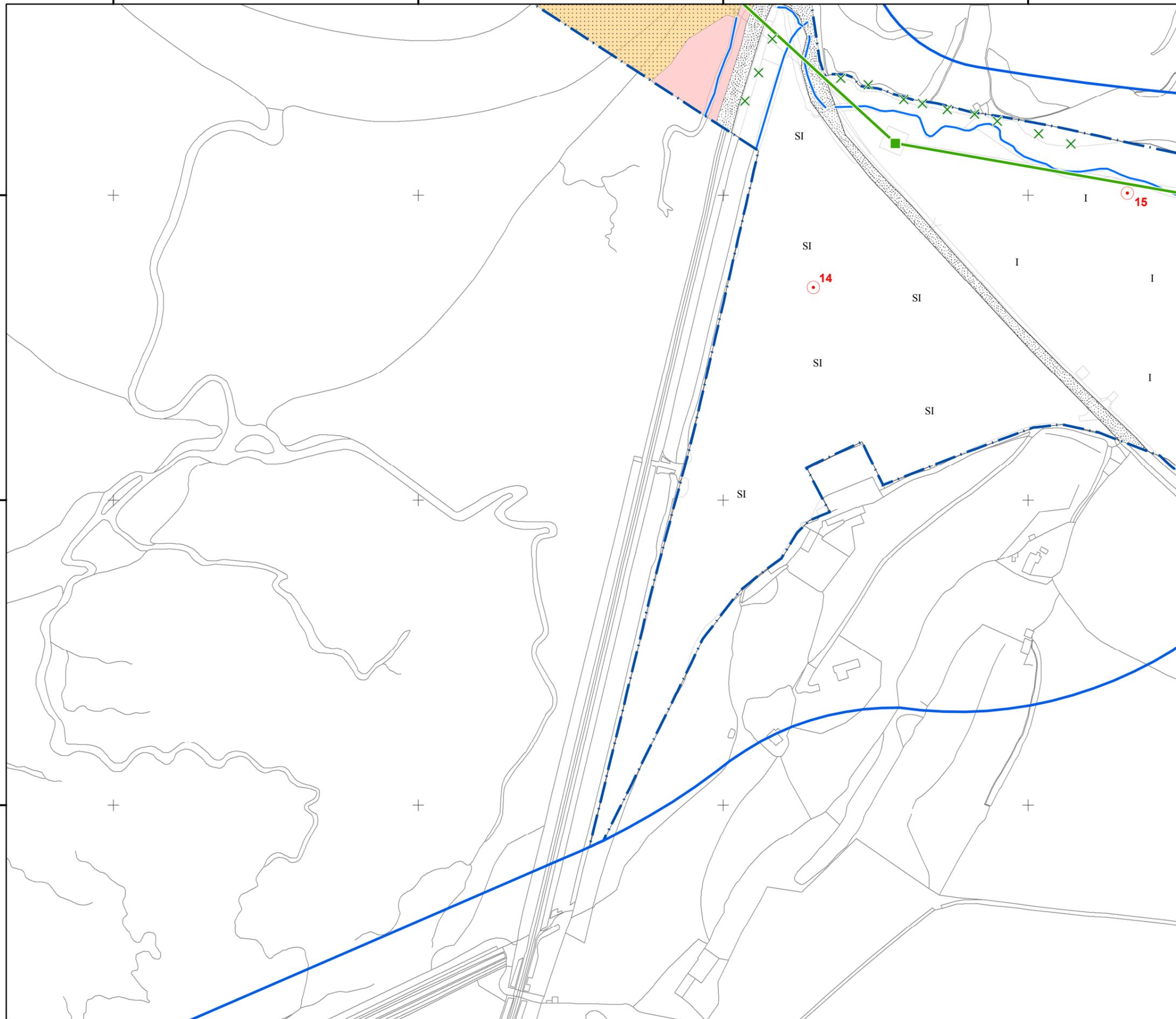
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Figure 2:
Phase 1 Habitat Survey

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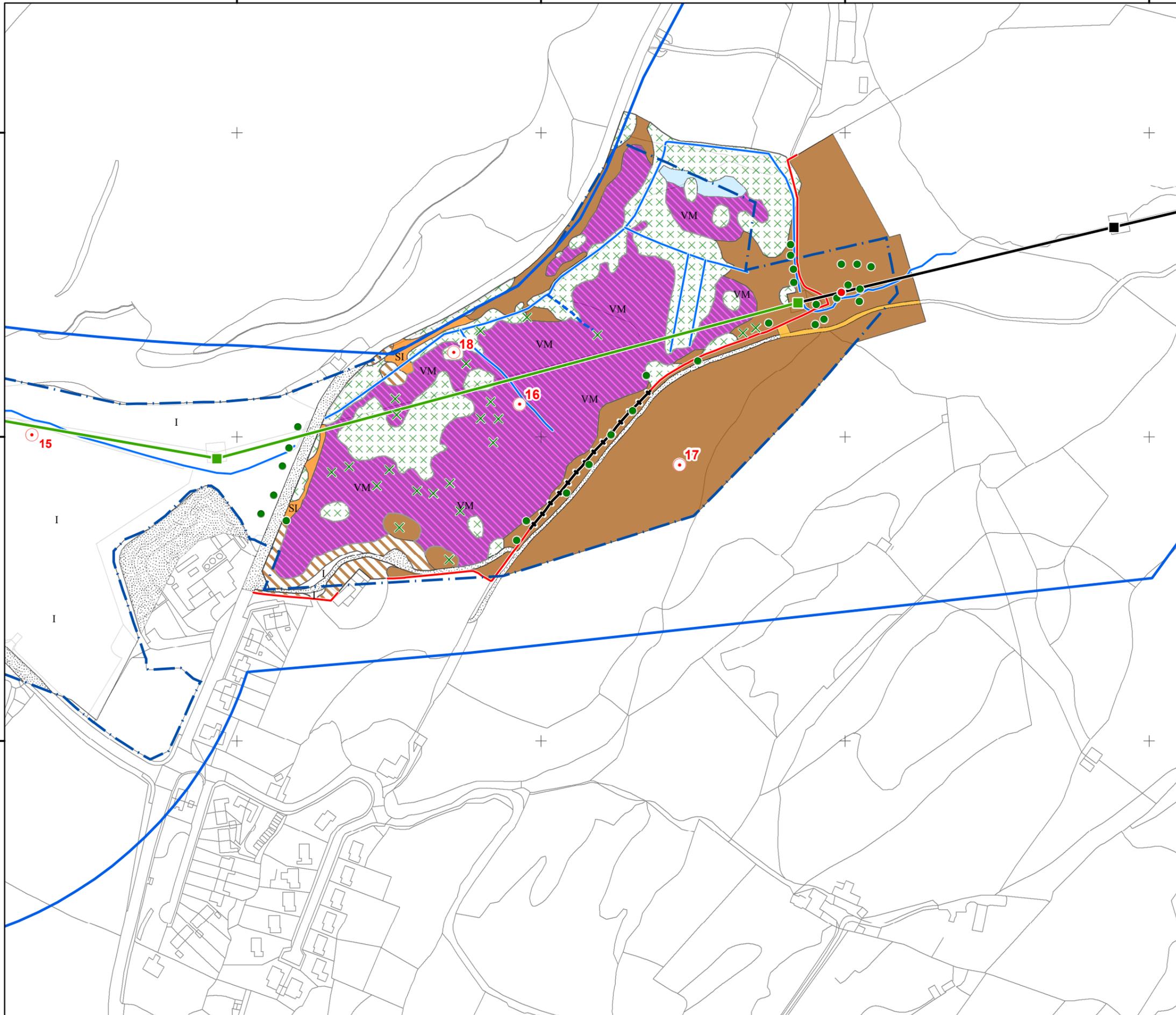
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Overview



Legend

- Area of Search for Permanent and Temporary Works
 - Ecological Area of Search
 - Overhead Line to be Removed
 - Existing National Grid Overhead Line
 - Existing National Grid Pylon to be Removed
 - Existing National Grid Pylon to be Retained
 - New National Grid Pylon
- Phase 1 Habitat Survey**
- Scattered Scrub
 - Scattered-Broad-leaved Tree
 - Target Note
 - Dry Ditch
 - Fence
 - Running Water
 - Wall
 - Bracken
 - Dense / Continuous Scrub
 - Hardstanding/Bare Ground
 - Improved Grassland
 - Rough Grassland
 - Semi-improved Grassland
 - Semi-improved Neutral Grassland
 - Swamp
 - Tall Ruderal
 - Valley Mire

Source: Study Area: P6 (with western extension) NG & RSK.Existing Infrastructure - National Grid

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02	updated to reflect site boundary	NH	WH	WH	27/09/2019
01	compound area phase 1	NH	WH	WH	07/03/2019
00	First draft	NH	JH	WH	15/10/2018
Rev	Description	Cre'd	Chk'd	App'd	Date



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Scheme Name: Visual Impact Provision (VIP) Snowdonia Project

Document Title: Figure 2: Phase 1 Habitat Survey

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N.Hogben	21/11/2019	W.Holden	21/11/2019	W.Holden	21/11/2019
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- Legend**
- Ecological Survey Area
 - Existing National Grid Underground Cable
 - Overhead Line to be Removed
 - Existing National Grid Overhead Line
 - Existing National Grid Pylon to be Removed
 - Hedgerow Survey
 - NVC Quadrat Group 1
 - NVC Quadrat Group 2
 - NVC Quadrat Group 3
 - NVC Quadrat Group 4

Source:
Ecology: RSK, 2016.
Study Area: AECOM, 2015, edited Mott MacDonald March 2016.

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02	Additional Sites, Reduced to AoS	NH	WH	WH	14/11/2018
01	Additional Sites	NH	TA	SR	17/10/2018
00	First Draft	NH	WH	SR	06/10/2016
Rev	Description	Cre'd	Chk'd	App'd	Date



Master Scheme No:	Sub-Scheme No:	Site:
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Scheme Name:
Visual Impact Provision (VIP) Snowdonia Project

Document Title:
**Figure 3:
National Vegetation Classification
Quadrat Locations and Hedgerow Survey**

Created by: N.Hogben	Date: 29/03/2019	Checked by: W.Holden	Date: 29/03/2019	Approved by: S.Rotherham	Date: 29/03/2019
Development Eng:	Document Type: .mxd	Scale: 1:5,000	Format: A3	Sheet(s): 1 of 2	Rev: 03

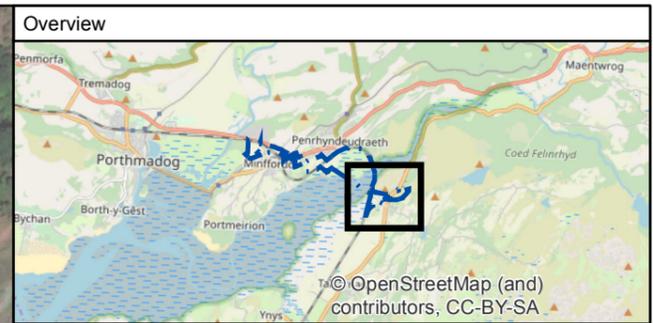
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- Legend**
- Ecological Survey Area
 - Overhead Line to be Removed
 - Existing National Grid Overhead Line
 - Foundation of Former Pylon 4ZC030 to be Removed
 - Existing National Grid Pylon to be Removed
 - Existing National Grid Pylon to be Retained
 - NVC Quadrat Group 5
 - NVC Quadrat Group 6
 - NVC Quadrat Group 7
 - NVC Quadrat Group 8
 - NVC Quadrat Group 9
 - NVC Quadrat Group 10
 - NVC Quadrat Group 11

Source:
Ecology: RSK, 2016.
Study Area: AECOM, 2015, edited Mott MacDonald March 2016.

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Rev	Description	Cre'd	Chk'd	App'd	Date
03	Infrastructure/limits	NH	WH	WH	29/03/2019
02	Additional Sites, Reduced to AoS	NH	WH	WH	14/11/2018
01	Additional Sites	NH	TA	SR	17/10/2018
00	First Draft	NH	WH	SR	06/10/2016



Master Scheme No:	Sub-Scheme No:	Site:
-	-	Snowdonia VIP

Scheme Name:
Visual Impact Provision (VIP) Snowdonia Project

Document Title:
**Figure 3:
National Vegetation Classification
Quadrat Locations and Hedgerow Survey**

Created by:	Date:	Checked by:	Date:	Approved by:	Date:
N.Hogben	29/03/2019	W.Holden	29/03/2019	S.Rotherham	29/03/2019
Development Eng:	Document Type:	Scale:	Format:	Sheet(s):	Rev:
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



- Legend**
- Ecological Survey Area
 - Existing National Grid Underground Cable
 - Overhead Line to be Removed
 - Existing National Grid Overhead Line
 - Existing National Grid Pylon to be Removed
 - Invasive Plant Species Areas

Source:
Ecology: RSK, 2016.
Study Area: AECOM, 2015, edited Mott MacDonald March 2016.

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Rev	Description	Cre'd	Chk'd	App'd	Date
04	infrastructure/limits	NH	WH	WH	29/03/2019
03	site compound area	NH	WH	WH	07/03/2019
02	Additional Sites, Reduced to AoS	NH	WH	WH	14/11/2018
01	Additional Sites	NH	TA	SR	17/10/2018
00	First Draft	NH	WH	SR	06/10/2016



Master Scheme No:	Sub-Scheme No:	Site:
-	-	Snowdonia VIP

Scheme Name:
Visual Impact Provision (VIP) Snowdonia Project

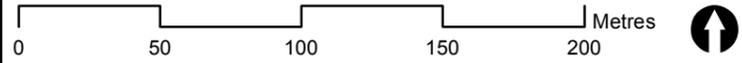
Document Title:
**Figure 4:
Invasive Species Survey**

Created by:	Date:	Checked by:	Date:	Approved by:	Date:
N.Hogben	29/03/2019	W.Holden	29/03/2019	S.Rotherham	29/03/2019
Development Eng:	Document Type:	Scale:	Format:	Sheet(s):	Rev:
-	.mxd	1:2,500	A3	1 of 3	04

National Grid Document Number:
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Overview



Legend

- Ecological Survey Area
- Overhead Line to be Removed
- Existing National Grid Overhead Line
- Existing National Grid Pylon to be Removed
- Invasive Plant Species Areas

Source:
Ecology: RSK, 2016.
Study Area: AECOM, 2015, edited Mott MacDonald March 2016.

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-	.mxd	1:2,500	A3	2 of 3	04

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- Legend**
- Ecological Survey Area
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Master Scheme No:	Sub-Scheme No:	Site:
-	-	Snowdonia VIP

Scheme Name:
Visual Impact Provision (VIP) Snowdonia Project

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**Figure 4:
Invasive Species Survey**

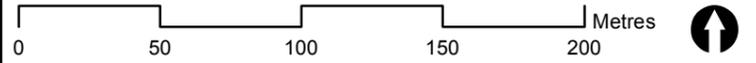
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N.Hogben	29/03/2019	W.Holden	29/03/2019	S.Rotherham	29/03/2019
Development Eng:	Document Type:	Scale:	Format:	Sheet(s):	Rev:
-	.mxd	1:2,500	A3	3 of 3	04

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APPENDIX A: NVC SURVEY RESULTS

Table A1. Quadrat Group 1: Floristic (NVC style) table for 5 two-metre square quadrats in semi-improved mesotrophic grassland

Species	Q1	Q2	Q3	Q4	Q5	Frq.	Cov.
<i>Anthoxanthum odoratum</i>	5	5	5	6	5	V	5-6
<i>Festuca rubra</i>	5	5	5	5	6	V	5-6
<i>Agrostis capillaris</i>	5	5	5	5	5	V	5
<i>Holcus lanatus</i>	5	3	5	4	4	V	3-5
<i>Rumex acetosa</i>	3	3	4	2	3	V	2-4
<i>Plantago lanceolata</i>	1	1	3	4	3	V	1-4
<i>Luzula campestris</i>	1	2	1	3	1	V	1-3
<i>Rhytiadelphus squarrosus</i>	2	1	1	3	3	V	1-3
<i>Taraxacum agg.</i>	1	1	2	1	1	V	1-2
<i>Dactylis glomerata</i>	3	4	2	-	3	IV	2-4
<i>Crepis capillaris</i>	3	1	1	1	-	IV	1-3
<i>Poa trivialis</i>	1	2	2	-	2	IV	1-2
<i>Ranunculus bulbosus</i>	1	1	1	1	-	IV	1
<i>Ranunculus repens</i>	1	1	1	-	1	IV	1
<i>Cerastium fontanum</i>	1	-	-	2	1	III	1-2
<i>Festuca ovina</i>	-	2	-	2	1	III	1-2
<i>Kindbergia praelonga</i>	1	-	-	2	1	III	1-2
<i>Trifolium repens</i>	-	1	-	2	1	III	1-2
<i>Conopodium majus</i>	1	-	-	1	-	II	1
<i>Hypochaeris radicata</i>	1	-	-	1	-	II	1
<i>Rumex acetosella</i>	1	1	-	-	-	II	1
<i>Veronica serpyllifolia</i>	-	1	1	-	-	II	1
<i>Cardamine pratensis</i>	-	-	1	-	-	I	1
<i>Ranunculus acris</i>	-	-	1	-	-	I	1
Total species per quadrat	19	18	17	17	16		

Sub-community Matching coefficients: 1: MG6b 56.88; 2: MG3 54.36; 3: MG3a 52.96

Diagnosis: **MG6b *Lolium perenne*-*Cynosurus cristatus* grassland, *Anthoxanthum odoratum* sub-community**. This moderately species-rich semi-improved grassland has affinities with **MG3 *Anthoxanthum odoratum*-*Geranium sylvaticum* grassland** though this is an upland type and many of the key species are absent in our samples.

This grassland is short and likely to be more or less continuously grazed by sheep. It is a closely cropped mixture of mainly fine-leaved grasses and forbs resistant to grazing. Grasses include abundant *Agrostis capillaris* (Common Bent), *Anthoxanthum odoratum* (Sweet Vernal-grass), *Festuca rubra* (Red Fescue) and *Holcus lanatus* (Yorkshire-fog). Other grasses and graminoids at lower levels of abundance include *Dactylis glomerata* (Cock's-foot), *Festuca ovina* (Sheep's-fescue), *Luzula campestris* (Field Wood-rush) and *Poa trivialis* (Rough Meadow-grass). Typical grassland forbs are present including occasional *Crepis capillaris* (Smooth Hawk's-beard), *Plantago lanceolata* (Ribwort Plantain), *Ranunculus acris* (Meadow Buttercup), *Ranunculus bulbosus* (Bulbous Buttercup), *Rumex acetosa* (Common Sorrel) and *Taraxacum* sect. *Ruderalia* (Common Dandelion) and *Trifolium repens* (White Clover). The grassland herb *Conopodium majus* (Pignut) is present and often indicates long-established grassland.

Table A2. Quadrat Group 2: Floristic (NVC style) table for 5 two-metre square quadrats in semi-improved mesotrophic grassland

Species	Q1	Q2	Q3	Q4	Q5	Frq.	Cov.
<i>Glyceria fluitans</i>	3	6	3	7	7	V	3-7
<i>Alopecurus geniculatus</i>	5	6	5	6	5	V	5-6
<i>Poa trivialis</i>	5	6	6	6	6	V	5-6
<i>Lolium perenne</i>	5	4	5	4	4	V	4-5
<i>Holcus lanatus</i>	5	4	2	3	4	V	2-5
<i>Ranunculus repens</i>	3	4	4	3	3	V	3-4
<i>Ranunculus flammula</i>	3	2	3	3	3	V	2-3
<hr/>							
<i>Agrostis stolonifera</i>	6	1	4	1	-	IV	1-6
<hr/>							
<i>Juncus acutiflorus</i>	3	-	4	4	-	III	3-4
<i>Bromus hordeaceus</i>	3	2	1	-	-	III	1-3
<i>Phleum pratense</i>	-	1	2	3	-	III	1-3
<i>Trifolium repens</i>	2	1	-	1	-	III	1-2
<hr/>							
<i>Anthoxanthum odoratum</i>	2	-	-	1	-	II	1-2
<i>Galium palustre</i>	2	-	-	-	1	II	1-2
<hr/>							
<i>Poa annua</i>	-	-	-	-	3	I	3
<i>Juncus effusus</i>	-	-	-	-	2	I	2
<i>Crepis capillaris</i>	-	-	-	1	-	I	1
<i>Myosotis scorpioides</i>	-	-	-	-	1	I	1
<i>Rumex acetosa</i>	-	1	-	-	-	I	1
<hr/>							
Total species per quadrat	13	12	11	13	11		

Sub-community Matching coefficients: 1: MG13 53.87; 2: MG10a 50.29; 3: MG10 47.26

Diagnosis: **MG13 *Agrostis stolonifera*-*Alopecurus geniculatus* grassland.** This grassland is closer to MG13 than MG10a or MG10 undifferentiated communities which are conventional rush pasture which this grassland does not resemble.

This grassland is dominated by productive grass species and a range of common herbs and is cut for hay. Several of the species are indicative of wet or seasonally flooded conditions. Grasses include abundant *Alopecurus geniculatus* (Marsh Foxtail), *Glyceria fluitans* (Floating Sweet-grass), *Holcus lanatus* (Yorkshire-fog), *Lolium perenne* (Perennial Rye-grass), *Poa trivialis* (Rough Meadow-grass), with lesser proportions of *Agrostis stolonifera* (Creeping Bent), *Bromus hordeaceus* (Soft-brome) and *Phleum pratense* (Timothy). The rush *Juncus acutiflorus* (Sharp-flowered Rush) is frequent and *Juncus effusus* (Soft-rush) occurs occasionally. The herbs present are often characteristic of wet conditions and include frequent *Ranunculus flammula* (Lesser Spearwort) and *Ranunculus repens* (Creeping Buttercup). Other wetland species at low levels of abundance include *Galium palustre* (Common Marsh-bedstraw) and *Myosotis scorpioides* (Water Forget-me-not).

Table A3. Quadrat Group 3: Floristic (NVC style) table for 5 two-metre square quadrats in improved mesotrophic grassland

Species	Q1	Q2	Q3	Q4	Q5	Frq.	Cov.
<i>Holcus lanatus</i>	5	5	5	5	7	V	5-7
<i>Poa trivialis</i>	5	6	3	6	5	V	3-6
<i>Lolium perenne</i>	3	4	4	5	3	V	3-5
<i>Anthoxanthum odoratum</i>	5	4	4	3	2	V	2-5
<i>Cynosurus cristatus</i>	1	4	5	2	4	V	1-5
<i>Agrostis stolonifera</i>	4	4	3	4	4	V	3-4
<i>Agrostis capillaris</i>	6	5	4	4	-	IV	4-6
<i>Trifolium repens</i>	3	4	6	6	-	IV	3-6
<i>Dactylis glomerata</i>	4	3	4	2	-	IV	2-4
<i>Rhynchospora squarrosus</i>	1	1	1	-	-	III	1
<i>Rumex obtusifolius</i>	-	1	-	1	1	III	1
<i>Cerastium fontanum</i>	2	2	-	-	-	II	2
<i>Taraxacum agg.</i>	-	1	2	-	-	II	1-2
<i>Ranunculus repens</i>	-	-	5	-	-	I	5
<i>Veronica chamaedrys</i>	3	-	-	-	-	I	3
<i>Poa annua</i>	-	-	-	2	-	I	2
<i>Achillea millefolium</i>	1	-	-	-	-	I	1
<i>Cerastium glomeratum</i>	-	-	-	1	-	I	1
<i>Rumex acetosa</i>	1	-	-	-	-	I	1
<i>Rumex crispus</i>	-	-	-	1	-	I	1
Total species per quadrat	14	13	12	13	7		

Sub-community Matching coefficients: 1: MG7b 64.69; 2: MG6b 63.36; 3: MG6a 61.78

Diagnosis: **MG 7b sub-community**. Though closely related to MG 6b and MG 6a, these are improved agriculturally important grasslands.

This grassland is variously dominated by a range of grass species accompanied by common grassland herbs. Grasses include frequent *Agrostis capillaris* (Common Bent), *Agrostis stolonifera* (Creeping Bent), *Anthoxanthum odoratum* (Sweet Vernal-grass), *Holcus lanatus* (Yorkshire-fog), *Poa trivialis* (Rough Meadow-grass) and *Lolium perenne* (Perennial Rye-grass). Other grass species include occasional *Cynosurus cristatus* (Crested Dog's-tail), *Dactylis glomerata* (Cock's-foot) and infrequent *Poa annua* (Annual Meadow-grass). Herb species include frequent *Trifolium repens* (White Clover), and occasional *Achillea millefolium* (Yarrow), *Cerastium glomeratum* (Sticky Mouse-ear), *Cerastium fontanum* (Common Mouse-ear), *Taraxacum* sect. *Ruderalia* (Common Dandelion), and *Veronica chamaedrys* (Germander Speedwell).

Table A4. Quadrat Group 4: Floristic (NVC style) table for 5 two-metre square quadrats in semi-improved mesotrophic grassland

Species	Q1	Q2	Q3	Q4	Q5	Frq.	Cov.
<i>Anthoxanthum odoratum</i>	5	5	5	5	6	V	5-6
<i>Holcus lanatus</i>	5	5	5	6	2	V	2-6
<i>Cynosurus cristatus</i>	5	5	4	3	4	V	3-5
<i>Lolium perenne</i>	4	5	3	3	3	V	3-5
<i>Poa trivialis</i>	5	5	3	3	3	V	3-5
<i>Rhynchospora squarrosus</i>	4	5	5	3	5	V	3-5
<i>Luzula campestris</i>	1	3	5	2	3	V	1-5
<i>Trifolium repens</i>	4	4	4	2	4	V	2-4
<i>Agrostis stolonifera</i>	2	4	4	3	-	IV	2-4
<i>Ranunculus repens</i>	-	1	1	1	1	IV	1
<i>Agrostis capillaris</i>	-	-	3	3	5	III	3-5
<i>Festuca rubra</i>	-	-	1	3	2	III	1-3
<i>Achillea millefolium</i>	4	5	-	-	-	II	4-5
<i>Cerastium fontanum</i>	3	2	-	-	-	II	2-3
<i>Rumex acetosa</i>	3	-	-	-	-	I	3
Total species per quadrat	12	12	12	12	11		

Sub-community Matching coefficients: 1: MG6b 61.75; 2: MG6a 61.08; 3: MG6 58.10

Diagnosis: **MG6b *Lolium perenne*-*Cynosurus cristatus* grassland, *Anthoxanthum odoratum* sub-community** but closely related to MG 6a and MG 6 typical sub-community

This grassland is grazed by sheep and variously dominated by mainly fine-leaved grasses and common grassland herbs. Grasses include abundant *Anthoxanthum odoratum* (Sweet Vernal-grass), *Holcus lanatus* (Yorkshire-fog), *Lolium perenne* (Perennial Rye-grass) and *Poa trivialis* (Rough Meadow-grass). Herbs include abundant *Trifolium repens* (White Clover), and infrequent *Achillea millefolium* (Yarrow), *Cerastium fontanum* (Common Mouse-ear), *Ranunculus repens* (Creeping Buttercup) and *Rumex acetosa* (Common Sorrel).

Table A5. Quadrat Group 5: Floristic (NVC style) table for 5 two-metre square quadrats in semi-improved mesotrophic grassland

Species	Q1	Q2	Q3	Q4	Q5	Frq.	Cov.
<i>Anthoxanthum odoratum</i>	6	5	5	5	4	V	4-6
<i>Agrostis capillaris</i>	5	5	3	5	6	V	3-6
<i>Cynosurus cristatus</i>	4	2	6	2	3	V	2-6
<i>Trifolium repens</i>	2	4	5	5	6	V	2-6
<i>Lolium perenne</i>	5	5	3	4	5	V	3-5
<i>Holcus lanatus</i>	4	3	3	4	1	V	1-4
<i>Poa trivialis</i>	5	5	5	5	5	V	5
<i>Rhytiadelphus squarrosus</i>	-	-	1	5	4	III	1-5
<i>Ranunculus repens</i>	3	3	4	-	-	III	3-4
<i>Kindbergia praelonga</i>	-	1	-	1	2	III	1-2
<i>Rumex acetosa</i>	4	2	-	-	-	II	2-4
<i>Sagina procumbens</i>	-	1	-	3	-	II	1-3
<i>Poa annua</i>	1	2	-	-	-	II	1-2
<i>Cirsium palustre</i>	-	1	1	-	-	II	1
<i>Alopecurus geniculatus</i>	-	4	-	-	-	I	4
<i>Carex ovalis</i>	-	-	-	2	-	I	2
<i>Galium palustre</i>	-	1	-	-	-	I	1
Total species per quadrat	10	15	10	11	9		

Sub-community Matching coefficients: 1: MG6b 57.02; 2: MG6a 52.59; 3: MG6 51.68

Diagnosis: **MG 6b *Lolium perenne*-*Cynosurus cristatus* grassland *Alopecurus geniculatus* variant, on seasonally inundated land.** The other coefficients do not take into account the species typical of inundation.

This grassland is grazed by sheep and variously dominated by fine-leaved grasses, but with a small number of grassland herbs, some of which are typical of wetlands. Grasses include *Agrostis capillaris* (Common Bent), *Anthoxanthum odoratum* (Sweet Vernal-grass), *Cynosurus cristatus* (Crested Dog's-tail), *Holcus lanatus* (Yorkshire-fog), *Lolium perenne* (Perennial Rye-grass) and *Poa trivialis* (Rough Meadow-grass). Grassland herbs include *Trifolium repens* (White Clover), *Ranunculus repens* (Creeping Buttercup) and *Rumex acetosa* (Common Sorrel). There is are infrequent wetland herbs including *Cirsium palustre* (Marsh Thistle), *Galium palustre* (Common Marsh-bedstraw), *Sagina procumbens* (Procumbent Pearlwort) and the wetland grass *Alopecurus geniculatus* (Marsh Foxtail).

Table A6. Quadrat Group 6: Floristic (NVC style) table for 5 two-metre square quadrats in semi-improved mesotrophic grassland

Species	Q1	Q2	Q3	Q4	Q5	Frq.	Cov.
<i>Alopecurus geniculatus</i>	7	5	7	7	7	V	5-7
<i>Honckenya peploides</i>	7	4	4	2	3	V	2-7
Bare ground	5	4	2	3	4	V	2-5
<i>Sagina procumbens</i>	2	5	4	2	1	V	1-5
<hr/>							
<i>Juncus effusus</i>	1	2	2	-	2	IV	1-2
<hr/>							
<i>Agrostis stolonifera</i>	-	-	4	4	5	III	4-5
<i>Eleocharis palustris</i>	4	-	2	4	-	III	2-4
<i>Poa annua</i>	-	4	-	1	2	III	1-4
<i>Juncus articulatus</i>	1	1	-	1	-	III	1
<hr/>							
<i>Holcus lanatus</i>	-	-	3	2	-	II	2-3
<i>Glyceria fluitans</i>	-	-	-	1	2	II	1-2
<i>Isolepis setacea</i>	1	-	-	2	-	II	1-2
<i>Rhynchospora squarrosus</i>	-	-	4	4	-	II	4
<hr/>							
<i>Calliergonella cuspidate</i>	-	-	-	-	2	I	2
<i>Juncus conglomeratus</i>	-	-	2	-	-	I	2
<i>Lotus pedunculatus</i>	-	2	-	-	-	I	2
<i>Trifolium repens</i>	-	2	-	-	-	I	2
<i>Cirsium palustre</i>	-	-	1	-	-	I	1
<i>Juncus bufonius</i>	1	-	-	-	-	I	1
<i>Potentilla anserina</i>	-	1	-	-	-	I	1
<i>Ranunculus repens</i>	-	-	-	-	1	I	1
<hr/>							
Total species per quadrat	9	10	11	12	10		

Sub-community Matching coefficients: 1: MG13 51.14; 2: MG10a 39.43; 3: S19 36.88

Diagnosis: **MG13 *Agrostis stolonifera*-*Alopecurus geniculatus* grassland**. On seasonally inundated land with affinities with **MG10a *Holcus lanatus*-*Juncus effusus* rush-pasture**, **typical sub-community** and **S19 *Eleocharis palustris* swamp**

This grassland is short and grazed by sheep. It contains a proportion of bare ground due to waterlogging, or possibly caused by seawater coming over a nearby sea wall in winter. There are a range of grasses, graminoids and herb species some with the ability to grow in saline or brackish conditions. Grasses include abundant *Alopecurus geniculatus* (Marsh Foxtail), and occasional *Agrostis stolonifera* (Creeping Bent), *Glyceria fluitans* (Floating Sweet-grass), *Holcus lanatus* (Yorkshire-fog) and *Poa annua* (Annual Meadow-grass). Graminoids that occur are generally associated with wet or seasonally wet conditions and include *Isolepis setacea* (Bristle Club-rush), *Juncus articulatus* (Jointed Rush), *Juncus effusus* (Soft-rush), *Juncus bufonius* (Toad Rush), and *Eleocharis palustris* (Common Spike-rush). Herbs are only a small proportion of the sward but include those typical of wet or saline conditions such as abundant

Honckenya peploides (Sea Sandwort), and occasional *Cirsium palustre* (Marsh Thistle), *Lotus pedunculatus* (Greater Bird's-foot-trefoil), *Potentilla anserina* (Silverweed), and *Ranunculus repens* (Creeping Buttercup).

Table A7. Quadrat Group 7: Floristic (NVC style) table for 5 two-metre square quadrats in improved mesotrophic grassland

Species	Q1	Q2	Q3	Q4	Q5	Frq.	Cov.
<i>Alopecurus geniculatus</i>	7	7	7	7	7	V	7
<i>Ranunculus repens</i>	7	5	4	3	2	V	2-7
<i>Poa trivialis</i>	4	5	4	4	4	V	4-5
<i>Glyceria fluitans</i>	5	5	5	3	3	V	3-5
<i>Lolium perenne</i>	4	5	3	4	3	V	3-5
<i>Trifolium repens</i>	2	5	4	3	4	V	2-5
<i>Poa annua</i>	3	3	3	3	4	V	3-4
<i>Phleum pratense</i>	1	4	2	2	-	IV	1-4
<i>Holcus lanatus</i>	-	4	2	-	4	III	2-4
<i>Agrostis capillaris</i>	-	-	3	-	2	II	2-3
<i>Rumex obtusifolius</i>	-	1	2	-	-	II	1-2
<i>Cerastium fontanum</i>	-	-	-	1	-	I	1
Total species per quadrat	8	10	11	9	9		

Sub-community Matching coefficients: 1: MG7b 62.7; 2: MG7 46.91; 3: OV23c 46.07

Diagnosis: **MG7b *Lolium perenne* leys and related grasslands, *Lolium perenne-Poa trivialis* leys is the highest matching coefficient**, however none of the communities listed take into account species indicative of seasonal inundation. The relationship with **OV23c *Lolium perenne-Dactylis glomerata* community, *Plantago major-Trifolium repens* sub-community** would indicate disturbance of possibly recently sown origin of an agricultural ley.

Table A8. Quadrat Group 8: Floristic (NVC style) table for 5 two-metre square quadrats in improved grassland

Species	Q1	Q2	Q3	Q4	Q5	Frq.	Cov.
<i>Alopecurus geniculatus</i>	7	1	9	8	7	V	1-9
<i>Poa annua</i>	4	4	4	4	5	V	4-5
<i>Lolium perenne</i>	3	5	5	4	4	V	3-5
<i>Trifolium pratense</i>	3	4	4	4	2	V	2-4
<i>Agrostis stolonifera</i>	3	2	2	2	2	V	2-3
<i>Phleum pratense</i>	1	2	1	2	3	V	1-3
<i>Rumex obtusifolius</i>	1	1	1	2	2	V	1-2
<i>Agrostis capillaris</i>	5	5	-	4	4	IV	4-5
<i>Poa trivialis</i>	-	5	4	4	5	IV	4-5
<i>Holcus lanatus</i>	5	5	-	3	4	IV	3-5
<i>Ranunculus repens</i>	-	4	2	4	2	IV	2-4
<i>Cerastium fontanum</i>	-	1	-	-	2	II	1-2
<i>Anthoxanthum odoratum</i>	-	5	-	-	-	I	5
<i>Trifolium dubium</i>	-	5	-	-	-	I	5
<i>Agrostis canina</i>	-	-	-	-	4	I	4
<i>Bellis perennis</i>	-	3	-	-	-	I	3
<i>Glyceria fluitans</i>	-	-	-	-	3	I	3
<i>Bromus hordeaceus</i>	-	2	-	-	-	I	2
<i>Plantago lanceolata</i>	-	2	-	-	-	I	2
<i>Sagina procumbens</i>	2	-	-	-	-	I	2
Total species per quadrat	10	17	9	11	14		

Sub-community Matching coefficients: 1: MG7b 54.72; 2: MG7 49.87; 3: MG11a 49.51

Diagnosis: **MG7b *Lolium perenne* leys and related grasslands, *Lolium perenne*-*Poa trivialis* leys**, but with species characteristic of **MG11a *Festuca rubra*-*Agrostis stolonifera*-*Potentilla anserina* grassland, *Lolium perenne* sub-community which is more indicative of seasonally inundated land.**

This grassland managed for hay has grasses and forbs typical of agricultural improvement and seasonally flooding. It is variously dominated by *Agrostis capillaris* (Common Bent), *Alopecurus geniculatus* (Marsh Foxtail), *Anthoxanthum odoratum* (Sweet Vernal-grass), *Lolium perenne* (Perennial Rye-grass) and *Poa trivialis* (Rough Meadow-grass). Less abundant grasses include *Agrostis canina* (Velvet Bent), *Agrostis stolonifera* (Creeping Bent), *Bromus hordeaceus* (Soft-brome) *Holcus lanatus* (Yorkshire-fog) and *Phleum pratense* (Timothy). Forbs typical of hay meadows include *Bellis perennis* (Daisy), *Cerastium fontanum* (Common Mouse-ear), *Plantago lanceolata* (Ribwort Plantain) and *Trifolium dubium* (Lesser Trefoil). Species typical of seasonally waterlogged conditions include occasional *Glyceria fluitans* (Floating Sweet-grass), *Sagina procumbens* (Procumbent Pearlwort) and *Alopecurus geniculatus* (Marsh Foxtail).

Table A9. Quadrat Group 9: Floristic (NVC style) table for 5 two-metre square quadrats in mire

Species	Q1	Q2	Q3	Q4	Q5	Frq.	Cov.
<i>Polytrichum commune</i>	9	9	1	1	1	V	1-9
<i>Molinia caerulea</i>	4	3	3	3	2	V	2-4
<i>Juncus acutiflorus</i>	4	4	4	4	4	V	4
<i>Sphagnum subnitens</i>	2	-	3	2	6	IV	2-6
<i>Juncus effusus</i>	4	3	-	4	-	III	3-4
<i>Potentilla erecta</i>	3	3	2	-	-	III	2-3
<i>Eriophorum angustifolium</i>	-	-	2	1	1	III	1-2
<i>Galium palustre</i>	2	-	-	-	4	II	2-4
<i>Rumex acetosa</i>	2	-	-	-	4	II	2-4
<i>Agrostis canina</i>	-	-	2	-	-	I	2
<i>Sphagnum fallax</i>	-	-	-	-	2	I	2
<i>Viola palustris</i>	-	2	-	-	-	I	2
<i>Carex echinata</i>	-	-	-	1	-	I	1
<i>Juncus conglomeratus</i>	1	-	-	-	-	I	1
Total species per quadrat	9	6	7	7	8		

Sub-community Matching coefficients: 1: M6c 56.67; 2: M6 53.02; 3: M6d 49.48

Diagnosis: **M6c *Carex echinata-Sphagnum recurvum/auriculatum* mire, *Juncus effusus* sub-community** but closely related to **M6 *Carex echinata-Sphagnum recurvum/auriculatum* mire typical sub-community** and **M6d *Carex echinata-Sphagnum recurvum/auriculatum* mire, *Juncus acutiflorus* sub-community**

This mire community is dominated by the moss *Polytrichum commune* but there are also *Sphagnum* species, frequently *Sphagnum subnitens* and *Sphagnum fallax*. Graminoids make up a significant proportion of the community with *Juncus acutiflorus* (Sharp-flowered Rush), *Molinia caerulea* (Purple Moor-grass) frequent. Rarely *Carex echinata* (Star Sedge), *Eriophorum angustifolium* (Common Cottongrass) and *Juncus effusus* (Soft-rush) also occur. Herbs typical of mire communities include *Galium palustre* (Common Marsh-bedstraw), *Potentilla erecta* (Tormentil), *Rumex acetosa* (Common Sorrel) and *Viola palustris* (Marsh Violet).

Table A10. Quadrat Group 10: Floristic (NVC style) table for 5 two-metre square quadrats in mire

Species	Q1	Q2	Q3	Q4	Q5	Frq.	Cov.
<i>Juncus effusus</i>	7	8	8	6	3	V	3-8
<i>Agrostis canina</i>	5	3	3	3	3	V	3-5
<i>Epilobium palustre</i>	2	3	4	4	3	V	2-4
<i>Galium palustre</i>	2	3	3	3	3	V	2-3
<i>Juncus acutiflorus</i>	8	-	3	5	7	IV	3-8
<i>Holcus lanatus</i>	4	5	-	5	5	IV	4-5
<i>Rumex acetosa</i>	-	3	4	3	2	IV	2-4
<i>Poa trivialis</i>	2	2	-	-	4	III	2-4
<i>Athyrium filix-femina</i>	-	3	-	2	2	III	2-3
<i>Dryopteris dilatata</i>	-	2	3	3	-	III	2-3
<i>Lotus pedunculatus</i>	1	3	-	2	-	III	1-3
<i>Potentilla erecta</i>	3	2	-	-	-	II	2-3
<i>Cirsium palustre</i>	1	-	-	-	3	II	1-3
<i>Juncus conglomeratus</i>	-	-	-	1	1	II	1
<i>Ranunculus repens</i>	-	-	-	-	5	I	5
<i>Hydrocotyle vulgaris</i>	-	-	-	3	-	I	3
<i>Ranunculus flammula</i>	2	-	-	-	-	I	2
<i>Stachys palustris</i>	-	-	-	2	-	I	2
<i>Angelica sylvestris</i>	1	-	-	-	-	I	1
<i>Equisetum palustre</i>	-	-	-	1	-	I	1
<i>Urtica dioica</i>	-	-	-	-	1	I	1
Total species per quadrat	12	11	7	14	13		

Sub-community Matching coefficients: 1: M23 58.82; 2: M23b 57.01; 3: M23a 53.43

Diagnosis: **M23 *Juncus effusus/acutiflorus-Galium palustre* rush-pasture**

This mire community is dominated by *Juncus acutiflorus* (Sharp-flowered Rush) and *Juncus effusus* (Soft-rush), together with grasses and a wide range of tall herbs including some commonly considered to be water-margin species. Grasses are abundant usually *Agrostis canina* (Velvet Bent) but also *Holcus lanatus* (Yorkshire-fog) and *Poa trivialis* (Rough Meadow-grass). There are low growing plants of wet conditions including *Galium palustre* (Common Marsh-bedstraw), *Lotus pedunculatus* (Greater Bird's-foot-trefoil) and *Potentilla erecta* (Tormentil). Frequent to occasional marsh plants include *Angelica sylvestris* (Wild Angelica), *Epilobium palustre* (Marsh Willowherb), *Hydrocotyle vulgaris* (Marsh Pennywort), *Ranunculus flammula* (Lesser Spearwort) and *Stachys palustris* (Marsh Woundwort). Among tall herbs *Urtica dioica* (Common Nettle) is frequent. Ferns and horsetails here include *Athyrium filix-femina* (Lady-fern) and *Equisetum palustre* (Marsh Horsetail).

Table A11. Quadrat Group 11: Floristic (NVC style) table for 5 two-metre square quadrats in mire

Species	Q1	Q2	Q3	Q4	Q5	Frq.	Cov.
<i>Molinia caerulea</i>	8	9	7	8	7	V	7-9
<i>Juncus acutiflorus</i>	4	4	7	6	6	V	4-7
<i>Holcus lanatus</i>	2	5	4	2	4	V	2-5
<i>Potentilla erecta</i>	4	4	2	3	2	V	2-4
<i>Rumex acetosa</i>	3	2	3	3	4	V	2-4
<i>Juncus effusus</i>	6	-	6	-	2	III	2-6
<i>Agrostis canina</i>	-	-	1	4	4	III	1-4
<i>Viola palustris</i>	2	-	-	4	1	III	1-4
<i>Epilobium palustre</i>	-	-	3	2	3	III	2-3
<i>Lotus pedunculatus</i>	-	-	3	3	3	III	3
<i>Dactylorhiza fuchsii</i>	1	-	-	-	-	I	1
<i>Equisetum palustre</i>	-	-	1	-	-	I	1
<i>Hydrocotyle vulgaris</i>	-	-	-	2	-	I	2
Total species per quadrat	8	5	10	10	10		

Sub-community Matching coefficients: 1: M25c 57.31; 2: MG25 52.43; 3: M25b 51.85

Diagnosis: **M25c *Molinia caerulea*-*Potentilla erecta* mire, *Angelica sylvestris* sub-community**

This mire community is made up of a mixture of grasses and rushes, with a modest number of herbs including tall, scrambling and low-growing species that are all typical of waterlogged conditions. Grasses present include *Holcus lanatus* (Yorkshire-fog), *Molinia caerulea* (Purple Moor-grass) and infrequently *Agrostis capillaris* (Common Bent). Rushes include *Juncus acutiflorus* (Sharp-flowered Rush) and tufted clumps of *Juncus effusus* (Soft-rush). Herbs make up only a small proportion of the mass of the vegetation but frequently include *Potentilla erecta* (Tormentil), *Lotus pedunculatus* (Greater Bird's-foot-trefoil) and *Rumex acetosa* (Common Sorrel). Irregularly occurring species include *Dactylorhiza fuchsii* (Common Spotted-orchid), *Epilobium palustre* (Marsh Willowherb), *Hydrocotyle vulgaris* (Marsh Pennywort) and *Viola palustris* (Marsh Violet).

APPENDIX B: HEGS SURVEY FORM

HEDGE RECORD AND EVALUATION SHEET

HEDGE NO. :

1

1 Recently laid or coppiced YES NO (if yes, score 7 and ignore criteria 2 to 4 below)

SCORE -> 1 2 3 4

2 Height (exclude bank)	0-1m	1-2m	2-4m	4m+
3 Width	0-1m	1-2m	2-3m	3m+
4 Average Cross-Section				

5 STANDARD TREES
Species present: *None*

No. of mature trees/pollards: 0
No. of young trees: 0

6 Length: 150 m

7 Mature Standards/100m	<input checked="" type="checkbox"/> nil	≤1	1 ≤3	3 ≤5	>5
8 Young Standards/100m	<input checked="" type="checkbox"/> nil	≤1	1 ≤3	3 ≤5	>5

STRUCTURAL SCORE

7

9 Percentage Gaps		30%+	30-10%	10-0%	no gaps
10 No. of End Connections	<input checked="" type="checkbox"/> nil	1	2	3	4+

CONNECTIVITY SCORE

5

11 HEDGE CANOPY SPECIES
Species present: *Corylus avellana, Crataegus monogyna, Prunus spinosa, Rosa arvensis, Salix sp.*

Combined total of tree and shrub species: 5

12 Native Species Dominant	<input checked="" type="checkbox"/> nil	1-2 spp	mixed		
13 Total No. of Tree & Shrub Spp.		1-4	5-7	8-9	10+

DIVERSITY SCORE

4

14 Hedgebank/Lynchet	<input checked="" type="checkbox"/> nil	0-1/2m	1/2-1m	1m+
15 Ditch	<input checked="" type="checkbox"/> nil			
16 Grass Verge (2m+ wide)	<input checked="" type="checkbox"/> nil	on 1 side	on 2 sides	

ASSOCIATED FEATURES SCORE

0

17 NOTES
Ground flora & Climbers: *Arrela, Hollan, Equarv, Vicsep, Urtica, Latpra, Germol, Rubsru, Dacglo, Lopcom, Potans, Plalan, Trirep, Odover, Rhimin, Fesrub, Antolo, Senjae, Agrsto, Poatri, Filulm, Ramsan, Hersph, Lotped, Brasgl.*

18 Notable Species present	Pop nig Sor tor	Til cor Til pla	Pyr cor other	-----> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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GRAI (NS) 3

new hedge track/roadside ✓ old laid fence/wall unmanaged parish boundary cut/trimmed garden boundary

Site: *Snowdonia VIP*

Date: *19/7/16*

Surveyor: *Will Holden*

APPENDIX C: INVASIVE PLANT SPECIES AREA

Invasive Plant Species Areas presented below are displayed on *Figure 4*.

- 1 – *Fallopia japonica* (Japanese Knotweed) c.15m x 10m in woodland.
- 2 – *Fallopia japonica* (Japanese Knotweed) c.4m x 2m in corner of residential garden and smaller stands c.1m x 1m along access road.
- 3 – *Fallopia japonica* (Japanese Knotweed) c.1m x 1m adjacent to access track.
- 4 – *Fallopia japonica* (Japanese Knotweed) c.25m x 15m adjacent to lay by and access road.
- 5 – *Fallopia japonica* (Japanese Knotweed) and *Crocoshia xrocoshiiiflora* (Montbretia) c.5m x 1m scattered throughout area of *Rubus fruticosus* agg. (Bramble). c.4m x 1m.
- 6 – *Fallopia japonica* (Japanese Knotweed) c.15m x 20m adjacent to lay by and access track.
- 7 – *Fallopia japonica* (Japanese Knotweed) c.4m x 1m in an area of *Pteridium aquilinum* (Bracken).
- 8 – *Fallopia japonica* (Japanese Knotweed) c.20m x 10m on railway embankment next to road bridge.
- 9 – Remnants of treated *Fallopia japonica* (Japanese Knotweed) root stocks c.2m x 5m. Some re-growth around 5cm high adjacent to field gate.
- 10 – Remnants of treated *Fallopia japonica* (Japanese Knotweed) root stocks c.10 m x 10m. Some re-growth around 5cm high at the base of pylon.
- 11 – *Parthenocissus quinquefolia* (Virginia-creeper), c. 10m x 5m alongside railway embankment and small stand of *Fallopia japonica* (Japanese Knotweed) c. 0.5m x 0.5m adjacent to farm access track.
- 12 – *Fallopia japonica* (Japanese Knotweed) c.40m x 3m alongside road and railway embankment.
- 13 – Patches of *Crassula helmsii* (New Zealand Pigmyweed) at pond margins.
- 14 – *Crocoshia xrocoshiiiflora* (Montbretia) c.5m x 1m in a single patch amongst ruderal herbs.
- 15 – small stand of *Crocoshia xrocoshiiiflora* (Montbretia) within an area of *Pteridium aquilinum* (Bracken) adjacent to a former compound area.
- 16 – Three dead stems of *Fallopia japonica* (Japanese Knotweed) adjacent to the access gate of a former compound site.

APPENDIX D: PHASE 1 HABITAT TARGET NOTES

Target Notes presented below are displayed on *Figure 2*.

Target Note 1. An area of rough semi-improved grassland bordered by a road, gazed fields, scrub and woodland. The grassland has a moderately dense sward of c. 20cm tall. It is rank and has a fair diversity of herb species (*Table A12*).

Table A12: Species found at *Target Note 1*

Species
<i>Anthoxanthum odoratum</i> (Sweet Vernal-grass)
<i>Arrhenatherum elatius</i> (False Oat-grass)
<i>Dactylis glomerata</i> (Cock's-foot)
<i>Festuca rubra</i> (Red Fescue)
<i>Plantago lanceolata</i> (Ribwort Plantain)
<i>Buddleja davidii</i> (Butterfly-bush)
<i>Taraxacum</i> agg. (Dandelion)
<i>Achillea millefolium</i> (Yarrow)
<i>Senecio jacobaea</i> (Common Ragwort)
<i>Rubus fruticosus</i> agg. (Bramble)
<i>Pteridium aquilinum</i> (Bracken)
<i>Juncus conglomeratus</i> (Compact Rush)
<i>Centaurea nigra</i> (Common Knapweed)
<i>Salix caprea</i> (Goat Willow)
<i>Hypericum perforatum</i> (Perforate St John's-wort)
<i>Lotus corniculatus</i> (Common Bird's-foot-trefoil)
<i>Equisetum arvense</i> (Field Horsetail)

Target Note 2. An improved grassland field closely grazed by sheep at the time of the survey, when it had a short sward of c.5 to 10cm. It is species-poor and dominated by *Lolium perenne* (Perennial Rye-grass). Other species are found in low densities, including *Agrostis capillaris* (Common Bent), *Bellis perennis* (Daisy), *Dactylis glomerata* (Cock's-foot), *Juncus effusus* (Soft-rush), *Ranunculus repens* (Creeping Buttercup), *Trifolium repens* (White Clover) and *Urtica dioica* (Common Nettle). In the corner a wet ditch c.1.5m deep that is very well-vegetated with *Phragmites australis* (Common Reed) and other species here including *Oenanthe crocata* (Hemlock Water-dropwort).

Target Note 3. Another grazed improved field adjacent to that of *Target Note 2* is also dominated by *Lolium perenne* (Perennial Rye-grass) but is slightly marshier and has a greater species diversity than in *Target Note 2*. As well as those listed in *Target Note 2*, the species found here include *Capsella bursa-pastoris* (Shepherd's-purse), *Cerastium fontanum* (Common Mouse-ear), *Epilobium palustre* (Marsh Willowherb), *Holcus lanatus* (Yorkshire-fog), *Juncus articulatus* (Jointed Rush), *Matricaria discoidea* (Pineappleweed), *Medicago lupulina* (Black Medick), *Myosotis arvensis* (Field Forget-me-not), *Potentilla anserina* (Silverweed), *Ranunculus flammula* (Lesser Spearwort) and *Silene flos-cuculi* (Ragged-Robin).

Target Note 4. A species-poor hedgerow, c. 2m tall and wide, spanning the western field boundary of the semi-improved grassland field described in *Target Note 3*. The hedgerow is formed primarily of *Corylus avellana* (Hazel), with *Crataegus monogyna* (Hawthorn), *Prunus spinosa* (Blackthorn), *Rosa canina* (Dog-rose), and *Salix* spp (Willow species). The ground flora is mostly formed by grassland species found in the habitat adjacent, and includes species such as *Agrostis stolonifera* (Creeping Bent), *Anthoxanthum odoratum* (Sweet Vernal-grass), *Arrhenatherum elatius* (False Oat-grass), *Brachypodium sylvaticum* (False Brome), *Dactylis glomerata* (Cock's-foot), *Equisetum arvense* (Field Horsetail), *Festuca rubra* (Red Fescue), *Filipendula ulmaria* (Meadowsweet), *Geranium molle* (Dove's-foot Crane's-bill), *Heracleum sphondylium* (Hogweed), *Holcus lanatus* (Yorkshire-fog), *Lapsana communis* (Nipplewort), *Lathyrus pratensis* (Meadow Vetchling), *Lotus pedunculatus* (Greater Bird's-foot-trefoil), *Odontites vernus* (Red Bartsia), *Plantago lanceolata* (Ribwort Plantain), *Poa trivialis* (Rough Meadow-grass), *Potentilla anserina* (Silverweed), *Rumex sanguineus* (Wood Dock), *Rhinanthus minor* (Yellow-rattle), *Rubus fruticosus* agg. (Bramble), *Senecio jacobaea* (Common Ragwort), *Trifolium repens* (White Clover), *Urtica dioica* (Common Nettle), *Vicia sepium* (Bush Vetch).

Target Note 5. A large field of grazed, semi-improved grassland with a short sward of c.10 to 15cm. The habitat is dominated by productive grass species and common herbs with some species present that are indicative of wet or seasonally flooded conditions. Grasses include abundant *Alopecurus geniculatus* (Marsh Foxtail), *Glyceria fluitans* (Floating Sweet-grass), *Holcus lanatus* (Yorkshire-fog), *Lolium perenne* (Perennial Rye-grass) and *Poa trivialis* (Rough Meadow-grass), with lesser proportions of *Agrostis stolonifera* (Creeping Bent), *Bromus hordeaceus* (Soft-brome) and *Phleum pratense* (Timothy). The rush *Juncus acutiflorus* (Sharp-flowered Rush) is frequent and *Juncus effusus* (Soft-rush) occurs occasionally. The herbs are often characteristic of wet conditions and include frequent *Ranunculus flammula* (Lesser Spearwort) and *Ranunculus repens* (Creeping Buttercup). A dry ditch here has additional wetland species at low levels of abundance including *Galium palustre* (Common Marsh-bedstraw), *Glyceria fluitans* (Floating Sweet-grass), *Myosotis scorpioides* (Water Forget-me-not), *Nasturtium officinale* (Water-cress), *Phragmites australis* (Common Reed), and *Veronica beccabunga* (Brooklime).

Target Note 6. An area of semi-natural broadleaved woodland. The trees here are mature, averaging a height of c.10m. The trees species here are predominantly broadleaved of a mixture of species include *Acer pseudoplatanus* (Sycamore), *Betula pendula* (Silver Birch), *Corylus avellana* (Hazel), *Fraxinus excelsior* (Ash), *Ilex aquifolium* (Holly), *Salix caprea* (Goat Willow),

Quercus robur (Pedunculate Oak). The understorey is sparse and includes species such as *Anemone nemorosa* (Wood Anemone), *Dryopteris filix-mas* (Male-fern), *Ficaria verna* (Lesser Celandine), *Hedera helix* (Ivy), *Hyacinthoides non-scripta* (Bluebell), *Juncus effusus* (Soft-rush), and *Umbilicus rupestris* (Navelwort).

Target Note 7. An area of semi-improved grassland with frequent ruderal herb species. The sward here is c.20cm tall, with some areas of bare earth. The graminoid species here include *Agrostis stolonifera* (Creeping Bent), *Anthoxanthum odoratum* (Sweet Vernal-grass), *Holcus lanatus* (Yorkshire-fog), *Juncus effusus* (Soft-rush), *Poa trivialis* (Rough Meadow-grass). Ruderal herbs are very common amongst the grasses and include species such as *Cirsium arvense* (Creeping Thistle), *Cirsium palustre* (Marsh Thistle), *Lotus pedunculatus* (Greater Bird's-foot-trefoil), *Ranunculus repens* (Creeping Buttercup), *Rubus fruticosus* agg. (Bramble), *Rumex acetosa* (Common Sorrel), *Rumex sanguineus* (Wood Dock), *Silene dioica* (Red Campion) and *Urtica dioica* (Common Nettle).

Target Note 8. A vegetated wet ditch, c.1m deep and 2m wide with slow flow. Plant species in the ditch and on its banks include *Apium nodiflorum* (Fool's Water-cress), *Cirsium arvense* (Creeping Thistle), *Cirsium palustre* (Marsh Thistle), *Glyceria fluitans* (Floating Sweet-grass), *Mentha aquatica* (Water Mint) and *Nasturtium officinale* (Water-cress).

Target Note 9. A dry, well-vegetated ditch, c.3m deep and 2m wide, beside an area of amenity grassland and broadleaved woodland. The banks of the ditch have grasses, scrub species and young trees, while wetland species are in the ditch itself. Species found in and around the ditch include *Acer pseudoplatanus* (Sycamore), *Anthoxanthum odoratum* (Sweet Vernal-grass), *Agrostis capillaris* (Common Bent), *Betula pendula* (Silver Birch), *Centaurea nigra* (Common Knapweed), *Cirsium palustre* (Marsh Thistle), *Dactylis glomerata* (Cock's-foot), *Digitalis purpurea* (Foxglove), *Epilobium tetragonum* (Square-stalked Willowherb), *Filipendula ulmaria* (Meadowsweet), *Fraxinus excelsior* (Ash), *Holcus lanatus* (Yorkshire-fog), *Juncus effusus* (Soft-rush), *Lotus corniculatus* (Common Bird's-foot-trefoil), *Lycopus europaeus* (Gypsywort), *Lythrum salicaria* (Purple-loosestrife), *Oenanthe crocata* (Hemlock Water-dropwort), *Potentilla anserina* (Silverweed), *Potentilla reptans* (Creeping Cinquefoil), *Plantago lanceolata* (Ribwort Plantain), *Prunella vulgaris* (Selfheal), *Pteridium aquilinum* (Bracken), *Ranunculus acris* (Meadow Buttercup), *Ranunculus repens* (Creeping Buttercup), *Rubus fruticosus* agg. (Bramble), *Rumex obtusifolius* (Broad-leaved Dock), *Salix caprea* (Goat Willow), *Senecio jacobaea* (Common Ragwort), *Sorbus aucuparia* (Rowan), *Taraxacum* agg. (Dandelion), *Ulex europaeus* (Gorse), *Urtica dioica* (Common Nettle). Species found within the amenity grassland include *Achillea millefolium* (Yarrow), *Bellis perennis* (Daisy), *Festuca rubra* (Red Fescue), *Lolium perenne* (Perennial Rye-grass), *Medicago lupulina* (Black Medick), *Taraxacum* agg. (Dandelion) and *Trifolium pratense* (Red Clover).

Target Note 10. Amenity grassland adjacent to some broadleaved woodland and residential housing. It appears to be regularly mown and therefore has a fairly short sward of c.15cm. It is dominated by *Lolium perenne* (Perennial Rye-grass) and is species-poor being otherwise formed

of species such as *Achillea millefolium* (Yarrow), *Agrostis stolonifera* (Creeping Bent), *Bellis perennis* (Daisy), *Plantago major* (Greater Plantain), *Poa annua* (Annual Meadow-grass) and *Ranunculus repens* (Creeping Buttercup). Some areas are wetter, especially towards the woodland edge and here species such as *Geranium robertianum* (Herb-Robert), *Juncus effusus* (Soft-rush), *Lysimachia nemorum* (Yellow Pimpernel) and *Rumex sanguineus* (Wood Dock) are growing. Closer to the woodland edge and towards the housing are patches of ruderal herbs and ferns such as *Chamerion angustifolium* (Rosebay Willowherb), *Crocsmia xcrocosmiiflora* (Montbretia), *Pteridium aquilinum* (Bracken), *Rubus fruticosus* agg. (Bramble), *Silene dioica* (Red Campion) and *Urtica dioica* (Common Nettle). The woodland is mature and dense and is formed of species including *Acer campestre* (Field Maple), *Acer pseudoplatanus* (Sycamore), *Corylus avellana* (Hazel), *Fraxinus excelsior* (Ash) *Sorbus aucuparia* (Rowan), and *Quercus robur* (Pedunculate Oak).

Target Note 11. A series of semi-improved grassland fields, grazed by sheep and dominated by a mixture of fine-leaved grasses and common grassland herbs. Grasses include abundant *Anthoxanthum odoratum* (Sweet Vernal-grass), *Holcus lanatus* (Yorkshire-fog), *Lolium perenne* (Perennial Rye-grass) and *Poa trivialis* (Rough Meadow-grass). Herbs include abundant *Trifolium repens* (White Clover), and infrequent *Achillea millefolium* (Yarrow), *Cerastium fontanum* (Common Mouse-ear), *Ranunculus repens* (Creeping Buttercup) and *Rumex acetosa* (Common Sorrel).

Target Note 12. Further agricultural fields with improved grassland. Grasses here include frequent *Agrostis capillaris* (Common Bent), *Agrostis stolonifera* (Creeping Bent), *Anthoxanthum odoratum* (Sweet Vernal-grass), *Holcus lanatus* (Yorkshire-fog), *Poa trivialis* (Rough Meadow-grass) and *Lolium perenne* (Perennial Rye-grass). Other grass species include occasional *Cynosurus cristatus* (Crested Dog's-tail), *Dactylis glomerata* (Cock's-foot) and infrequent *Poa annua* (Annual Meadow-grass). Herb species include frequent *Trifolium repens* (White Clover), and occasional *Achillea millefolium* (Yarrow), *Cerastium glomeratum* (Sticky Mouse-ear), *Cerastium fontanum* (Common Mouse-ear), *Taraxacum* sect. *Ruderalia* (Common Dandelion), and *Veronica chamaedrys* (Germander Speedwell). The fields are dissected by a series of ditches, each being wet and between c.1.5 and 2m deep. These ditches are heavily managed and are likely to be dredged regularly, as they have few species typical of ditch or wetland habitats, with the exception of species such as *Alisma plantago-aquatica* (Water-plantain), *Glyceria fluitans* (Floating Sweet-grass), and *Phragmites australis* (Common Reed) which are present at low densities.

Target Note 13. Salt-marsh in the Dwyrud Estuary. The area is large and as such has a good diversity of salt-marsh vegetation, mostly closed but short (c.5 to 10cm) as due to sheep grazing. There are pools and creeks. Species are listed in *Table 4*.

Table A13: Species found at Target Note 13

Species
<i>Agrostis stolonifera</i> (Creeping Bent)
<i>Armeria maritima</i> (Thrift)

Species
<i>Aster tripolium</i> (Sea Aster)
<i>Atriplex glabriuscula</i> (Babington's Orache)
<i>Atriplex prostrata</i> (Spear-leaved Orache)
<i>Atriplex xtaschereaui</i> (Taschereau's Orache)
<i>Bolboschoenus maritimus</i> (Sea Club-rush)
<i>Cochlearia officinalis</i> (Common Scurvygrass)
<i>Festuca rubra</i> (Red Fescue)
<i>Glaux maritima</i> (Sea-milkwort)
<i>Juncus acutus</i> (Sharp Rush)
<i>Juncus gerardii</i> (Saltmarsh Rush)
<i>Juncus maritimus</i> (Sea Rush)
<i>Oenanthe lachenalii</i> (Parsley Water-dropwort)
<i>Phragmites australis</i> (Common Reed)
<i>Plantago coronopus</i> (Buck's-horn Plantain)
<i>Plantago maritima</i> (Sea Plantain)
<i>Puccinellia maritima</i> (Common Saltmarsh-grass)
<i>Ruppia maritima</i> (Beaked Tasselweed)
<i>Salicornia</i> agg. (Glasswort)
<i>Samolus valerandi</i> (Brookweed)
<i>Schoenoplectus tabernaemontani</i>
<i>Scorzoneroides autumnalis</i> (Autumn Hawkbit)
<i>Silene flos-cuculi</i> (Ragged-Robin)
<i>Spartina anglica</i> (Common Cord-grass)
<i>Spergularia marina</i> (Lesser Sea-spurrey)
<i>Spergularia media</i> (Greater Sea-spurrey)
<i>Trifolium repens</i> (White Clover)
<i>Triglochin maritimum</i> (Sea Arrowgrass)

Target Note 14. Semi-improved grassland grazed to c.10cm with some bare ground and areas that are waterlogged, and have some species typical of wet conditions. Grasses include abundant *Alopecurus geniculatus* (Marsh Foxtail), and occasional *Agrostis stolonifera* (Creeping Bent), *Glyceria fluitans* (Floating Sweet-grass), *Holcus lanatus* (Yorkshire-fog) and *Poa annua* (Annual Meadow-grass). Other graminoids include *Isolepis setacea* (Bristle Club-rush), *Juncus articulatus* (Jointed Rush), *Juncus effusus* (Soft-rush), *Juncus bufonius* (Toad Rush), and *Eleocharis palustris* (Common Spike-rush). Herbs are infrequently found and are typically tolerant of wet conditions including *Honckenya peploides* (Sea Sandwort), and occasional *Cirsium palustre* (Marsh Thistle),

Lotus pedunculatus (Greater Bird's-foot-trefoil), *Potentilla anserina* (Silverweed), and *Ranunculus repens* (Creeping Buttercup).

Target Note 15. Agriculturally improved grassland used for grazing and dominated by grasses such as *Agrostis capillaris* (Common Bent), *Alopecurus geniculatus* (Marsh Foxtail), *Anthoxanthum odoratum* (Sweet Vernal-grass), *Lolium perenne* (Perennial Rye-grass) and *Poa trivialis* (Rough Meadow-grass). Less abundant grasses include *Agrostis canina* (Velvet Bent), *Agrostis stolonifera* (Creeping Bent), *Bromus hordeaceus* (Soft-brome) *Holcus lanatus* (Yorkshire-fog) and *Phleum pratense* (Timothy). Typical grassland herbs include *Bellis perennis* (Daisy), *Cerastium fontanum* (Common Mouse-ear), *Plantago lanceolata* (Ribwort Plantain) and *Trifolium dubium* (Lesser Trefoil). Some areas appear more waterlogged, and these include species such as *Glyceria fluitans* (Floating Sweet-grass), *Sagina procumbens* (Procumbent Pearlwort), *Alopecurus geniculatus* (Marsh Foxtail). A c. 1.5m deep ditch dissecting this field is dominated by *Phragmites australis* (Common Reed) vegetation.

Target Note 16. Extensive mire habitats at the bottom of a valley. The substrate is peaty, and in some areas there are large hummocks of *Polytrichum* and *Sphagnum* mosses. Young trees have established themselves in some areas, predominantly *Salix* spp (Willow species), as well as *Acer pseudoplatanus* (Sycamore) and *Betula pendula* (Silver Birch). Graminoids are abundant throughout with *Molinia caerulea* (Purple Moor-grass) forming tussocks towards the north of this area. Other graminoids found here include *Agrostis canina* (Velvet Bent), *Agrostis capillaris* (Common Bent), *Carex echinata* (Star Sedge), *Carex nigra* (Common Sedge), *Eriophorum angustifolium* (Common Cottongrass), *Holcus lanatus* (Yorkshire-fog), *Juncus acutiflorus* (Sharp-flowered Rush), *Juncus articulatus* (Jointed Rush), *Juncus conglomeratus* (Compact Rush) and *Juncus effusus* (Soft-rush). Amongst these is a diverse community of herbs and ferns, including many species typical of marshy areas. Species recorded during the survey include *Aegopodium podagraria* (Ground-elder), *Cirsium palustre* (Marsh Thistle), *Digitalis purpurea* (Foxglove), *Epilobium palustre* (Marsh Willowherb), *Equisetum fluviatile* (Water Horsetail), *Galium palustre* (Common Marsh-bedstraw), *Hydrocotyle vulgaris* (Marsh Pennywort), *Lotus corniculatus* (Common Bird's-foot-trefoil), *Lythrum salicaria* (Purple-loosestrife), *Potentilla erecta* (Tormentil), *Potentilla reptans* (Creeping Cinquefoil), *Pteridium aquilinum* (Bracken), *Ranunculus flammula* (Lesser Spearwort), *Ranunculus repens* (Creeping Buttercup), *Rubus fruticosus* agg. (Bramble), *Rumex acetosa* (Common Sorrel) and *Viola palustris* (Marsh Violet). Surrounding the edges of this habitat are areas of *Pteridium aquilinum* (Bracken) and *Rubus fruticosus* agg. (Bramble) scrub.

Target Note 17. An area of dense *Pteridium aquilinum* (Bracken) dominating the eastern side of the valley. The habitat is homogenous and species-poor, with some *Hyacinthoides non-scripta* (Bluebell) and *Potentilla erecta* (Tormentil).

Target Note 18. The area of mire drains into a c.2m deep wet ditch. This is well vegetated by species including *Glyceria maxima* (Reed Sweet-grass), *Lycopus europaeus* (Gypsywort), *Phragmites australis* (Common Reed), *Potamogeton* spp (Pondweed species), *Sparganium erectum* (Branched Bur-reed), and *Typha latifolia* (Bulrush).

Target Note 19. A shallow balancing pond c. .5m deep with rocky shores and a silty bed. It appears to be newly created most likely for the adjacent bypass. It is species-poor, with *Juncus effusus* (Soft-rush), *Iris pseudacorus* (Yellow Iris), *Phragmites australis* (Common Reed) and *Typha latifolia* (Bulrush) as the most common species.

Target Note 20. A well-developed pond made for the visual amenity of nearby offices. Its banks are planted with species including *Alnus glutinosa* (Alder), *Betula pendula* (Silver Birch), *Larix decidua* (European Larch), and *Salix* spp (Willows). It is deep and appears to be of a depth of at least 2m. The banks are of a shallow gradient and are well-vegetated with *Filipendula ulmaria* (Meadowsweet), *Iris pseudacorus* (Yellow Iris), *Lysimachia* spp (Loosestrife species) and *Lythrum salicaria* (Purple-loosestrife).

Target Note 21. Previously cleared are of ground composed primarily of gravel and chipped slate. The southern portion of this area remains bare; however the northern section has some colonising vegetation including *Agrostis capillaris* (Common Bent), *Buddleja davidii* (Butterfly-bush), *Epilobium hirsutum* (Great Willowherb), *Luzula* cf. *sylvatica* (Great Wood-rush), *Rumex obtusifolius* (Broad-leaved Dock), *Senecio jacobaea* (Common Ragwort) and *Taraxacum* sect. *Ruderalia* (Common Dandelion).

Target Note 22. A small stand of *Crococsmia xcrocosmiiflora* (Montbretia) c. 1m x 1m within an area of *Pteridium aquilinum* (Bracken) at the base of an embankment and an area of dense *Rubus fruticosus* agg. (Bramble) scrub.

Target Note 23. A small stand of *Fallopia japonica* (Japanese Knotweed) c. 1m x 1m, adjacent to the access gate to the site.