Nant Maesglase Hydro Scheme

Ecology Report

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1. SUMMARY

- A micro hydro scheme is proposed for the Nant Maesglase, close to Dinas Mawddwy, Meirionnydd. Consultation had taken place with Snowdonia National Park Authority (SNPA). At the time of survey, no response was received from the SNPA ecologist. However, in line with previous experience, an extended Phase I vegetation survey of the site was carried out, as well as protected species assessments. These latter addressed the potential for otter, badger, amphibians and reptiles and breeding birds. Protected species surveys also addressed the potential for bats, if any mature or semi-mature trees were to be affected. In order to pre-empt any requirement for a lower plants survey, a bryophyte survey was carried out on the day. In addition, an appraisal of the site for sensitive lichen species was carried out (i.e. not a full survey but an assessment of the potential of the site to support sensitive lichens).

- Extended Phase 1 vegetation survey concentrated primarily on the penstock route and the proposed locations of infrastructure (intake, powerhouse, outfall) since these were the areas that were most likely to be directly impacted. Woodland areas on both sides of the Nant Maesglase were also categorised in terms of their Phase I categories. Phase I habitat survey revealed that all vegetation communities likely to be impacted were widespread upland communities of mid and north Wales. In terms of sensitivity, the route and infrastructure avoids all vegetation/habitats of value. The penstock route does however, run through open semi-natural broadleaved woodland for approximately the first 125m. Care will need to be taken to avoid impacts on mature and semi-mature trees and large rocks in this area. The remainder of the route runs through poor quality habitats and no impacts are anticipated.

- Survey and assessment for protected species did not reveal any otter holts or resting places (including close to the intake and outfall points), and it is considered that the proposed works will have a negligible impact on this species. There was no evidence of active badger setts along any of the proposed penstock route or close to any proposed infrastructure. A small number of trees were considered suitable as bat roosts. However, these will all be avoided by the proposed infrastructure. The woodland is not considered suitable for dormouse (lack of understorey). In addition, water vole are not considered to be present.

- The breeding bird assemblage of the proposed route and infrastructure areas was also taken into consideration during the survey. This was assessed to be entirely typical for the locality and unlikely to support any species protected under Schedule 1 of the Wildlife and Countryside Act. The only exception to this was the presence of red kite *Milvus milvus*, which may breed at the locality. It is suggested that construction take place outside the red kite nesting season, particularly

in the area near the intake point, and for the first 500m of the penstock route.

- A bryophyte survey was carried out which focused particularly on humidity-demanding species, representative of the Section 7 (Environment (Wales) Act 2016) oceanic ravine community. The site was also assessed for the presence of 'old forest' lichens and any indicators of important areas for riparian lichens. The lower plants assemblage was found to be poor, and did not qualify as an oceanic ravine community under Section 7. 'Old forest' lichens were not present within the infrastructure areas.

- The overall conclusion of the ecology surveys was that the proposed penstock route, intake point and powerhouse will have little ecological impact. Provided the stipulations with regard to red kite are adhered to, there will not be a significant impact on any protected species or important ecological receptor.

- Formal mitigation and protection measures are outlined for the potential presence of bat roosts. No measures are stipulated for otter, dormouse or water vole, as it is considered that these species are not present (apart from otter which is likely to be sporadically present along this watercourse).

2. INTRODUCTION

2.1. Background and Survey Objectives

A hydro scheme is proposed on the Nant Maesglase, Dinas Mawddwy, Meirionnydd.

Chris F. Brown MCIEEM surveyed the site to establish if there were any ecological constraints or likely impacts on, or of, the proposed development.

The survey consisted of the following elements:

- A habitat survey of the route and infrastructure areas to a Phase 1 level;

- A site survey that identified the potential for protected species on the proposed route and infrastructure locations;

- A bryophyte survey of the proposed penstock route and associated with the stream itself (to ascertain the presence and sensitivity of humidity-demanding species);

- A desk study comprising recorded ecological interests within 2km of the proposed development. Information relating to the location of key sites and species of nature conservation interest within the search area

was obtained from cofnod (north Wales environmental information service).

- This report, which details the results of the above together with species protection measures and suggestions for ecological enhancement.

2.2. Site Description

The proposed penstock route runs relatively close to the Nant Maesglase, which forms a narrow upland stream, with wooded banks for the first 250m of its length. Photo 1 (Appendix 3) shows the intake location. The area immediately adjacent to the intake (Photo 2, Appendix 3) comprises open, rocky, semi-natural broadleaved woodland.

Heading north-east from the intake, the penstock route runs through similar open semi-natural broadleaved woodland (Photo 3, Appendix 3), for approximately 125m. The penstock route leaves the broadleaved wooded area and for the remainder of its length, crosses fields of poor semi-improved improved and semi-improved neutral grassland (Photo 4, Appendix 3). Small areas are more akin to marshy grassland, with frequent soft rush (Photo 5, Appendix 3). The cable route lies in similar poor semi-improved and improved grassland (with one field of semi-improved neutral grassland).

2.3. Proposed Works

The project involves the construction of an intake weir across the full width of the watercourse, a building to house the turbine and generator (power house), and a pipe (penstock) buried for its entire length from the intake to the power house. A cable route will run from the power house for 610m before connecting to an existing electricity pole.

A screen will be used on the intake weirs and the screen size (2mm) has been stipulated by the Environment Agency to eliminate the risk of fish being drawn into the penstock. Where the water is discharged back into the watercourse, the tailrace pipe will be above the water level preventing fish from entering the turbine even during flood levels.

The trench depth required for the penstock will be a minimum of 1000mm to provide at least 500mm of cover over the pipe. The trench width will be approximately 350mm wide. The working width required for the pipe installation, including the temporary pile of spoil, will be about 3,500mm.

2.4. Correspondence with consultees

Greenearth hydro, working on behalf of the developer, approached SNPA to discuss any concerns they may have with the proposal in relation to ecology (as well as other aspects of the scheme). No reply was received in relation to ecology. However, in line with previous submissions, we have assumed that SNPA will require that protected species are assessed, including otter, reptiles and amphibians, badger, Schedule 1 birds and, where relevant, bats. SNPA also usually request that an extended Phase 1 vegetation survey

should be conducted. To this end, protected species assessments and a Phase I habitat survey were carried out.

3. METHODOLOGY

3.1. Vegetation Survey and Assessment

A vegetation survey and assessment was carried out to a Phase 1 habitat survey level, in line with previous guidance from SNPA. The penstock route (including the power house and intake weir sections), was surveyed in terms of its vegetation communities, and these were categorized according to Phase I habitat categories. Brief species lists were compiled for these areas. Habitat survey was based on the procedures in JNCC (2010).

The site was surveyed on 9th October 2018. The weather was bright, with no rain. There was a slight south westerly (F. 1/2) breeze. Chris F. Brown, a qualified ecologist, ornithologist and bryologist, carried out the survey. He has carried out many similar surveys previously and is highly familiar with their aims and requirements.

3.2. Protected Species Surveys

Surveys for protected species were undertaken on the same date as the vegetation survey. The presence or potential presence of protected species was noted on a survey field map.

3.1.1. Otter

A standard otter *Lutra lutra* survey was undertaken, following the methodology detailed by Chanin (2003). The stream was searched for signs of otter at suitable locations and in particular at the intake location, the outfall and the power house. Otter signs include spraints (faeces), tracks, paths, food remains and shelters (holts and couches). This last (i.e. the presence of holts and/or couches) is a particularly important survey requirement, in that breeding sites and resting places are specifically mentioned in the European legislation covering this species. They are also highlighted by Natural Resources Wales (NRW) and SNPA as an important survey requirement.

3.1.2. Bats

The potential for bats was assessed through the identification of suitable habitat and roost structures. This included assessing any large trees close to the pipeline route, intake point and powerhouse location. Guidance was taken from the Bat Conservation Trust guidelines (Collins, 2016). In particular, large trees with split limbs, dense epicormic growth, covering of ivy and/or woodpecker and other holes were noted. Potential signs of bat use were also noted, including droppings, feeding remains, urine splats, bat carcases, grease staining and polishing suggestive of bat entry.

3.1.3. Dormouse

The potential for dormouse *Muscardinus avellanarius* was assessed through habitat appraisal. This included reviewing the site for the following features, considered favourable for dormice (Natural England/Forestry Commission interim guidance, 2007):

- Woods that are connected to other areas of suitable woodland;
- Wide range of broadleaved species and ages present, in patches, scattered throughout, or around the edge;
- Shrub layer present, especially with hazel, honeysuckle or bramble;
- Species-rich scrub on woodland margins, ride sides or in patches;
- Canopy connections across tracks or thick, wide hedgerow connections to other nearby suitable habitat;
- Conifer/broadleaved mixtures or conifer plantations colonised by native broadleaves; and
- Fruiting hazel or sweet chestnut – ideally as managed coppice.

3.1.4. Badger

Badger *Meles meles* survey was undertaken through looking for signs such as setts, foraging signs, dung pits or tracks. Active setts in particular were searched for, as these may constrain the location of any development (i.e. no development within 30m of an active sett).

3.1.5. Birds

An assessment of the site for breeding birds was conducted whilst walking the route of the penstock. Particular attention was paid to species associated with the intake areas, the powerhouse and the Nant Maesglase and surrounding woodland.

3.3. Lower Plants Survey and Assessment

Suitable micro-habitats were searched in detail for mosses and liverworts. These included steep damp rock faces, rock niches, woodland flushes and tree bases, trunks and branches. Drier areas of rock faces were also examined, as was the floor of the woodland and rocks/boulders within the stream and woodland. All species from the proposed site were identified. Wherever possible, material was identified on site using x10 and x20 hand lenses. In cases where identification was not possible with a hand lens, a sample of material was obtained and packaged, for microscopic identification later. The survey also encompassed ‘old forest’ lichen species i.e. lichens

associated with long-established woodland conditions. This included a search for species typical of more humid woodland conditions e.g. species of *Sticta*, *Lobaria virens*, etc.

A number of lower plant species (in particular some of the bryophytes) are dependent on high levels of humidity. They are therefore principally associated with areas of fast-flowing water, often exacerbated by topographical features such as waterfalls, incised ravines and gorges. The importance of these ravine communities of bryophytes is underlined by their inclusion as an assemblage under Section 7 of the Environment (Wales) Act 2016 (i.e. of principal importance for conservation of biological diversity in Wales). The Section 7 'oceanic ravine community' list of species is reproduced in Appendix 2.

4. RESULTS

4.1. Desk Study

A very low number of species records (9) were returned from cofnod. None of these were within the footprint of the proposal. In addition, few (6) were less than 1km distant from the proposal (centre point). Mammal records were particularly sparse, with the only record being of an 'unknown bat species'. There were however, records for a Schedule 1 bird species, peregrine *Falco peregrinus*. This was associated with Craig Maesglase, the crags at the head of the Nant Maesglase. Two other species, on the Wales Birds of Conservation Concern red list, were also recorded from Craig Maesglase. These are kestrel *Flaco tinnunculus* and ring ousel *Turdus torquatus*. It is likely that all three of these species breed (or have bred in the recent past) in this location.

No statutory designated sites lie within 2km of the site.

4.2. Vegetation Survey and Assessment

4.2.1. Vegetation Descriptions

In terms of vegetation communities, the penstock route can be divided into four basic types:

- poor semi-improved and improved grassland;
- semi-improved grassland;
- marshy grassland;
- semi-natural broadleaved woodland;

These habitats are broken down further below, into their respective Phase I survey categories. A plan showing the location of these communities at the site is provided in Appendix 1.

Poor semi-improved and improved grassland

Poor semi-improved and improved grassland is found along approximately half of the penstock route. This grassland is species-poor and contains a high proportion of indicators of agricultural improvement (in particular perennial rye-grass *Lolium perenne*). White clover *Trifolium repens* is also prominent in the grassland. The distinction between poor semi-improved and improved grassland is largely based on the frequency of these agricultural indicator species. The second half of the penstock route in particular (i.e. between 450m and the powerhouse location falls into the poor semi-improved and improved grassland categories. The cable route for much of its length also passes through improved and poor semi-improved grassland.

Semi-improved neutral grassland

Between approximately 125m and 450m, the penstock route crosses two fields of semi-improved neutral grassland. This contains similar species to the improved/poor semi-improved sections, but also includes indicators of a less improved status. These include common bent *Agrostis capillaris*, common sorrel *Rumex acetosa* and yarrow *Achillea millefolium*. The cable route also includes a section of semi-improved neutral grassland, between approximately 200m and 400m. A representative photo of semi-improved neutral grassland is provided in Appendix 3 (Photo 4).

Marshy grassland

The section of the penstock route between 625m and 650m lies in poor quality marshy grassland. This is dominated by soft rush *Juncus effusus* with few associated species. The powerhouse location and first section of the cable route also lie in poor quality marshy grassland. It is found in a mosaic here with poor semi-improved grassland. A representative photo of this grassland (powerhouse location) is provided in Appendix 3 (Photo 5).

Semi-natural broadleaved woodland

The first 125m of the penstock route lies in semi-natural broadleaved woodland. This is open in character and rather overgrazed. The main tree species are downy birch *Betula pubescens*, goat willow *Salix caprea* and occasional sycamore *Acer pseudoplatanus*. Hazel *Corylus avellana* and hawthorn *Crataegus monogyna* were also sparsely present. The field layer in the majority of the woodland is quite sparse and representative of acidic conditions. Thus species such as male-fern *Dryopteris filix-mas* and common polypody *Polypodium vulgare* were prominent. Scattered bracken was also present at the edge of the woodland area. Steep acid rocks close to the intake point also supported the species climbing corydalis *Corydalis claviculata*. Photos of the semi-natural broadleaved woodland are provided as photos 2 and 3 (Appendix 3).

No other vegetation communities were present.

4.2.2. Flora

All plant species recorded were widespread and typical of the habitats they were found in. No vascular (i.e. higher) plant species were found that are protected.

4.3. Lower Plants Survey and Assessment

All bryophytes recorded were common and widespread species. The commonest species within the woodland areas were *Rhytidiadelphus loreus*, *Thuidium tamariscinum* and *Mnium hornum*. The rocks in the watercourse supported typical species for the area and setting. Dominating these rocks were *Hyocomium armoricum* and *Racomitrium aciculare*. Other typical waterside species were *Marsupella emarginata, Pellia epiphylla* and *Rhizomnium punctatum*. *Diplophyllum albicans* was a good indicator of the underlying acidic conditions. Only two species were recorded that are listed under the Section 7 community. These are *Hyocomium armoricum* and *Lejeunea lamacerina*. These fall under criterion 4. The site therefore clearly fails to qualify as one supporting the Section 7 oceanic ravine community. No 'old forest' lichens were recorded.

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4.4. Protected Species Surveys

4.4.1. Otter

No signs of otter were recorded. Otter potentially use the lower sections of the Nant Maesglase from time to time, but it is thought highly unlikely that the upper sections are used. It is likely that the water is largely poor for fish species (too base-poor).

4.4.2. Bats

No buildings lay close to the proposed pipeline or infrastructure locations and therefore there was no potential for such structures to support bat roosts. A small number of trees (two sycamore, occasional large ash) were considered to have features potentially suitable for roosting bats. These were all at a sufficient distance from the penstock route and proposed infrastructure locations so that they will not be affected by the construction of the pipeline.

4.4.3. Dormouse

The woodland was wholly unsuitable for supporting dormouse. There was a lack of food plants for this species (food plant species such as honeysuckle were sparse) and there was no appreciable cover of hazel.

4.4.4. Badger

No badger setts were found on the proposed route. No evidence of badgers was found within the woodland.

4.4.5. Birds

Few birds were recorded on the site. A number of species are likely to be associated with the broadleaved woodland areas. These are likely to include redstart *Phoenicurus phoenicurus* (edges of woodland). A number of red kite were present in the trees and grassland surrounding the site. These are likely to be present partly on account of the high density of pheasants *Phasianus colchicus* in the area (the site is used for pheasant rearing). The site did also look suitable for breeding red kite. The desk study also revealed that there are likely to be breeding peregrine, kestrel and ring ousel on the nearby crags at Craig maesglase.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. Evaluation

This section provides an evaluation of the potential impact of the proposed development on habitats and species identified within the report above.

5.2. Possible Impacts of Proposed Works on Vegetation

The entire infrastructure (proposed intake point, power house and penstock route, cable route) is anticipated as having a negligible impact on its respective surrounding habitats. The only caveat to this is that care should be taken to avoid impacts on broadleaved woodland (and associated species of bats) from the penstock route. Provided care is taken to avoid tree roots and bases, there should be no detrimental impact on trees or any associated biodiversity. The removal of very small trees for the intake is of no consequence as these are of no ecological significance.

5.3. Possible Impacts of Proposed works on Lower Plant Species

There will be negligible impact from the proposed works on lower plant species. The site does not meet the criteria for the Section 7 ‘oceanic ravine’ community in terms of its bryophytes. No ‘old forest’ lichens were recorded.

5.4. Possible Impacts of Proposed works on Protected Species

5.4.1. Bats

There will be no impact from the scheme on bats, as all suitable bat roost trees are at a sufficient distance from the proposed route and infrastructure so as not to be impacted. However, general mitigation and protection measures are outlined for this group.

5.4.2. Dormouse

There will be no impact from the scheme on dormouse as there is no suitable habitat for this species.

5.4.3. Badger

No signs of badger were recorded and no active setts will be impacted by the proposal. There will therefore be no impacts on this species and no mitigation measures are considered necessary.

5.4.4. Otter

No signs of otter were recorded, and usage of the Nant Maesglase is likely to be very low or non-existent in this section. No impacts are predicted for this species and no mitigation measures are considered necessary.

5.4.5. Birds

No impacts are predicted from the scheme on birds, subject to the mitigation and species protection measures outlined below.

5.5. Mitigation and Species Protection Measures

No mitigation measures are considered necessary for lower plants, dormouse, badger and otter.

5.5.1. Vegetation

Mitigation measures for vegetation are outlined above i.e. routing of the cable route carefully through the semi-natural woodland area. No other mitigation measures for vegetation are considered necessary, as the penstock route and other infrastructure will avoid all vegetation of ecological value (the penstock route largely runs through poor quality habitat).

5.5.2. Bats

Although it is not anticipated that any large trees with potential bat roosts are likely to be felled (based on the information and route provided), the developer should notify the ecologist prior to the works commencing if it is likely that any large trees will be impacted. An initial roost assessment (in line with the BCT Guidelines) can then be carried out on the impacted tree, and from this, decisions can be made with regard to emergence surveys and further assessment. In general, felling should take place in the winter when roosts are least likely to be present. It is possible however that hibernation roosts may be present at this time of year, and the ecologist should be notified of any large trees that could potentially be felled.

5.5.3. Otter

Whilst no impacts are predicted for otter, it would be prudent to carry out a pre-construction survey immediately prior to construction to ascertain whether there is more evidence of otter (and to check for any newly established holts or couches).

5.5.4. Badger

Whilst no impacts are predicted for badger, it would be prudent to carry out a pre-construction survey immediately prior to construction to ascertain whether

there is more evidence of badger (and to check for any newly established setts).

5.5.5. Birds

A number of species of bird may be breeding close to the penstock route, intake points or power house area. It is recommended that a pre-construction survey take place for any active nests that may be disturbed by construction. This would take the form of a check immediately ahead of the works for the presence of nesting or nest-building birds. If found, then they should be left undisturbed with at least 5m of cover around the nest, until the young have fledged and the nest is no longer in use. It is likely that a small number of Schedule 1 and/or red-listed birds of conservation concern are breeding close to the scheme. These include red kite, peregrine, kestrel and ring ousel. It is suggested that peregrine, kestrel and ring ousel will be breeding at a sufficient distance (i.e. on Craig Maesglase) that they will not be disturbed by construction. However, in order to avoid potential disturbance to these species and to red kite (which may be breeding in trees closer to the intake point) that this area is avoided by construction during the breeding season. This is particularly critical between March and end June.

5.6. Recommendations and Ecological Enhancement Measures

The lack of predicted impacts from the scheme means that few mitigation and species protection measures are considered necessary (aside from those detailed above). No other ecological enhancement measures are considered necessary.

6. REFERENCES

Chanin (2003). Ecology of the European otter *Lutra lutra*. Conserving Natura 2000 Rivers Ecology Series No 10. English Nature. Peterborough, UK.

Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.

Rodwell (1991). Rodwell, J.S. *et seq*., (1992). British Plant Communities Vols 1-5. Cambridge University Press: Cambridge.

Appendix 1: Phase I habitat map of site (see next page)

Key:

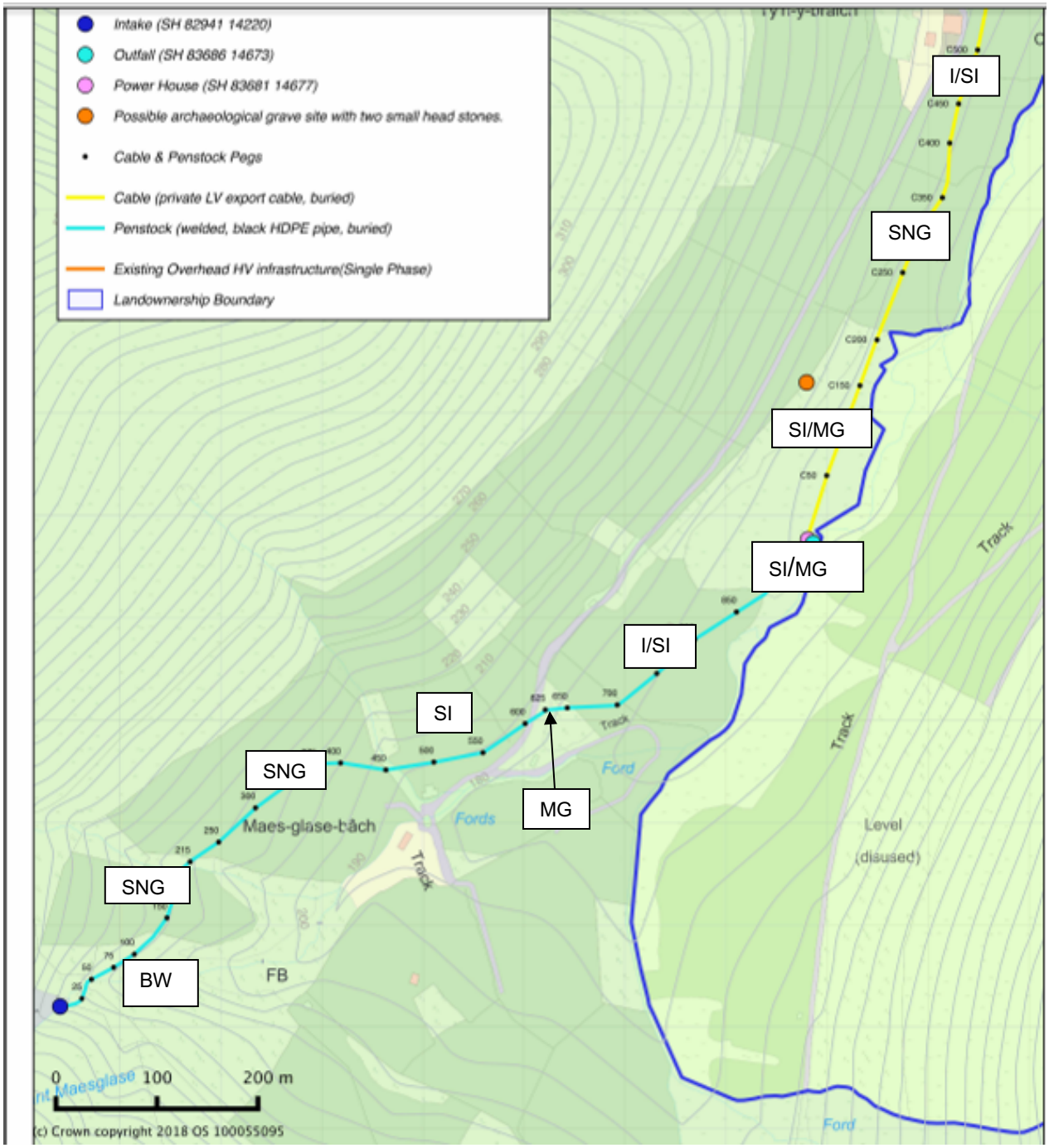
I Improved grassland

SI Poor semi-improved grassland

SNG Semi-improved neutral grassland

MG Marshy grassland

BW Semi-natural broadleaved woodland


Intake (SH 82941 14220)
Outfall (SH 83686 14673)
Power House (SH 83681 14677)
Possible archaeological grave site with two small head stones.
Cable & Penstock Pegs
Cable (private LV export cable, buried)
Penstock (welded, black HDPE pipe, buried)
Existing Overhead HV infrastructure(Single Phase)
Landownership Boundary
I/SI
SNG
SI/MG
SI/MG
I/SI
SI
SNG
MG
SNG
BW
Maes-glase-bach
Fords
Ford
Track
Track
Track
Level
(disused)
FB
0
100
200 m
(c) Crown copyright 2018 OS 100055095

Appendix 2: Section 42 Oceanic Ravine Bryophytes.

Bryophytes included under Section 42 of the Natural Environment and Rural Communities (NERC) Act 2006 have recently been revised and now include 52 species plus an assemblage named 'Oceanic Ravine Bryophytes'. Important sites for the latter are identified by the following indicator species:

1. Presence of any one of the following species: *Aphanolejeunea microscopica*, *Campylopus setifolius*, *Daltonia splachnoides*, *Drepanolejeunea hamatifolia*, *Hageniella micans*, *Harpalejeunea molleri*, *Leptoscyphus cuneifolius*, *Metzgeria leptoneura*, *Paraleptodontium recurvifolium*, *Plagiochila exigua*, *Plagiochila heterophylla*, *Radula voluta* or *Sematophyllum demissum*; OR

2. Presence of three or more of the following species: *Adelanthus decipiens*, *Andreaea megistospora*, *Dicranum scottianum*, *Fissidens polyphyllus*, *Jubula hutchinsiae*, *Lepidozia cupressina*, *Lepidozia pearsonii* or *Radula aquilegia*; OR

3. Presence of five or more of the following species: *Anastrepta orcadensis*, *Colura calyptrifolia*, *Douinia ovata*, *Heterocladium wulfsbergii*, *Hygrobiella laxifolia*, *Hygrohypnum eugyrium*, *Isothecium holtii*, *Marchesinia mackaii*, *Plagiochila bifaria*, *Plagiochila punctata*, *Platyhypnidium lusitanicum*, *Porella pinnata*, *Rhabdoweisia crenulata* or *Sphenolobopsis pearsonii*; OR

4. Presence of eight or more of the following species: *Bazzania trilobata*, *Fissidens bryoides* var. *caespitans*, *Hyocomium armoricum*, *Lejeunea lamacerina*, *Lejeunea patens*, *Lophocolea fragrans*, *Plagiochila spinulosa*, *Saccogyna viticulosa*, *Scapania gracilis*, *Solenostoma paroicum* or *Sphagnum quinquefarium*.

Appendix 3: Photographs

Photo 1: Intake location

Photo 2: Semi-natural broadleaved woodland, open and rocky in character

Photo 3: Open broadleaved woodland (bracken, hawthorn, hazel)

Photo 4: Semi-improved neutral grassland

Photo 5: Poor quality marshy grassland/poor semi-improved grassland (powerhouse location)