Technical Appendix

Lairdmannoch Energy Park

Technical Appendix 6-1: Extended Phase 1 Survey

Lairdmannoch Energy Park Limited

May 2025

Contents

Tables

Figures

Glossary of Terms

Term	Definition
The Applicant	Lairdmannoch Energy Park Limited
Designated Site	Nature sites and areas of countryside can be 'designated', which means they have special status as protected areas because of their natural and cultural importance.
Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a means of carrying out, in a systematic way, an assessment of the likely significant environmental effects from a development
The Proposed Development	Lairdmannoch Energy Park.
The Proposed Development Site	The full application boundary as per Figure 1-1

List of Abbreviations

Acronym	Full Term
EcIA	Ecological Impact Assessment
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
ha	Hectare
JNCC	Joint Nature Conservation Committee
km	Kilometre
LNR	Local Nature Reserve
m	Metre
NNR	National Nature Reserve
SAC	Special Area of Conservation
SEPA	Scottish Environment Protection Agency
SPA	Special Protection Area
SSSI	Site of Specific Scientific Interest
SWSEIC	South West Scotland Environmental Information Centre
TA	Technical Appendix

1 Introduction

In April 2023 Atmos Consulting Ltd (Atmos) were commissioned by Lairdmannoch Energy Park Limited ('the Applicant') to carry out an Extended Phase 1 survey on land at Lairdmannoch.

The proposed Lairdmannoch Energy Park (the 'Proposed Development') would be located 7 km north-east of Gatehouse of Fleet and 10 km west of Castle Douglas in Dumfries and Galloway (the 'Proposed Development Site') and lies entirely within the planning authority area of Dumfries and Galloway Council.

This Technical Appendix (TA) has been prepared in support of **Chapter 6: Ecology** in **Volume 2** of this EIA Report and, as such, does not comprise an assessment of impacts, but provides baseline information only. It should be read in conjunction with **Chapter 8: Hydrology, Geology and Hydrogeology** in **Volume 2** of this EIA Report**.**

2 Methodology

2.1 Desk study

A review of online data using the SiteLink website (NatureScot, 2020) was undertaken October 2023 to gather details of statutory nature conservation designations up to 10 km of the Proposed Development, e.g., Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Ramsar sites, Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs) and Local Nature Reserves (LNRs).

A search of publicly available records on the NBN Atlas (http://nbnatlas.org) (undertaken for licenses CC-BY, OGL and CCO) was undertaken in order to review the following records from the past 10 years from the approximate centre of the Proposed Development;

- Protected species records/records of high conservation significance (Scottish Biodiversity List, Schedule species from the Wildlife and Countryside Act 1981, local Biodiversity Action Plan species for up to 5 km from the centre of the Proposed Development); and
- Records of mobile species (bats – 10 km, geese – 20 km).

The Proposed Development is located within an area covered by The South West Scotland Environmental information Centre (SWSEIC), a local environmental records centre (LERC), which was contacted for the following information within the last 10 years from the approximate centre of the Proposed Development;

- Non-statutory designated sites up to 3 km;
- Protected species records/records of high conservation significance (Scottish Biodiversity List, Schedule species from the Wildlife and Countryside Act 1981, local Biodiversity Action Plan species for up to 5 km from the centre of the Proposed Development); and
- Records of mobile species (bats – 10 km, geese – 20 km).

Designated sites are shown on **Figure 6-1-1.**

2.2 Extended Phase 1 habitat survey

An Extended Phase 1 survey was carried out between the 4th September 2023 and 8th September 2023 within the land area held by the Applicant as shown on **Figure 6-1-2**. This area comprises the Proposed Development Site boundary.

The survey involved mapping areas of habitat greater than 0.1 ha and listing target notes to describe significant features as per JNCC (2010). These included features with the potential to support protected or otherwise notable species that may require further survey.

- Provides a preliminary evaluation of the nature conservation significance of the Proposed Development Site and assesses the potential for impacts on habitats/species likely to represent a material consideration in planning terms; and
- Determines the scope of further specialised surveys that may be required to inform an ecological impact assessment.

All field signs were geo-referenced with a handheld global positioning system (GPS) device and notes were taken regarding findings. Signs of particular interest were bat roost potential, otter *Lutra lutra*, water vole *Arvicola amphibius*, nesting birds, Schedule 1 birds and badger *Meles meles* although specific surveys for these species were also carried out (see TA 6-3: Protected Species Surveys).

2.3 Limitations

It was not possible to access much of the commercial forestry which borders the Proposed Development Site to the west and north. The dense rows of trees did not afford consistently safe access. There are not considered to be any other limitations as the survey was carried out in good weather, in the optimal growing period, and access was fully available within the Proposed Development Site boundary.

3 Results

3.1 Desk study

3.1.1 Statutory Designated Nature Conservation Sites

Nature Conservation Designations

Statutory designated sites for non-avian ecological interests within 10 km of the Proposed Development Site are shown in Table 6-1-1 and on **Figure 6-11 and 6-1-2.** Where sites have a combination of both ecological and ornithological features, ornithological features are not stated here; for any such designations refer to EIAR **Chapter 7: Ornithology** in **Volume 2** of this EIA Report. The Laughenghie and Airie Hills SSSI, for which all notified features are avian, is not included in the table and is considered further alongside other designated sites relating to ornithology in **Chapter 7: Ornithology** in **Volume 2** of this EIA Report of the EIAR. For the sake of completeness, **Figure 6-1-1** shows designations relevant to both ecology and ornithology.

Sixteen designated sites relevant to ecology were identified; thirteen Sites of Special Scientific Interest (SSSI), one Special Area of Conservation (SAC), one Ramsar Designation, and one National Nature Reserve.

Two non-statutory sites are considered potentially relevant to this assessment based on a 3 km distance of the Proposed Development Site (**Figure 6-2**).

Ancient Woodland Inventory Sites adjacent to the Proposed Development Site are included (**Figure 6-1-2**).

Table 6-1-1: Statutory and Non Statutory Nature Conservation Sites

Designated Sites	Designated Features	Distance from Proposed Development Site
Statutory		
Special Area of Conservation (SAC)		
Galloway Oakwoods	Western acidic oak woodland	1.7 km
Site of Specific Scientific Interest (SSSI)		
Killiegowan Wood	Upland oak woodland	1.7 km
Ardwall Hill	Upland assemblage Wet woodland	2.2 km
Carstramon Wood	Upland oak woodland	2.2 km
Woodhall Loch	Beetles Caddisfly (*Phacopteryx brevipennis*) Fen meadow Oligotrophic Loch Open water transition fen	3.6 km
Lagganmullan	Fen meadow Springs (including flushes)	4.7 km
Skyreburn Grasslands	Fen meadow Lowland neutral grassland	4.7 km
Borgue Coast	Sand dune Maritime cliff	5.2 km

Designated Sites	Designated Features	Distance from Proposed Development Site
Threave and Carlingwark Loch	Fen meadow	5.3 km
Carrick Ponds	Basin fen Beetle assemblage	5.5 km
River Dee (Parton to Crossmichael)	Dragonfly assemblage Lowland acid grassland Open water transition fen	6.8 km
Cairnsmore of Fleet	Blanket bog Upland assemblage	7.5 km
Airds of Kells Wood	Upland mixed ash woodland Upland oak woodland	7.6 km
Ravenshall Wood	Lichen assemblage Upland mixed ash woodland Upland oak woodland Vascular plant assemblage	8.7 km
Ramsar Site		
Loch Ken and River Dee Marshes	Beetles Vascular plant assemblage	5.3 km
National Nature Reserve		
Cairnsmore of Fleet	See SSSI entry.	7.4 km
Non Statutory		
Local Wildlife Site		
Culcaigrie & Trostrie Lochs LWS	Designated for its fen, willow carr and marshy grassland	2.6 km
Scottish Wildlife Trust		
Carstramon Wood	Oak, beech, birch and rowan woodland. Target species include pied flycatcher *Ficedula hypoleuca* and redstart *Phoenicurus phoenicurus*	2.2 km
Ancient Woodland Inventory Site		
A 120.57 ha area	Long-Established (of plantation origin)	Adjacent (south-west)
A 4.84 ha area	Ancient (of semi-natural origin)	Adjacent (east)

3.1.2 Historic Protected Species Records

Table 6-1-2 shows the results of the search of publicly available records from the NBN Atlas (http://nbnatlas.org) (undertaken for data held under licences CC-BY, OGL and CCO). Records from the desk-top study commissioned from SWSEIC are shown in Table 6-1-3.

Table 6-1-2: NBN Atlas Records from the Last 10 Years Within 5 km of the Proposed Development and up to 10 km for Bat Species

Species	Summary of Records
Adder *Vipera berus*	One record from 2021, 3 km to the north
Common frog *Rana temporaria*	One record from 2023, 2.5 km to the northeast
Common lizard *Zootoca vivipara*	Six records, 2020-2023, closest 2 km east
Common toad *Bufo bufo*	Two records 2019-2023, closest 2 km east

Species	Summary of Records
Red squirrel *Sciurus vulgaris*	73 records 2013-2021, mostly from Laurieston Forest
Common Pipistrelle *Pipistrellus pipistrellus*	5174 records from 2016, closest 2 km northeast
Soprano pipistrelle *Pipistrellus pygmaeus*	9658 records 2015-2016, closest 2 km northeast
Pipistrelle bat species *Pipistrellus sp.*	One record from 2016, 8 km southeast
Daubenton's bat *Myotis daubentonii*	216 records 2016 to 2021, closest 2 km northeast
Natterer's bat *Myotis natterii*	135 records from 2016, closest 2 km northeast
Myotis bat species *Myotis sp.*	340 records from 2016, closest 2 km northeast
Lesser noctule *Nyctalus leisleri*	536 records from 2016, closest 2 km northeast
Noctule bat *Nyctalus noctula*	126 records from 2016, closest 5.5 km south
Nyctalus bat species *Nyctalus sp.*	8 records from 2016, closest 5.5 km southwest
Unidentified Bat *Chiroptera*	Two records from 2021, 7 km southwest

Data came from six sources: Biological Records Centre, National Trust for Scotland Species Records, NatureScot, The Scottish Squirrel Database, The Southern Scotland Bat Survey and the Waterway Survey.

Table 6-1-3: SWSEIC Records from the Last 10 Years Within 5 km of the Proposed Development and up to 10 km for Bat Species

Species	Summary of Records
Adder *Vipera berus*	2 records 2016 & 2020, closest 3 km west
Common frog *Rana temporaria*	7 records 2013-2023, closest 2 km north-east
Common lizard *Zootoca vivipara*	11 records 2013-2023, closest 1.5 km southwest
Common toad *Bufo bufo*	7 records 2013-2019, closest 1 km east
Great crested newt *Triturus cristatus*	3 records from 2022, closest 3 km northeast
Badger *Meles meles*	9 records 2013-2023, closest 1 km north-west
Otter *Lutra lutra*	3 records from 2023, locations unknown
Red squirrel *Sciurus vulgaris*	68 records 2013-2021, mostly from Laurieston Forest
Common pipistrelle *Pipistrellus pipistrellus*	51 records 2013-2019, closest 2.5 km north-east
Soprano pipistrelle *Pipistrellus pygmaeus*	55 records 2013-2016, closest 0.5 km south
Nathusius's pipistrelle *Pipistrellus nathusii*	3 records from 2016, closes 6 km south
Pipistrelle bat species *Pipistrellus sp.*	51 records 2013-2017, closest 3 km north
Daubenton's bat *Myotis daubetonii*	26 records from 2016, closest 2.5 km south-east
Natterer's bat *Myotis nattererii*	32 records from 2016, closest 2 km north-east
Whiskered bat *Myotis mystacinus*	1 record from 2018, 7 km southwest
Whiskered/Brandt's bat *Myotis mystacinus/brandtii*	19 records from 2016, closest 3.5 km north-east
Myotis bat species *Myotis sp.*	28 records from 2016, closest 2 km north-east
Nyctalus bat species *Nyctalus sp.*	6 records from 2016, closest 6 km south-west
Lesser noctule *Nyctalus leisleri*	42 records 2014-2022, closest 2.5 km north-east
Noctule *Nyctalus noctula*	21 records from 2016, closest 5.5 km south-west
Brown long-eared bat *Plecotus auritus*	19 records 2013-2016, closest 3 km north-east
Unidentified bat *Chiroptera*	2 records 2014 & 2018, closest 5 km east

Data came from seven sources: Amphibian and Reptile Conservation, Biological Records Centre, British Trust for Ornithology, National Trust for Scotland Species Records, NatureScot, SWSEIC and The Scottish Squirrel Database.

Records suggest the primary potential protected species interest to be focused on bats, badger, red squirrel *Sciurus vulgaris*, and to a lesser extent, otter. Whilst three great crested newt records were returned, these were from private gardens, which is a habitat very different to the Proposed Development. Whilst the absence of pine marten *Martes martes,* records is noted it is acknowledged that absence of records may not constitute actual absence.

3.2 Extended Phase I habitat survey

The Proposed Development is located in the uplands of Dumfries and Galloway. Loch Mannoch lies to the south-east, Glengap Forest to the west and Laurieston Forest to the north. The Proposed Development Site is dominated by marshy grassland, and, at lower elevations, wet modified bog. The Proposed Development Site rises to the north/northeast with ridges of higher land orientated on a north/south axis.

Habitats in this part of the Proposed Development are dominated by marshy grassland, semi-improved acid grassland, bracken *Pteridium aquilinum* and dry dwarf shrub heath. Elsewhere, and particularly to the west and in the far north, wet modified bog is dominant. There are several small watercourses flowing south or south-east from the site.

Two types of marshy grassland are present. The first and most widespread, is mature purple moor-grass *Molinia caerulea* grassland. Comprising the most dominant habitat on the Proposed Development Site, it is interspersed with occasional heather *Calluna vulgaris* and bilberry *Vaccinium myrtillus*. Rush pasture is the second type, present in lower areas and adjacent watercourses it is dominated by smooth rush *Juncus effusus* and sharp-flowered rush *Juncus acutiflorus*.

Wet modified bog is present in the west spreading through the centre to the north. The absence of sphagnum is notable. Dominated by varying quantities, heather, deergrass *Trichophorum germanicum*, purple moor-grass and occasional crossed leaved heath *Erica tetralix* localised acid flushes are also present. These are characterised by the rush species referred to above, occasional sphagnum, carnation sedge *Carex panicea* and broad-leaved pondweed *Potamogeton natans*.

Blanket bog is present in the north west, differentiated by the wet modified bog which proliferates elsewhere by the increased presence of sphagnum species which included *S.palustre* and *S.capillifolium*.

Conifer seedlings from plantations to the west and north occur sporadically throughout the northern part of the Proposed Development Site.

One small patch of semi-natural broadleaf woodland is present in the southwest of the Proposed Development boundary, in addition to two other small areas of mixed woodland. Though dominated by beech *Fagus sylvatica* conifers are present in small quantities (Douglas fir *Pseudotsuga menziesi* and larch *Larix decidua* is present at up to 10% of the canopy composition). Other canopy species included sycamore *Acer pseudoplatanus*, sessile oak *Quercus petraea* and downy birch *Betula pubescens*.

Small watercourses flow through the main site. They appear channelised, which is possibly part of agricultural drainage management.

Technical Appendix 6-2: National Vegetation Classification Survey in **Volume 3** of this EIA Report should be consulted for further information.

3.2.1 Protected Species

For detailed results of the protected species surveys please refer to **Technical Appendix 6-4: Protected Species Surveys** in **Volume 3** of this EIA Report.

No signs of protected reptiles were observed during the survey, although given the habitats on the Proposed Development it is considered that they are likely to be present.

The Proposed Development is crossed by a network of watercourses and ditches, which along with the waterbody of Loch Mannoch, provide plentiful bat foraging opportunities. Four potential bat roost sites were found within the Proposed Development. One of these sites was assessed as having high bat roost potential, the other three were assessed as moderate potential. These potential roosts are detailed in **Technical Appendix 6-4: Protected Species Surveys** in **Volume 3** of this EIA Report.

The mature plantation bordering the Proposed Development to the north and west, and areas of mature broadleaf woodland to the southeast also have potential to contain further bat roosts. Full details on the results of bat surveys may be found in Technical **Appendix 6-3: Bat Surveys** in **Volume 3** of this EIA Report.

The Loch Mannoch waterbody, the Tarff Water running along the eastern edge of the Proposed Development, and several smaller burns in the east provide suitable habitats for otter. Two signs of otter presence within the Proposed Development were recorded, both beside the Tarff Water, which are detailed in **Technical Appendix 6-4: Protected Species Surveys** in **Volume 3** of this EIA Report.

No signs of water vole were recorded during the survey, though the Tarff Water and numerous smaller watercourses in the east of the Proposed Development provide suitable habitat for the species.

Two squirrel dreys were noted in a small area of plantation forestry to the east of Proposed Development, as detailed in Technical **Appendix 6-4: Protected Species Surveys** in **Volume 3** of this EIA Report. The mature plantation forestry bordering the Proposed Development to the north and west, and areas of mature broadleaf woodland to the southeast of the Proposed Development have further high potential to support red squirrel.

Information on badger is regarded as confidential and included in Confidential Technical Appendix 6-5 in **Volume 5** of this EIA Report.

No other evidence of other protected species, such as pine marten was seen during the survey.

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Appendices

Appendix A. Figures

See Next Page

Lairdmannoch Energy Park

wind2

Figure 6-1-1
Statutory Nature Conservation Designations

Key

- Site boundary
- 5km and 10km site buffers
- Turbine location
- Solar panel
- Local Nature Reserve
- Special Area of Conservation
- Special Protection Area
- National Nature Reserve
- Site of Special Scientific Interest
- Ramsar wetland

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0 1 2 4
Kilometres

N

Scale @ A3:
1:100,000

19/03/2025	TL010	40418/BP/039d
Drawn by: LB	Checked by: TH	Approved by: SM

Lairdmannoch Energy Park

wind2

Figure 6-1-2
Non-Statutory Nature Conservation Designations

Key

- Site boundary
- 3km, 5km and 10km site buffers
- Turbine location
- Solar panel
- Local Nature Conservation Site
- Ancient Woodland Inventory
- RSPB Reserve
- Scottish Wildlife Trust Reserves
- RSPB Important Bird Areas

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0 1 2 4
Kilometres

N

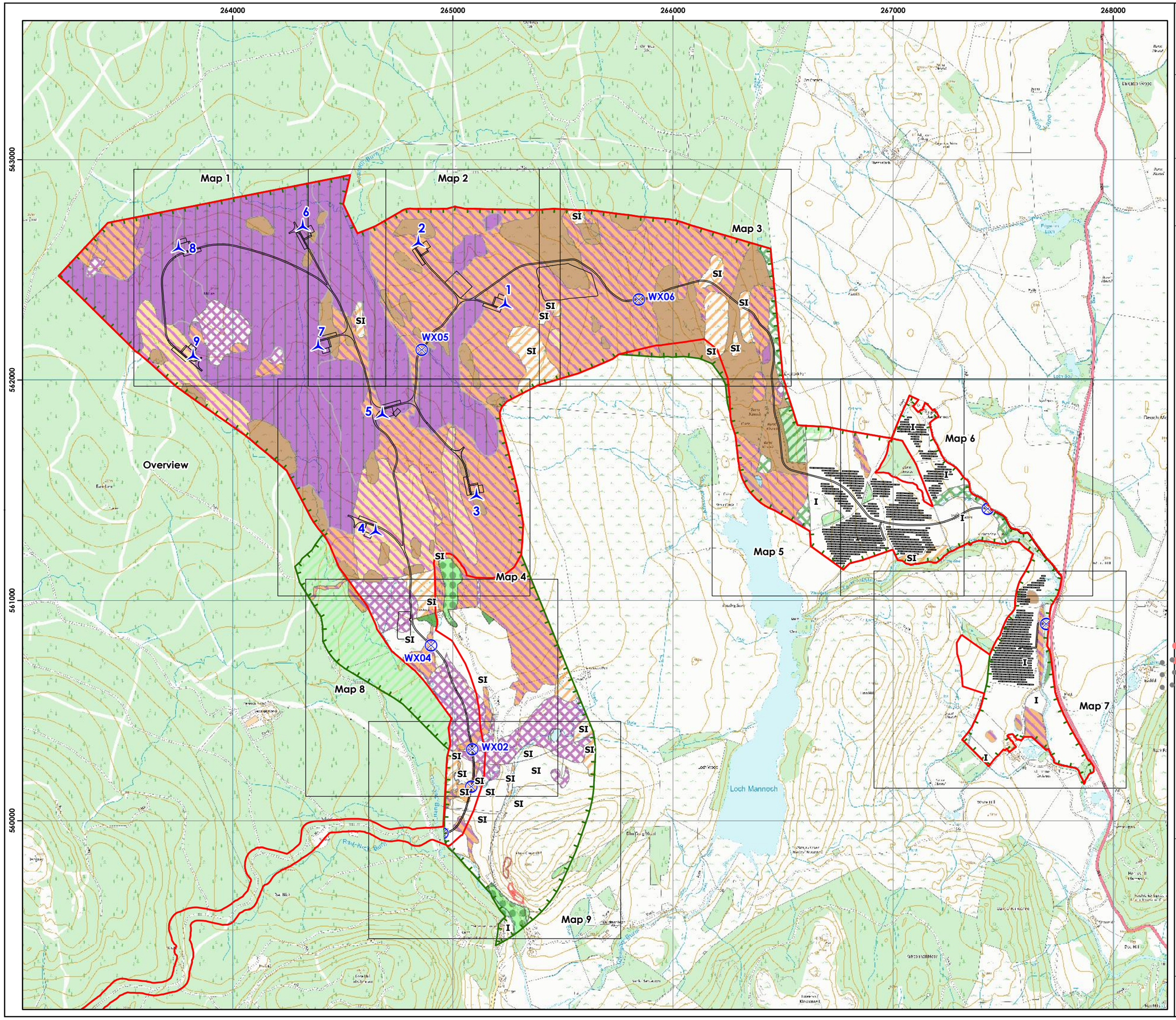
Scale @ A3:
1:100,000

19/03/2025	TL010	40418/BP/088a
Drawn by: LB	Checked by: TH	Approved by: SM

Lairdmannoch Energy Park

wind2

Figure 6-1-3
Extended Phase 1
Overview



Key

- Site boundary
- Survey Area
- Turbine Location
- Proposed infrastructure, including earthworks
- Watercourse crossing

Phase 1 habitats

- Broadleaved woodland - semi-natural
- Broadleaved woodland - plantation
- Coniferous woodland - plantation
- Mixed woodland - semi-natural
- Scrub - dense/continuous
- F — Coniferous woodland - recently felled
- SI — Acid grassland - semi-improved
- SI — Neutral grassland - semi-improved
- I — Improved grassland
- Marsh/marshy grassland
- SI — Poor semi-improved grassland
- Bracken - continuous
- Wet dwarf shrub heath
- Wet heath/acid grassland
- Bog
- Blanket sphagnum bog
- Wet modified bog
- Swamp
- Scree
- Bare ground

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0 50 100 200
Metres

N

Scale @ A3:
1:16,000

19/03/2025 TL010 40418/HB/048d
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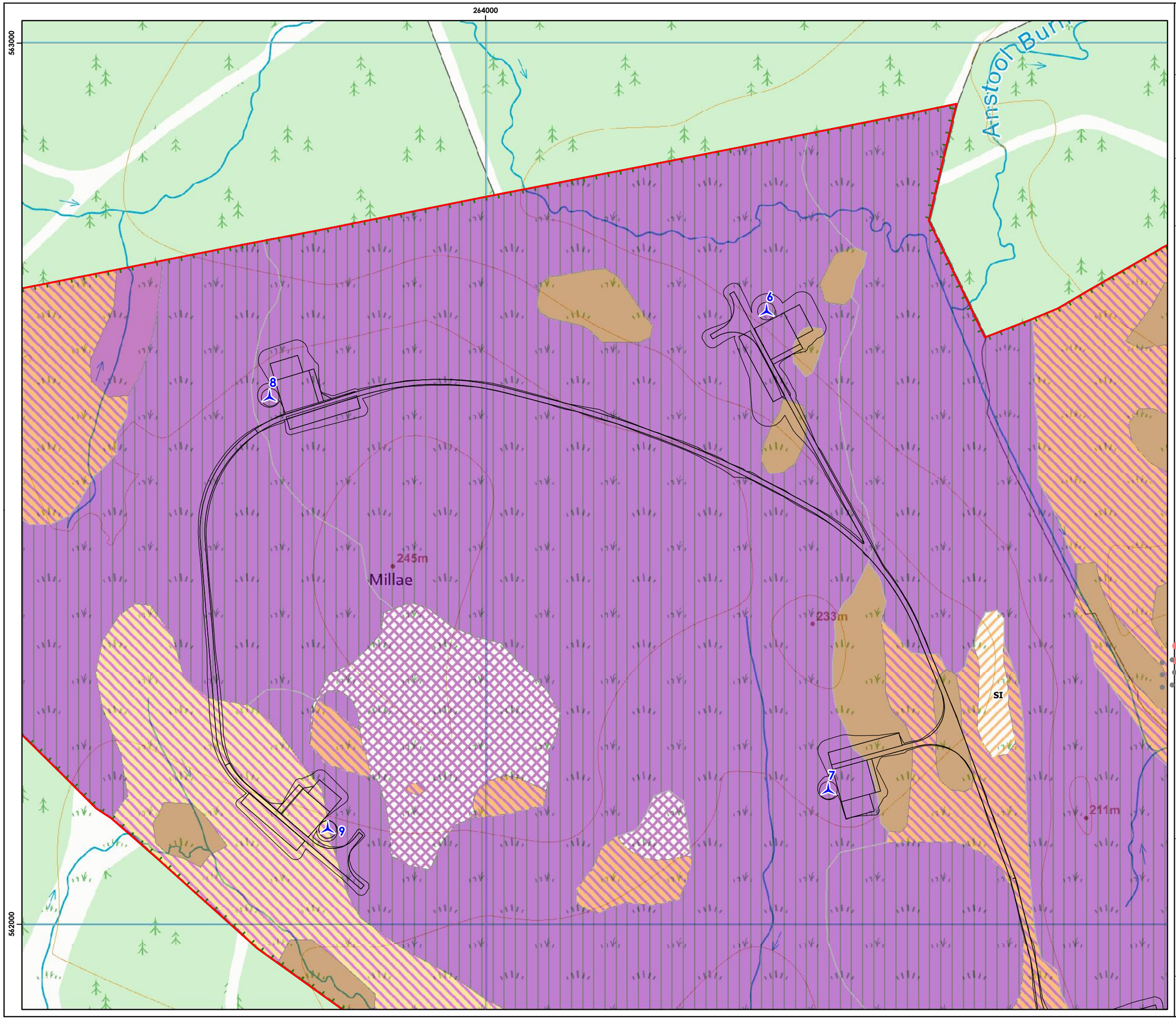
Lairdmannoch Energy Park

wind2

Figure 6-1-3
Extended Phase 1
Map 1



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- Swamp
- Scree
- Bare ground

atmos CONSULTING

0 50 100 200
Metres

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Scale @ A3:
1:4,000

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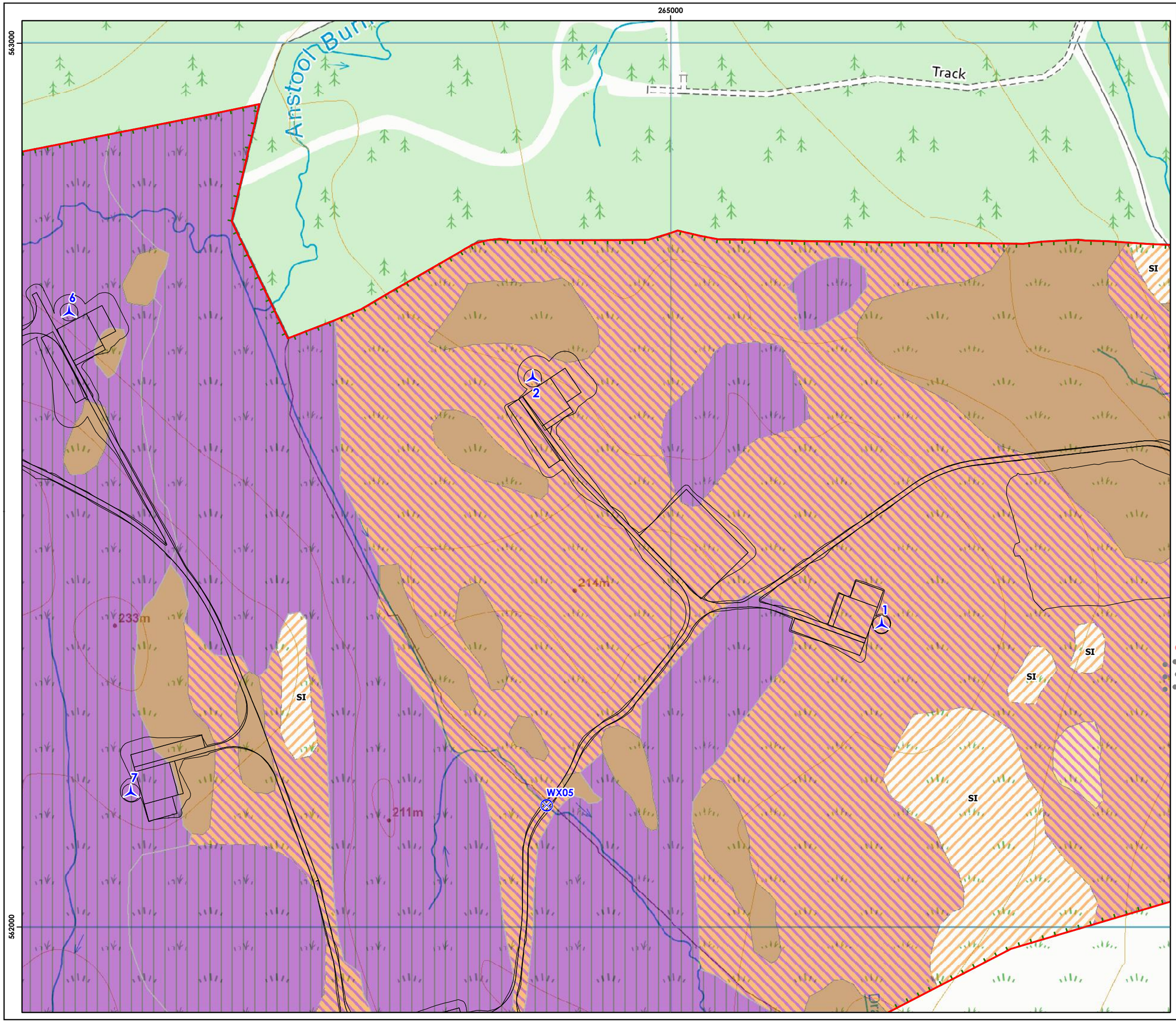
Lairdmannoch Energy Park

wind2

Figure 6-1-3
Extended Phase 1
Map 2



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- Scree
- Bare ground

atmos CONSULTING

0 50 100 200
Metres

N

Scale @ A3:
1:4,000

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Lairdmannoch Energy Park

wind2

Figure 6-1-3
Extended Phase 1
Map 3

266000
563000
562000
171m
WX06
Livestock Pen
SI
ISS

Key

- Site boundary
- Survey Area
- Turbine Location
- Proposed infrastructure, including earthworks
- Watercourse crossing

Phase 1 habitats

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- Scree
- Bare ground

atmos CONSULTING

0 50 100 200
Metres

N

Scale @ A3:
1:4,000

19/03/2025 TL010 40418/HB/048d
Drawn by: LB Checked by: TH Approved by: SM

Lairdmannoch Energy Park

wind2

Figure 6-1-3
Extended Phase 1
Map 4

265000
562000
561000
5
4
3
223m
229m
Cairn
Drain
SI
Livestock Pen

Key

- Site boundary
- Survey Area
- Turbine Location
- Proposed infrastructure, including earthworks
- Watercourse crossing

Phase 1 habitats

- Broadleaved woodland - semi-natural
- Broadleaved woodland - plantation
- Coniferous woodland - plantation
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- Scrub - dense/continuous
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- SI — Acid grassland - semi-improved
- SI — Neutral grassland - semi-improved
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- Wet heath/acid grassland
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- Blanket sphagnum bog
- Wet modified bog
- Swamp
- Scree
- Bare ground

atmos CONSULTING

0 50 100 200
Metres

N

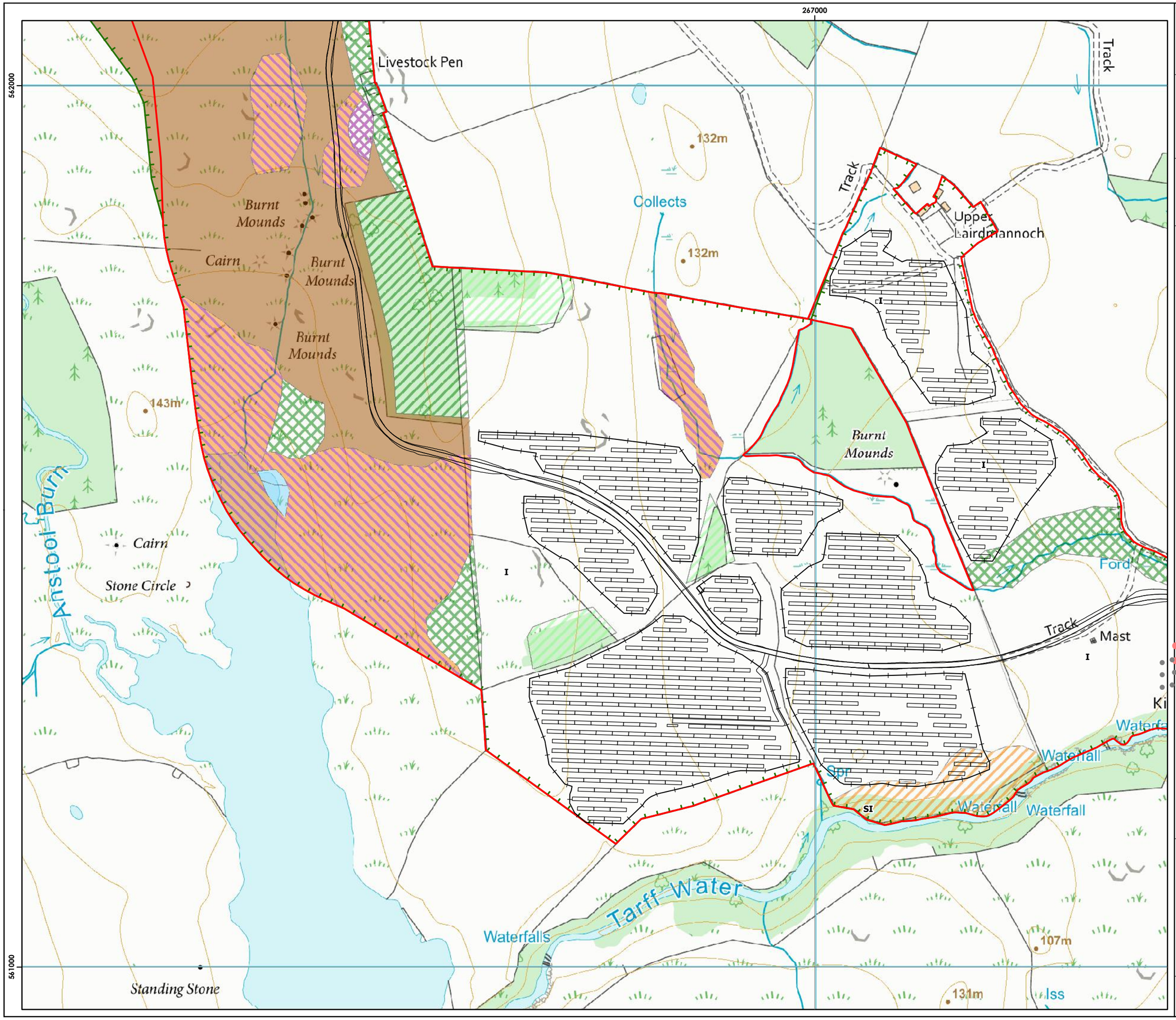
Scale @ A3:
1:4,000

19/03/2025 TL010 40418/HB/048d
Drawn by: LB Checked by: TH Approved by: SM

Lairdmannoch Energy Park

wind2

Figure 6-1-3
Extended Phase 1
Map 5



Key

- Site boundary
- Survey Area
- Turbine Location
- Proposed infrastructure, including earthworks
- Watercourse crossing

Phase 1 habitats

- Broadleaved woodland - semi-natural
- Broadleaved woodland - plantation
- Coniferous woodland - plantation
- Mixed woodland - semi-natural
- Scrub - dense/continuous
- F — Coniferous woodland - recently felled
- SI — Acid grassland - semi-improved
- SI — Neutral grassland - semi-improved
- I — Improved grassland
- Marsh/marshy grassland
- SI — Poor semi-improved grassland
- Bracken - continuous
- Wet dwarf shrub heath
- Wet heath/acid grassland
- Bog
- Blanket sphagnum bog
- Wet modified bog
- Swamp
- Scree
- Bare ground

atmos CONSULTING

0 50 100 200
Metres

N

Scale @ A3:
1:4,000

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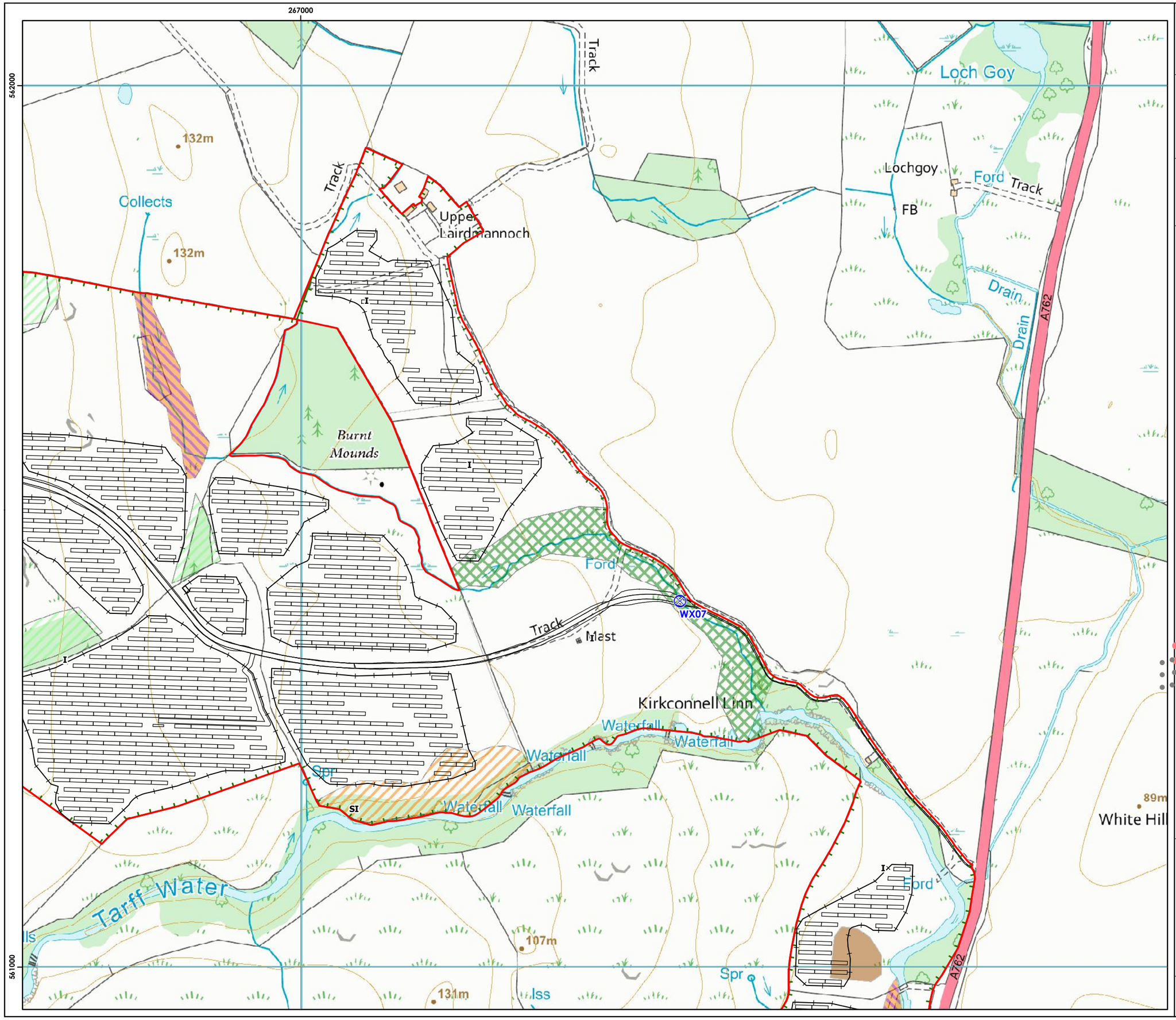
Lairdmannoch Energy Park

wind2

Figure 6-1-3
Extended Phase 1
Map 6



Key

- Site boundary
- Survey Area
- Turbine Location
- Proposed infrastructure, including earthworks
- Watercourse crossing

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atmos CONSULTING

0 50 100 200
Metres

N

Scale @ A3:
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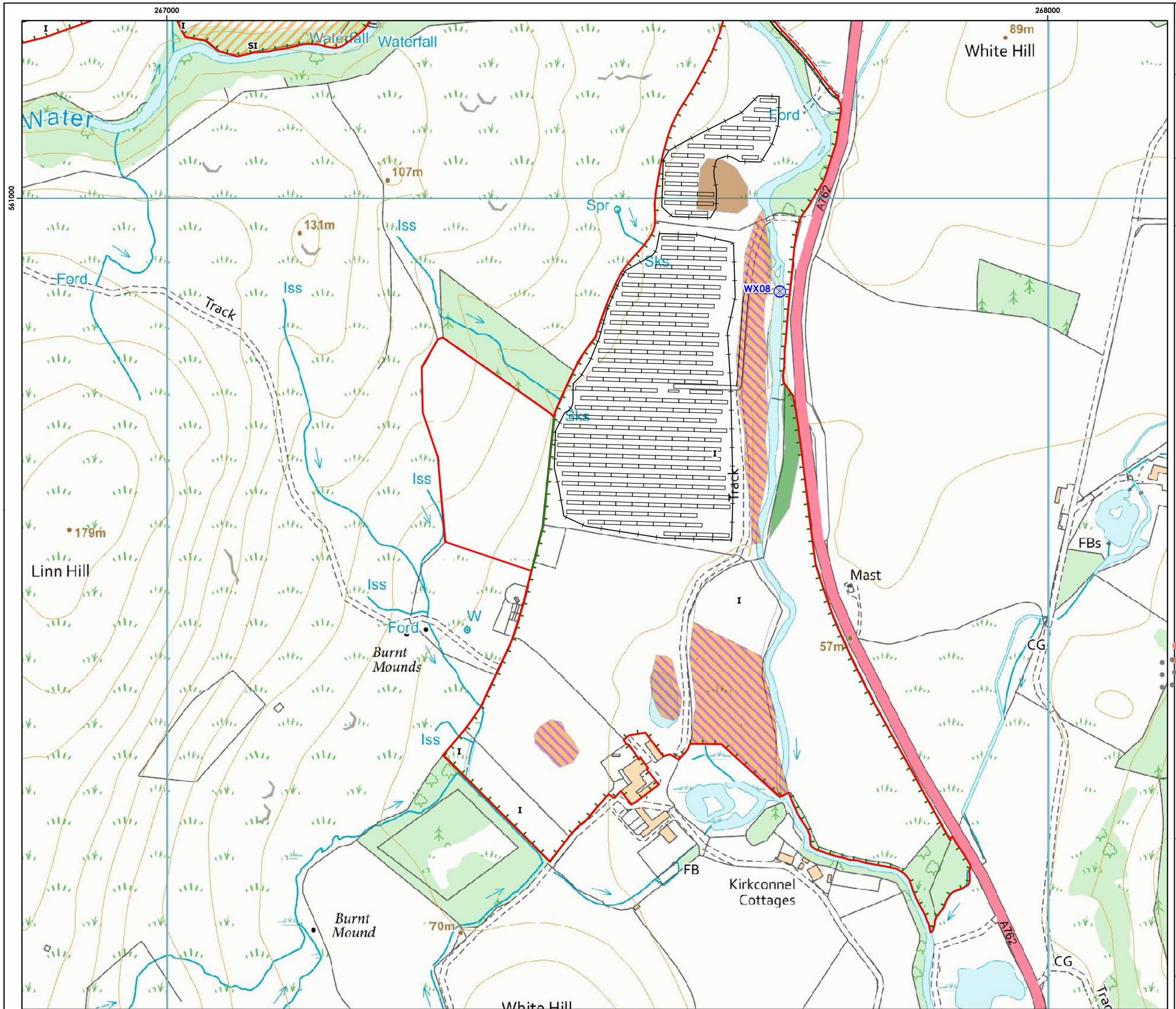
Lairdmannoch Energy Park

wind2

Figure 6-1-3
Extended Phase 1
Map 7



Key

- Site boundary
- Survey Area
- Turbine Location
- Proposed infrastructure, including earthworks
- Watercourse crossing

Phase 1 habitats

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atmos CONSULTING

0 50 100 200
Metres

N

Scale @ A3:
1:4,000

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Lairdmannoch Energy Park

wind2

Figure 6-1-3
Extended Phase 1
Map 8

265000

561000

Livestock Per

Track

Track

Track

Drain

Drain

Drain

Drain

Glengap Burn

WX02

WX03

WX04

SI

Key

- Site boundary
- Survey Area
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Metres

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1:4,000

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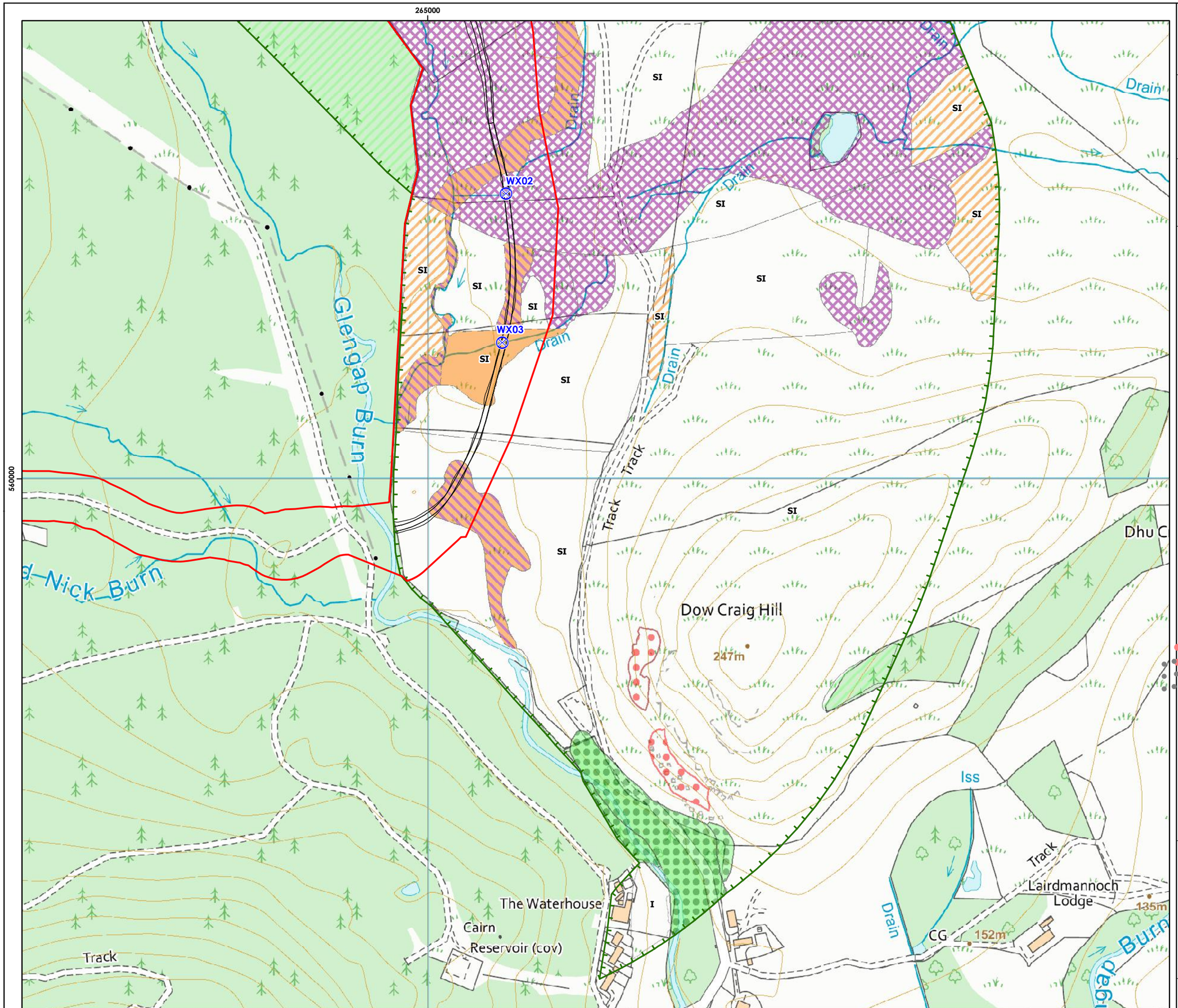
Lairdmannoch Energy Park

wind2

Figure 6-1-3
Extended Phase 1
Map 9



Key

- Site boundary
- Survey Area
- Turbine Location
- Proposed infrastructure, including earthworks
- Watercourse crossing

Phase 1 habitats

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