

APPENDIX D-9

Avian Monitoring Results

Winter 2018 / 2019

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Winter Bird Survey 2018/19

Drumnahough Wind Farm





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1 INTRODUCTION

1.1 PROJECT BACKGROUND

Consent is being sought by Drumnahough Designated Activity Company (Drumnahough DAC) (the applicant), a co-development company between *SSE Renewables Ireland Limited* and *Cuideachta Ghníomhaíochta Ainmnithe (Coillte CGA)*, from An Bord Pleanála (the competent authority) for development of a 12 No. turbine wind farm at Drumnahough, south-west of Letterkenny.

This report, which pertains to the Drumnahough site, presents the findings of bird surveys conducted at Drumnahough during the winter bird season of 2018/19. The report has been informed by both desk-top and field studies. Relevant mapping, including the study area and site boundary were provided by SSE.

1.2 STATEMENT OF AUTHORITY

The winter 2018/19 surveys were managed and co-ordinated by John N. Murphy. Field surveyors were; John N. Murphy, Shane Cully (BSc.) and Muiréad Kelly (BSc. MSc.), Hazel Dalton (BSc.) and John Collins (BSc.). This report has been prepared by Fiona McKenna (BSc.), an ecologist with Malachy Walsh and Partners, with the assistance of John N. Murphy who is the Project Ornithologist and Monica Kane (BSc. MSc.) who is the Project Manager.

The reliability of the survey work is dependent on the observers used to collect the underlying information. Using appropriately skilled and experienced observers is therefore essential. Individual surveyor profiles outlining surveyor competencies, expertise and previous experience are included in **Appendix 1**.

1.3 SITE LOCATION

The study area is located in the southwest County Donegal, approximately 13km southwest of Letterkenny and 11km north-west of Stranorlar town. The site entrance is along a local road to the south-east of the site which can be accessed from the N13 (see **Figure 1** below).

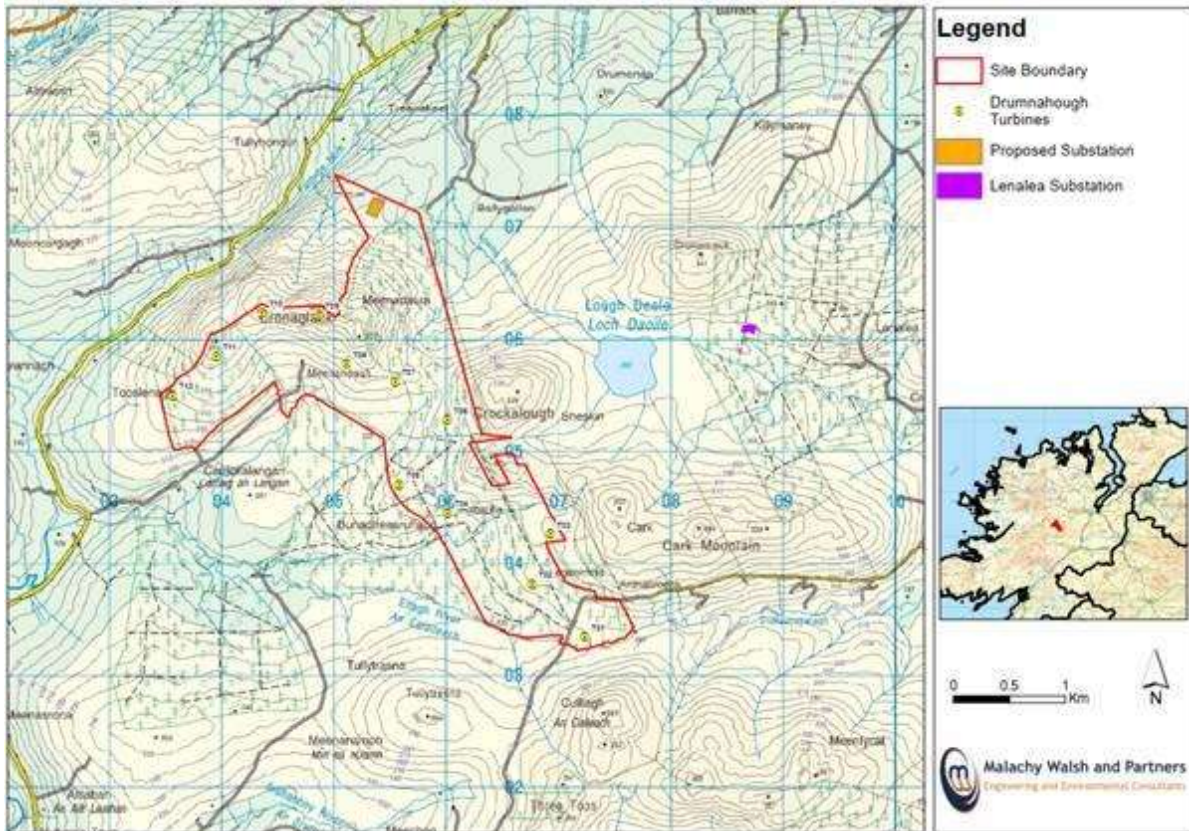


Figure 1. Site location and proposed wind farm layout

2 METHODOLOGY

2.1 DESK-STUDY

The results from desk-top study are presented in Breeding 2018 report (Doc. No. 19123-6004-B)

2.2 IDENTIFICATION OF TARGET SPECIES

The results of the desk-top study and reconnaissance surveys were used to identify those bird species which were considered likely to occur. The reconnaissance survey consisted of the initial field visit undertaken by the Project Ornithologist to review the landscape and habitats in the area in the context of its potential ornithological importance and to inform the identification of target species, which influenced survey design.

Target species are typically those species which are afforded a higher level of legislative protection or which are considered to be more sensitive to potential impacts from wind farm developments by virtue of their behaviour (Scottish Natural Heritage, 2017). Target species should be restricted to those likely to be affected by wind farms (SNH, 2017).

With regards to drawing up the target species list for Drumnahough, the SNH (2017) guidance was referred to. This guidance outlines three important sources of potential target species. Additionally, Species of Conservation Interest (SCI species) for Special Protected Areas (SPAs) located within a 20km radius of the site were considered using guidelines provided by Scottish Natural Heritage (SNH) Guidance, 'Assessing Connectivity with Special Protection Areas (SPA)' (2016) to assess the

core foraging distances of bird species and the connectivity distances of each species in relation to the SPA. The target species list was drawn from:

- Annex I of the Birds Directive
- Special Conservation Interests (SCI) of Special Protection Areas (SPA) within 20km radius of site
- Species protected under the fourth schedule of the Wildlife Acts 1976-2012 (buzzards, eagles, falcons, harriers, hawks, kites, osprey, owls)
- Red-listed birds of Conservation Concern (Colhoun and Cummins, 2013)

The following table (**Table 1**) outlines those species for which past records exist within the hectad C00 identified during the desk-top study (**Section 2.1** above) and which meet one or more of the target species selection criteria as outlined above. The conservation status/level of protection afforded to each species is also included.

Table 1: Target species for which previous records exist in relevant hectad C00

Target Species	Conservation/Protection Status
Hen harrier (<i>Circus cyaneus</i>)	BoCCI Amber-listed/ Annex I EU Birds Directive/Fourth schedule of the Wildlife Acts 1976-2012
Sparrowhawk (<i>Accipiter nisus</i>)	BoCCI Amber-listed/Fourth schedule of the Wildlife Acts 1976-2012
Common buzzard (<i>Buteo buteo</i>)	BoCCI Green-listed/ Fourth schedule of the Wildlife Acts 1976-2012
Kestrel (<i>Falco tinnunculus</i>)	BoCCI Amber-listed/ Fourth schedule of the Wildlife Acts 1976-2012
Merlin (<i>Falco columbarius</i>)	BoCCI Amber-listed/ Annex I EU Birds Directive
Red grouse (<i>Lagopus lagopus-hibernicus</i>)	BoCCI Red-listed/ Annex II & Annex III EU Birds Directive
Common Pheasant (<i>Phasianus colchicus</i>)	BoCCI Green-listed/ Annex II & Annex III EU Birds Directive
Common snipe (<i>Gallinago gallinago</i>)	BoCCI Amber-listed/ Annex II & Annex III EU Birds Directive
Woodcock (<i>Scolopax rusticola</i>)	BoCCI Amber-listed/ Annex II & Annex III EU Birds Directive
Rock dove (<i>Columba livia</i>)	BoCCI Green-listed/Annex II and III EU Birds Directive
Northern lapwing (<i>Vanellus vanellus</i>)	BoCCI Red-listed/ Annex II EU Birds Directive
Eurasian curlew (<i>Numenius arquata</i>)	BoCCI Red-listed/ Annex II EU Birds Directive
Twite (<i>Carduelis flavirostris</i>)	BoCCI Red-listed

Wind-farm sensitive species meeting the criteria outlined above which were not identified as previously occurring within the general area during the desk-top study such as Golden eagle (*Aquila chrysaetos*) were also included as target species, where recorded.

As outlined above and set out in SNH (2017), target species typically comprise those species which are afforded a higher level of legislative protection and should be restricted to those likely to be affected by wind farms. Therefore, only red-listed species have been included as target species, unless the species meets one of the other target species selection criteria e.g. Annex I, outlined above. However, to ensure other species which may be sensitive to wind farms were not missed during surveys all other species of gull, wader, duck, goose, swan, cormorant and heron were included as secondary target species. According to SNH (2017), it is generally considered that passerine species are not significantly impacted by wind farms. While they were not, therefore,

included as either (primary) target or secondary target species their presence was recorded in order to provide a complete picture of bird usage of the study area.

2.3 CONSULTATION

Informal consultation was carried out on site on the 24th of January 2019 between Mr. John N. Murphy (project ornithologist) and local NPWS rangers to show the general location of the Merlin nest which was identified in the previous breeding season (April-September 2018).

2.4 FIELD SURVEYS

Initial walkovers of the site were carried out to enable the identification of suitable survey locations.

Field surveys were undertaken to gather detailed information on bird distribution and flight activity in order to predict the potential effects of a wind farm proposal on birds. The field surveys comprised two main elements: vantage point (VP) watches and targeted distribution and abundance surveys which comprised of transects and point count surveys.

2.4.1 Hinterland Survey

A hinterland survey was undertaken within 5km radius of the site boundary to determine the suitability of the surrounding habitats for target species with particular focus on birds of prey and whether large assemblages of birds (e.g. wildfowl, waders) occurred regularly in the locality.

2.4.2 Vantage Point (VP) Surveys

Overview Vantage point surveys were carried out with regard to 'Recommended bird survey methods to inform impact assessment of onshore wind farms' (SNH, 2017).

Vantage point (VP) surveys were carried out by suitably qualified personnel over a six-month period (October 2018 to March 2019, inclusive). The overall aim of these surveys was to quantify the level of flight activity and its distribution over the flight activity survey area and to determine bird usage of the site.

2.4.2.1 Selection of VP Locations

Vantage points are ideally located on elevated areas, or other areas, which provide clear views over the survey area. Achieving maximum visibility over as much of the site as possible is important for these surveys.

According to SNH (2017) vantage point viewsheds should extend to 2km. VP2 extends to 2.5km, the full extent which can be readily viewed using a telescope. In order to minimise observer effect on bird behaviour VPs should ideally be located outside the survey area but should be located as close as possible. SNH (2017) stipulates that where VPs are located within the survey area they should not be used simultaneously with other VPs which overlook them to minimise potential observer effect on birds.

Five vantage point locations were surveyed over the summer 2018 season (see **Figure 2**). VP1 to VP4 were selected for coverage of the site and VP5 was included as it covers Lough Deelee, a habitat sometimes found to be used by birds of high conservation importance, including Red-throated diver and Whooper swan. Lough Deelee is the only significant body of standing water near the site. The location of each VP using Irish Transverse Mercator (ITM) grid co-ordinates are provided in **Table 2**

below. **Figure 3** shows all VP locations and the corresponding viewshed for each. All other Maps showing the locations of each VP and the viewsheds from each VP showing the extent of the study area and site coverage are provided in **Appendix 2**. Full details on individual VP surveys including survey dates, times and weather conditions can be found in **Appendix 3**.

Table 2: Drumnahough VP locations

VP No.	ITM Grid Co-ordinates
1	203954.903 - 405333.016
2	206174.435 - 404808.899
3	206981.679 - 403134.8
4	202981.519 - 403798.994
5	606985.000 - 904823.800

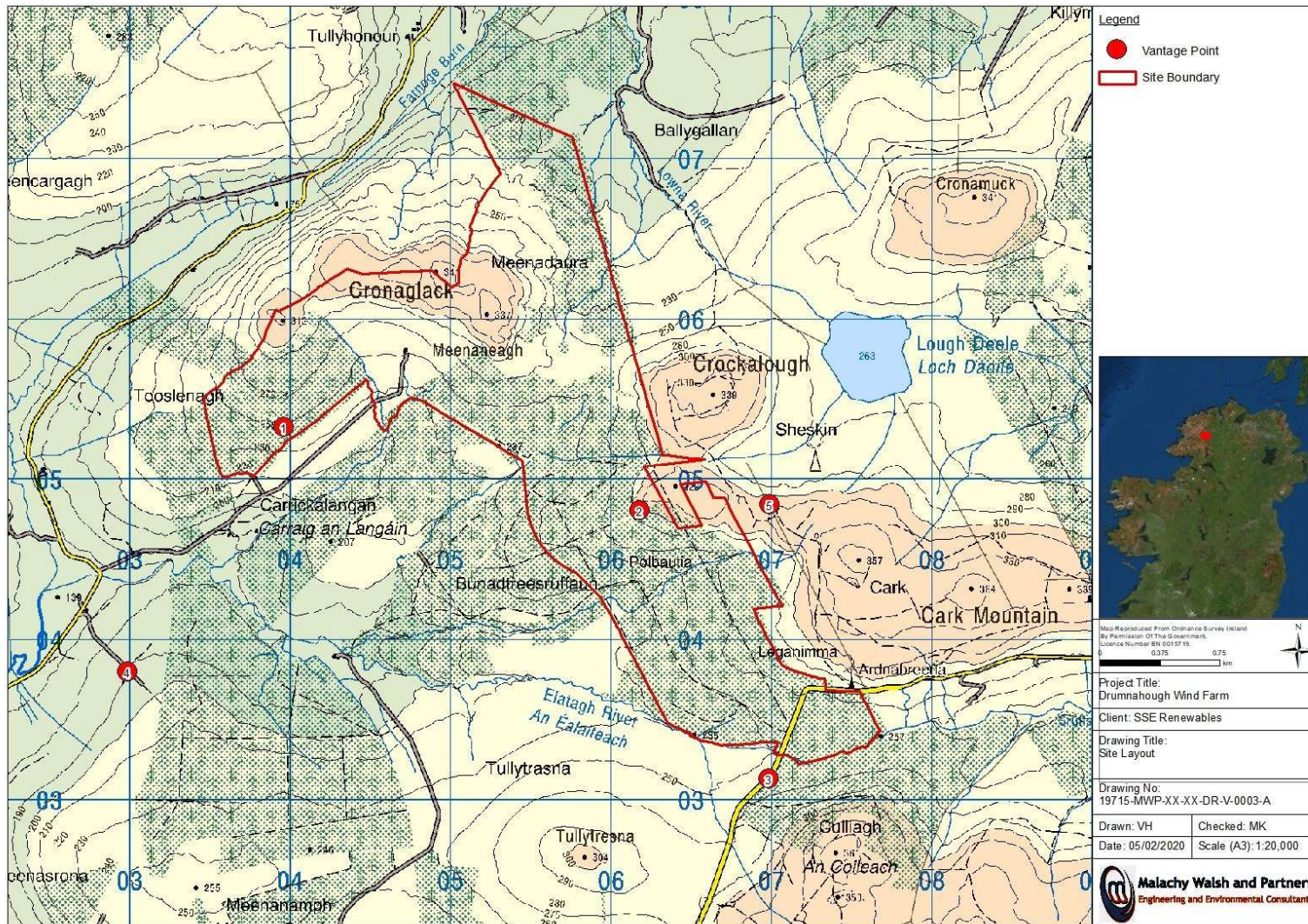


Figure 2. VP locations and development site boundary

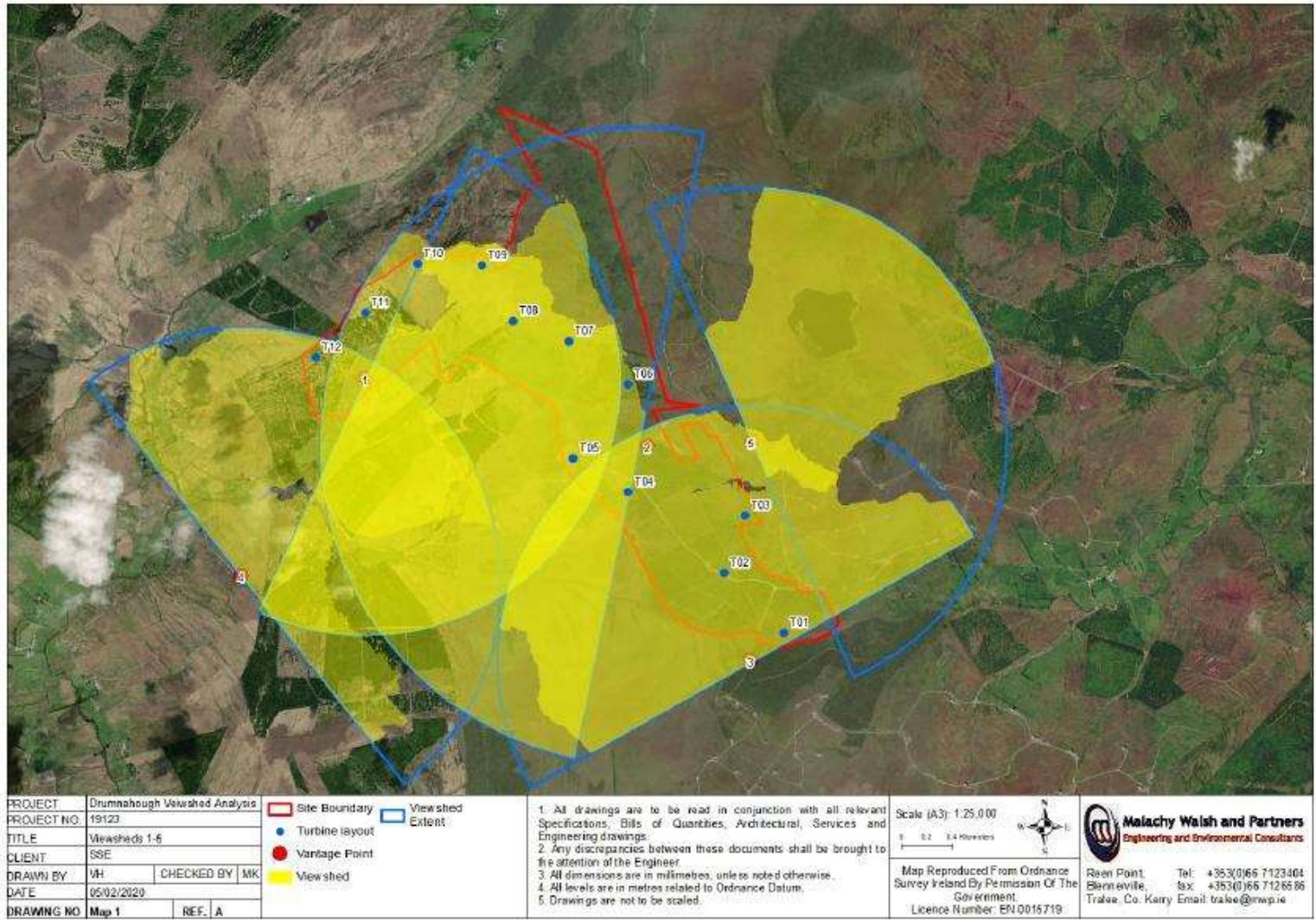


Figure 3. Vantage Point location and corresponding viewsheds

2.4.2.2 Viewshed Analysis of VP Locations

Viewshed analysis was undertaken for each VP location to determine visual coverage of the survey area. Viewsheds were set to observer height of 2m showing a view of everything over 25m height. Viewsheds encompassed a 2km radius with 360^o view with the exception of VP2 which extended to 2.5km. Each viewshed was then cropped to an 180^o arc showing the relevant direction of view. Figures showing the viewsheds from each VP in order to show the extent of site coverage are provided in **Figure 3** above and **Appendix 2**.

2.4.2.3 Flight Data Recording

A total of 5 vantage points were surveyed and each one was watched for a total of six hours per month. This resulted in a total of 30 survey hours per month and 180 survey hours in total over the entire season. The watches were divided into three hour periods for each individual watch. Further detailed vantage point survey information can be found in **Appendix 3**.

During VP surveys the flight behaviour of target species was recorded. Based on the precautionary principle flight behaviour of secondary species was also recorded; however, recording of secondary species was subsidiary to recording of target species (SNH, 2017). At the time of each species observation the following information was recorded:

- The time that the bird was detected;
- The flight duration (seconds) within various flight height categories (0-20m, 20-50m, 50-100m, 100-150m and >150) (
- Sex and age of the bird(s) (adult/juvenile), where possible to determine;
- Type of activity/behaviour such as hunting, flying, displaying etc;
- Estimation of actual flight height;
- Habitat(s) where the bird was observed;
- Weather conditions at time of sighting including wind speed, direction, degree of visibility.

Once an initial sighting was made, each target or secondary species was observed until lost from view. Flight paths were recorded as observed, including where birds travelled or were observed outside of the flight activity survey area; such that all flight activity within the broader landscape was encompassed.

Details on flight behaviour for each individual target/secondary species observed, including a unique map identifier code which corresponds to a mapped flight path, are provided in tabulated format in **Appendix 4**. All flight paths are provided in **Appendix 5**.

2.4.2.4 Recording of Non-target Species

During the VP surveys, non-target species were also recorded. Monthly peak counts of all non-target species of conservation concern recorded during VP surveys are provided in **Appendix 6**.

2.4.3 Distribution and Abundance Surveys

2.4.3.1 Transect Surveys

A transect survey is a survey along a defined route within the study area. The overall aim of the transect surveys was to assess general bird distribution throughout the site and gather data on bird

usage of the site. Transect surveys were completed three months between October 2018 and March 2019. All bird species seen or heard, typically within 100m of the transect route, were recorded, although the topography of the landscape often allowed for detection of birds at greater distances. The transect routes were selected to provide representative coverage of all habitats, both open and closed, occurring within the site e.g. clearfell forestry, young/mature forestry, scrub etc. The transect routes (B & C) followed an existing forestry access track which runs through the site.

2.4.3.2 Point Count Surveys

Birds were also surveyed using point count methodologies. Point counts were conducted during the same month the transect surveys took place and along the same routes as Transect B and Transect C. During each individual Transect Survey, six point count locations along Transect B and 3 point count locations along Transect C were surveyed. Point count locations were sited at approximately 0.5km intervals along the overall length of the designated transect route. All birds seen or heard during this period were recorded.

A map showing the transect survey routes and point count locations within the Drumnahough site is included in **Appendix 2**. Details on each survey carried out including survey date, time and weather conditions can be found in **Appendix 7**. Tabulated results of peak counts for all species recorded during monthly transect and point count surveys are provided in **Appendix 8**.

3 EXISTING ENVIRONMENT

3.1 SITE DESCRIPTION

The Drumnahough project site lies within rural upland setting of central Donegal, approximately 13km southwest of Letterkenny and 11km Northwest of Stranorlar and 10km north of Ballybofey. The wind farm development site encompasses the townlands of Cark to the south, Meenadaura to the east, Treankeel to the north and Carrickalangan to the west.

The dominant habitat type throughout the overall site is mature non-native conifer forestry occurring in mosaic with areas of second rotation forestry and clearfell. Areas of heath and blanket bog occur in the north-western corner and eastern section of the site and the main land-use extending away from the area comprises peatlands, improved agricultural farmland, wind farms and commercial forestry. Internal forestry access roads are located throughout the site. According to the CORINE (Co-ORdinated INformation on the Environment) data series (last updated 2018), land cover on the site comprises of 'Transitional woodland scrub (324)', 'coniferous forests (312)' and 'peat bogs (412)' in the surrounding area¹. Bedrock throughout the subject site and surrounding area is classified as 'Termon Formations' which is described as 'Banded semi-pelitic & psammitic schist'². A review of the Teagasc map viewer determined that soil composition throughout the wind farm site comprises 'peat'³. Site investigations undertaken for the project indicate average peat depths of 1.82m within the footprint of the study area.

¹ <https://gis.epa.ie/EPAMaps/>

² <https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aac3c228>

³ <http://gis.teagasc.ie/soils/map.php>

The study area is primarily drained by the River Finn catchment to the south ultimately draining to the River Foyle and Lough Foyle estuary, which lies between Counties Donegal and Derry to the east-northeast of the site. Lough Deele lies just over 1km east of the wind farm site boundary and is drained by the Swilly catchment. The permitted Lenalea substation and proposed Option B for grid connection for Drumnahough Wind Farm lie within the Deele catchment, which drains to the Deele River, which in turn drains to the River Foyle and Lough Foyle estuary. The wind farm site supports a number of headwater streams that feed the rivers to the lower parts of these catchments.

4 BIRD SURVEY RESULTS

4.1 INTRODUCTION

The following nine target and secondary species were recorded during bird surveys carried out at the Drumnahough site during the winter 2018/19 (Annex I species; highlighted in bold):

- **Golden plover**
- **Merlin**
- **Whooper swan**
- Goosander
- Kestrel
- Sparrowhawk
- Buzzard
- Lesser black-backed gull
- Grey heron
- Mallard

A comprehensive list of all bird species recorded within the study area over the course of the winter 2018/19 surveys is provided in **Appendix 9**.

4.2 VANTAGE POINT SURVEY RESULTS

4.2.1 Hinterland Survey

The surrounding hinterland comprises of expanses of peatland habitats (intact and cutaway blanket bog, heath, fen), forestry blocks with agricultural land on the lowlands and river valleys. It was considered that the surrounding areas supported suitable breeding and foraging habitat for target species including birds of prey. No regularly occurring large assemblages of target species were observed.

4.2.2 Target Species

The following sub-sections summarise sightings of all target species recorded during vantage point surveys at Drumnahough during the winter 2018/19 period. Tabulated summaries of these target species observations, including flight information, are available in **Appendix 4**. Flight line mapping and activity areas for each target species are available in **Appendix 5**. Annex I species are highlighted in bold in the following sections.

4.2.2.1 Golden plover

Golden Plover (*Pluvialis apricaria*) were recorded on five occasions during the winter bird surveys. One sighting occurred in the months of November and February and three sightings occurred in the month of March, the majority of the activity took place outside the site boundary. Golden plover were seen at all VP locations except VP2 and flight heights ranging from 0->150m. On 21st November a flock of 8 was spotted just northwest of VP5, they flew up from the ground and circled the area for a few minutes before being lost from sight. On 14th February a small flock of 5 birds were seen flying over a hill to the east of Lough Deele and heading west over the Lough. On 20th March a flock of 30 birds was observed circling and flying over grassland moorland and 1st rotation forest to the south of VP3. On 21st March a flock of 39 birds were observed circling and flying over bog, grassland moorland, rough grassland and 2nd rotation forest to the north/northeast of VP1 within the site boundary. On 22nd March a flock of 40 birds were recorded circling and flying over grassland moorland, heather moorland and 1st rotation forest to the south of VP4. It is likely these Golden plover recorded in March were the last of wintering Golden Plover passing through the area. Golden Plover are listed under Annex I of the Birds Directive and are red-listed in Ireland.

4.2.2.2 Merlin

Merlin (*Falco columbarius*) activity was recorded only once on 21st March at VP2 within the site boundary. A lone female was observed flying northeast of VP2 over 1st and 2nd rotation forest at a height of 10m; she flew over the VP heading south dropping height down to 2m. Merlin is an amber-listed species in this country and are is also an Annex I species of the Birds Directive.

4.2.2.3 Whooper swan

Whooper swan (*Cygnus cygnus*) activity was recorded on 21st March at VP4. A flock of 53 birds were seen west of VP4 flying in a north-easterly direction over improved grassland, grassland moorland and bog at height of 150m. The group then gained height to 250m as they flew over a valley before dropping down to 150m again. Whooper swan is a winter visitor throughout Ireland and is an Annex I species of the Birds Directive and amber-listed species in Ireland.

4.2.2.4 Goosander

Goosander (*Mergus merganser*) activity was recorded once on 25th at VP4. A small flock of 5 birds were seen flying at heights between 25-30m to the west/southwest of VP4. There appeared to be four males and one female/juvenile. Goosander is an amber-listed species in Ireland. According to BirdWatch Ireland (2019), they are known to frequent large lakes in Donegal and Wicklow.

4.2.2.5 Kestrel

Kestrel (*Falco tinnunculus*) was observed at VP1, VP2 and VP5 in the months of October, November and January. In total four observations of Kestrels in flight were made, two of which were located within the site boundary and two outside. All observations pertained to single birds hunting, flying or perched. Kestrel is an amber-listed species and common localised breeder in this region of Donegal.

4.2.2.6 Sparrowhawk

Sparrowhawk (*Accipiter nisus*) was observed once at VP4 in the month of December. A lone male was spotted briefly just northwest of VP and headed south to north at heights between 15-20m over improved grassland and linear woodland. Sparrowhawk is an amber-listed species in Ireland.

4.2.2.7 Buzzard

Buzzard (*Buteo buteo*) was observed at all VP locations apart from VP2 in the months of November, February and March only. A total of 4 flight-lines of buzzard were recorded over the survey period, the majority of which were located within the site boundary or just outside. The sightings pertained to 1 or 2 birds flying or on the ground. Buzzard is a green-listed species in Ireland.

4.2.2.8 Target Species Summary

The target species recorded during VP surveys in winter 2018/19 can be categorised as follows (Annex I species are highlighted in bold):

- Raptors
 - **Merlin**
 - Kestrel
 - Sparrowhawk
 - Buzzard

- Swans/wader/divers/gulls
 - **Whooper swan**
 - **Golden plover**
 - Goosander

The following table (**Table 3**) shows monthly peak counts of all target species recorded during vantage point surveys over the winter 2018/19 period. Species name are colour-coded to indicate conservation status as determined in the most recent assessment of all regularly occurring birds in Ireland (Colhoun and Cummins, 2013). Species highlighted in red represent species that are 'red-listed' (considered to be of high conservation concern); species highlighted in orange represent species that are 'amber-listed' (considered to be of lesser conservation concern but still with an unfavourable conservation status). Remaining species, which are 'green-listed', are considered to have a favourable conservation status (Colhoun and Cummins, 2013). Species which are considered to be of unfavourable conservation status in a European context and are listed on Annex I of the EU Birds Directive (Directive 2009/147/EC) are highlighted in bold in the table below.

Table 3: Monthly peak counts of all target species recorded during winter 2018/19 VP surveys

Common Name	Latin Name	Oct	Nov	Dec	Jan	Feb	Mar
Golden plover	<i>Pluvialis apricaria</i>	0	1	0	0	5	40
Merlin	<i>Falco columbarius</i>	0	0	0	0	0	1
Whooper swan	<i>Circus cyaneus</i>	0	0	0	4	0	53
Goosander	<i>Mergus merganser</i>	0	1	0	5	0	0
Kestrel	<i>Falco tinnunculus</i>	1	1	0	1	0	0
Sparrowhawk	<i>Accipiter nisus</i>	0	0	1	0	0	0
Buzzard	<i>Buteo buteo</i>	1	1	0	0	1	2

4.2.3 Secondary Species

The following sub-sections summarise sightings of all secondary species recorded during vantage point surveys at Drumnahough during the winter 2018/19 period. Tabulated summaries of these secondary species observations, including flight information, are available in **Appendix 4**. Flight line mapping for each target species is available in **Appendix 5**.

4.2.3.1 Lesser black-backed gull

Lesser black-backed gull (*Larus fuscus*) was recorded once in the month of March at VP2. Two birds flew in from the east just south of VP2 over improved grassland. The birds looped round to head back east, flight heights began at 150m then dropped to 70m before finally dropping down to 20m. Lesser black-backed gull is an amber-listed species in Ireland.

4.2.3.2 Grey heron

Grey heron (*Ardea cinerea*) was recorded once in the month of November at VP5. An individual was seen north of the VP on the western shore of Lough Deele for a few minutes before flying to the south-west corner of the Lough. Grey heron is a green-listed species in Ireland.

4.2.3.3 Mallard

Mallard (*Anas platyrhynchos*) was observed once on 22nd March at VP4. A single male was observed flying west to east at a height of 1-2m off the ground to the north of VP4. A second sighting of a pair (1 male and 1 female) was observed north-west of VP4 flying up valley in a north-easterly direction at heights between 10-15m. Mallard is an Annex II and II and green-listed species in Ireland.

4.2.3.4 Secondary Species VP Summary

The secondary species recorded during VP surveys in winter 2018/19 can be categorised as follows:

- Swans/wader/divers/gulls
 - Lesser Black-backed gull
 - Mallard
 - Grey heron

The following table (**Table 4**) shows monthly peak counts of all secondary species recorded during vantage point surveys over the winter 2018/19 period. As above, species name are colour-coded to indicate conservation status (Colhoun and Cummins, 2013).

Table 4: Monthly peak counts of all secondary species recorded during winter 2018/19 VP surveys

Common Name	Latin Name	Oct	Nov	Dec	Jan	Feb	Mar
Lesser Black-backed gull	<i>Larus fuscus</i>	0	0	0	0	0	2
Grey heron	<i>Ardea cinerea</i>	0	1	0	0	0	0
Mallard	<i>Anas platyrhynchos</i>	0	0	3	0	0	3

4.2.4 Non-target Species

During the VP surveys, non-target species were also recorded. Monthly peak counts of all non-target species recorded during VP surveys are provided in **Appendix 6**.

Meadow pipit (*Anthus pratensis*) was the only non-target red-listed species which was recorded. Meadow pipit was recorded in every month throughout the site with numbers highest in November and March. Amber-listed non-target species recorded most frequently were Robin (*Erithacus rubecula*) and Mistle thrush (*Turdus viscivorus*). Amber-listed species which were less frequently recorded included; Goldcrest (*Regulus regulus*), Golden eye (*Bucephala clangula*), Skylark (*Alauda arvensis*), Starling (*Sturnus vulgaris*) and Stonechat (*Saxicola torquata*).

Other than Buzzard, Grey heron and Mallard 23 other green-listed species were recorded during the winter vantage point surveys. The majority of these species are common and widespread and occur in a wide variety of habitat-types, many of which are found within the survey area. Most of these species are present throughout the year while some are summer visitors to Ireland.

All species recorded during VP surveys are provided in **Appendix 9**.

4.3 DISTRIBUTION AND ABUNDANCE SURVEY RESULTS

4.3.1 Transect and Point Count Surveys

A total of 23 species were recorded during the Transect and Point count surveys. Meadow pipit (*Anthus pratensis*) was the only red-listed species record and was recorded in month of March only. Six amber-listed species were recorded in total with Robin (*Erithacus rubecula*) and Goldcrest (*Regulus regulus*) being seen most frequently appearing all three months. The remaining amber-listed species consisted of; Linnet (*Carduelis cannabina*), Mistle thrush (*Turdus viscivorus*), Stonechat (*Saxicola torquatus*) and Whooper swan (*Cygnus cygnus*) with each only appearing in one of the three months. A total of 16 green-listed species were recorded with Chaffinch (*Fringilla coelebs*) and Wren (*Troglodytes troglodytes*) being recorded most frequently and appeared each of the three months. Buzzard was recorded on one occasion in the month of March, this was the only bird of prey recorded.

Tabulated results of peak counts for all species recorded during transect and point count surveys are provided in **Appendix 8**.

4.4 INCIDENTAL RECORDS

Incidental records of birds relate to birds recorded either during or outside of the formal survey periods and can be summarised as follows:

- An incidental sighting of buzzard occurred on 25th October in which an individual was seen hunting over a conifer plantation close to the site entrance southwest of VP1 after the VP watch.
- On 21st November a Snipe was heard calling to the north-west of VP3.
- On 23rd January during VP5 watch four Whooper swans and one Mallard were seen on Lough Deele throughout the watch.
- On 14th February during VP5 watch three Mallard were seen on Lough Deele.
- On 21st March during VP5 a male mallard was seen in a stream in a valley to the north/northeast of VP.

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Appendix 1

Statement of Surveyor Competency and Expertise



The winter 2018/19 field surveys were undertaken by the following competent personnel.

Team Role	Name and Qualifications
Project Manager	Monica Kane (Senior Ecologist, MSc. BSc.)
Project Ornithologist/Survey Team Lead/ Report Input	John Murphy (Senior Ornithologist, Dip.)
Field Surveyor	Muiréad Kelly (Ecologist, BSc. Zoology, MSc. Marine Biology)
Field Surveyor	Hazel Dalton (Ecologist, BSc. Wildlife Biology)
Field Surveyor	Shane Cully (Ecologist, BSc. Wildlife Biology)
Field Surveyor	John Collins (Biologist, BSc. Freshwater and Marine Biology)
Reporting	Fiona McKenna (Ecologist, BSc. Wildlife Biology)
GIS Mapping & Data	Jeremy King (GIS Technician, Dip. PGDip.)
GIS Mapping & Data	Valerie Heffernan (Environmental Scientist, MSc. BSc.)

Monica Kane

Monica Kane manages the Environmental Section of Malachy Walsh and Partners where her role involves managing the day to day running of the section and the Environmental Team. She is an Environmental and Ecological Consultant with over 15 years consultancy experience. She has been responsible for EIA and planning application project management, Appropriate Assessments, Ecological Impact Assessments, auditing and constraints studies. She undertook and managed the environmental inputs into the Cluddaun Wind Farm, a Strategic Infrastructure Development, as well as the Boggeragh Wind Park, Knockranny Wind Farm and Clydaghroe Wind Farm EIS. As part of her involvement in the EU stoRE Project she was the principal author of EC guidelines for PHES and Natura 2000 sites. She was an expert witness for the Oral Hearing on the Kenmare Water Supply Scheme for Kerry County Council and Cluddaun Wind Farm.

Role: Project Manager, liaising with client, review of all reports

John Murphy

John Murphy is a senior ornithologist with Malachy Walsh and Partners and is the Project Ornithologist. He is very experienced having worked in the field of ornithology and ecology since 1982 and has extensive knowledge of the Irish landscape with regard to bird populations. He collaborates regularly with NPWS on different projects throughout the country. John is one of the country's foremost ornithologists and is a licensed bird ringer. He has always had an interest in wildlife photography and his work has been published in many magazines and books. As a 'Heritage in the Schools Specialist', he has travelled the country lecturing in schools and colleges, and to various clubs and organizations. He was the Biodiversity Officer with Clare County Council and has been working as part of the MWP Ecology team on a variety of projects nationwide since 2010. He spends as much time in the field as possible as a bird observer.

Role: Project ornithologist, lead surveyor responsible for all field activity, report input

Muiréad Kelly

Muiread Kelly is an experienced field ecologist who has been working as part of the Malachy Walsh and Partners team for the past four years. She has been working on a variety of ecological projects including wind farm projects. She works with the ornithology team and assists in bird survey work across the country including large-scale bird surveys for BNM in the midlands. Muiréad has particular experience in seabirds and waders.

Role: Field surveyor

Hazel Dalton

Hazel Dalton is an experienced field ecologist who has been working with Malachy Walsh and Partners for the past four years on a full-time basis and for several years previously on a part-time basis over the summer months. She qualified with a degree in Wildlife Biology from Tralee IT in 2015. Over the last four years she has undertaken bird survey work for a number of large-scale wind farm projects in the west and south-west of Ireland as well as in the midlands. She has completed numerous reports for bird survey work and is experienced in the collation of data, GIS mapping and in field ecology survey techniques.

Role: Field surveyor

Shane Cully

Shane has a Degree in Wildlife Biology and has over 6 years general birding experience. He has experience of Vantage Point Surveys, Transect surveys, Merlin/Golden Plover walkover surveys, Nightjar/Woodcock Surveys, Red Grouse Surveys and Hen Harrier Roost Surveys. He has previously been involved in the Corncrake Conservation Project with Birdwatch Ireland where he undertook dedicated night-time surveys, on a nightly basis during peak season, and dealt directly with landowners with regards to participation in the Corncrake Grant scheme. He has also worked with Birdwatch Ireland on the Results Based Agri-Environment Payments Scheme (RBAPS) in the Shannon Callows. This work included surveying of breeding waders, monitoring of whinchat and signing farmers/landowners up to the scheme.

Role: Field surveyor

John Collins

John has a Degree in Freshwater and Marine Biology in 2018. His final year project was focused on the diet of breeding Raven on Loop head peninsula Co. Clare in which he gained extensive observational experience. In 2018 he carried ornithological surveys of rice paddies in Spain which contributed to his knowledge of species identification. John has been a volunteer with a local group in West Co. Clare and has been involved in Hen Harrier winter roost and summer breeding site surveys.

Role: Field surveyor

Fiona McKenna

Fiona McKenna is a Graduate field ecologist who has been working with Malachy Walsh and Partners for the past two years on a part-time and full-time basis. She qualified with a degree in Wildlife

Biology from Tralee IT in 2019. Over the last two years she has contributed and helped complete numerous reports for bird survey work and is experienced in the collation of data and in field ecology survey techniques.

Role: Report author

[Jeremy King](#)

Jeremy is the lead GIS technician in Malachy Walsh and Partners. He assists the environmental team in completing EIAR's, wind farm feasibility studies and planning applications and also works closely with the wind farm civil design team. He also works on LVIA, photomontages and shadow flicker assessments with the EIA team. Jeremy assists in the final reporting for all bird survey projects through the production of mapping and other drawings, as well as any other GIS requirements which arise throughout the life of the project.

Role: Responsible for mapping, GIS project and report inputs

[Valerie Heffernan](#)

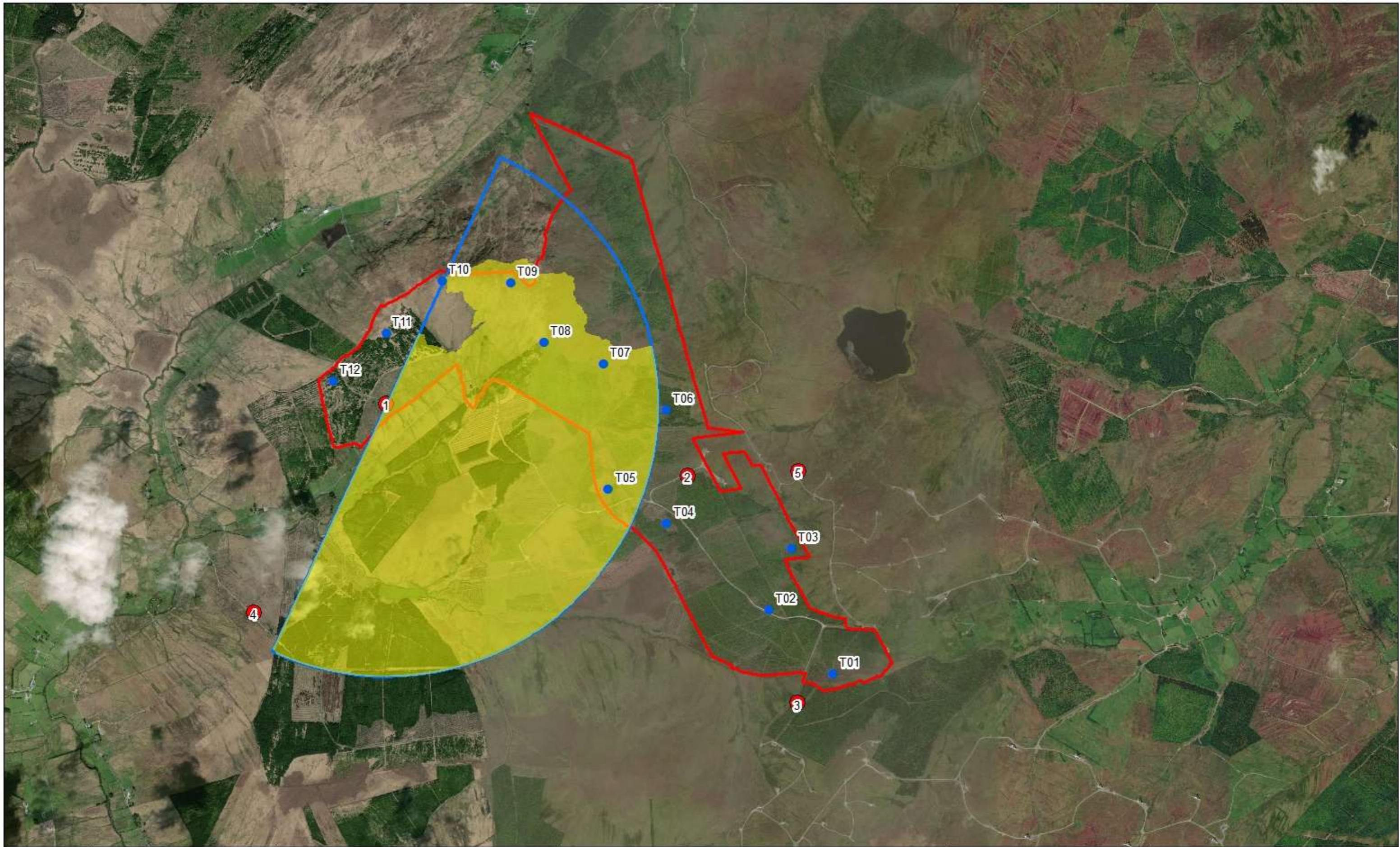
Valerie has worked as an environmental professional since graduating in 2015 and has been employed as an Environmental Scientist with Malachy Walsh and Partners since 2018. She has considerable experience in Solar Farm development and has had input in a variety of projects including solar farms, marine and wind energy developments. She is experienced in GIS, planning and environmental report input.

Role: Responsible for viewshed analysis and flight path mapping

Appendix 2

Survey Location and Viewshed Maps





PROJECT	Drumnaough Veiwshed Analysis		
PROJECT NO.	19123		
TITLE	Viewsheds 1		
CLIENT	SSE		
DRAWN BY	VH	CHECKED BY	MK
DATE	05/02/2020		
DRAWING NO	Map 1	REF.	A

- Site Boundary
- Viewshed Extent
- Turbine layout
- Vantage Point
- Viewshed

1. All drawings are to be read in conjunction with all relevant Specifications, Bills of Quantities, Architectural, Services and Engineering drawings.
2. Any discrepancies between these documents shall be brought to the attention of the Engineer.
3. All dimensions are in millimetres, unless noted otherwise.
4. All levels are in metres related to Ordnance Datum.
5. Drawings are not to be scaled.

Scale (A3): 1:25,000

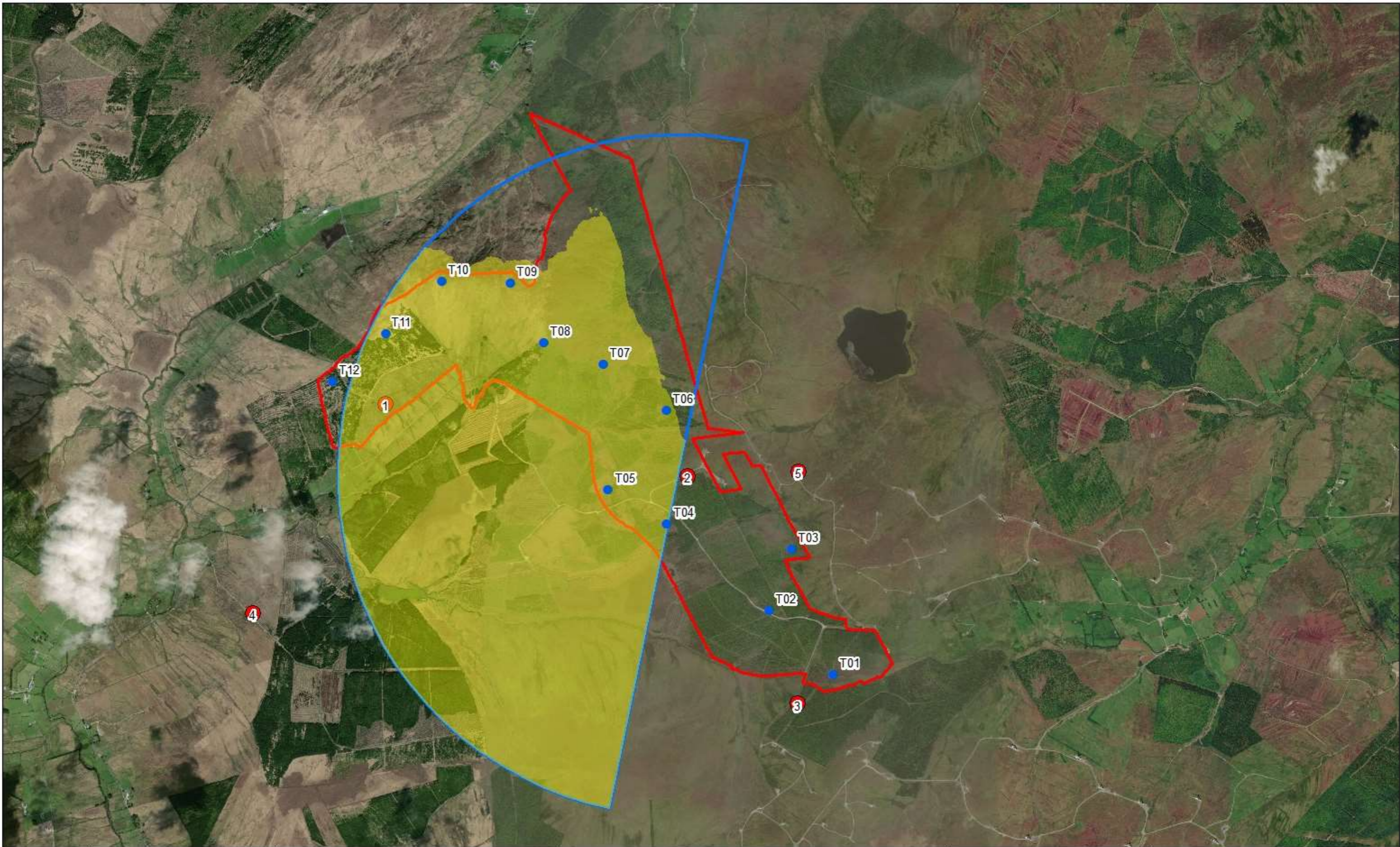
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Engineering and Environmental Consultants

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Email: tralee@mwpc.ie



PROJECT	Drumnaough Veiwshed Analysis		
PROJECT NO.	19123		
TITLE	Viewsheds 2		
CLIENT	SSE		
DRAWN BY	VH	CHECKED BY	MK
DATE	05/02/2020		
DRAWING NO	Map 1	REF.	A

▭ Site Boundary ▭ Viewshed Extent
● Turbine layout
● Vantage Point
▭ Viewshed

1. All drawings are to be read in conjunction with all relevant Specifications, Bills of Quantities, Architectural, Services and Engineering drawings.
2. Any discrepancies between these documents shall be brought to the attention of the Engineer.
3. All dimensions are in millimetres, unless noted otherwise.
4. All levels are in metres related to Ordnance Datum.
5. Drawings are not to be scaled.

Scale (A3): 1:25,000

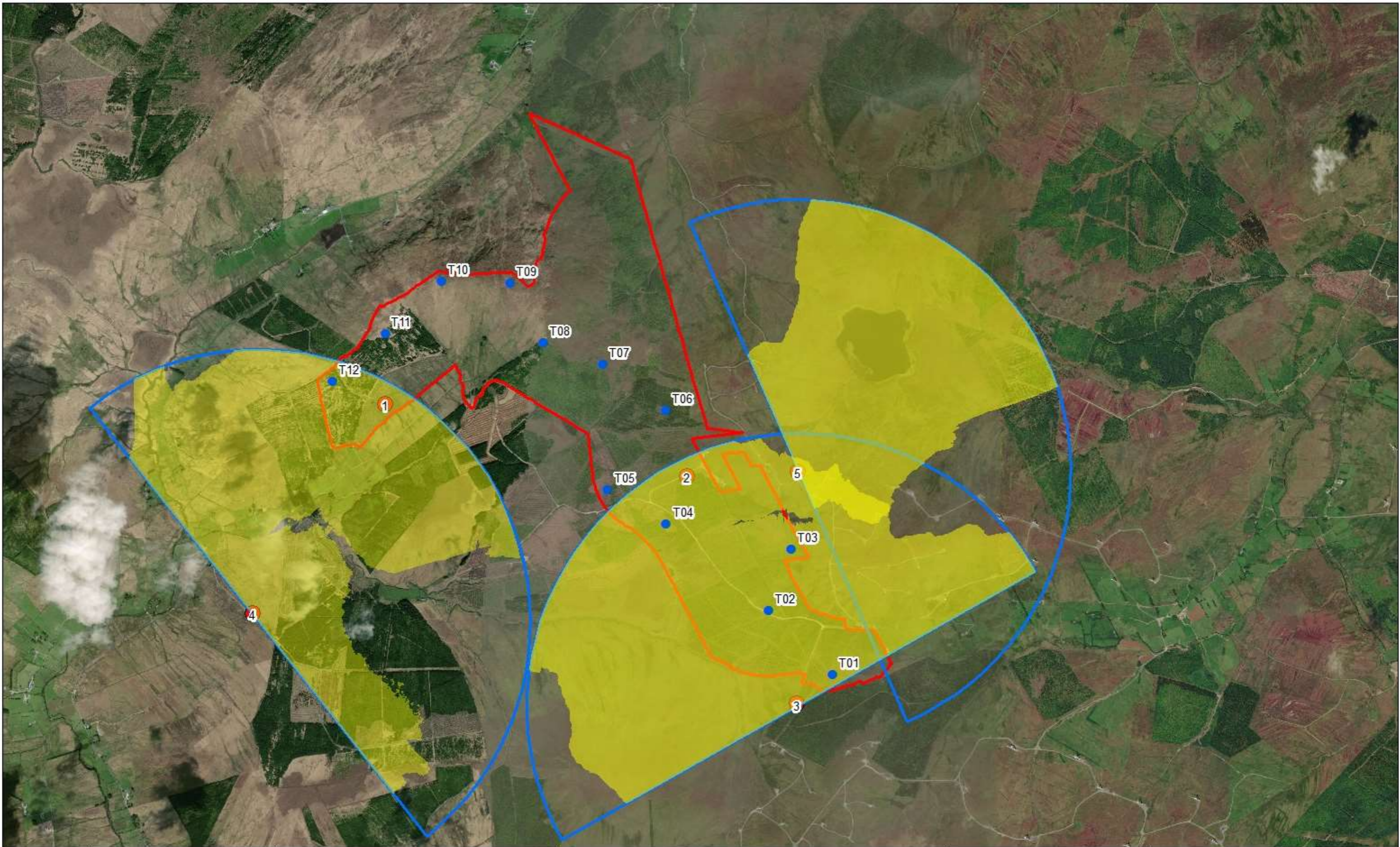
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 Tralee, Co. Kerry Email: tralee@mwp.ie



PROJECT	Drumhough Veiwshed Analysis		
PROJECT NO.	19123		
TITLE	Viewsheds 3-5		
CLIENT	SSE		
DRAWN BY	VH	CHECKED BY	MK
DATE	05/02/2020		
DRAWING NO	Map 1	REF.	A

▭ Site Boundary ▭ Viewshed Extent
● Turbine layout
● Vantage Point
▭ Viewshed


1. All drawings are to be read in conjunction with all relevant Specifications, Bills of Quantities, Architectural, Services and Engineering drawings.
2. Any discrepancies between these documents shall be brought to the attention of the Engineer.
3. All dimensions are in millimetres, unless noted otherwise.
4. All levels are in metres related to Ordnance Datum.
5. Drawings are not to be scaled.

Scale (A3): 1:25,000

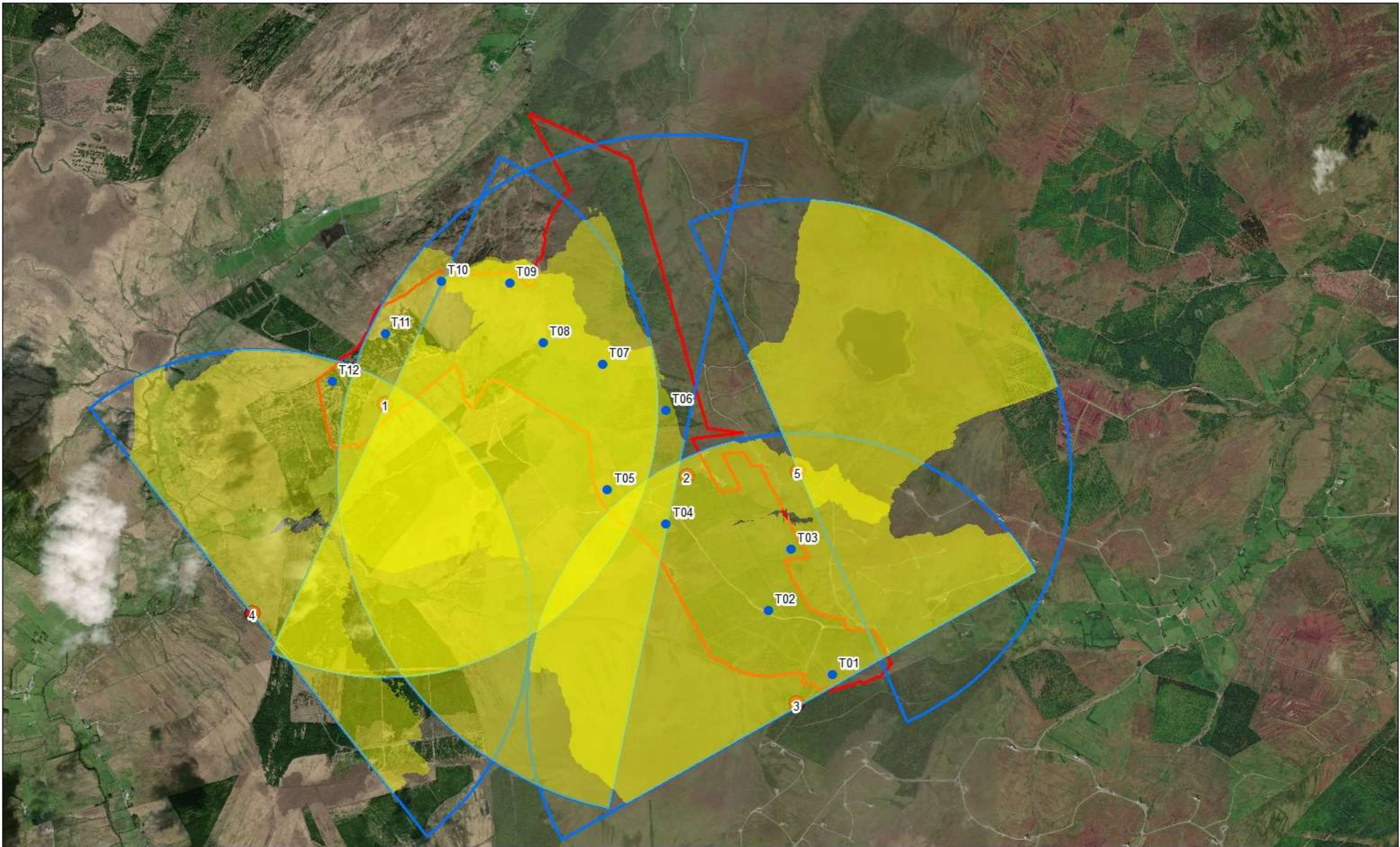
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PROJECT	Drumhough Veiwshed Analysis		
PROJECT NO.	19123		
TITLE	Viewsheds 1-5		
CLIENT	SSE		
DRAWN BY	VH	CHECKED BY	MK
DATE	05/02/2020		
DRAWING NO	Map 1	REF.	A

▭ Site Boundary ▭ Viewshed Extent
● Turbine layout
● Vantage Point
▭ Viewshed


1. All drawings are to be read in conjunction with all relevant Specifications, Bills of Quantities, Architectural, Services and Engineering drawings.
2. Any discrepancies between these documents shall be brought to the attention of the Engineer.
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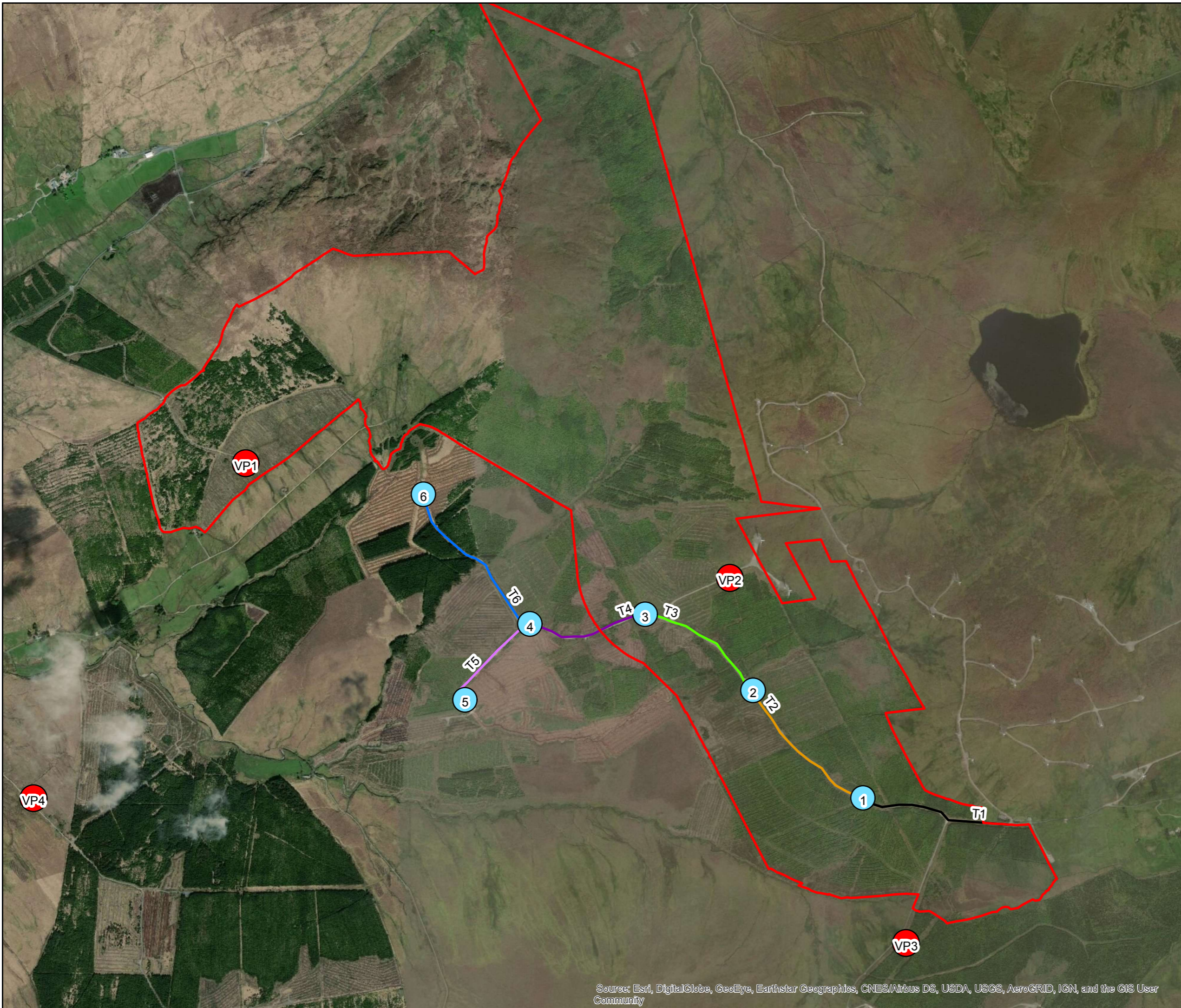
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Legend

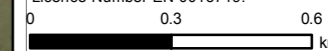
-  VP Location
-  Site Boundary
-  Point Count B

Transect B

-  T1
-  T2
-  T3
-  T4
-  T5
-  T6



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Project Title:
Drumnahough Wind Farm

Client: SSE Renewables

Drawing Title:
Transect B

Drawing No:
19123-MWP-

Drawn: VH	Checked: FM
Date: 09/12/2019	Scale (A3): 1:15,000





Legend

- VP Location
- Site Boundary
- Point Count C

Transect C

- T1
- T2
- T3



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0 0.375 0.75 km



Project Title:
 Drumnahough Wind Farm

Client: SSE Renewables

Drawing Title:
 Transect C

Drawing No:
 19123-MWP-

Drawn: VH	Checked: FM
Date: 09/12/2019	Scale (A3): 1:15,000

Malachy Walsh and Partners
 Engineering and Environmental Consultants

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

Appendix 3

Vantage Point Survey Summary



Vantage Point Survey Summary

VP	Date	Observer	Start Time	Finish Time	Length of VP watch (hours)	Weather
1	25/10/2018	MK	12.00	15.00	3	Cloud cover 7/8-8/8, low mist and showers. Wind SW F1-2, gusts of F3-4, visibility excellent to moderate.
1	25/10/2018	HD	15.15	18.15	3	Cloud cover 8/8, occasional misty rain/showers with low cloud. Wind SW F2-3, temp 11-12oC, visibility moderate/poor.
2	24/10/2018	MK	13.00	16.00	3	Cloud cover 8/8, misty at times with heavy rain from 15.00 onwards. Wind W F2-4, temp 11oC, visibility good to excellent to good.
2	25/10/2018	HD	08.30	11.30	3	Cloud cover 8/8, low cloud/mist and drizzle. Wind SW F2-3, temp 10oC, visibility moderate/poor.
3	24/10/2018	HD	13.00	16.00	3	Cloud cover 8/8, hazy and dull. Wind SW F3 gust F4, temp 11-14oc, visibility good.
3	25/10/2018	MK	08.30	11.30	3	Dry spells and light rain. Wind SW F1-2, temp 10oC, visibility moderate to poor.
4	25/10/2018	HD	12.00	15.00	3	Cloud cover 8/8, misty and drizzle. Wind SW F1-2, occasional gust F3, temp 11oC, visibility moderate.
4	25/10/2018	MK	15.15	18.15	3	Cloud cover 8/8, low mist and rain. Wind SW F1-2, temp 11oC, visibility moderate to poor.
5	23/10/2018	MK	15.00	18.00	3	Cloud cover 8/8, fog and mist. Wind Q F3-5, visibility poor.
5	24/10/2018	HD	09.30	12.30	3	Cloud cover 8/8, low cloud, dull and drizzly. Wind SW F2-3, temp 8-10oC, visibility moderate.
1	22/11/2018	JNM	09.00	12.00	3	Cloud cover 6/8-7/8, a dry cool morning with low cloud, clearing to a nice bright spells and sunshine. Wind E-SEF1-3, temp 5-6oC, visibility fair to ok.
1	22/11/2018	SC	13.30	16.30	3	Cloud cover 5/8, cloudy with some prolonged clear spells, hazy in distance reducing visibility. Wind SE F1-2, temp 6-4oC, visibility moderate.
2	21/11/2018	JNM	14.30	17.30	3	Cloud cover 6/8, dry for the majority of the afternoon. A few light showers. Wind E F5/6, temp 7-5oC, visibility good.
2	23/11/2018	JNM	-	-	-	Cloud cover 8/8 – 6/8, foggy misty dull start to the day which brightened up around 09.30, sunny spells and cold. Wind E calm F1-4, temp 2-4oC, visibility poor to good.
3	19/11/2018	JNM	13.30	16.30	3	Cloud cover 8/8, a dull overcast afternoon with some light showers.

Vantage Point Survey Summary

VP	Date	Observer	Start Time	Finish Time	Length of VP watch (hours)	Weather
						Wind E F2-4, temp 7-8oC, visibility good.
3	21/11/2018	SC	14.30	17.30	3	Cloud cover 5/8, hazy on horizon with mixture of cloud and clear skies, rain from 16.55 – VP end. Wind E-SE F1-2, temp 5-3oC, visibility good to moderate.
4	22/11/2018	SC	09.00	12.00	3	Cloud cover 7/8-4/8, mostly overcast with occasional clear patch in sky but brightening from 10.30 to intermittent cloud. Wind E-SE F1-2, temp 4-6oC, visibility moderate to good.
4	22/11/2018	JNM	13.30	16.30	3	Cloud cover 5/8, dry and sunny afternoon. Wind E-SE F1-3, temp 5-7oC, visibility good.
5	21/11/2018	JNM	08.00	11.00	3	Cloud cover 8/8-4/8, heavy downpours giving way to fog. Cleared from 09.40 improving to intermittent sunshine and cloud. Wind N-NE, temp 5-6oC, visibility poor to good.
5	21/11/2018	JNM	11.15	14.15	3	Cloud cover 6-7/8, day began very wet but brightened up to sunshine and scattered showers. Wind E F5-6 variable, temp 4-8oC, visibility good.
1	19/12/2018	JNM	13.00	16.00	3	Cloud cover 6/8, dull cold afternoon with a few brighter spells; Wind S-SE F4-5, temp 5oC, visibility good.
1	21/12/2018	SC	10.00	13.00	3	Cloud cover 5/8, mostly cloudy with some bright spells; Wind SW F1-3, temp 6-7oC, visibility good.
2	20/12/2018	SC	09.00	12.00	3	Cloud cover 7/8, mostly overcast with intermittent heavy showers making visibility poor at times; Wind SW F3-5, temp 5-6oC, visibility moderate to poor.
2	20/12/2018	JNM	13.00	16.00	3	Cloud cover 8/8, a wet and windy day; Wind SW-W F5-6, temp 6oC, visibility fair.
3	17/12/2018	JNM	13.00	16.00	3	Cloud cover 8/8, a dull dark damp day, light showers in late afternoon; Wind S-SE F3-6, temp 7-9oC, visibility fair.
3	18/12/2018	JNM	09.00	12.00	3	Cloud cover 6/8, a dull damp morning; Wind S-SE F2-4, temp 7-8oC, visibility fair.
4	19/12/2018	SC	13.00	16.00	3	Cloud cover 8/8, overcast; Wind SSE F2-4, temp 6-5oC, visibility good
4	21/12/2018	JNM	10.00	13.00	3	Cloud cover 6/8, a still calm dry morning; Wind W and slack, temp 6-7oC, visibility good.
5	20/12/2018	JNM	09.00	12.00	3	Cloud cover 8/8, lots of rain showers throughout the morning and strong winds. Wind SW-W F5-6, temp 6oC, visibility fair.

Vantage Point Survey Summary

VP	Date	Observer	Start Time	Finish Time	Length of VP watch (hours)	Weather
5	20/12/2018	SC	13.00	16.00	3	Cloud cover 8/8, mostly overcast with heavy prolonged showers. Wind S/SW-W F5-6, temp 6oC, visibility moderate – poor.
1	24/01/2019	SC	08.30	11.30	3	Cloud cover 8/8, dense fog and persistent misty rain throughout. Wind S/SW-W F0-1, temp 6-8C, visibility very poor.
1	25/01/2019	JNM	11.15	14.15	3	Cloud cover 8/8, a misty damp, dull wet day. Wind NW F2-4, temp 9-11oC and visibility poor.
2	23/01/2019	SC	08.30	14.30	6	Cloud cover 8/8, snow on the ground and the occasional rain shower. Wind W F0-1, temp -2C to +3C and visibility good/moderate.
3	21/01/2019	SC	13.20	16.20	3	Cloud cover 8/8, heavy persistent rain turning to sleet at times. Wind SW F5-6, temp 3-4oC and visibility poor.
3	25/01/2019	SC	08.00	11.00	3	Cloud cover 8/8, dense fog and persistent drizzle throughout. Wind W, temp 9-10C and visibility poor.
4	21/01/2019	JNM	13.30	16.30	3	Cloud cover 8/8, very wet and windy afternoon. Wind SW F5-6, temp 3-4oC and visibility ok.
4	25/01/2019	JNM	08.00	11.00	3	Cloud cover 8/8, misty, damp wet day with fog and low cloud cover. Wind NW F2-5, temp 9-11oC and visibility Fair/poor.
5	23/01/2019	JNM	08.30	14.30	6	Cloud cover 8/8, very cold with snow on the ground, sleet showers and lots of snow. Wind W F2-3, temp 2oC, visibility ok.
1	13/02/2019	JNM	08.00	11.00	3	Cloud cover 5/8-6/8, a dull and dry morning. Wind S-SW F2-5, temp 10oC and visibility ok.
1	13/02/2019	SC	14.20	17.20	3	Cloud cover 6/8, mostly cloudy with some sunny spells. Wind S F4-5, temp 11oC and visibility good.
2	14/02/2019	JNM	08.00	11.00	3	A calm, dull and overcast morning. Wind S and slack, temp 9oC and visibility ok-good.
2	14/02/2019	SC	14.30	17.30	3	Cloud cover 6/8, mostly cloudy with some sunny spells. Wind SE F2-4, gusts F5. Temp 12-9oC and visibility good.
3	11/02/2019	JNM	14.00	17.00	3	Cloud cover 5/8, a dry day with some sunny spells. Wind S-SW F1-4, temp 7oC and visibility good.
3	15/02/2019	JNM	08.30	11.30	3	Cloud cover 5/8, a dry morning with some bright sunny spells. Wind SE-S-SW F2-3/4. Temp 5oC and visibility good.
4	13/02/2019	SC	08.00	11.00	3	Cloud cover 8/8 and overcast. Wind S F2-4, temp 10oC and visibility moderate/good.

Vantage Point Survey Summary

VP	Date	Observer	Start Time	Finish Time	Length of VP watch (hours)	Weather
4	13/02/2019	JNM	14.30	17.30	3	A dull dry day with small spells of sunshine. Wind S-SW F2-5, temp 10oC and visibility ok.
5	14/02/2019	JNM	14.30	17.30	3	Cloud cover 4/8, a windy dry sunny afternoon. Wind S-SW F4-5, temp 13oC, visibility good.
5	14/02/2019	SC	08.00	11.00	3	Cloud cover 8/8, overcast. Wind S F1-5, temp 8-10oC, visibility good/moderate.
1	21/03/2019	SC	16.10	19.10	3	Cloud cover 8/8, overcast. Wind SW F2-4, temp 11-10oC, visibility good.
1	22/03/2019	JC	08.45	11.45	3	Cloud cover 8/8, continuous light rain and mist, wind F4-5, temp 8oc, visibility poor – moderate.
2	21/03/2019	SC	08.45	11.45	3	Cloud cover 8/8, low cloud, fog, persistent misty rain. Wind S-SW F1-3, temp 10-11oC, visibility very poor – moderate.
2	21/03/2019	JC	12.00	15.00	3	Cloud cover 7/8, light intermittent rain and mist. Wind S-SW F3-5, temp 9oC, visibility poor – good.
3	20/03/2019	SC	08.30	11.30	3	Cloud cover 8/8, overcast, low cloud. Wind SW F1-3, temp 10-12oc, and visibility moderate/good.
3	19/03/2019	SC	16.00	19.00	3	Cloud cover 6/8 – 8/8, mostly cloudy with occasional clear spells, later patchy showers, low cloud and persistent mist. Wind W/S-SW F3-4, temp 9oC, visibility good/moderate – poor.
4	21/03/2019	JC	15.30	18.30	3	Cloud cover 7/8, dry. Wind W F2-4, temp 9oC, and visibility good – excellent.
4	22/03/2019	SC	08.20	11.20	3	Cloud cover 8/8 – 5/8, heavy rain, windy until 10.50 then rain stopped and brightened up. Wind W F3-5, gust f6, temp 9-8oC, visibility moderate/poor to good.
5	21/03/2019	JC	08.30	11.30	3	Cloud cover 8/8, light continuous rain and mist. Wind SW F4-6, temp 9oC, visibility poor-moderate.
5	21/03/2019	SC	12.05	15.05	3	Cloud cover 8/8, overcast, misty with rain. Wind S/SW F2-3, temp 12-13oC, visibility good – poor.

Appendix 4

Target/Secondary Species Observations



Drumnahough Winter 2018/2019 Target Species

Golden plover															
Date	VP	Sex	Age	Map Ref	Habitat	No. Of Birds	Time of Flight/ Obs.	Activity	Flight Height (m)	Time (sec) in Height Category					>150m
										Non-flight	0-20m	20-50m	50 – 100m	100-150m	
20/03/2019	3	Unknown	Adult	1	Grassland moorland, 1 st rotation forest	30	09.52	Flying, circling	100-150	-	-	-	-	480	-
21/03/2019	1	Unknown	Adult	2	Bog, grassland moorland, rough grassland, 2 nd rotation forest	39	18.07	Flying circling	-	-	-	-	-	-	120
22/03/2019	4	Unknown	Adult	3	Grassland moorland, heather moorland, 1 st rotation forest	40	10.59	Flying, circling	>150	-	-	-	-	-	15

Golden plover (VP5)															
Date	VP	Sex	Age	Map Ref	Habitat	No. Of Birds	Time of Flight/ Obs.	Activity	Flight Height (m)	Time (sec) in Height Category					>150m
										Non-flight	0-20m	20-50m	50 – 100m	100-150m	
21/11/2018	5	Unknown	Unknown	1	Heather moorland, temporary standing water	8	10.29	On ground, flying, circling	100-150	-	5	5	5	465	-
14/02/2019	5	Unknown	Unknown	2	Grassland moorland and lake	5	15.54	Flying	40-50	-	120	-	-	-	-

Drumnahough Winter 2018/2019 Target Species

Merlin															
Date	VP	Sex	Age	Map Ref	Habitat	No. Of Birds	Time of Flight/ Obs.	Activity	Flight Height (m)	Time (sec) in Height Category					
										Non-flight	0-20m	20-50m	50 – 100m	100-150m	>150m
21/03/2019	2	Female	Adult	1	1 st rotation forest, 2 nd rotation forest	1	14.51	flying	10-2	-	10	-	-	-	-

Whooper swan															
Date	VP	Sex	Age	Map Ref	Habitat	No. Of Birds	Time of Flight/ Obs.	Activity	Flight Height (m)	Time (sec) in Height Category					
										Non-flight	0-20m	20-50m	50 – 100m	100-150m	>150m
21/03/2019	4	Unknown	Unknown	1	Valleys, improved grassland, grassland moorland and bog	53	15.35	Flying	150-250	-	-	-	-	120	60

Goosander															
Date	VP	Sex	Age	Map Ref	Habitat	No. Of Birds	Time of Flight/ Obs.	Activity	Flight Height (m)	Time (sec) in Height Category					
										Non-flight	0-20m	20-50m	50 – 100m	100-150m	>150m
25/01/2019	4	4 Male 1 Female/juv	Adult Adult/juv	1	River valley	5	11.48	Flying	25-30	-	-	60	-	-	-

Drumnahough Winter 2018/2019 Target Species

Kestrel															
Date	VP	Sex	Age	Map Ref	Habitat	No. Of Birds	Time of Flight/ Obs.	Activity	Flight Height (m)	Time (sec) in Height Category					
										Non-flight	0-20m	20-50m	50 – 100m	100-150m	>150m
24/10/2018	2	Unknown	Unknown	1	2 nd rotation forestry	1	13.17	Hunting	20-30	-	-	60	-	-	-
22/11/2018	1	Female	Unknown	2	Scrub, rough grassland, 2 nd rotation forest	1	09.02	Hunting	3-7	-	240	-	-	-	-
25/01/2019	1	Male	Adult	3	1 st rotation forest	1	12.10	Flying	2-3	-	30-40	-	-	-	-

Kestrel (VP5)															
Date	VP	Sex	Age	Map Ref	Habitat	No. Of Birds	Time of Flight/ Obs.	Activity	Flight Height (m)	Time (sec) in Height Category					
										Non-flight	0-20m	20-50m	50 – 100m	100-150m	>150m
21/11/2018	5	Female	Adult	1	Heather moorland, temporary standing water	1	09.52	Flying, hunting	40-50	-	-	300	-	-	-

Sparrowhawk															
Date	VP	Sex	Age	Map Ref	Habitat	No. Of Birds	Time of Flight/ Obs.	Activity	Flight Height (m)	Time (sec) in Height Category					
										Non-flight	0-20m	20-50m	50 – 100m	100-150m	>150m
19/12/2018	4	Male	Adult	1	Improved grassland and linear woodland	1	14.02	Flying	-	-	5	-	-	-	-

Drumnahough Winter 2018/2019 Target Species

Buzzard															
Date	VP	Sex	Age	Map Ref	Habitat	No. Of Birds	Time of Flight/ Obs.	Activity	Flight Height (m)	Time (sec) in Height Category					
										Non-flight	0-20m	20-50m	50 – 100m	100-150m	>150m
19/11/2018	3	Unknown	Unknown	1a 1b	1 st rotation forest, heather moorland	1	15.40	Flying	15-18	-	420	-	-	-	-
22/11/2018	4	Unknown	Adult	2	Heather moorland, improved grassland	1	12.00	Flying, on ground	-	-	40	20	-	-	-
13/02/2019	4	Unknown	Adult	3	Rough grassland and 1 st rotation forest	1	09.24	Flying	20-30	-	-	5	-	-	-
21/03/2019	1	Male Female	Adult Adult	4a 4b	1 st rotation forest, clear fell, bog, rough grassland, improved grassland	2	16.26	Flying	>150 0-150	- -	- 3	- 8	- 5	180 -	- -

Lesser black-backed Gull															
Date	VP	Sex	Age	Map Ref	Habitat	No. Of Birds	Time of Flight/ Obs.	Activity	Flight Height (m)	Time (sec) in Height Category					
										Non-flight	0-20m	20-50m	50 – 100m	100-150m	>150m
21/03/2019	2	Unknown	Adults	1	Improved grassland	2	13.00	Flying	20-150	-	10	10	10	-	30

Grey heron (VP5)															
Date	VP	Sex	Age	Map Ref	Habitat	No. Of Birds	Time of Flight/ Obs.	Activity	Flight Height (m)	Time (sec) in Height Category					
										Non-flight	0-20m	20-50m	50 – 100m	100-150m	>150m
21/11/2018	5	Unknown	Adult	1	Lake, heather moorland	1	10.54	On ground, flying	-	-	240	-	-	-	-

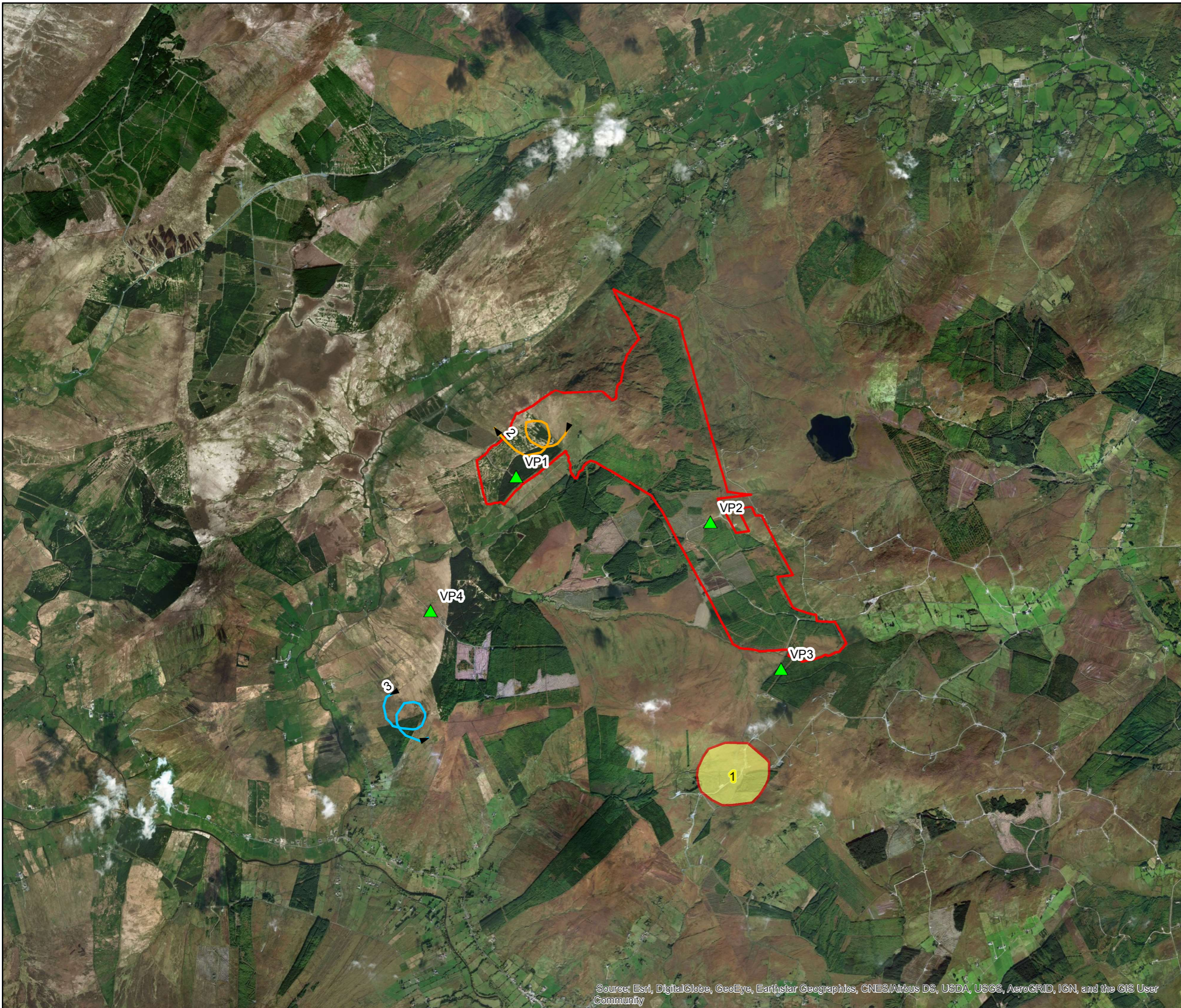
Drumnahough Winter 2018/2019 Target Species

Mallard															
Date	VP	Sex	Age	Map Ref	Habitat	No. Of Birds	Time of Flight/ Obs.	Activity	Flight Height (m)	Time (sec) in Height Category					>150m
										Non-flight	0-20m	20-50m	50 – 100m	100-150m	
22/03/2019	4	Male Female	Adult Adult	1a 1b	Rough grassland, grassland moorland, improved grassland	3	09.22	Flying	1-2 10-15	-	10 15	-	-	-	-

Appendix 5

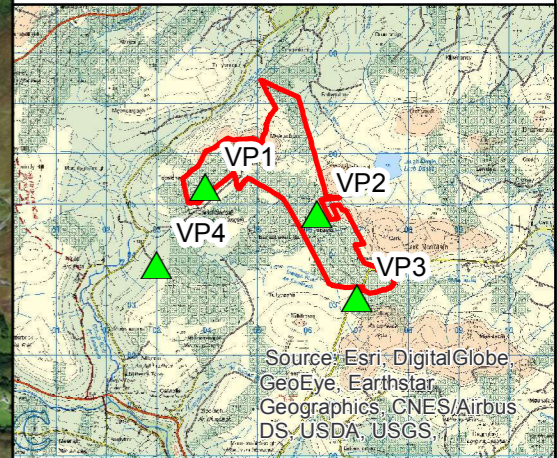
Flight Paths and Activity Areas





Legend

- ▲ VP Location
- Site Boundary
- Golden Plover**
- 2
- 3
- Golden Plover Activity



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0 0.75 1.5 km

Project Title:
 Drumnahough Wind Farm

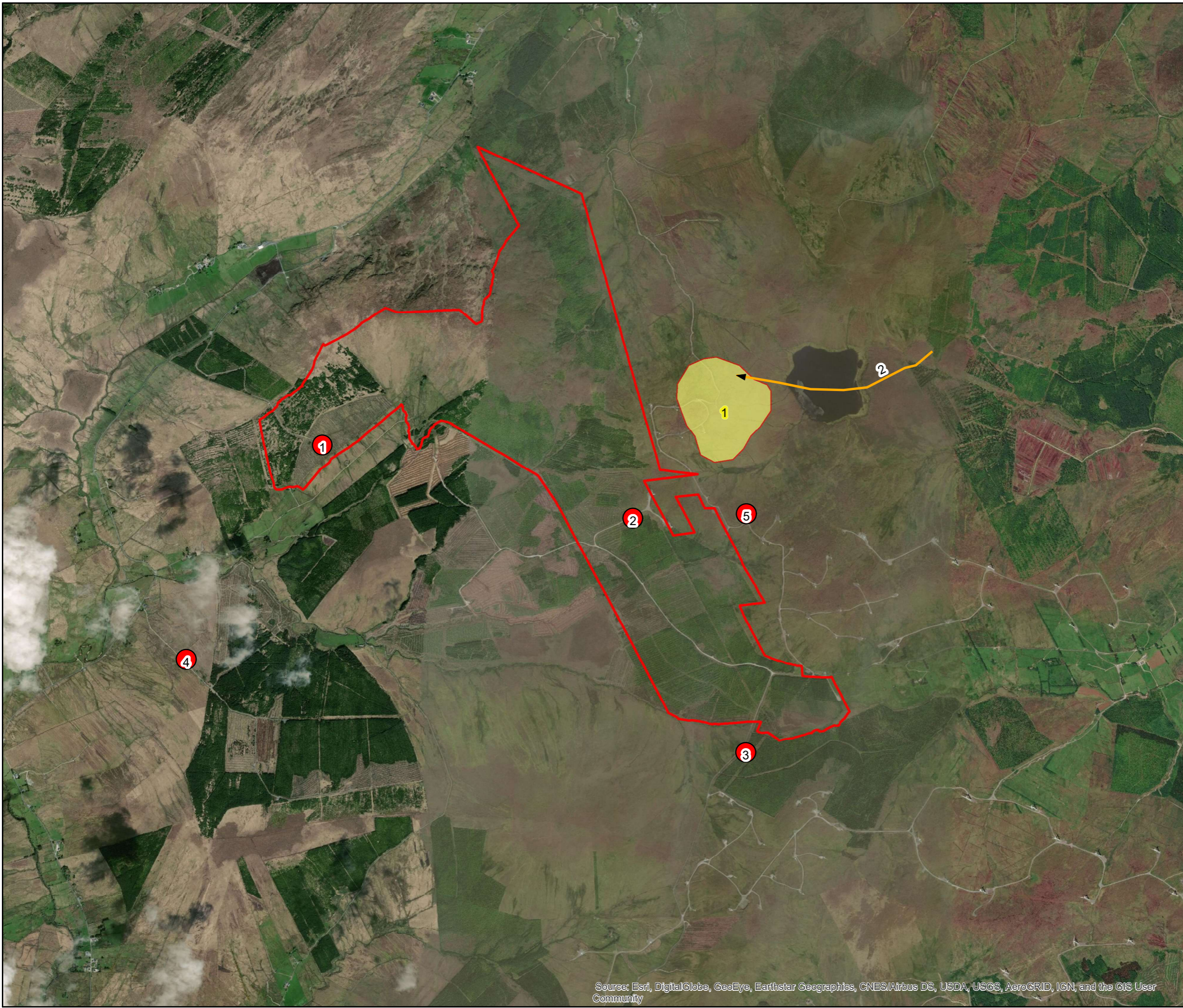
Client: SSE Renewables

Drawing Title:
 Winter 2018/9
 Golden Plover Flight Paths

Drawing No:
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Drawn: VH	Checked: FMcK
Date: 24/06/2019	Scale (A3): 1:40,000

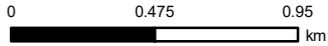




Legend

- Vantage Point
- ▶ Golden Plover Flight Path
- Golden Plover Activity
- Site Boundary

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Project Title:
Drumnahough Wind Farm

Client: SSE Renewables

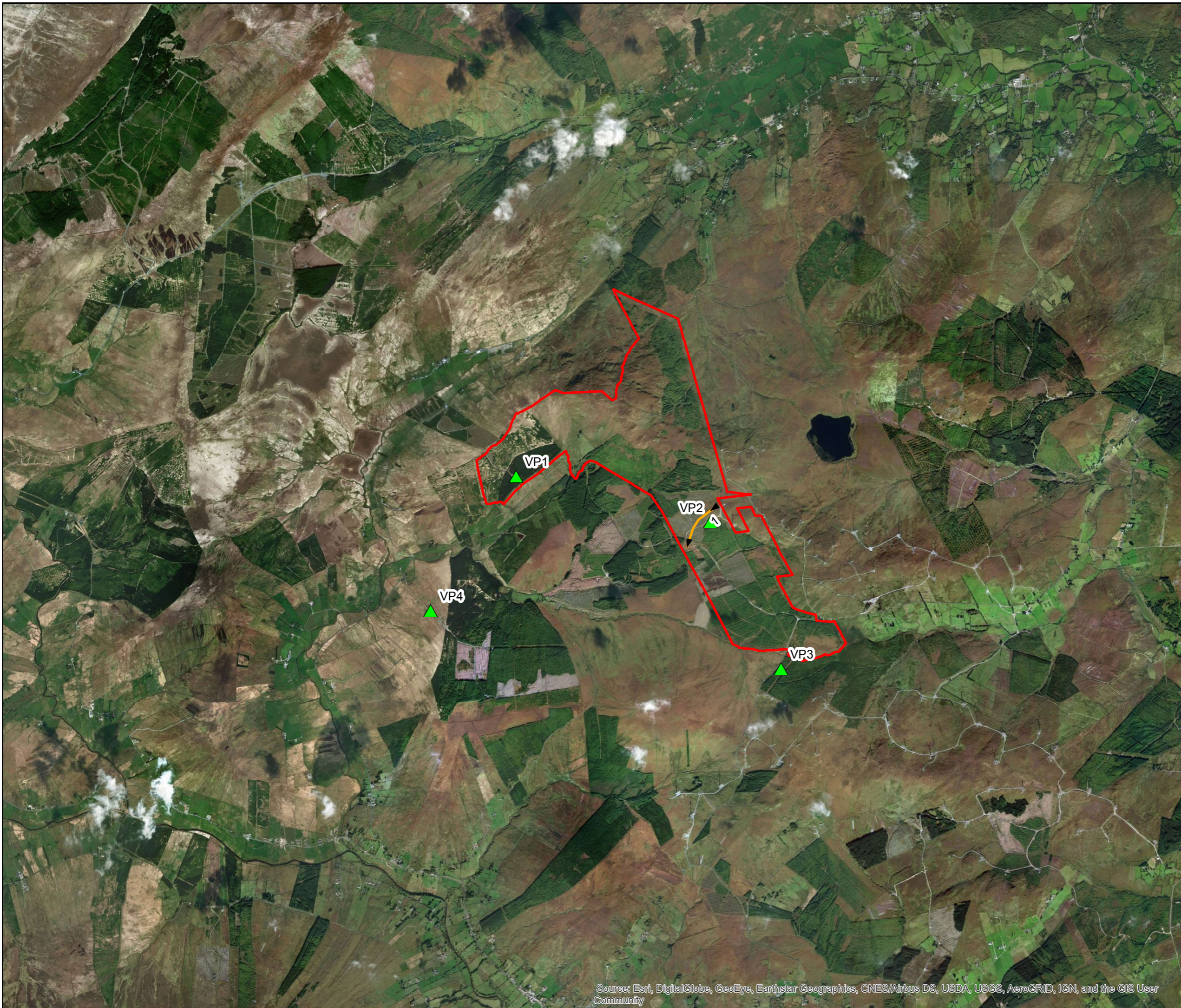
Drawing Title:
Winter 2018/9
Golden Plover Flight Path

Drawing No:
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Drawn: VH **Checked:** FMcK

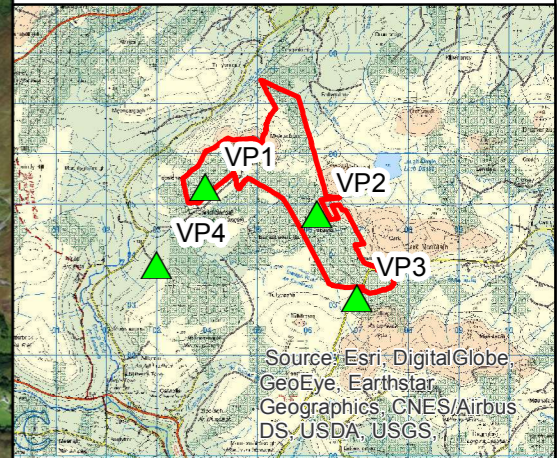
Date: 07/02/2020 **Scale (A3):** 1:25,000





Legend

- ▲ VP Location
- Site Boundary
- Merlin Flight Path**
- ▶ 1



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0 0.75 1.5 km

Project Title:
 Drumnahough Wind Farm

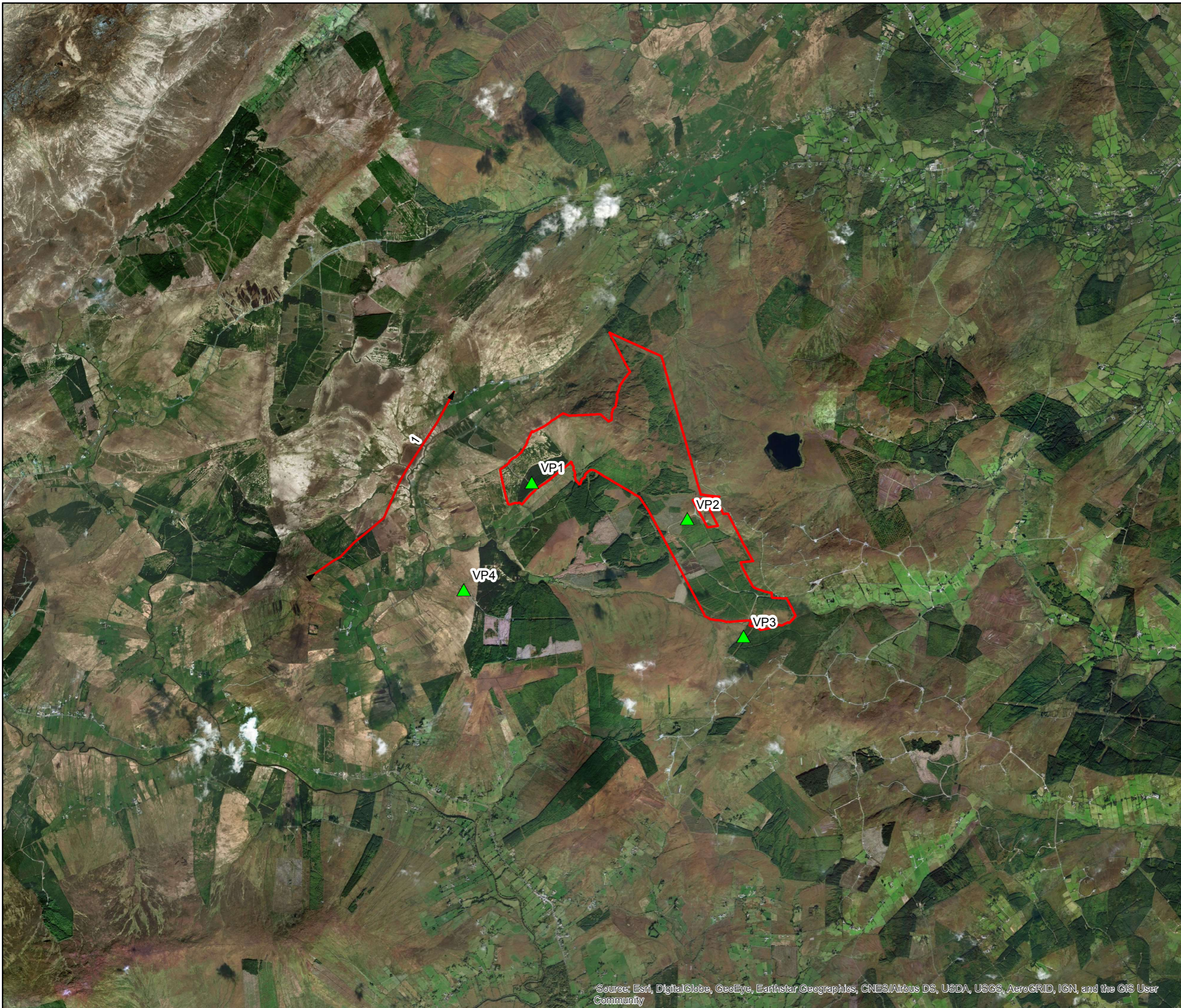
Client: SSE Renewables

Drawing Title:
 Winter 2018/9
 Merlin Flight Path

Drawing No:
 19123-MWP-XX-XX-DR-V-0018-A

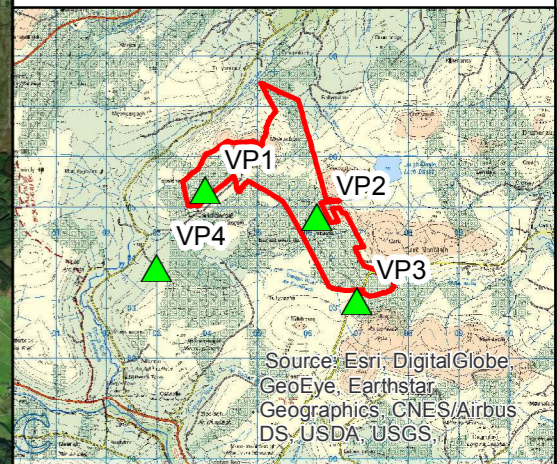
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Date: 24/06/2019	Scale (A3): 1:40,000





Legend

- ▲ VP Location
- Whooper Swan Flight Path**
- ▶ 1
- Site Boundary



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0 0.75 1.5 km

Project Title:
 Drumnahough Wind Farm

Client: SSE Renewables

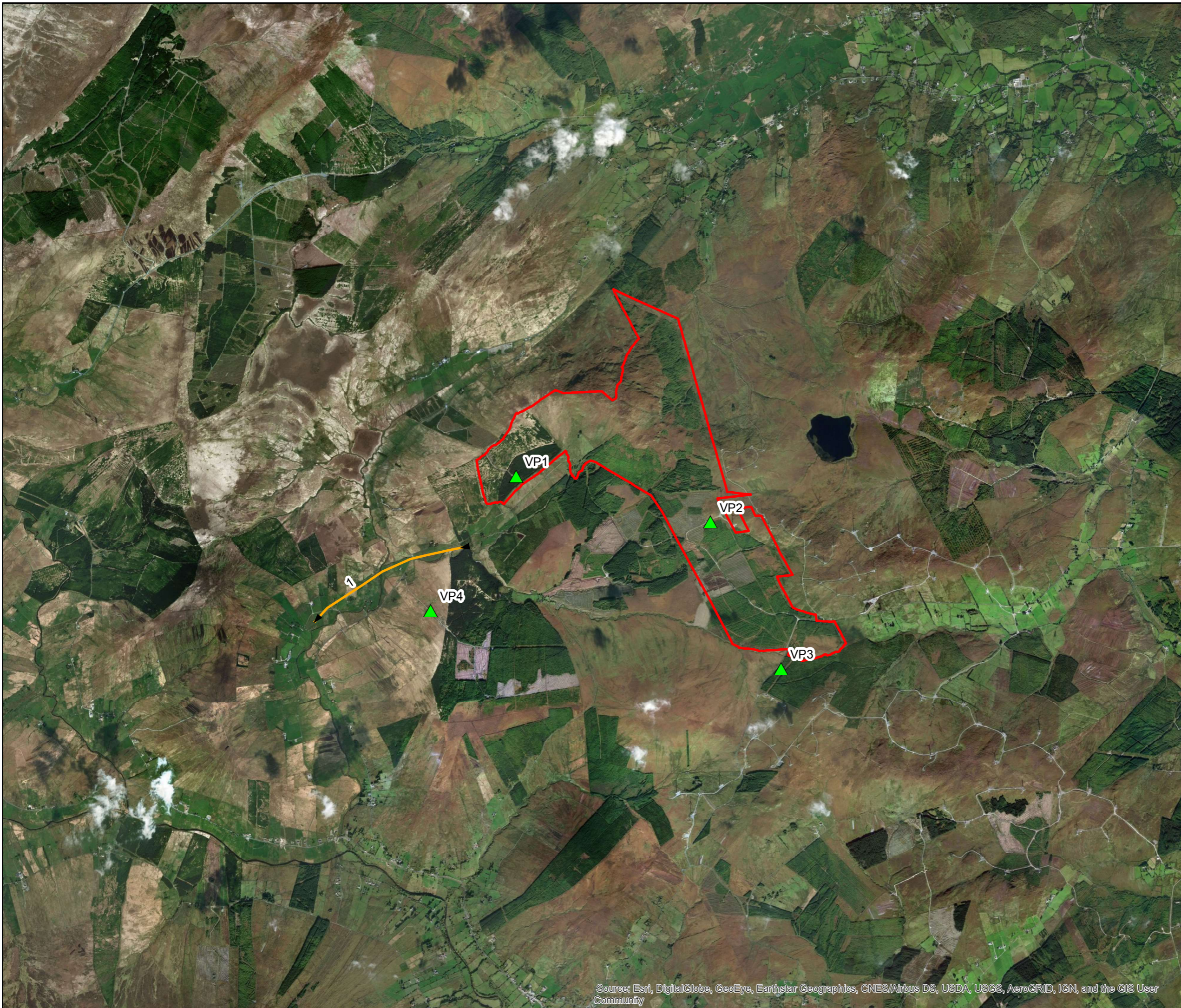
Drawing Title:
 Winter 2018/9
 Whooper Swan Flight Paths

Drawing No:
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Drawn: VH	Checked: FMcK
Date: 4-06-2019	Scale (A3): 1:50,000

Malachy Walsh and Partners
 Engineering and Environmental Consultants

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

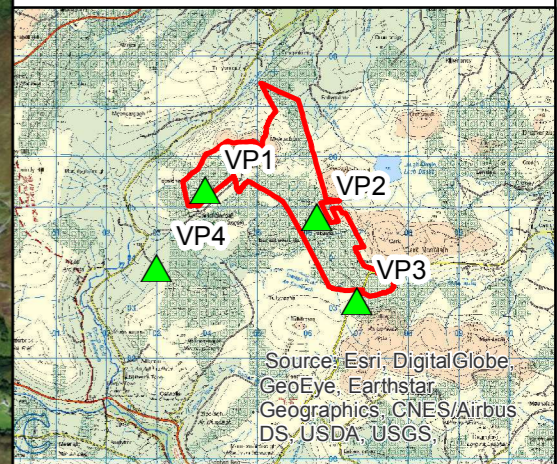


Legend

- ▲ VP Location
- Site Boundary

Goosander Flight Path

➔ 1



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0 0.75 1.5 km

Project Title:
 Drumnahough Wind Farm

Client: SSE Renewables

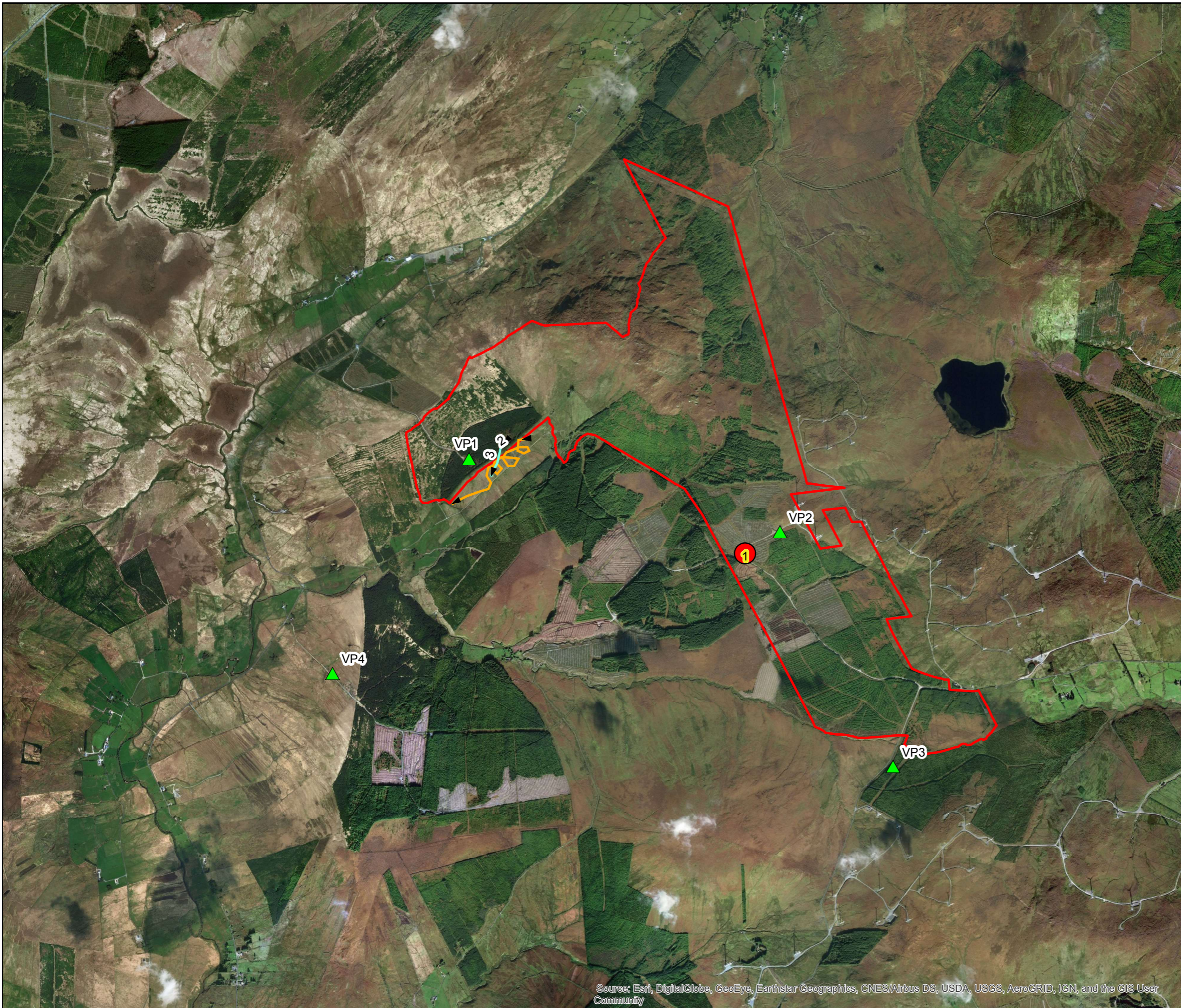
Drawing Title:
 Winter 2018/9
 Goosander Flight Path

Drawing No:
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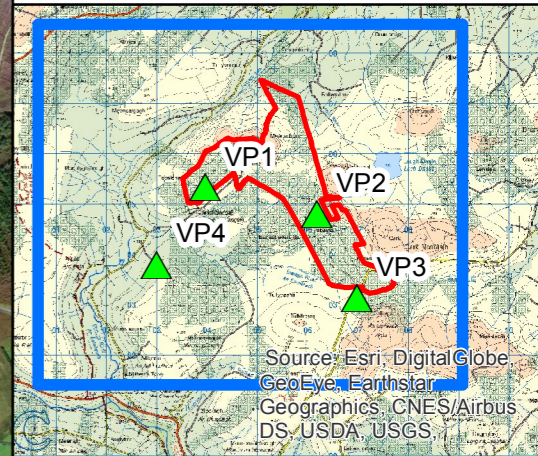
Malachy Walsh and Partners
 Engineering and Environmental Consultants

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

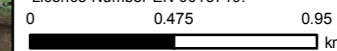


Legend

-  VP Location
-  Site Boundary
- Kestrel Flight Path**
-  2
-  3
- Kestrel Point**
-  1



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Project Title:
Drumnahough Wind Farm

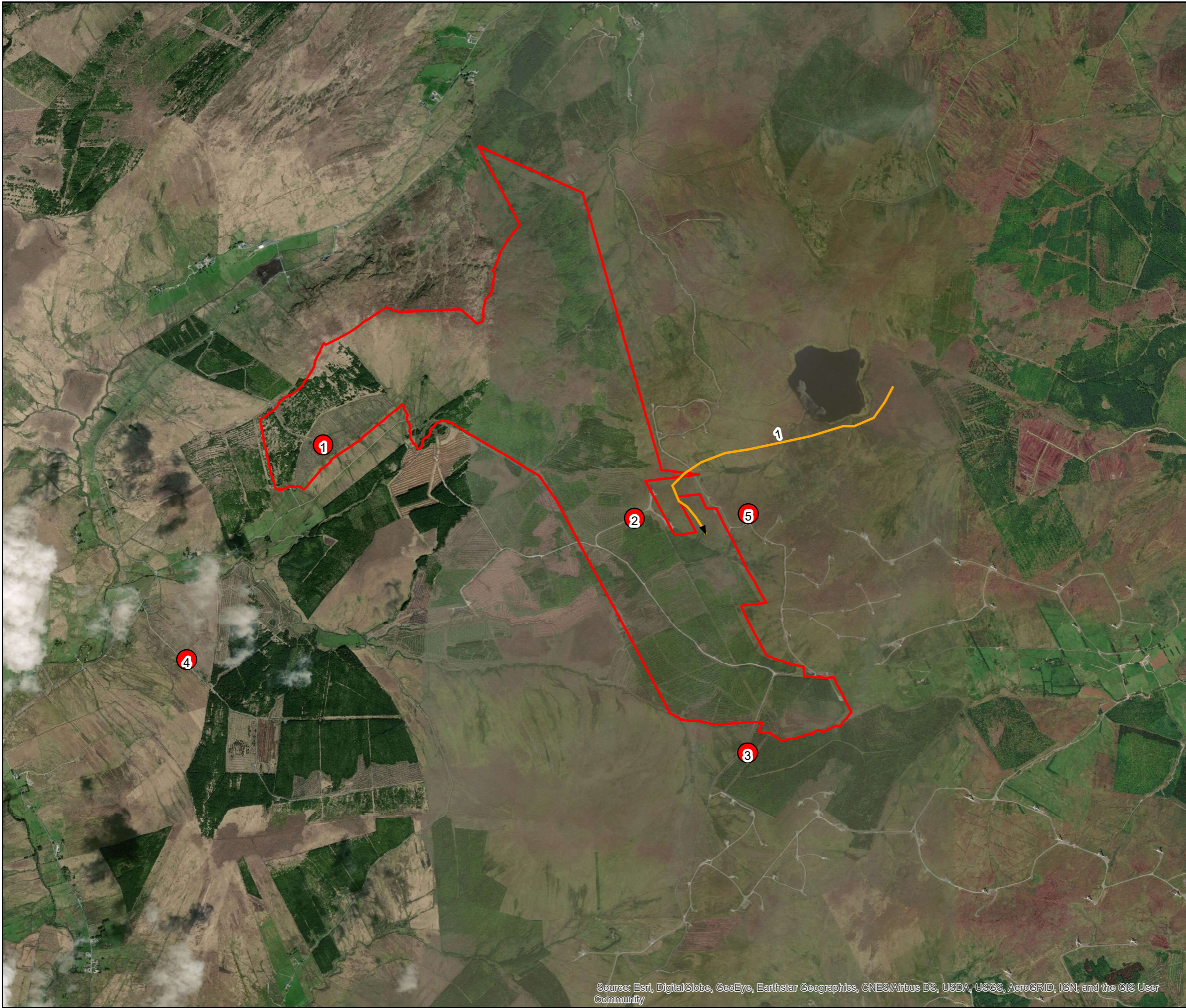
Client: SSE Renewables

Drawing Title:
Winter 2018/9
Kestrel Flight Path

Drawing No:
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Drawn: VH	Checked: FMcK
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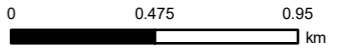




Legend

- Vantage Point
- ▶ Kestrel Flight Path
- Site Boundary

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Client: SSE Renewables

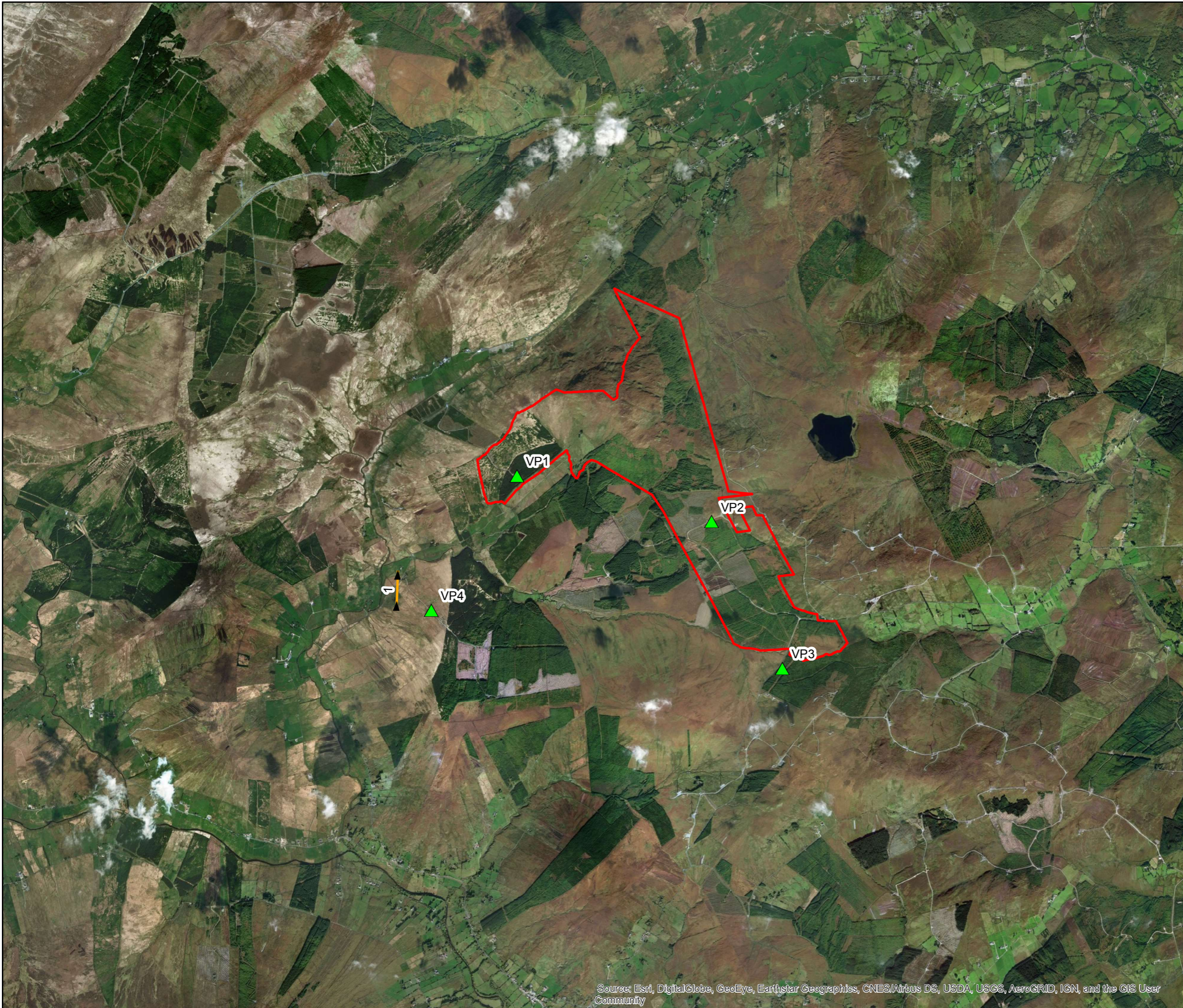
Drawing Title:
Winter 2018/9
Kestrel Flight Path

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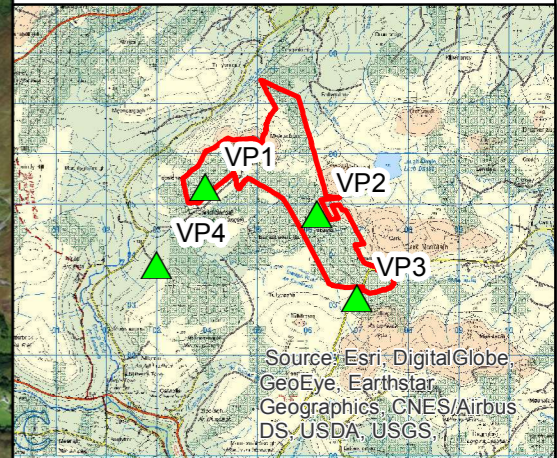




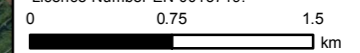
Legend

- ▲ VP Location
- Site Boundary

Sparrowhawk Flight Path



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Project Title:
Drumnahough Wind Farm

Client: SSE Renewables

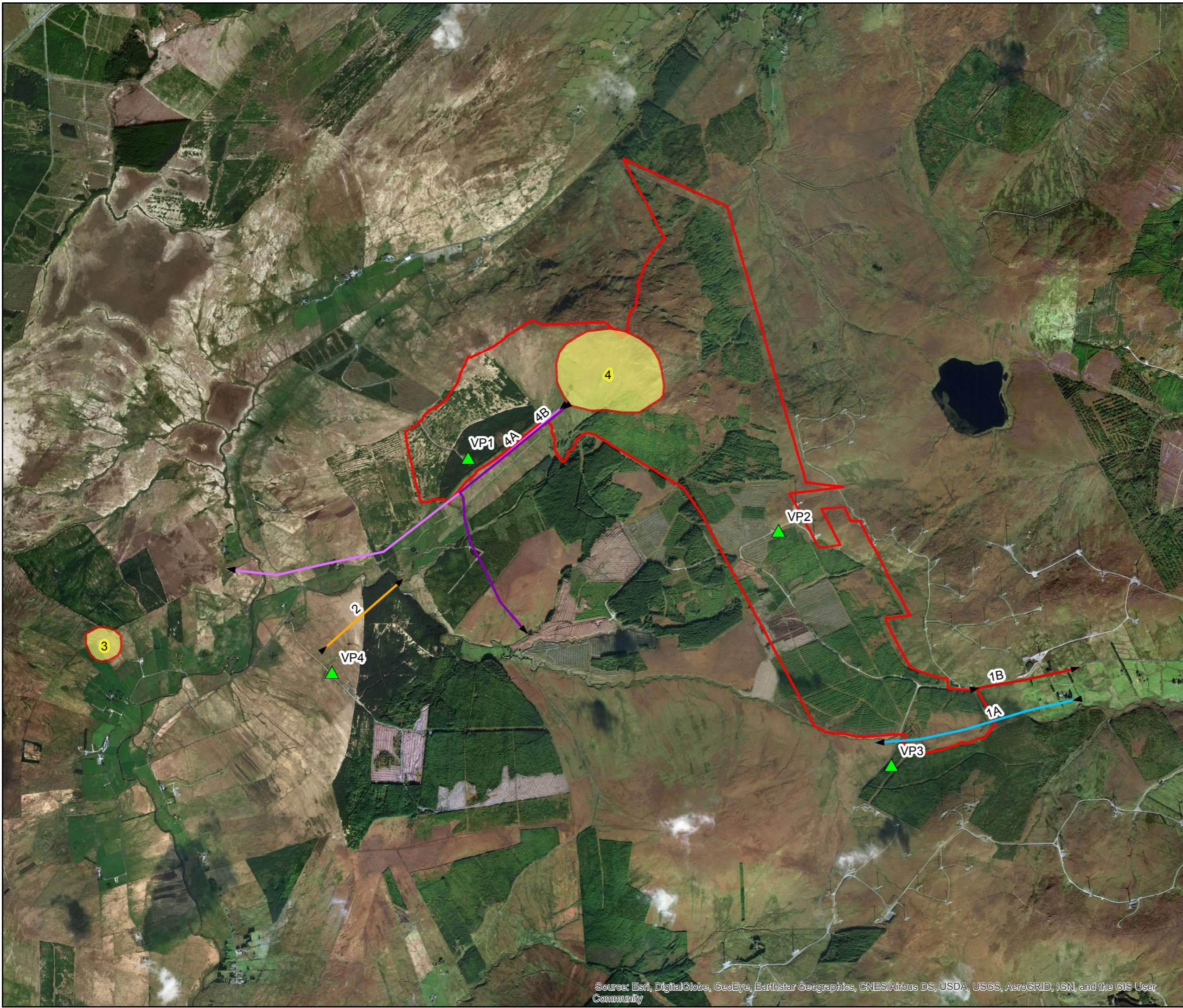
Drawing Title:
Winter 2018/9
Sparrowhawk Flight Path

Drawing No:
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Drawn: VH **Checked:** FMcK

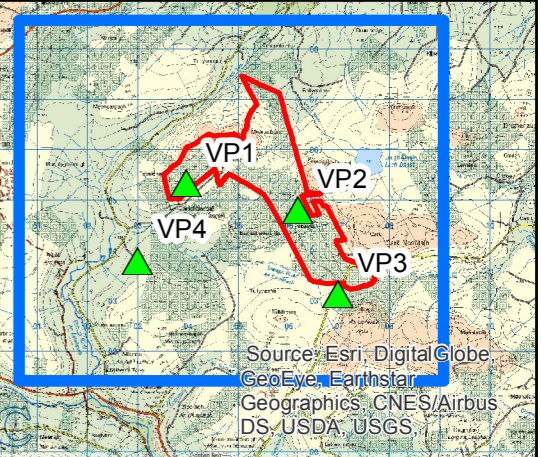
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Legend

- ▲ VP Location
- Site Boundary
- Buzzard Flight Path**
- 1B
- 2
- 1A
- 4A
- 4B
- Buzzard Activity



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0 0.475 0.95 km

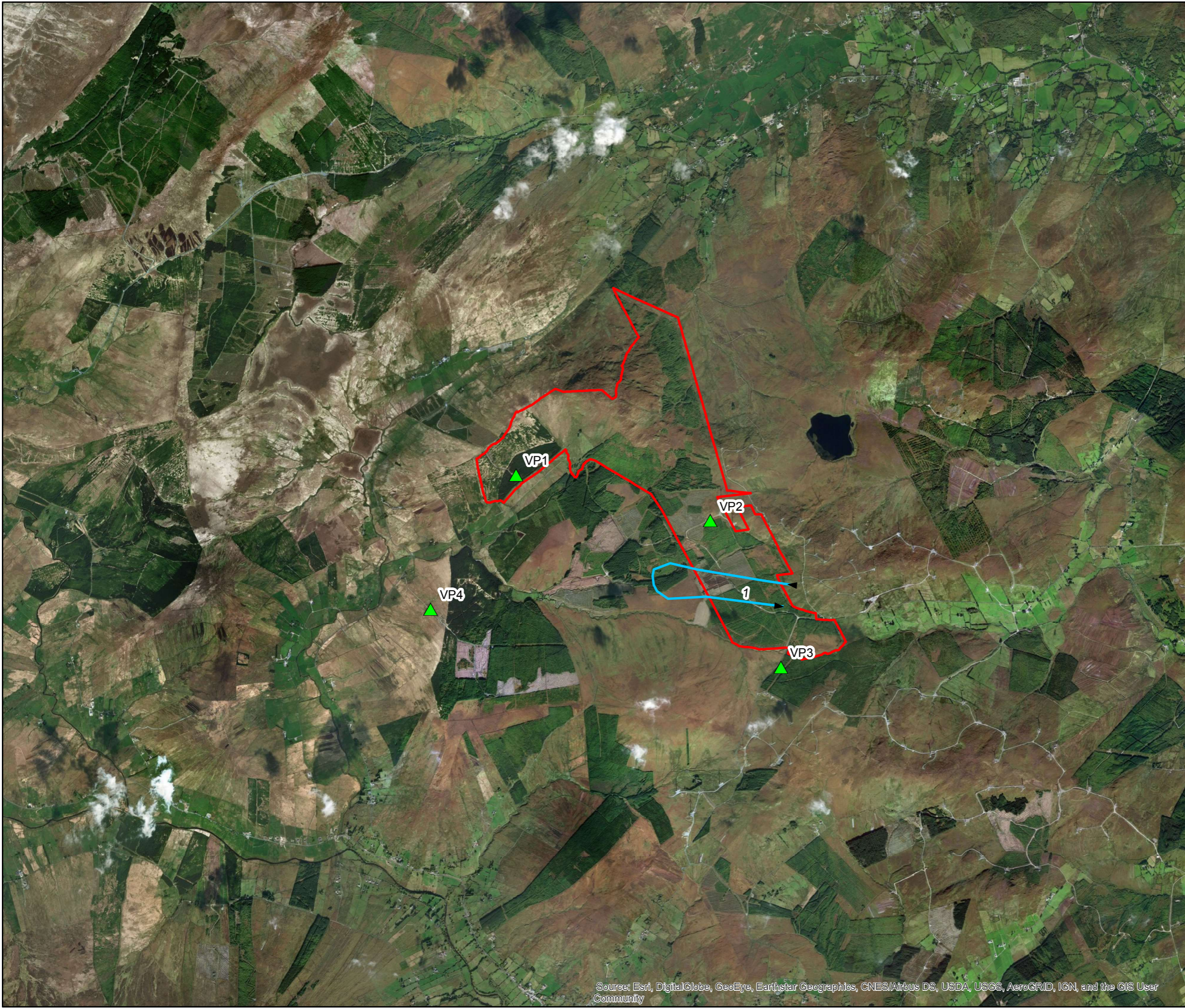
Project Title:
 Drumnahough Wind Farm

Client: SSE Renewables

Drawing Title:
 Winter 2018/9
 Buzzard Flight Path

Drawing No:
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Drawn: VH	Checked: FMcK
Date: 24/06/2019	Scale (A3): 1:25,000

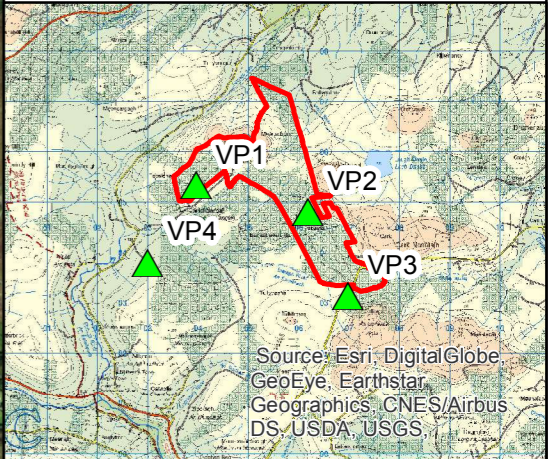


Legend

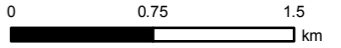
- ▲ VP Location
- Site Boundary

Lesser Black Backed Gull Flight Path

- ➔ 1



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Project Title:
Drumnahough Wind Farm

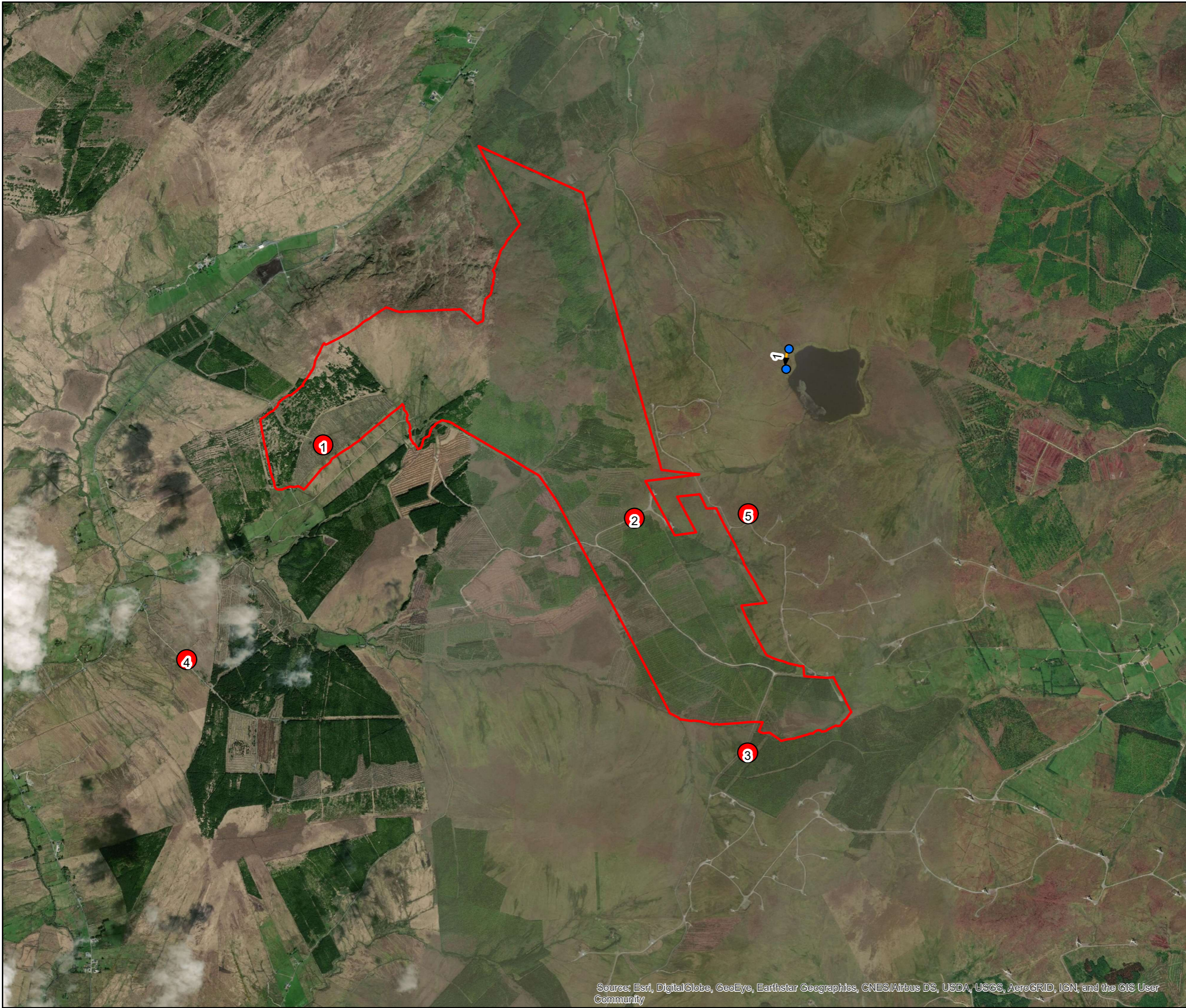
Client: SSE Renewables

Drawing Title:
Winter 2018/9
Lesser Black Backed Gull Flight Paths

Drawing No:
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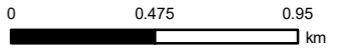




Legend

- Vantage Point
- Grey Heron Perched
- ▶ Grey Heron Flight Path
- Site Boundary

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Project Title:
Drumnahough Wind Farm

Client: SSE Renewables

Drawing Title:
Winter 2018/9
Grey Heron

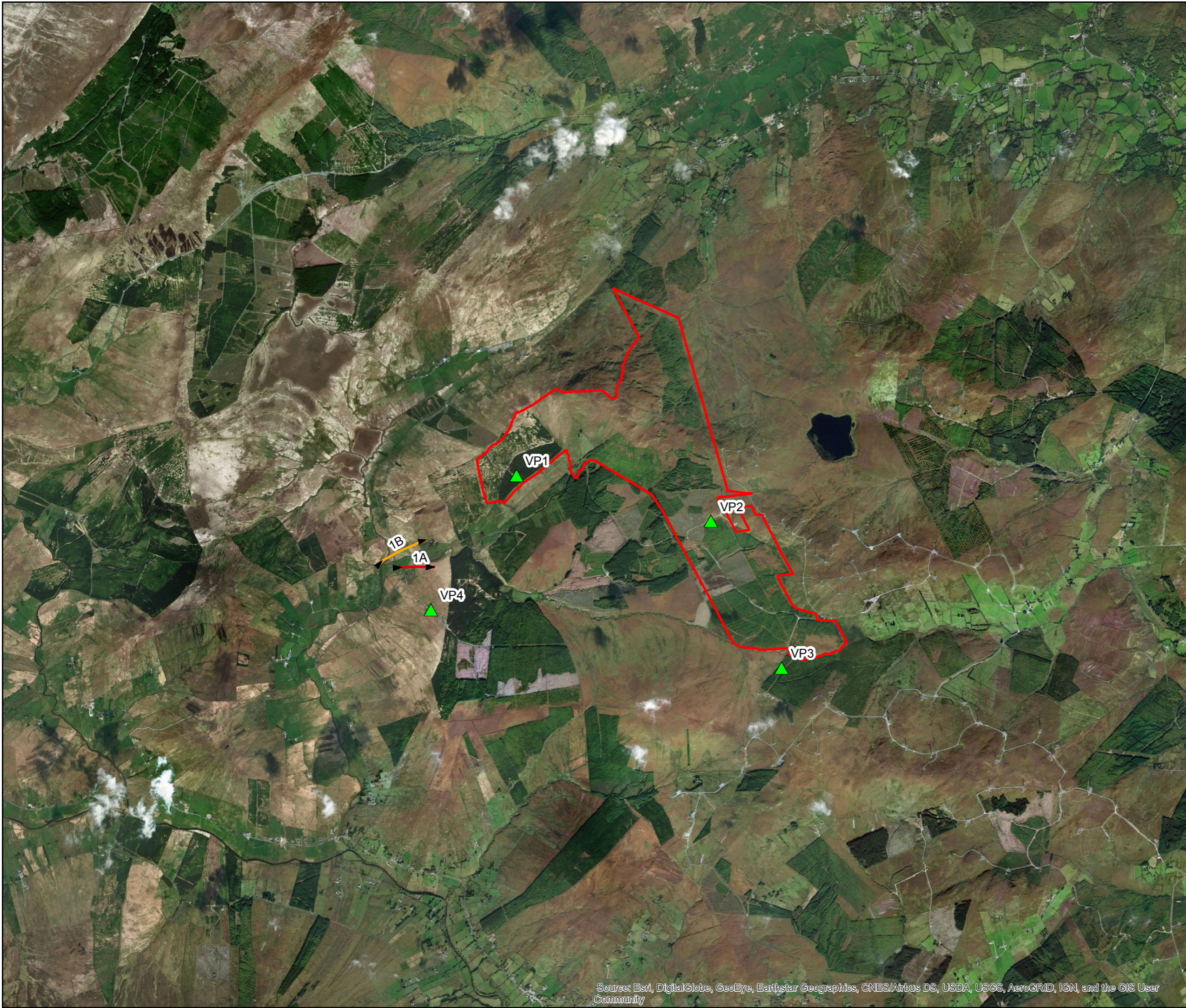
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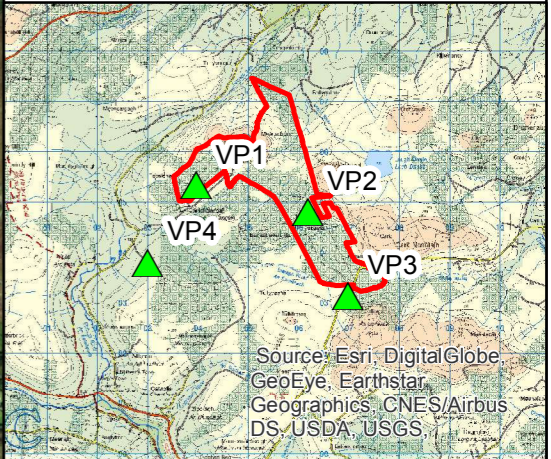


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

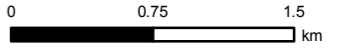


Legend

- ▲ VP Location
- Site Boundary
- Mallard Flight Path**
- ▶ 1A
- ▶ 1B



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Project Title:
Drumnahough Wind Farm

Client: SSE Renewables

Drawing Title:
Winter 2018/9
Mallard Flight Paths

Drawing No:
19123-MWP-XX-XX-DR-V-0013-A

Drawn: VH **Checked:** FMcK

Date: 4-06-2019 **Scale (A3):** 1:40,000



Appendix 6

Non-Target Species of Conservation Concern recorded during VP Surveys



The following table outlines monthly peak counts for all non-target species of conservation concern recorded during vantage point surveys at Drumnahough during winter 2018/19.

Common Name	Latin Name	Oct	Nov	Dec	Jan	Feb	Mar
Meadow pipit	<i>Anthus pratensis</i>	1	10	3	1	2	12
Goldcrest	<i>Regulus regulus</i>				1	1	2
Goldeneye	<i>Bucephala clangula</i>		1				
Mistle thrush	<i>Turdus viscivorus</i>			5	2	2	5
Robin	<i>Erithacus rubecula</i>		1	1	1	2	2
Skylark	<i>Alauda arvensis</i>						4
Starling	<i>Sturnus vulgaris</i>			56		40	
Stonechat	<i>Saxicola torquata</i>	2		1			

Appendix 7

Transect Survey Summary



Transect Survey Summary

Transect	Date	Observer	Start Time	Finish Time	Weather
B	19/11/2018	SC	12.35	14.25	Cloud cover 8/8, wind E F1-2, temp 7oC and visibility good.
C	19/11/2018	SC	14.45	15.45	Cloud cover 8/8, wind E F2-3, temp 7oC and visibility good.
B	24/01/2019	SC	14.30	15.45	Cloud cover 8/8, mist and rain throughout. Wind W-NW F1-2, temp 9oC and visibility good.
C	24/01/2019	SC	11.30	12.00	Dense fog with persistent rain throughout. Wind S/SW-W F0-1, temp 6-8oC and visibility poor-very poor.
B	22/03/2019	JC & SC	12.25	13.30	Cloud cover 5/8, mostly cloudy with some sunny spells. Wind W F3-4, temp 9oC and visibility good
C	22/03/2019	JC	08.15	08.45	Continuous light rain and mist with intermittent heavy rain. Wind F4-5, temp 8oC and visibility poor-moderate.

Appendix 8

Transect/Point Counts Summary Results

The following table outlines peak counts of species recorded during the winter 2018/19 Transect routes B and C and Point count surveys at Drumnaough. A total of 23 species were recorded.

Common Name	Latin Name	Nov		Jan		Mar	
		B	C	B	C	B	C
Blackbird	<i>Turdus merula</i>			1			
Buzzard	<i>Buteo buteo</i>					1	
Chaffinch	<i>Fringilla coelebs</i>		2	1	1	9	5
Coal tit	<i>Periparus ater</i>	1	2	1	2		
Crossbill	<i>Loxia curvirostra</i>	6					
Dunnock	<i>Prunella modularis</i>	1	1				
Goldcrest	<i>Regulus regulus</i>	3	3	1	9	11	1
Hooded crow	<i>Corvus cornix</i>	3	5			2	
Jackdaw	<i>Corvus monedula</i>	0	3				
Linnet	<i>Carduelis cannabina</i>	1					
Mallard	<i>Anas platyrhynchos</i>					2	
Meadow pipit	<i>Anthus pratensis</i>					5	2
Mistle thrush	<i>Turdus viscivorus</i>					1	
Raven	<i>Corvus corax</i>	1	3		2		
Redpoll	<i>Carduelis cabaret</i>	4					
Reed bunting	<i>Emberiza schoeniclus</i>	1					
Robin	<i>Erithacus rubecula</i>		1	1	2	2	1
Rook	<i>Corvus frugilegus</i>		2				
Song thrush	<i>Turdus philomelos</i>			1			
Stonechat	<i>Saxicola torquatus</i>					1	
Whooper swan	<i>Cygnus cygnus</i>					1	
Woodpigeon	<i>Columba palumbus</i>						1
Wren	<i>Troglodytes troglodytes</i>	2	2	1		1	1

Appendix 9

List of all species recorded



The following table outlines all species recorded during the winter 2018/19 surveys at Drumnahough. A total of 41 species were recorded.

Common Name	Latin Name	Oct	Nov	Dec	Jan	Feb	Mar
Blackbird	<i>Turdus merula</i>						
Blue tit	<i>Cyanistes caeruleus</i>						
Buzzard	<i>Buteo buteo</i>						
Chaffinch	<i>Fringilla coelebs</i>						
Chiffchaff	<i>Phylloscopus collybita</i>						
Coal tit	<i>Periparus ater</i>						
Crossbill	<i>Loxia curvirostra</i>						
Dunnock	<i>Prunella modularis</i>						
Feildfare	<i>Turdus pilaris</i>						
Goldcrest	<i>Regulus regulus</i>						
Golden plover	<i>Pluvialis apricaria</i>						
Goldfinch	<i>Carduelis carduelis</i>						
Goldeneye	<i>Bucephala clangula</i>						
Goosander	<i>Mergus merganser</i>						
Grey heron	<i>Ardea cinerea</i>						
Hooded crow	<i>Corvus cornix</i>						
Jackdaw	<i>Corvus monedula</i>						
Jay	<i>Garrulus glandarius</i>						
Kestrel	<i>Falco tinnunculus</i>						
Lesser black-backed gull	<i>Larus fuscus</i>						
Magpie	<i>Pica pica</i>						
Mallard	<i>Anas platyrhynchos</i>						
Meadow pipit	<i>Anthus pratensis</i>						
Merlin	<i>Falco columbarius</i>						
Mistle thrush	<i>Turdus viscivorus</i>						
Pied wagtail	<i>Motacilla alba</i>						
Raven	<i>Corvus corax</i>						
Redpoll	<i>Carduelis cabaret</i>						
Reed bunting	<i>Emberiza schoeniclus</i>						
Robin	<i>Erithacus rubecula</i>						
Rook	<i>Corvus frugilegus</i>						
Siskin	<i>Carduelis spinus</i>						
Skylark	<i>Alauda arvensis</i>						
Snipe	<i>Gallinago gallinago</i>						
Song thrush	<i>Turdus philomelos</i>						
Sparrowhawk	<i>Accipiter nisus</i>						
Starling	<i>Sturnus vulgaris</i>						
Stonechat	<i>Saxicola torquatus</i>						
Whooper Swan	<i>Cygnus cygnus</i>						
Woodpigeon	<i>Columba palumbus</i>						
Wren	<i>Troglodytes troglodytes</i>						