TECHNICAL APPENDIX 8.1: HABITATS REPORT

HARESTANES WEST WINDFARM

Ae, Dumfries & Galloway

25.10.2024 VERSION 2.1

PREFACE

This document is a report for ecological services to be carried out by the company.

Direct Ecology Limited
Unit 1, Block 2
Duckburn Industrial Estate
Dunblane
FK15 0EW

Tel: +44 (0) 1786 826865
Mob: +44 (0) 7803 587734

info@directecology.co.uk
www.directecology.co.uk

Company Number: SC343106

REVISION AND SIGN OFF

ISSUE DATE	AUTHORS	CHECKED BY	SIGNED OFF	VERSION	CHANGE REFERENCE
20.09.2024	Cróna McMonagle Emma Robson	Sarah Moore	Beccy Osborn	1	Draft for comment
23.09.2024	Cróna McMonagle Emma Robson	Sarah Moore	Beccy Osborn	2	Issued
25.10.2024	-	Sarah Moore	Beccy Osborn	2.1	Issued

CONTENTS

1 PROJECT INFORMATION

1.1 INTRODUCTION

This Technical Appendix has been prepared to accompany **Chapter 8: Ecology and Biodiversity** of the Harestanes West Windfarm (hereafter, the 'proposed Development') Environmental Impact Assessment (EIA) Report. The report was instructed by RSK Biocensus on behalf of ScottishPower Renewables to advise on potential ecological constraints to the proposal, as well as to advise on compliance with relevant legislation and planning policy.

It presents the results of the habitat surveys undertaken to establish the baseline habitat and vegetation conditions to inform the design and assessment of the proposed Development and should be read with reference to the following figures, presented in **Volume 3** of the EIA Report:

- **Figure 8.1: Ecological Designated Sites;**
- **Figure 8.2a-c: UK Habitats; and**
- **Figure 8.3: National Vegetation Classification;**

Ecological work included:

- Desk Study;
- UKHab survey; and
- National Vegetation Classification (NVC) survey of potential Groundwater Dependent Terrestrial Ecosystems (GWDTEs).

1.2 SITE LOCATION AND DESCRIPTION

The Site (the area within the Application Boundary) measures 1,242 ha and consists of both the main turbine development area and access track. It is located 13 km north of Dumfries, in Dumfries & Galloway (central grid reference NX 95993 91814 (Figure 1)). The area around the Site is predominantly plantation woodland, with areas of farmland and heathland in the wider area.

1.3 RELEVANT LEGAL FRAMEWORK AND POLICY

This assessment has taken into account relevant legislation, guidance and policy including:

- EC Habitats (Directive 92/43/EEC);
- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended);
- The Conservation of Habitats and Species Regulations 2017;
- Wildlife and Countryside Act 1981 (as amended);
- Nature Conservation Scotland Act 2004 (as amended);
- The Wildlife and Natural Environment (Scotland) Act 2011;
- Planning for Natural Heritage: Planning Advice Note 60 (Scottish Government, 2000);
- Local Biodiversity Action Plan;
- Scottish Biodiversity List (SBL) (NatureScot, 2020);
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017;
- National Planning Framework 4 (Scottish Government, 2023); and
- Developing with Nature guidance (NatureScot, 2023).

Further details where relevant are provided in Appendix 1.

2 METHODS

2.1 DESK STUDY

A desk study was undertaken to determine the presence of any designated nature conservation sites and conservation areas, as well as records of protected and notable habitats and species, and invasive non-native species (INNS), within a 2 km radius of the Site. In addition, a 50 m buffer used to search for areas of woodland listed on the Ancient Woodland Inventory and in the Native Woodland Survey of Scotland (NWSS).

The following sources were consulted:

- NatureScot SiteLink (NatureScot, 2023); and
- Scotland's Environment Web Map (Scottish Government, 2023).

2.2 FIELD SURVEY METHODS AND SURVEY AREA

Survey details for the habitat surveys are outlined in Table 1. Ten figure grid references were taken to record notable site features as target notes, using a handheld GPS device. The habitat survey study area comprised of the Application Boundary as shown in Figure 1. The area identified for habitat enhancement to the east (as shown on Figure 1) was not included in the surveys as this area is for enhancement only and did not require to be assessed as part of the proposed Development.

2.2.1 UKHAB CLASSIFICATION

The Site was mapped using the UK Habitat Classification (UKHab, 2023). Plants and their frequency of occurrence were recorded using the subjective DAFOR scale (dominant, abundant, frequent, occasional, or rare). Any invasive and invasive non-native plant species present within the survey area covered by the Wildlife and Natural Environments (Scotland) Act 2011 (WANE) were noted, although a specific survey for non-native invasive species was not undertaken.

2.2.2 NATIONAL VEGETATION CLASSIFICATION (NVC) SURVEY AND GROUNDWATER DEPENDENT TERRESTRIAL ECOSYSTEM SURVEY (GWDTE)

Vegetation within the Site was assessed to be potentially dependent on groundwater following guidelines published by SEPA (2017) and aligned to an NVC community (Rodwell, 1991).

2.3 SURVEY INFORMATION

All survey work and reporting was overseen by Beccy Osborn, Principal Ecologist and Company Director. She is an experienced Ecologist and a full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM) with over 20 years' ecological consultancy experience. She holds various protected species licences including a NatureScot bat licence and badger development licence.

The site surveys were undertaken by Emma Robson (Principal Ecologist, ACIEEM), Cróna McMonagle (Principal Ecologist, ACIEEM), Victoria Curley (Senior Ecologist) and Kirsty Duncan (Ecologist).

Table 1: Survey details

Date	Surveyor	Survey Type	Start / Finish	Weather
17.08.2023	Emma Robson Kirsty Duncan	NVC/UK Hab	10:00 – 17:30	Temp: 17, WS: 1-2, CC: 4-8. Rain: 0
22.08.2023 – 23.08.2023	Emma Robson	NVC/UK Hab	10:00 – 18:00 09:00 – 16:00	Temp: 20, WS: 0, CC 6-8, Rain: 0 Temp: 20, WS: 0, CC 3-8, Rain 0
17.07.2024	Cróna McMonagle	NVC/UK Hab	09.30-15.00	Temp: 15, WS: 2, CC: 3. Rain: 0
24.07.2024	Cróna McMonagle & Victoria Curley	NVC/UK Hab	10.00-17.00	Temp: 13, WS: 2, CC: 5, Rain: 0

3 RESULTS

3.1 DESK STUDY

3.1.1 STATUTORY DESIGNATED SITES

The Site is not designated for any natural heritage features.

There are no statutory designated sites within the area of search.

3.1.2 NON-STATUTORY DESIGNATED SITES

There are no non-statutory designated sites within the area of search.

3.1.3 ANCIENT WOODLAND INVENTORY, TREE PRESERVATION ORDERS AND NATIVE WOODLAND SURVEY OF SCOTLAND SITES

There are 24 parcels registered on the Native Woodland Survey of Scotland (NWSS), and three parcels listed on the Ancient Woodland Inventory (AWI) within 50 m of the Site. These are shown in Figure 2, Appendix 2).

Two of the three AWI parcels are located within the Site: one parcel is classed as 'of ancient (of semi-natural origin)' and one as of 'long established (of plantation origin)'.

Of the NWSS areas, 21 of these fall either partially or entirely within the Site, the remaining three are within 50 m of the Site. The native woodland is predominantly a mix of wet woodland and upland birchwood. There are also noted areas of acid grassland, upland oakwood, dwarf shrub heath, and scrub of exotic species.

There are no Tree Preservation Orders within the area of search.

3.2 FIELD SURVEY

The UKHab habitats recorded within the Site are described below. Figure 3, Appendix 2 shows the location of UKHab habitats and Figure 4, Appendix 2 describes the NVC and GWDTE results.

Cereal crops (c1c)

A large arable field is located in the south of the site, near the entrance to the access track, and consists of abundant barley, with occasional redshank *Persicaria maculosa*, pineappleweed *Matricaria discoidea*, marsh foxtail *Alopecurus geniculatus*, perennial rye grass *Lolium perenne*, annual meadow grass *Poa annua*, and bifid hemp nettle *Galeopsis bifida*.

Blanket bog (f1a)

The largest expanse of blanket bog at the site is present towards the centre of the southern portion, where a mosaic of wetland habitats is present (Photo 1). The bog is surrounded by commercial plantation which is likely to be slowly drying up the peatland. Vegetation comprises of common heather *Calluna vulgaris*, purple moor grass *Molinia caerulea*, hare's-tail cotton grass *Eriophorum vaginatum*, heath bedstraw *Galium saxatile*, red bog-moss *Sphagnum capillifolium,* papillose bog-moss *S. papillosum,* and common haircap moss *Polytrichum commune.* This habitat shows closest affinity to NVC community **M19 -** *Calluna vulgaris – Eriophorum vaginatum* blanket mire.

Other areas of bog are limited to forest rides to the south of the site (Photo 2).

This habitat on site corresponds to Annex 1 habitat type: 7130 Blanket bogs, SBL Priority Habitat: Blanket bog, LBAP Priority Habitat: Blanket bogs.

Photo 1

Photo 2

Degraded blanket bog (f1a6)

Degraded blanket bog was typically recorded along the western boundary of the site, in the southern portion. Here the effects of the adjacent plantation (drying and drainage effects) were noted in the form of dense heather cover and abundant Sitka spruce *Picea sitchensis*. Hare's-tail cotton grass was noted frequently, with occasional mosses heath plait-moss *Hypnum jutlandicum* and red-stemmed feather-moss *Pleurozium schreberi.* Purple moor grass, common heather, bilberry *Vaccinium myrtillus*, red bog-moss, cross-leaved heath *Erica tetralix*, common cotton grass *Eriophorum angustifolium* and wavy hair grass *Avenella flexuosa* were also noted.

This habitat was classed as **M19** during the NVC survey.

This habitat on site corresponds to SBL Priority Habitat: Blanket bog and LBAP Priority Habitat: Blanket bogs.

Purple moor-grass and rush pastures (f2b)

An area of rush pasture is present towards the centre of the southern half of the turbine area, where a mosaic of marsh, bog and other wetlands was noted. Species present include soft rush *Juncus effusus*, hemp nettle *Galeopsis tetrahit*, marsh thistle *Cirsium palustre*, creeping soft grass *Holcus mollis*, marsh bedstraw *Galium palustre*, tufted hair grass *Deschampsia cespitosa* and foxglove *Digitalis purpurea* (Photos 3 and 4).

This habitat shows most affinity to **M23b** - *Juncus effusus/acutiflorus-Galium palustre* rush-pasture, *Juncus effusus* sub-community.

Other, smaller areas of f2b (both M23a and b) are present across the site, restricted to rides and clearings, where it's likely that damper soils have prevented the colonisation of a commercial crop. Typical species compositions include soft rush, sharp flowered rush *Juncus acutiflorus*, valerian *Valeriana officinalis,* marsh thistle, marsh willowherb *Epilobium palustre*, angelica *Angelica sylvestris*, sneezewort *Achillea ptarmica*, common sorrel *Rumex acetosa* and ragged robin *Silene flos-cuculi.*

Photo 3

Photo 4

Other wetlands (f2f)

Other wetland habitats present across the site include a small area of bottle sedge *Carex rostrata* dominated swamp (NVC community **S9** - *Carex rostrata* swamp) surrounding a pond in the centre of the southern portion of the site (Photo 5) and more flushed areas of vegetation where a carpet of Sphagnum species is present beneath rush species and occasionally star sedge *Carex echinata*, including flat-topped bog-moss *S. fallax,* blunt-leaved bog-moss *S. palustre,* and spiky bog-moss *S. squarrosum* (NVC community **M6c/d**) (Photo 6).

Two small reedbeds were noted with dominant bulrush *Typha latifolia* with occasional marsh willowherb, angelica, and tufted forget-me-not *Myosotis laxa*. This habitat was classed as **S12** during the NVC survey.

Three small areas of tall herb mire dominated by meadowsweet *Filipendula ulmaria* bisected by a track in the west of the Site. This habitat is considered to align with NVC community **M27c**. This habitat on site corresponds to SBL Priority Habitat Upland Flushes, Fens and Swamps.

Photo 5

Photo 6

Other Upland acid grassland (g1b6)

Small pockets of acid grassland were noted across the Site in open areas (Photo 7). These areas appear unmanaged and contain species typical of such conditions including common bent *Agrostis*

capillaris, sweet vernal grass *Anthoxanthum odoratum*, tormentil *Potentilla erecta*, heath bedstraw, Yorkshire fog *Holcus lanatus*, germander speedwell *Veronica chamaedrys* and sheep's fescue *Festuca ovina.*

Acid grassland was also noted where areas have been clear-felled and coniferous regeneration has not occurred (Photo 8). A large area was recorded to the south of the public road, beyond the area of other Scots pine woodland. Here, velvet bent *Agrostis canina* was noted to be abundant, with frequent heath bedstraw, male fern *Dryopteris filix-mas,* foxglove, bracken *Pteridium aquilinum* and tufted hair grass. Heather was noted occasionally as well as sheep's sorrel *Rumex acetosella*, bilberry, sheep's fescue, heath plait-moss, great wood rush *Luzula sylvatica*, springy turf-moss *Rhytidiadelphus squarrosus.* Creeping soft grass, red bog-moss and heath rush *Juncus* squarrosus were noted rarely.

Photo 7

Photo 8

Bracken (g1c)

A large area of dense bracken with scattered trees is present along the Goukstane Burn. In addition, some forest rides are dominated with bracken, and along the public road that bisects the site (Photo 9).

Photo 9

Other neutral grassland (g3c)

Areas of 'other neutral grassland' were generally restricted to wider rides and glades amongst the plantation and present in small pockets along the access track. Two larger areas towards in the

southern portion of the turbine area were noted, one of which is a clearing where an old sheepfold was recorded (Photo 10), and another -a wide ride leading to a slope down to the Goukstane Burn (Photo 11). Both areas are unmanaged, and species present in the sward include Yorkshire fog, false oat grass *Arrhenatherum elatius*, hemp nettle, stitchwort *Rabelera holostea*, germander speedwell, creeping bent *Agrostis stolonifera*, creeping buttercup *Ranunculus repens* and sweet vernal grass.

Photo 10

Photo 11

Deschampsia neutral grassland (g3c7)

Small pockets of this habitat are present along the access track. Species noted include dominant tufted hair-grass with abundant Yorkshire fog and occasional soft rush, sharp-flowered rush, marsh valerian, angelica, foxglove and rosebay willowherb *Chamerion angustifolium*.

This area was noted as **M23a** in the NVC survey.

Holcus – Juncus neutral grassland (g3c8)

This habitat contained frequent Yorkshire fog and soft rush, with frequent bent grass, marsh thistle, foxglove, common haircap moss and marsh willowherb. Occasional tufted hair-grass, creeping buttercup, common sorrel, false oat grass, and willow *Salix sp.* was also noted, along with rare lesser stitchwort *Stellaria graminea*, wood sorrel *Oxalis acetosella*, selfheal *Prunella vulgaris* and marsh violet *Viola palustris*.

This area was noted as **M23b** in the NVC survey.

Modified grassland (g4)

A small area of modified grassland was noted in the south of the site. This habitat consisted of dominant perennial rye grass, with occasional common daisy *Bellis perennis*, annual meadow grass, creeping buttercup, broad-leaved dock *Rumex obtusifolius*, creeping thistle *Cirsium arvense*, and Yorkshire fog.

Dry heaths, upland h1b5

Areas of dry heath were limited to steeper slopes, where common heather dominates, pockets were recorded along the slopes of the Goukstane Burn (Photos 12 and 13).

This habitat contains frequent heather, bilberry, tormentil and heath bedstraw, with occasional wavy hair-grass, flat-topped bog-moss, springy turf-moss, foxglove, and bracken. Scattered trees were also frequently noted in this habitat and consisted of rowan *Sorbus aucuparia*, downy birch *Betula pubescens*, and Sitka spruce.

This habitat on site corresponds to Annex 1 habitat type: 4030 European dry heaths, SBL Priority Habitat: Upland heathland and LBAP Priority Habitat: Upland heaths.

Wet heathland with cross-leaved heath (h1b6)

An area of wet heath was noted surrounding a possible weather station (Photos 14 and 15), within the southern portion of the site. Purple moor grass and red-stemmed feather-moss were abundant and common heather, bilberry and hare's-tail cotton grass were frequent. Cross leaved heath, tormentil and foxglove were rarely recorded.

Another area of wet heath is present is along the shallower southern slopes of the Goukstane Burn where heather and purple moor grass are abundant and other species including cross leaved-heath, tormentil, red bog-moss, bog asphodel *Narthecium ossifragum* and bilberry.

Wet heath habitats show most affinity to the NVC community **M15** - *Trichophorum germanicum-Erica tetralix* wet heath.

This habitat on site corresponds to Annex 1 habitat type: 4010 North Atlantic wet heaths with *Erica tetralix,* SBL Priority Habitat: Upland heathland and LBAP Priority Habitat: Upland heaths.

Photo 12

Photo 13

Photo 14

Photo 15

Mixed scrub (h3h)

This habitat was generally limited to the edges of tracks and includes grey willow *Salix cinerea*, goat willow *Salix caprea*, rowan and bramble *Rubus fruticosus* (Photos 16 and 17).

Photo 16

Photo 17

Willow scrub (h3j)

This habitat is dominated by grey willow and goat willow, with abundant Yorkshire fog, frequent rosebay willowherb, soft rush with occasional common ragwort *Senecio jacobaea*, marsh willowherb, tufted hair-grass, and spear thistle *Cirsium vulgare*.

This habitat on site corresponds to LBAP Priority Habitat: Scrub woods.

Eutrophic standing waters (r1a)

One large pond is present on site, associated vegetation includes marsh valerian, ragged robin *Lychnis flos-cuculi*, yellow iris *Iris pseudacorus*, marsh thistle, bottle sedge, soft rush and meadow sweet (Photo 18).

Acid peat-stained lakes and ponds (r1c7)

Three ponds were noted towards the southern portion of the site all of which were noted to be peat-stained and supporting vegetation typical of such conditions including bog pondweed *Potamogeton polygonifolius.* (Photo 19).

Photo 18

Photo 19

Other rivers and streams (r2b)

Several small rivers and burns flow through the Site.

Other inland rock and scree (s1d)

Two quarries are present within the Site one towards the centre and one near the northern site boundary (Photo 20).

Photo 20

Other developed land (u1b6) and artificial unvegetated unsealed surface (u1c)

Turbine pads (u1b6) and tracks (u1c) are present within the site boundary. The majority of this habitat does not have any plant life, though some sparse colonising vegetation is present. Species recorded include common cudweed *Filago vulgaris*, silver spike grass *Achnatherum calamagrostis*, selfheal, colt's-foot *Tussilago farfara*, black medic *Medicago lupulina*, common birds foot trefoil, sweet vernal grass, broad-leaf plantain *Plantago major*, common ragwort, ragged robin, tufted forget-me-not, compact rush *Juncus conglomeratus*, and common centaury *Centaurium erythraea.*

Wet woodland (w1d)

An area of wet woodland is present within the north-eastern portion of the Site (Photos 5 and 6). Mature grey willow and goat willow dominate the canopy and within the ground flora damp soils are dominated within ferns including male fern and lemon scented fern *Oreopteris limbosperma.* Other species include marsh bedstraw*,* creeping buttercup, marsh thistle, nettle *Urtica dioica*, soft rush*,* forget me not *Myosotis* sp. and tufted hair grass (Photos 21 and 22).

This habitat on site corresponds to SBL Priority Habitat: Wet woodland and LBAP Priority Habitat: Native wet woods.

Photo 21

Photo 22

Upland Birchwoods (w1e)

One small pocket of this habitat is present near the south of the access track and consist of a mix of abundant downy birch and grey willow, with occasional rowan. Marsh thistle, red clover *Trifolium pratense*, tufted hair-grass, selfheal, bracken, and broom *Cytisus scoparius* are present in the understorey.

Lowland mixed deciduous woodland (w1f7)

To the north of the public road that bisects the site is an area of woodland (Photos 23 and 24) comprising rowan, willow, silver birch *Betula pendula*, bird cherry *Prunus avium*, alder *Alnus glutinosa* and hazel *Corylus avellana* with rarely poplar *Populus sp.* and Sitka spruce. The ground flora varies, on steep slopes the understorey is heathy with heather and bilberry abundant, on the lower reaches where the woodland meets the Windyhill Burn damper soils support abundant ferns including lemon scented fern, scaly male fern *Dryopteris affinis,* and lady fern *Athyrium filix-femina* alongside marsh thistle, bramble, tufted hair grass and angelica.

This habitat is also present near the entrance of the access track beside the A701. The southernmost pocket consists of mixed of hazel, pedunculate oak *Quercus robur*, sycamore *Acer pseudoplatanus*, downy birch, willow, beech *Fagus sylvatica*, and hawthorn *Crataegus monogyna*. The understorey contains frequent herb-Robert *Geranium robertianum*, cleavers *Galium aparine*, soft rush, broad buckler fern *Dryopteris dilatata*, and bramble, with occasional wood avens *Geum urbanum*, honeysuckle *Lonicera periclymenum*, common nettle, woodrush sp. *Luzula sp.*, common haircap moss, hedge woundwort *Stachys sylvatica* and enchanter's nightshade *Circaea lutetiana*.

Photo 23

Photo 24

Other woodland - broadleaved (w1g)

To the south of the public road, a narrow strip of beech dominated woodland with occasional sycamore and bird cherry is present where a limited ground flora was noted (Photos 9 and 10). East of the beech wood is a woodland block dominated with birch with occasional rowan. Ground flora here comprises mainly of bilberry with male fern, bank haircap *Polytrichastrum formosum,* bent species *Agrostis spp*. and lemon scented fern occasional.

Areas of other broadleaved woodland are also present along the access track and consist of a mix of silver birch, pedunculate oak, rowan, alder, and ash *Fraxinus excelsior*. The understorey contained abundant bent species and Yorkshire fog, with common bird's-foot-trefoil *Lotus corniculatus*, creeping thistle, lesser stitchwort, common nettle, broad-leaved dock, soft rush, pignut *Conopodium majus*, and foxglove (Photos 25 and 26).

This habitat on site corresponds to SBL Priority Habitat: Upland birchwoods and LBAP Priority Habitat: Native birch woods.

Photo 25

Photo 26

Other woodland mixed (w1h)

A large block of relatively young woodland is regenerating to the north of the public road, beyond the area of w1f mentioned above (Photos 27 and 28). Willow, birch and Sitka spruce were recorded growing densely with limited ground flora.

Areas of self-seeded Sikta spruce, rowan, willow, and downy birch are common throughout the site especially close to turbine areas. The understorey consists of a mix of wavy hair-grass, heather, rosebay willowherb, Yorkshire fog, soft rush, tufted hair-grass, and spear thistle.

Photo 27

Photo 28

Other Scots pine woodland (w2b)

To the south of the public road is a block of Scots pine *Pinus sylvestris* woodland (Photo 29) with rowan in the understorey and bracken dominates the ground flora.

Photo 29

Photo 30

Other coniferous woodland (w2c)

The majority of the Site comprises of this habitat, where a commercial conifer crop, generally Sitka spruce, has been densely planted. Given the dense planting, ground flora is generally limited given the low light levels at the woodland floor (Photo 30).

Large areas of the site have been clear-felled (Photos 31 and 32), in such areas the commercial conifer crop is generally showing signs of regenerating (hence why it has been mapped still as w2c), alongside other species including foxglove, heather, rosebay willowherb, bramble, bilberry and wavy hair grass.

Photo 31

Photo 32

3.2.1 HABITAT AREAS

The area of each habitat within the Site is shown in Table 2.

Table 2: Areas of UKHab communities on site (with priority habitat status in brackets)

UKHab	Area (ha)
Other coniferous woodland (w2c)	**895.68**
Other woodland mixed (w1h)	**86.50**
Other neutral grassland (g3c)	**45.04**
Artificial unvegetated unsealed surface (u1c)	**23.87**
Other upland acid grassland (g1b6)	**20.28**
Bracken (g1c)	**18.64**
Lowland mixed deciduous woodland (w1f)	**14.34**
Purple moor-grass and rush pastures (f2b)	**10.24**
Other woodland - broadleaved (w1g) (SBL, LBAP)	**7.42**
Dry heaths, upland (h1b5) (Annex 1, SBL, LBAP)	**6.92**
Other developed land (u1b6)	**6.37**
Cereal crops (c1c)	**6.10**
Wet heathland with cross-leaved heath, upland (h1b6) (Annex 1, SBL, LBAP)	**6.03**
Blanket bog (f1a) (Annex 1, SBL, LBAP)	**5.80**
Degraded blanket bog (f1a6) (SBL, LBAP)	**4.90**
Willow scrub (h3j) (LBAP)	**4.79**
Other Scots pine woodland (w2b)	**4.51**
Mixed scrub (h3h)	**4.43**
Holcus-juncus neutral grassland (g3c8)	**4.02**
Modified grassland (g4)	**3.77**
Other wetlands (f2f) (0.69 ha of the total area of this habitat on Site is SBL)	**2.34**

UKHab	Area (ha)
Deschampsia neutral grassland (g3c7)	**2.25**
Other inland rock and scree (s1d)	**2.19**
Wet woodland (w1d) (SBL, LBAP)	**1.57**
Upland birchwoods (w1e)	**1.12**
Eutrophic standing waters (r1a)	**0.32**
Acid peat-stained lakes and ponds (r1c7)	**0.13**
Total Area	**1189.5**
Key: Annex 1 = Habitat listed on Annex 1 of the Habitats Directive; SBL = listed as a priority habitat on the Scottish Biodiversity List; LBAP = identified as a local priority on the Local Biodiversity Action Plan (Appendix 1)	

3.2.2 NVC AND GWDTES

The NVC communities for wetland habitats recorded across the Site are given in Table 3 below alongside their likelihood for their dependence on groundwater (SEPA, 2017).

Table 3: UKHab and NVC communities recorded.

UKHab	NVC Communities and Conservation Importance	Likelihood for Dependency on Groundwater 1= High 2= moderate 3= low
Deschampsia neutral grassland (g3c7)	**M23a** *Juncus effusus/acutiflorus-Galium palustre* rush-pasture, *Juncus acutiflorus* sub-community.	1
Holcus – Juncus neutral grassland (g3c8)	**M23b** - *Juncus effusus/acutiflorus-Galium palustre* rush-pasture, *Juncus effusus* sub-community.	1
Wet woodland (w1d)	**W1-** *Salix cinerea - Galium palustre* woodland	2
Blanket bog (f1a)	**M19 -** *Calluna vulgaris – Eriophorum vaginatum* blanket mire	3

UKHab	NVC Communities and Conservation Importance	Likelihood for Dependency on Groundwater 1= High 2= moderate 3= low
	Annex 1 Habitat type 7130 Blanket bogs; SBL Priority Habitat Blanket bog; LBAP Priority Habitat Blanket bogs	
Degraded blanket bog (f1a6)	**M19 -** *Calluna vulgaris – Eriophorum vaginatum* blanket mire SBL Priority Habitat Blanket bog; LBAP Priority Habitat Blanket bogs	3
Purple moor-grass and rush pastures (f2b)	**M23a** *Juncus effusus/acutiflorus-Galium palustre* rush-pasture, *Juncus acutiflorus* sub-community.	1
	M23b - *Juncus effusus/acutiflorus-Galium palustre* rush-pasture, *Juncus effusus* sub-community.	1
	M25a *Molinia caerulea-Potentilla erecta* mire, *Erica tetralix* sub-community	2
	M27c - *Filipendula ulmaria – Angelica sylvestris* mire, *Juncus effusus – Holcus lanatus* sub-community SBL Priority Habitat Upland Flushes, Fens and Swamps	2
Wet heathland with cross-leaved heath (h1b6)	**M15** - *Trichophorum germanicum-Erica tetralix* wet heath. **Annex 1 – H4010**	2
Other wetlands (f2f)	**M6c** - *Carex echinata-Sphagnum fallax/denticulatum* mire, *Juncus effusus* sub-community.	1
	M6d - *Carex echinata-Sphagnum fallax/denticulatum* mire, *Juncus acutiflorus* sub-community.	1

UKHab	NVC Communities and Conservation Importance	Likelihood for Dependency on Groundwater 1= High 2= moderate 3= low
	S9 - *Carex rostrata* swamp	3

3.2.3 INVASIVE NON-NATIVE SPECIES

A single stand of montbretia *Crocosmia sp.* (Photo 33) was recorded near the edge of the track in the middle of the Site close to recent clear-felled area. This species can outcompete native species due to its rapid reproduction rate.

Rhododendron *Rhododendron ponticum* was recorded within the cemetery in the south of the Site (Photo 34).

Photo 33: A stand of montbretia growing at the edge of recent clear fell

Photo 34: Rhodedendron within old cemetry

4 BIBLIOGRAPHY AND REFERENCES

NatureScot (2024) *SiteLink*. Available online at: https://sitelink.nature.scot/home. Accessed 01.07.2024.

Rodwell, J.S. (Ed.) (1991 et seq.). British Plant Communities. 5 volumes: Vol. 1 (1991) - Woodlands and Scrub; Vol. 2 (1991) - Mires and Heaths; Vol. 3 (1992) - Grasslands and montane communities; Vol. 4 (1995) - Aquatic communities, swamps and tall-herb fens; Vol. 5 (2000) - Maritime Cliffs, Sand Dunes, Saltmarshes and Other Vegetation. Cambridge University Press, Cambridge.

Scottish Environment Protection Agency (2017) *Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems. Land Use Planning System SEPA Guidance Note 31.* Available online at: https://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions-and-groundwater-dependent-terrestrial-ecosystems.pdf

Scottish Government (2012) *Scottish Biodiversity List v1.4.* Available online at: http://www.gov.scot/Topics/Environment/Wildlife-Habitats/16118/Biodiversitylist/SBL. Accessed 01.07.2024.

Scottish Government (2019). Scotland's Environment Web Interactive mapping tool. Available online at: https://map.environment.gov.scot/sewebmap/. Accessed 01.07.2024.

UKHab Ltd (2023). UK Habitat Classification Version 2.0 (at https://www.ukhab.org)

APPENDIX 1 – RELEVANT LEGISLATION

THE HABITATS DIRECTIVE

European Council Directive 92/43/EEC (the 'Habitats Directive') aims to promote the maintenance of biodiversity by ensuring the conservation of a wide range of rare, threatened or endemic animal and plant species. Habitats listed in Annex I are those considered to be most in need of conservation at a European level. The Habitats Directive no longer applies but was transposed into specific legal obligations by the Conservation of Habitats and Species Regulations 2017 for section 36 applications; this requires the protection of sites that are internationally important for threatened habitats and species. Special Areas of Conservation (SAC) are designated under this legislation.

THE NATURE CONSERVATION (SCOTLAND) ACT 2004

The Nature Conservation (Scotland) Act 2004 places a duty on NatureScot to notify as Sites of Special Scientific Interest (SSSI) areas of land they consider of special interest for their flora or fauna, geology or geomorphology.

THE SCOTTISH BIODIVERSITY LIST (SBL)

The Scottish Biodiversity List (SBL) is a list of species and habitats that Scottish Ministers consider to be of principal importance for biodiversity. The list is split into several categories which identify: the requirement for conservation action; avoidance of negative impacts; monitoring of species and habitats; and species and habitats which are of use in communicating the importance of nature to the public.

LOCAL BIODIVERSITY ACTION PLAN (LBAP)

Local Biodiversity Action Plans (LBAPs) are written at a local authority level and are administered by the local authority, often in partnership with local conservation organisations. These LBAP documents identify key local species and habitats and determine plans for action to conserve these. Of relevance to the proposed development is the Dumfries and Galloway LBAP.[1]

ANCIENT WOODLAND

In Scotland, Ancient Woodland is defined as land that is currently wooded and has been continually wooded since at least 1750. The age of these woodlands means that they are especially important for biodiversity as they usually have much richer wildlife than more recent woods, and the integrity of soil ecological processes is preserved. The Scottish Ancient Woodland Inventory (AWI) is a provisional guide to the location of ancient woodlands. In addition, a list of ancient woodland indicator species for Scotland has been published, which is intended to complement archive and field evidence regarding putative locations of ancient woodland.

NATIVE WOODLAND SURVEY OF SCOTLAND

The Native Woodland Survey of Scotland (NWSS) identified and mapped the location, extent, type and condition of all of Scotland's native and nearly native woodlands, as well as woods planted on ancient woodland sites (PAWS), of at least 0.5 ha; the survey was intended to be a national baseline to monitor future changes in area and condition.

[1] https://www.dumgal.gov.uk/media/19945/Local-Biodiversity-Action-Plan/pdf/Local_Biodiversity_Action_Plan.pdf

INVASIVE NON-NATIVE SPECIES

The WANE Act amended and expanded Section 14 of the Wildlife and Countryside Act 1981. The 1981 Act now contains sections on the release or planting of all non-native species and the keeping, sale and notification of invasive species, in addition to provisions on Species Control Agreements and Species Control Orders. Non-native is re-defined to include native species outwith their natural range and the natural range is further defined as the location in which an animal or plant is indigenous. The 'wild' is also more clearly defined and there is a list of exempted land (Section 5, list 2 of Code of Practice). The WANE Act also put in place the means to introduce a new code of practice with regard to non-native species. This was done under Section 14C of the amended Wildlife and Countryside Act and came into force in July 2012. The code of practice should be referred to when dealing with any non-native animal or plant. The code outlines the law relating to native and non-native species and explains the main provisions set out in the 1981 Act. Schedule 9 has now been repealed.

WATER FRAMEWORK DIRECTIVE 2000/60/EC AND GROUNDWATER DIRECTIVE 2006/118/EC

The Water Framework Directive (WFD; 2000/60/EC) aimed to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater. For groundwater, the objectives include good groundwater status, which is a combination of good groundwater quantitative status and good groundwater chemical status. Terrestrial ecosystems that are directly dependent on groundwater (groundwater-dependent terrestrial ecosystems: GWDTE) are specifically protected under the WFD. The hydrological linkage between groundwater and the wetland ecosystems that depend upon that is crucial, and as such GWDTEs are sensitive receptors to the pressures that are potentially caused by a variety of activities. GWDTEs that critically depend upon groundwater represent the ecological quality of the invisible groundwater bodies (GWB). A GWDTE can affect the status of a GWB: if the quantity or quality of the groundwater of a GWB that a GWDTE receives, or does not receive, causes a GWDTE to be significantly damaged this will result in a GWB to be classified at poor status.

The WFD and the Groundwater Directive (GWD; 2006/118/EC) placed a duty on authorities to protect GWDTE from 'significant damage' caused by, for example, pollution, abstraction or diversion of groundwater. Significant damage is a combination of the conservation importance of the habitat (i.e. 'botanical richness') and the scale of damage caused by changes to the groundwater flow to the habitat.

Both directives no longer apply in Scotland but have been implemented in Scotland through the Water Environment and Water Services (Scotland) Act 2003 and subsequent regulations. These provisions continue to apply .

Activities such as forestry, mining, quarrying and construction can disrupt groundwater flow. Activities may remove protective layers of soil and subsoil making the groundwater below more vulnerable to pollution from leaks or spills from vehicles or equipment on Site. If activities are carried out in close proximity to groundwater abstractions and GWDTEs, they can have adverse impacts on these receptors.

APPENDIX 2 – MAPS

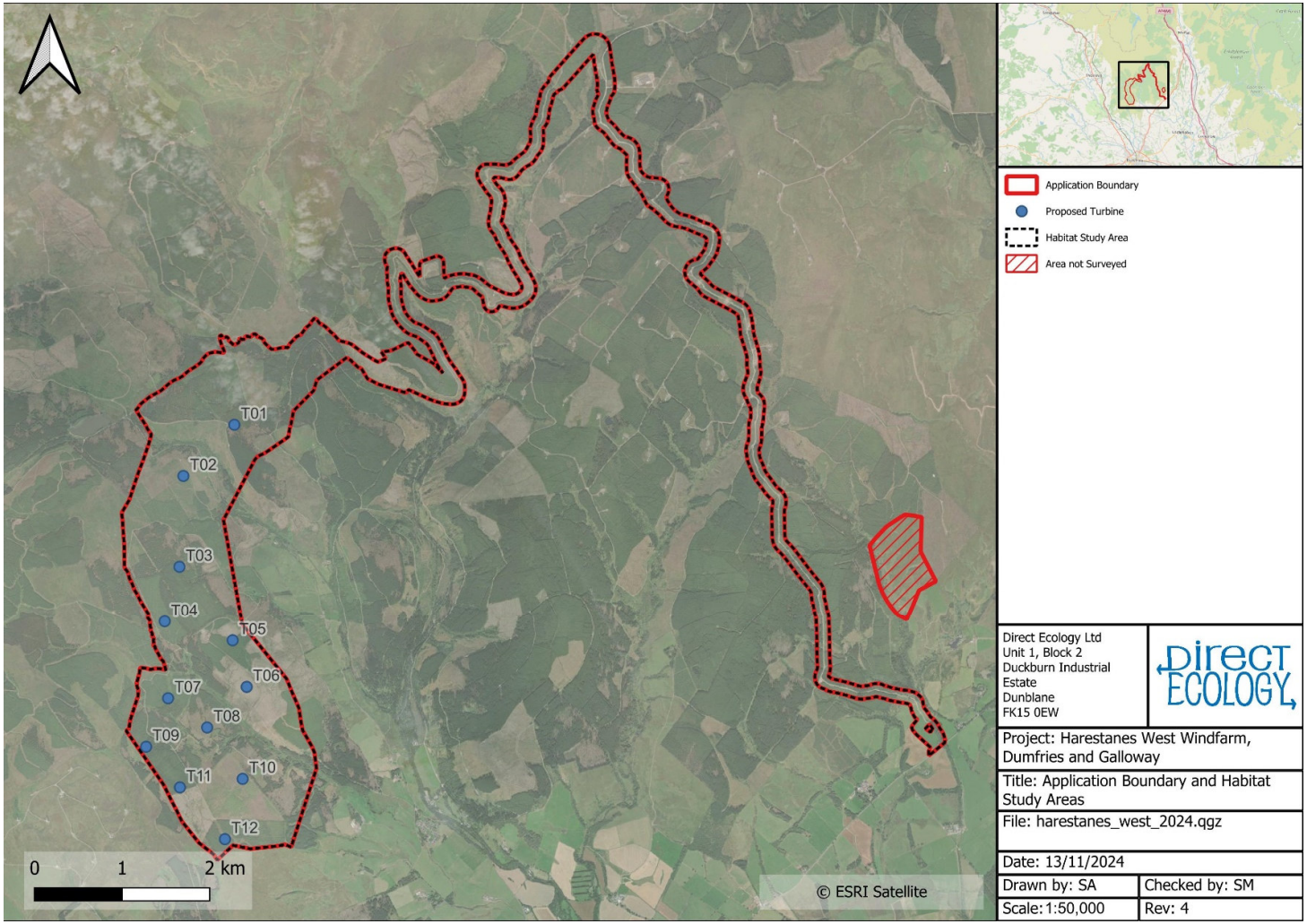

Figure 1: Survey Area

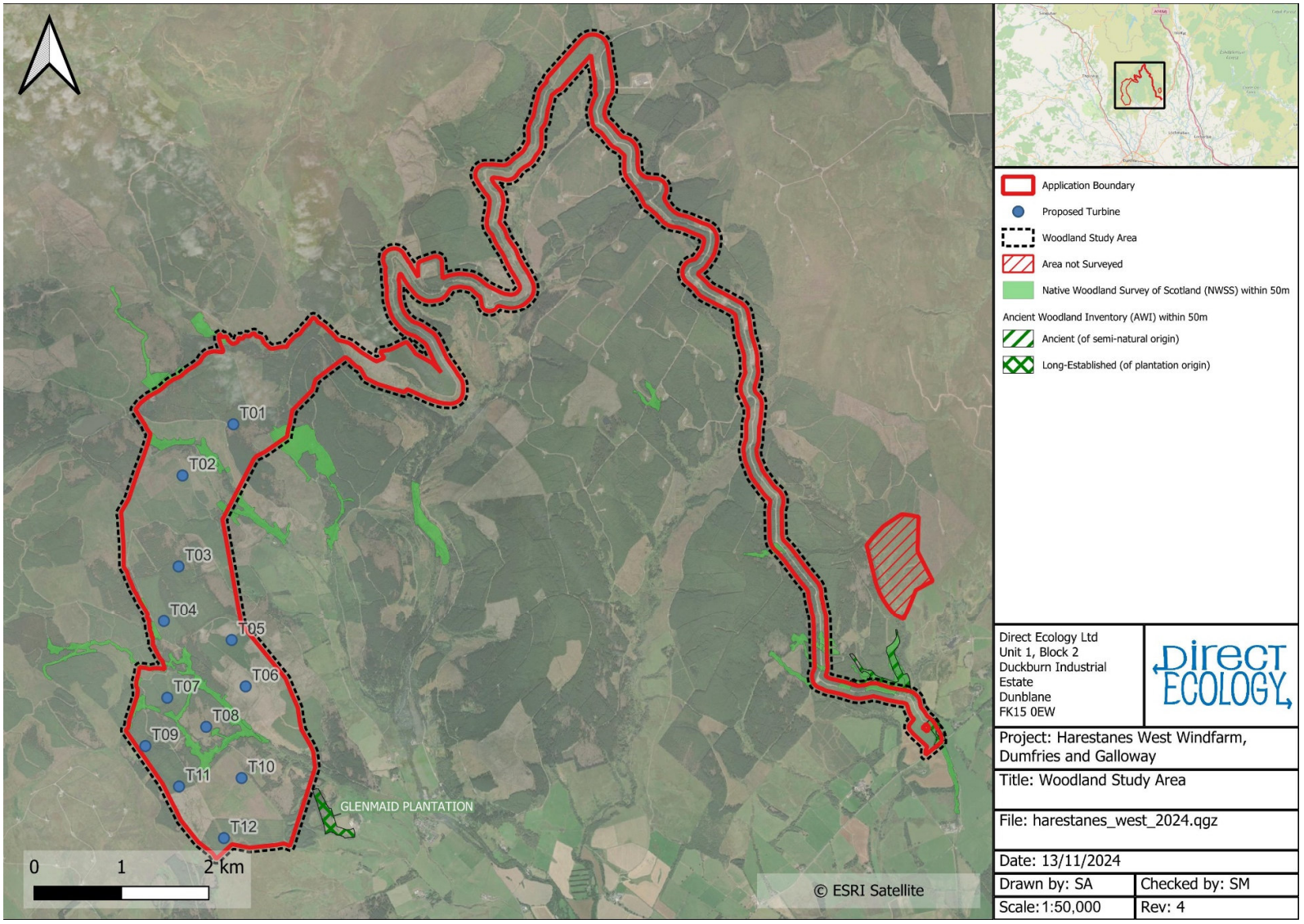

Figure 2: Ancient Woodland Inventory (AWI) and Native Woodland Species of Scotland (NWSS) within 50 m of the Site.

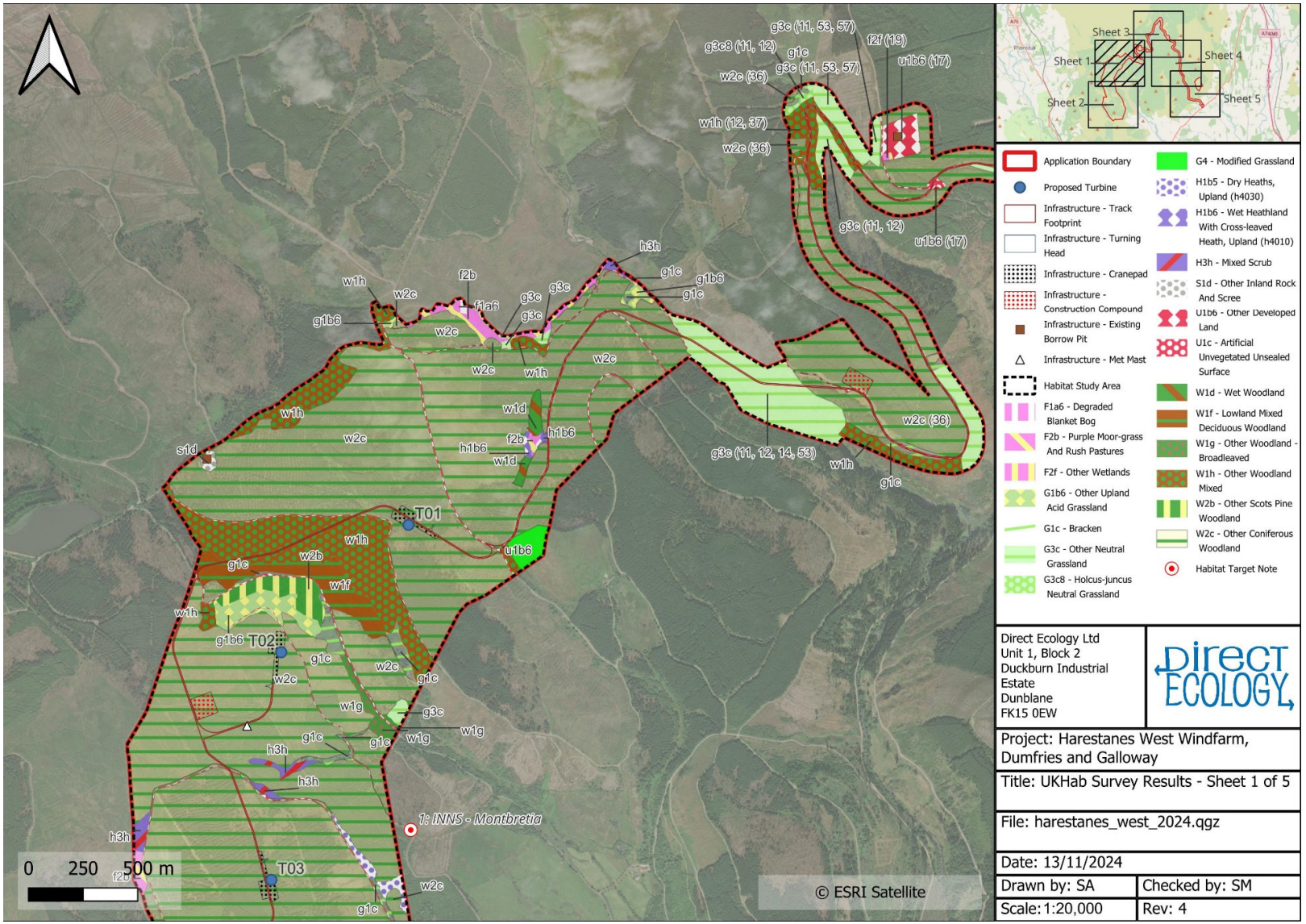

Figure 3a: UKHabs survey results (sheet 1).

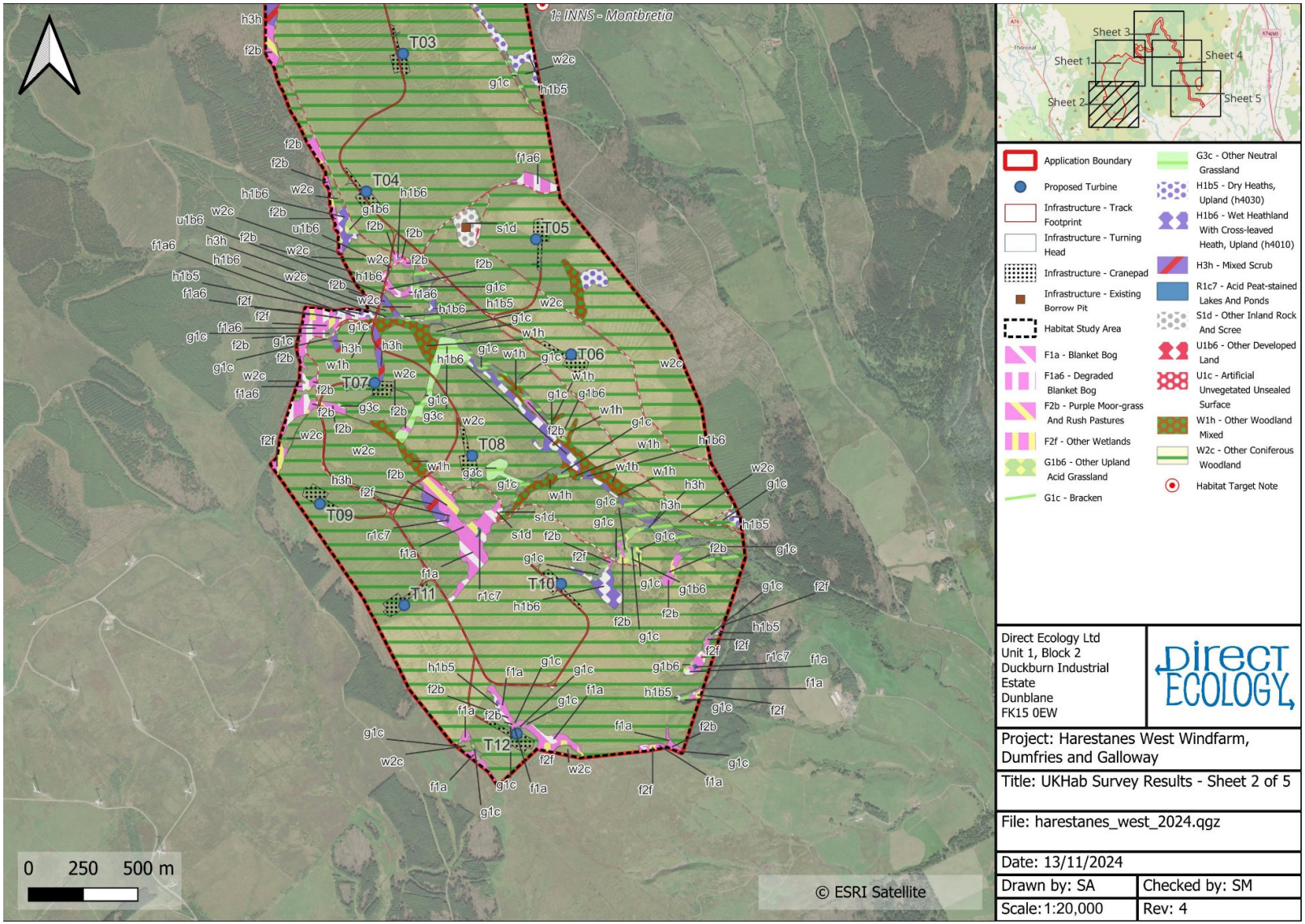

Figure 3b: UKHabs survey results (sheet 2)

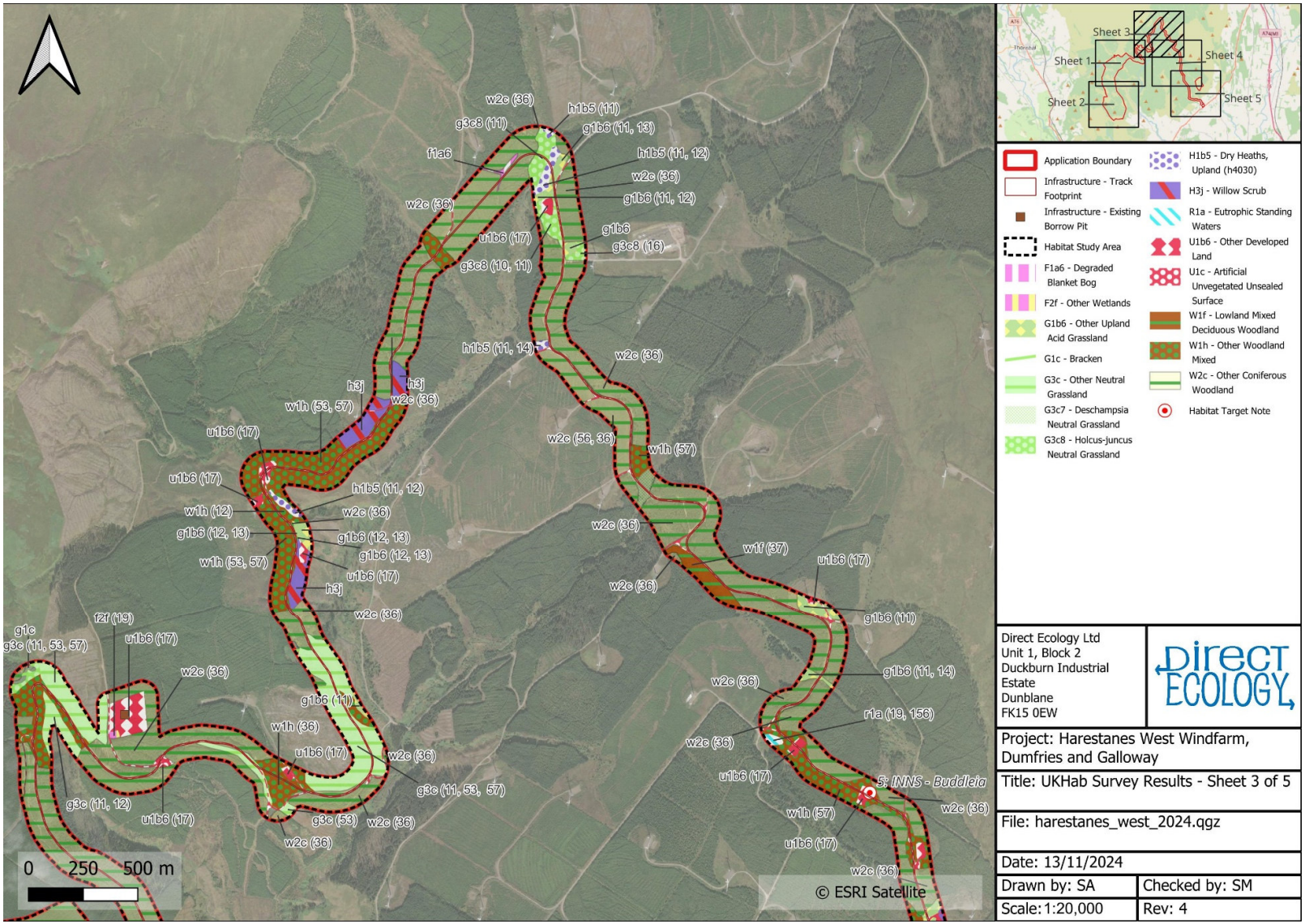

Figure 3c: UKHabs survey results (sheet 3)

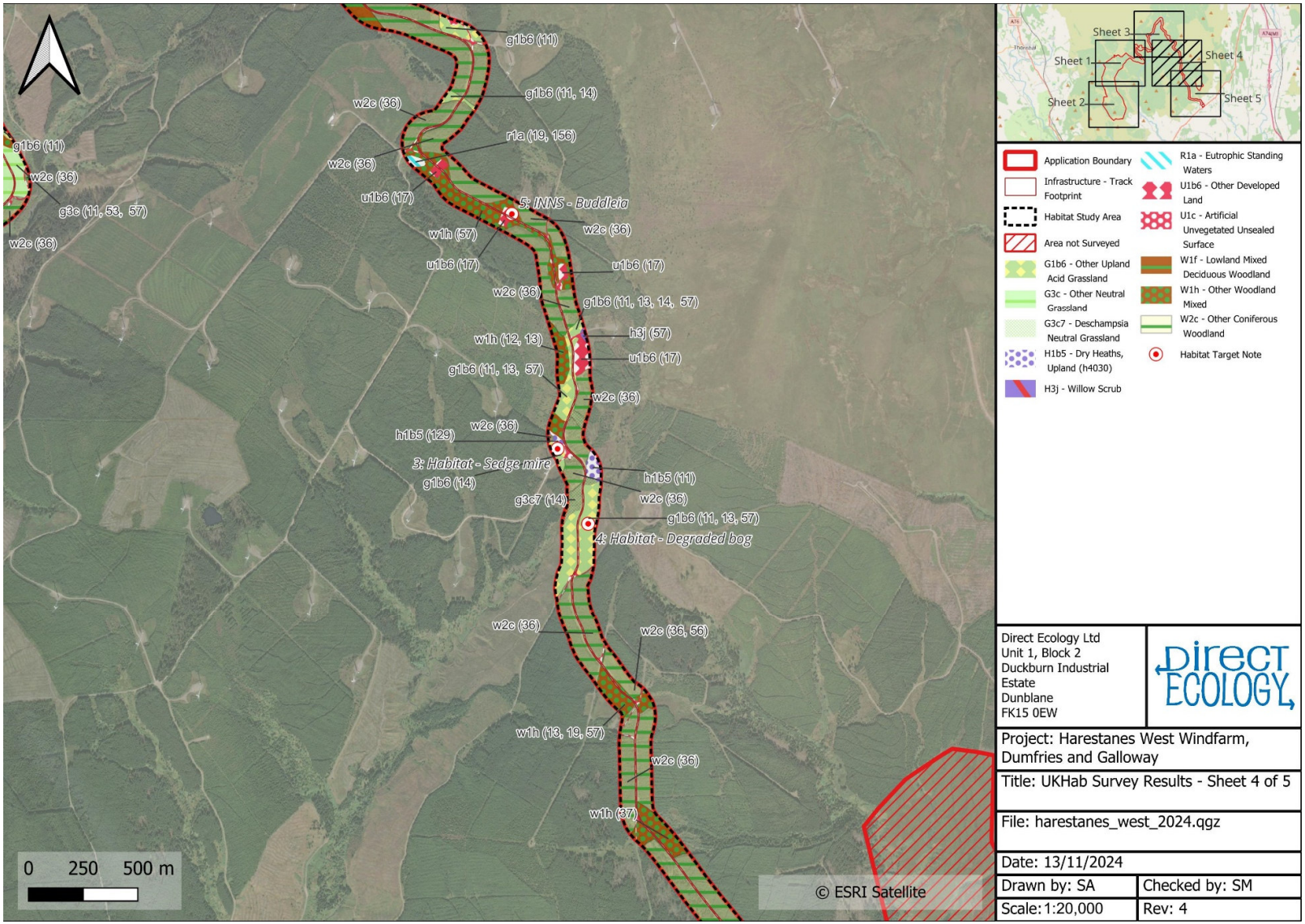

Figure 3d: UKHabs survey results (sheet 4)

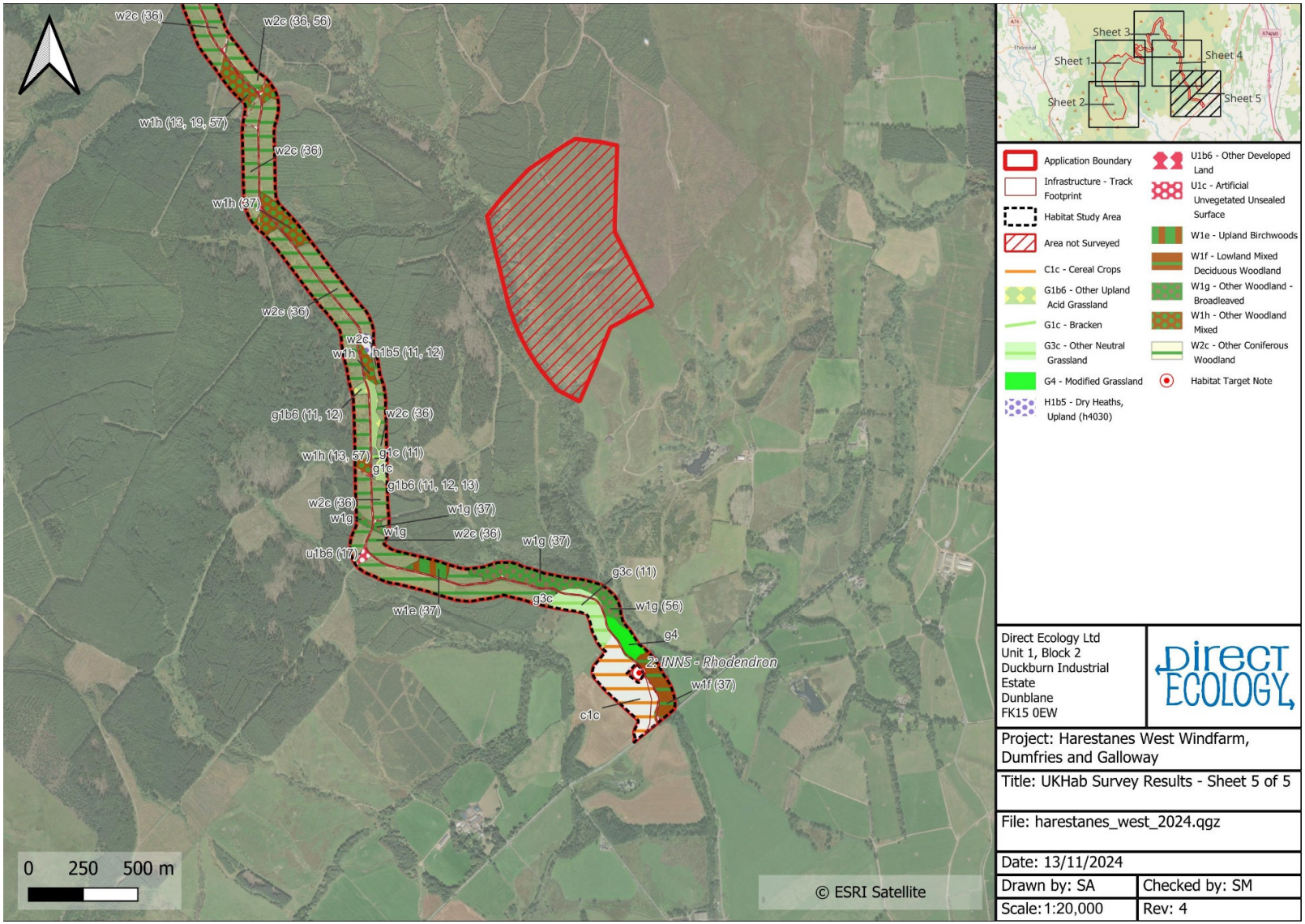

Figure 3e: UKHabs survey results (sheet 5).

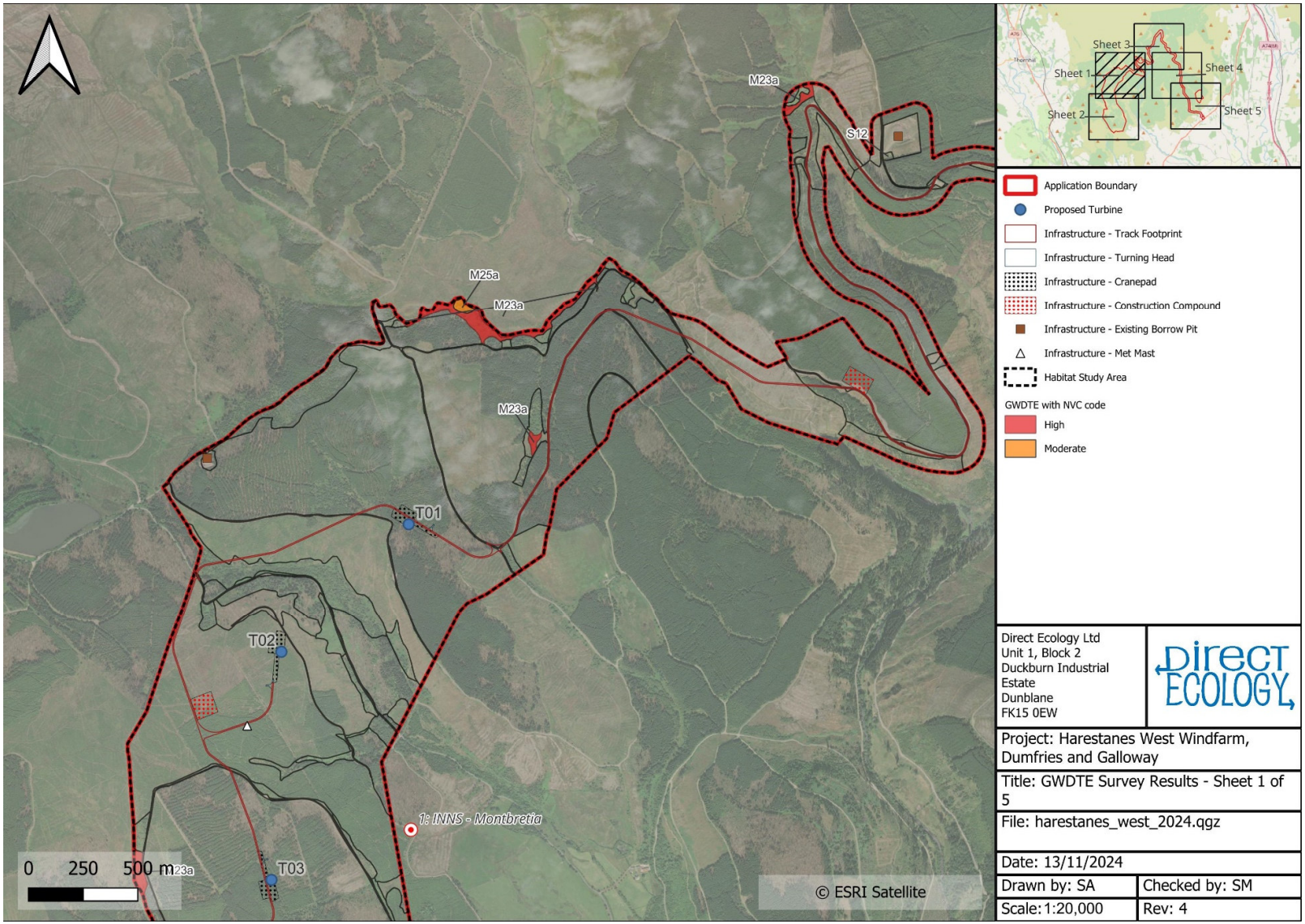

Figure 4a: GWDTE survey results (sheet 1)

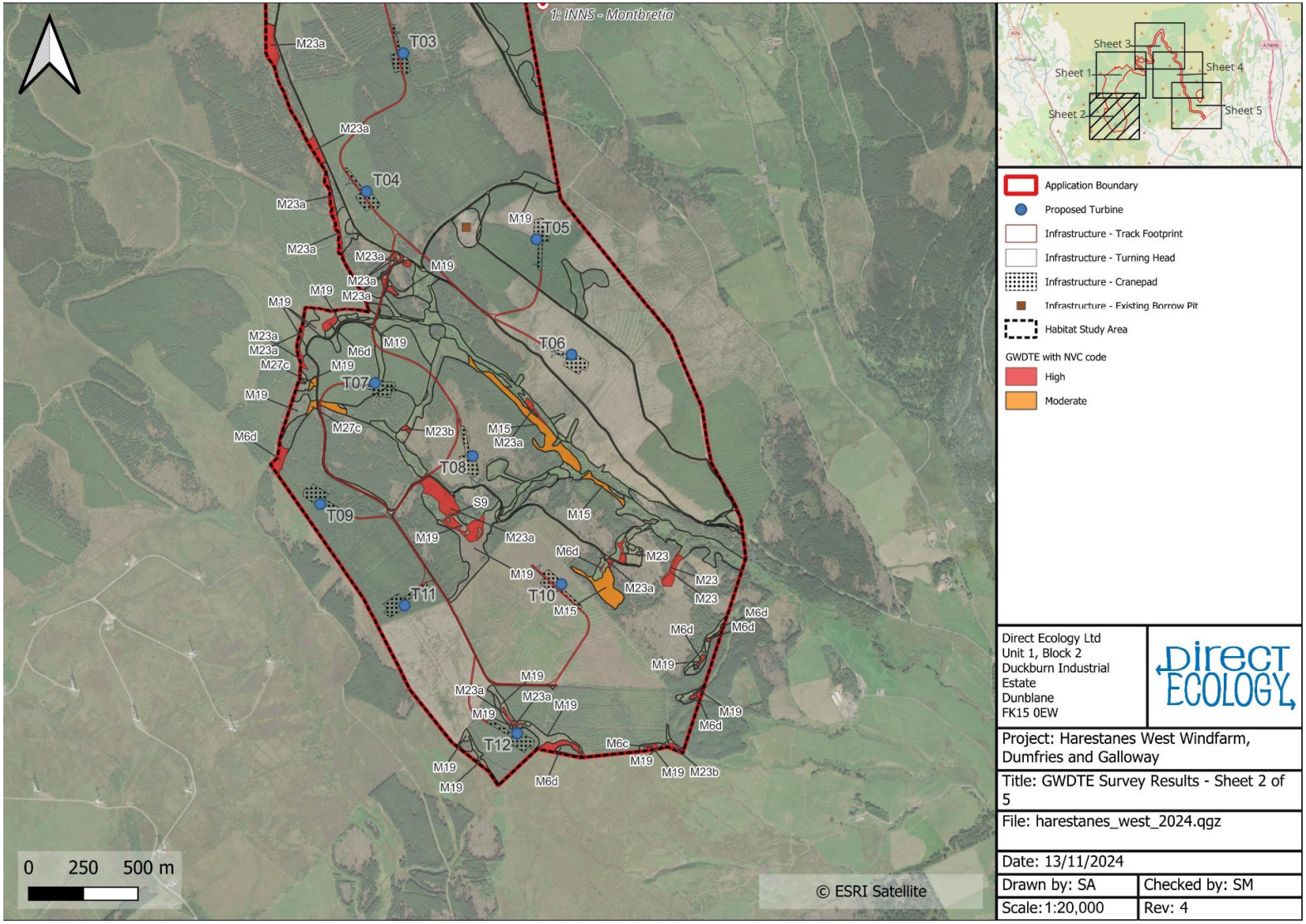

Figure 4b: GWDTE survey results (sheet 2)

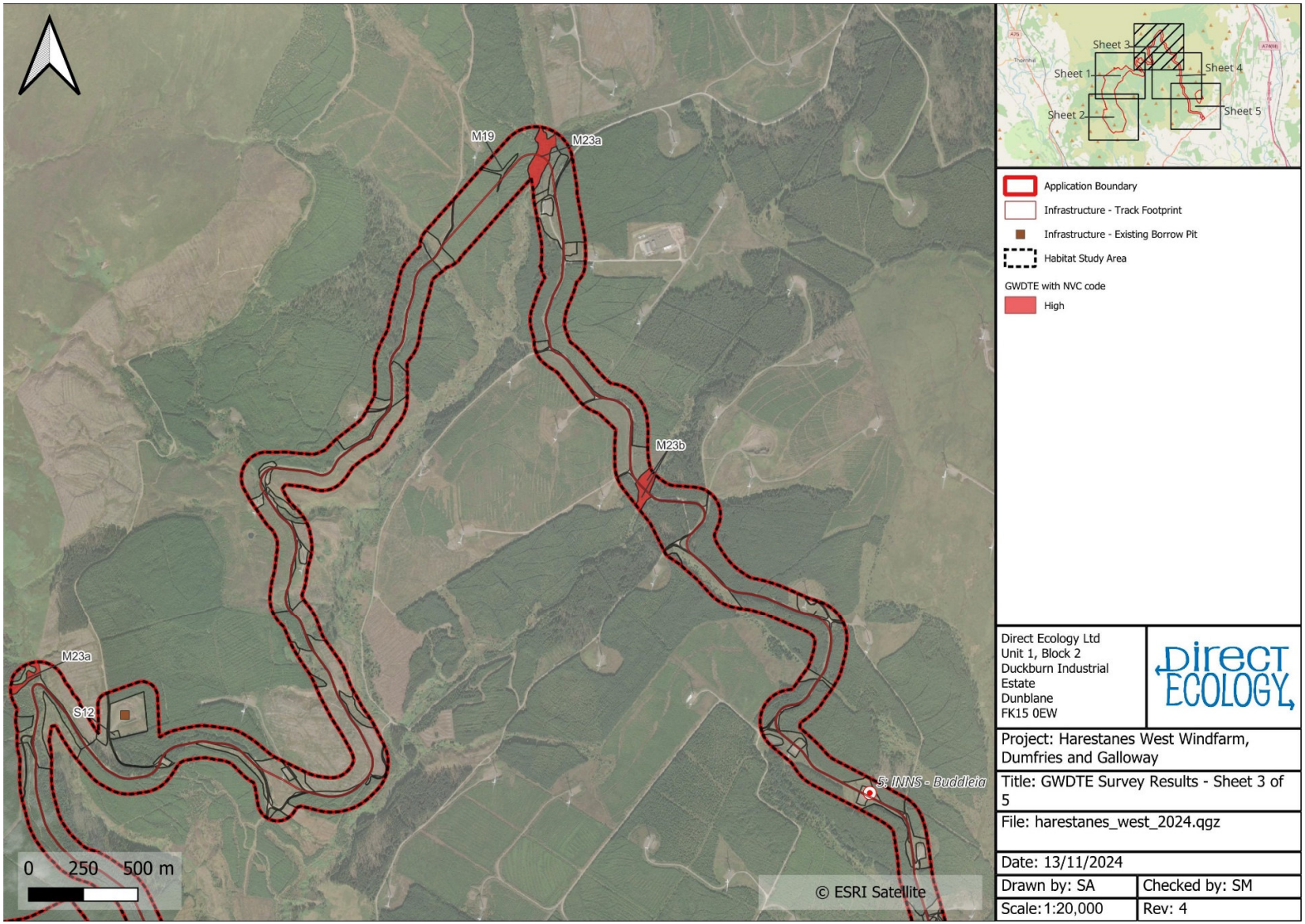

Figure 4c: GWDTE survey results (sheet 3).

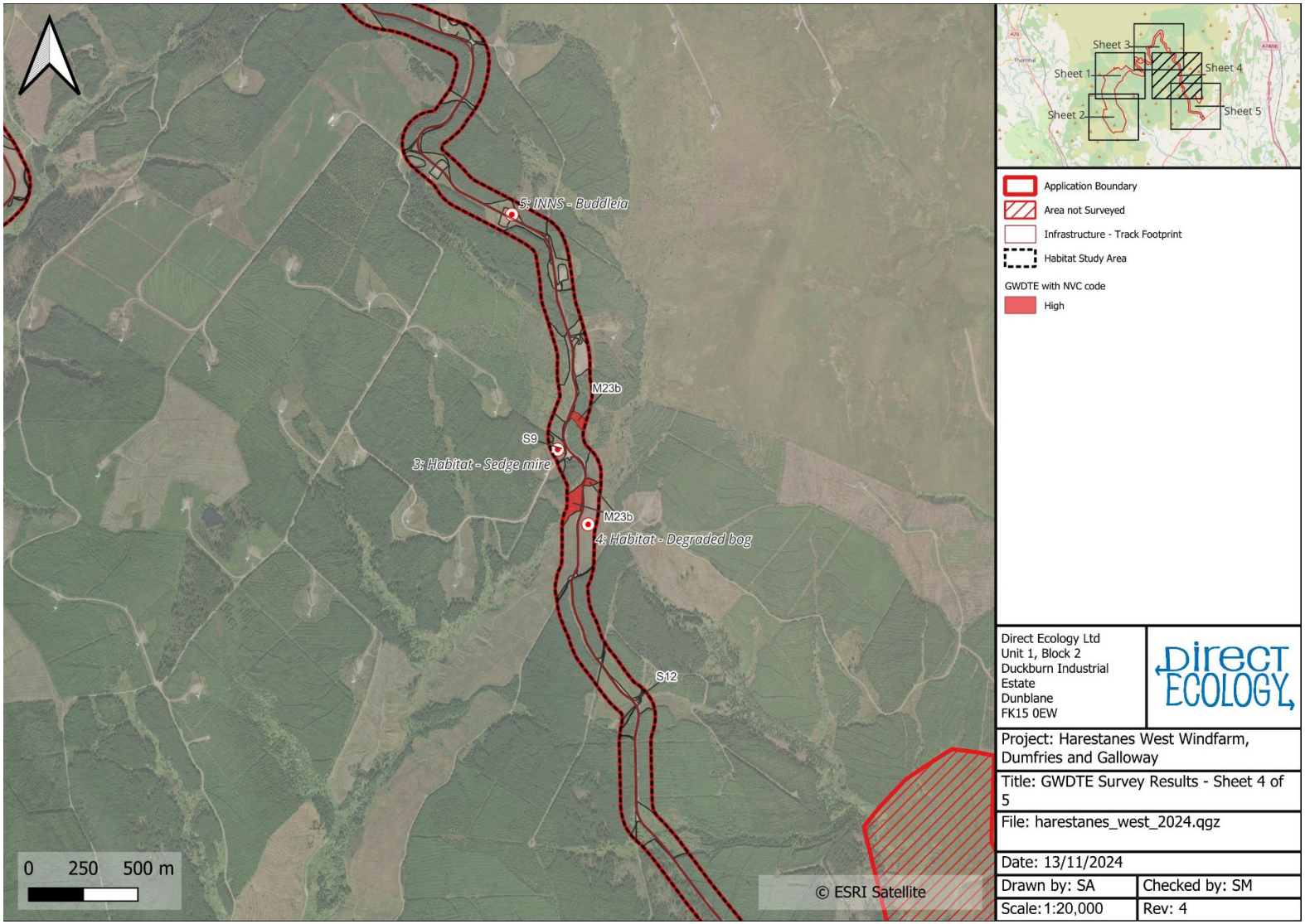

Figure 4d: GWDTE survey results (sheet 4).

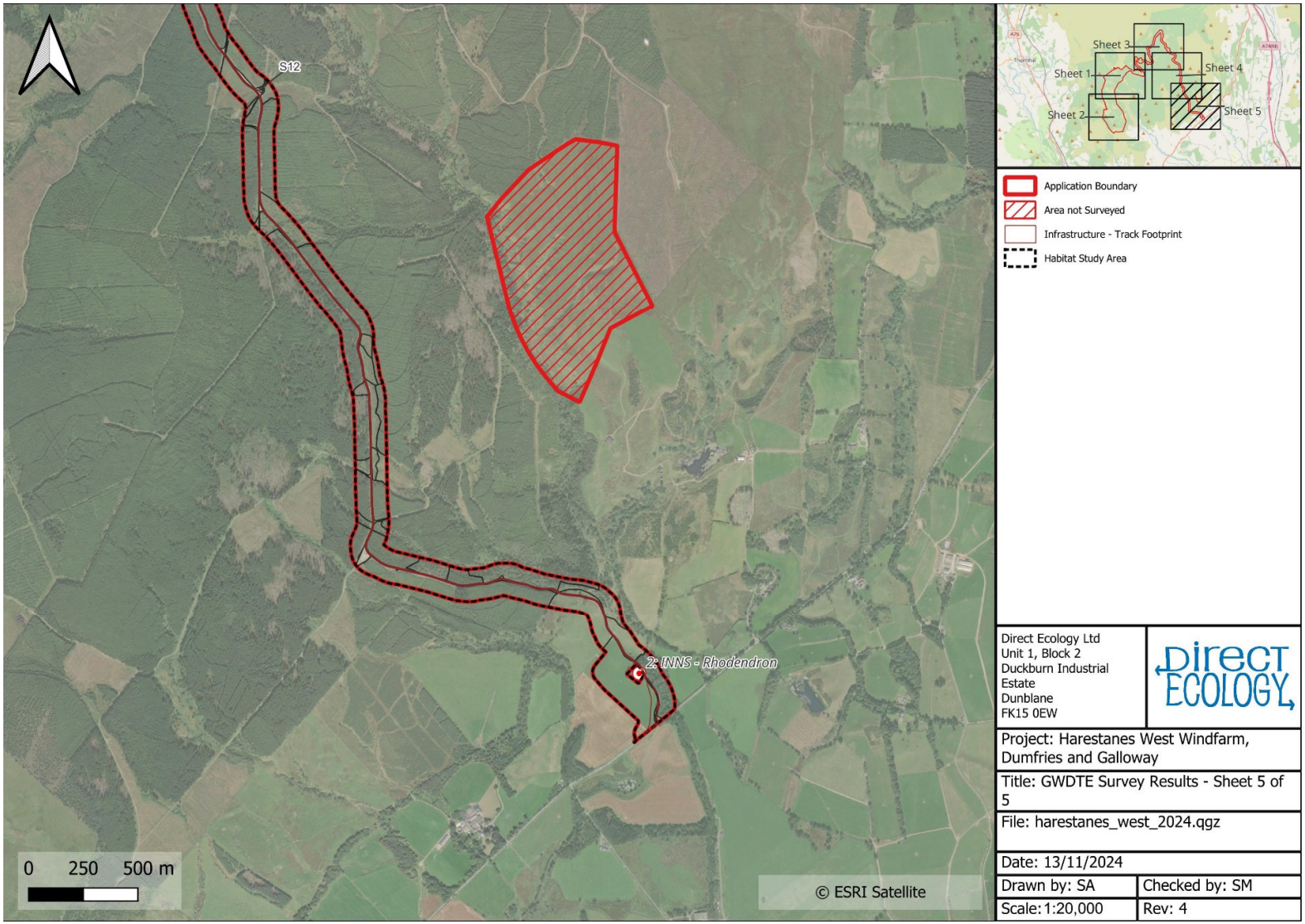

Figure 4e: GWDTE survey results (sheet 5).

APPENDIX 3 – TARGET NOTES

Target Note	Grid reference	Species	Feature	Description	Photo
1	*NX 96200 92385*	*Montbretia*	*INNS*	*Invasive species - single Montbretia plant near the edge the track at a recently clear-felled compartment.*	
2	*NY 04145 90307*	*Rhodendron*	*INNS*	*Rhododendron ponticum noted within cemetry*	
3	*NY 02047 94126*	*Habitat*	*Sedge mire*	*S9 - Carex rostrata swamp*	
4	*NY 02187 93784*	*Habitat*	*Degraded bog*	*Small pockets of hare's tail cottongrass and Sphagum present within area of clearfell.*	

Target Note	Grid reference	Species	Feature	Description	Photo
5	*NY 01838 95203*	*Buddleia*	*INNS*	*Single plant by track.*