

APPENDIX D-10

Avian Monitoring Results

Summer 2019

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Breeding Bird Survey 2019

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 breeding season of 2019. 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 breeding 2019 surveys were managed and co-ordinated by John N. Murphy. Field surveyors were; John N. Murphy, Shane Cully (BSc.), John Collins (BSc.), Austin Cooney and Brian Porter (Dip.). 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 southeast of the site which can be accessed from the N13 (see **Figure 1** below).

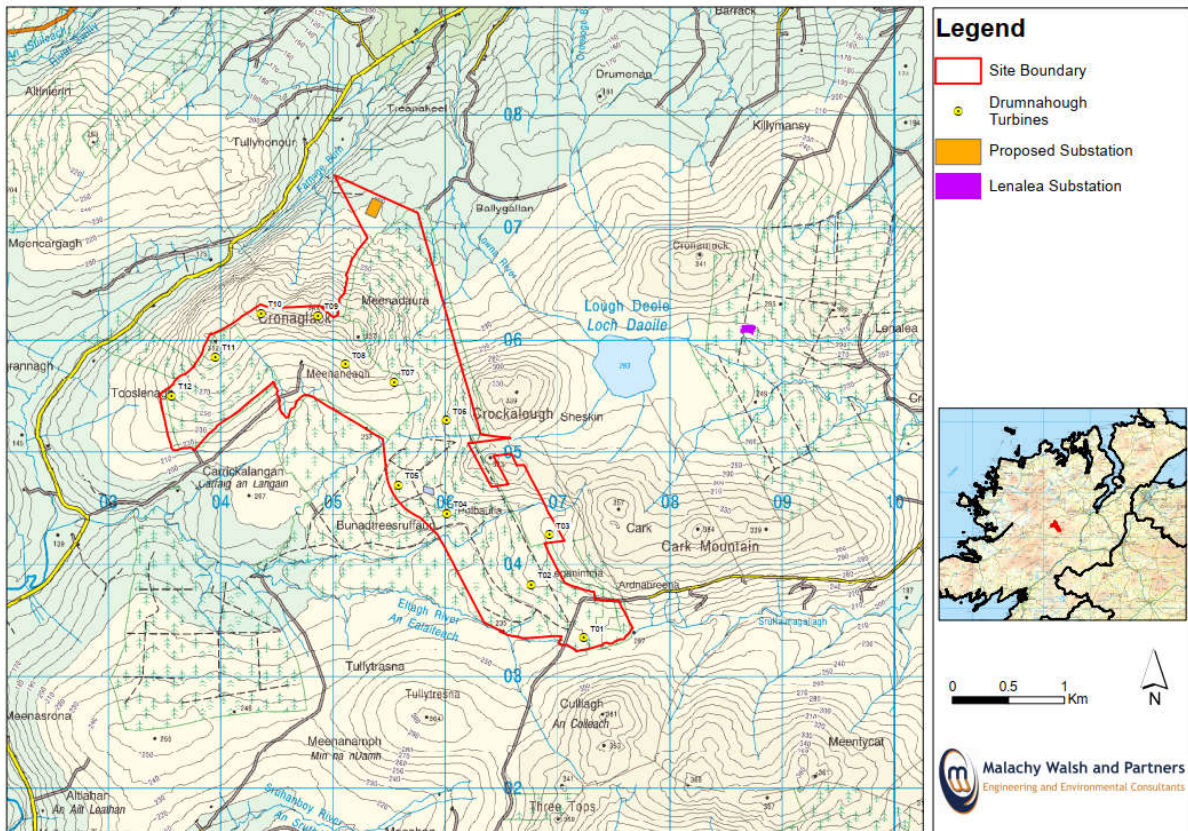


Figure 1. Site location and proposed wind farm layout

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 was 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 windfarms. 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 site.

2.3 CONSULTATION

There was no formal or informal consultation prior to or during this survey period.

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 (April to September 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 study 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 study 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 wind farm site and VP5 was included as it covers Lough Deelee, a habitat sometimes found to be used by birds of high conservation importance, including Whooper swan. Lough Deelee is the only significant body of standing water in proximity to 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

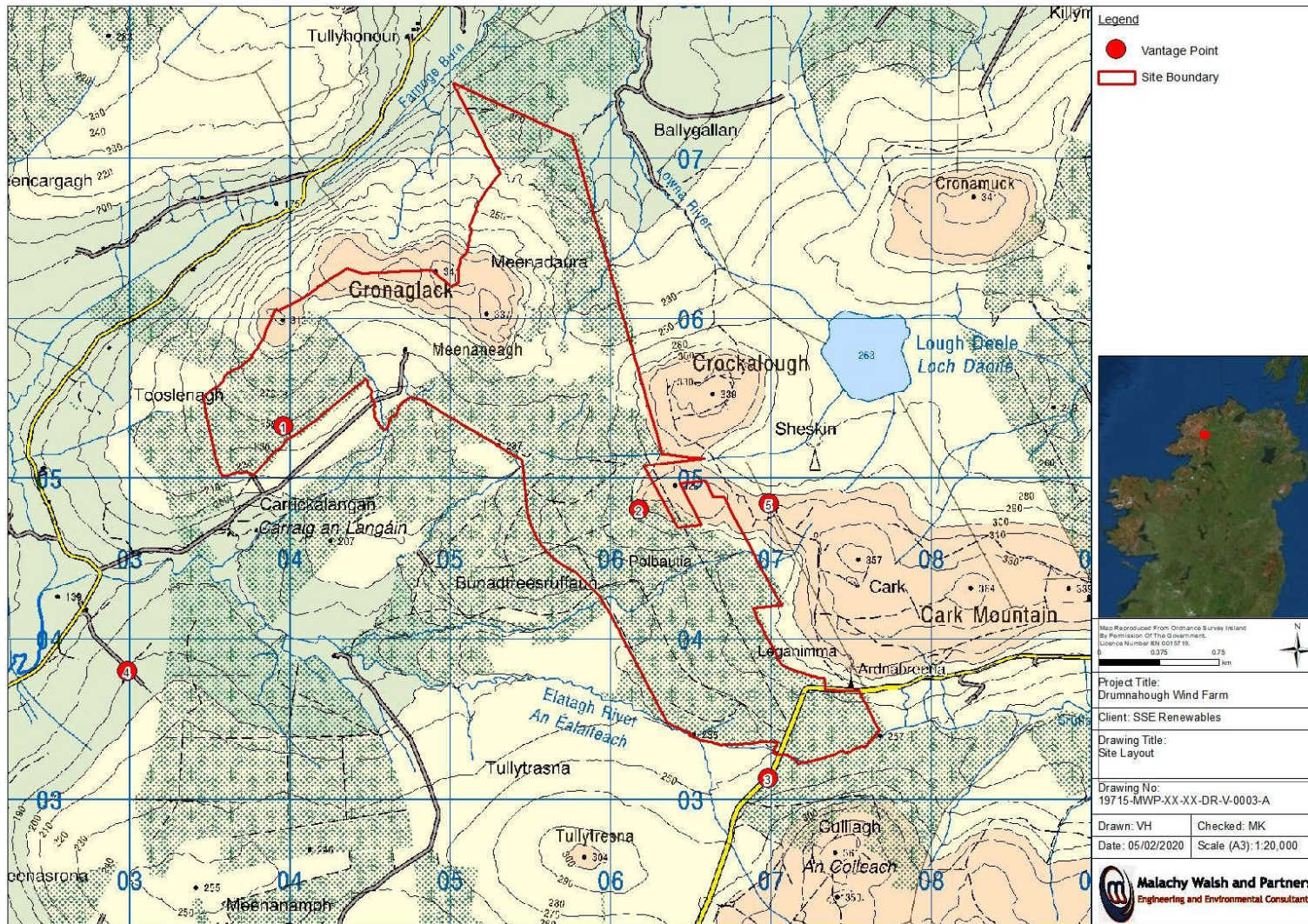


Figure 2. VP locations and development site boundary

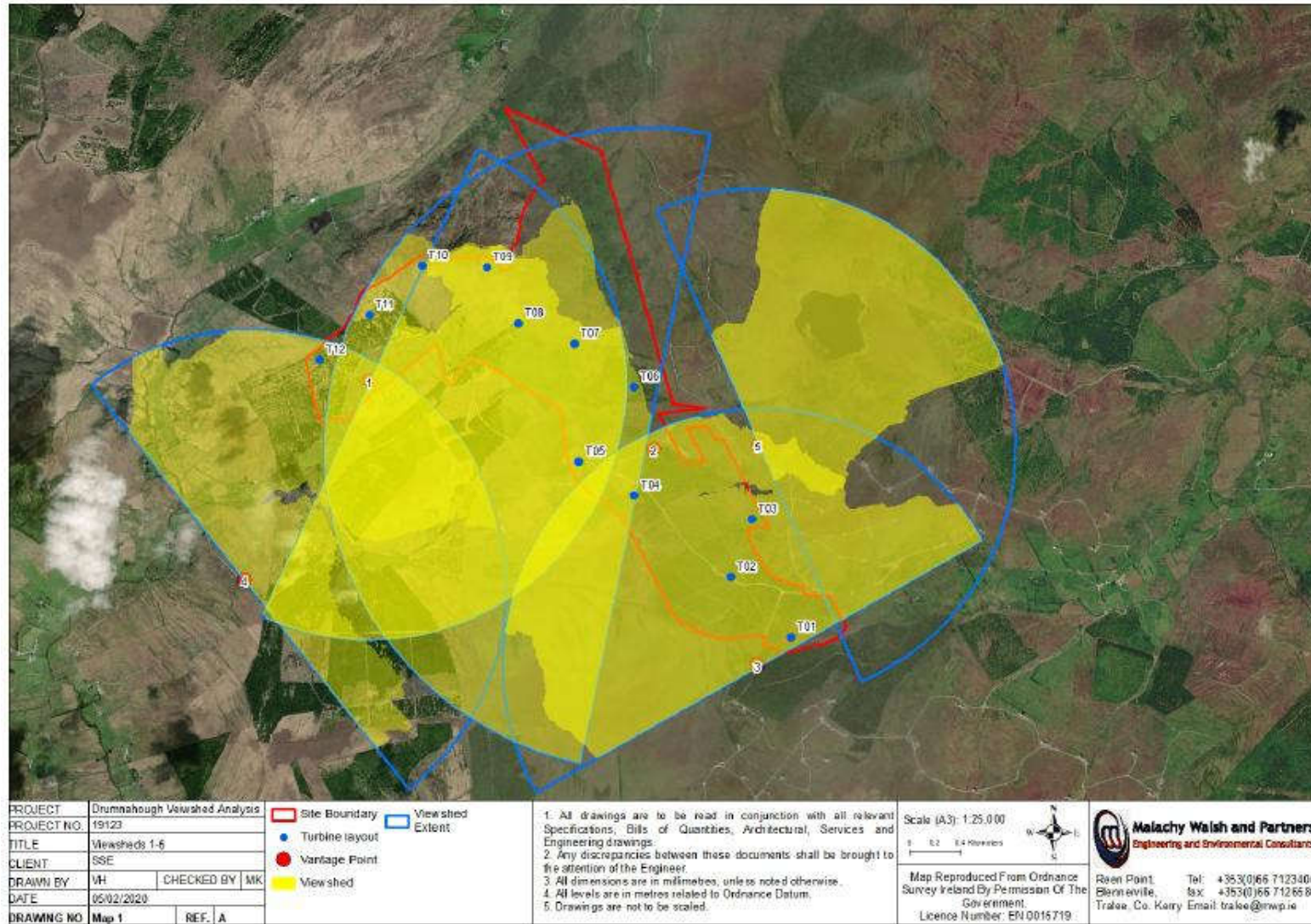


Figure 3. Vantage Point location and corresponding viewsheds

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° view with the exception of VP2 which extended to 2.5km. Each viewshed was then cropped to an 180° 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

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 in four months between April and September 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**.

2.4.3.3 Merlin nest watch surveys

During the breeding season in 2018, a suspected Merlin nest appeared to be in the area close to VP2. Adults and fledglings were observed interacting during the 2018 breeding survey period. Since then adult Merlin activity has been recorded in winter 2018/19 and breeding 2019 with all observations occurring exclusively at VP2. A nest watch survey was carried out to determine whether the nest was occupied or if it has been successful. The watch was carried out from a suitable vantage point; in this case VP2 was used. The duration of the watch was between 4-6 hours. Two nest watches were carried out during the 2019 breeding season, one in June and the other in July. Details on each watch survey including survey date, time and weather conditions can be found in **Appendix 9**. Tabulated results are provided in **Appendix 10** and flight paths recorded during the survey are provided in **Appendix 11**.

2.4.3.4 Walkover surveys

Nocturnal activity may pose greater hazards for birds at wind farms therefore nocturnal species should be surveyed. Breeding survey should be undertaken and should extend out to 500m beyond the proposed site for non-owl species, and 1km for owls (SNH, 2017). Gilbert *et al* 1998 provide guidelines to survey Nightjar in which the surveyor will listen for calling birds around dusk in the months May-July (inclusive). These surveys were carried out for Nightjar and Woodcock and followed the same two routes for Transect B and Transect C. A map showing the survey routes (Transect B and C route) within the Drumnahough site is included in **Appendix 2**. Details on each survey carried out including survey date, time and weather conditions and the results can be found in **Appendix 12**.

Walkover surveys were also carried out for Merlin and Golden plover along routes that were chosen in suitable breeding habitat. The surveyors then walked these routes and recorded any calls or activity observed in regard to Merlin and Golden plover. A map showing the route for Walkover 1

and Walkover 2 within the Drumnahough site is included in **Appendix 2**. Details on each survey carried out including survey date, time and weather conditions and the results can be found in **Appendix 13**.

2.4.3.5 *Incidental records*

Incidental records of birds relate to birds recorded either during or outside of the formal survey periods in which the surveyor took note of when on site. All records are presented in **Section 4.4**.

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.

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.

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>

4 BIRD SURVEY RESULTS

4.1 INTRODUCTION

The following target and secondary species were recorded during bird surveys carried out at the Drumnahough site during the breeding 2019 period (Annex I species are highlighted in bold):

- **Golden eagle**
- **Hen harrier**
- **Merlin**
- Kestrel
- Snipe
- Sparrowhawk
- Buzzard
- Common sandpiper
- Cormorant
- Great black-backed gull
- Lesser black-backed gull
- Grey heron
- Mallard

A comprehensive list of all bird species recorded within the study area over the course of the breeding 2019 surveys is provided in **Appendix 14**.

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 breeding 2019 period. Tabulated summaries of these target species observations, including flight information, are available in **Appendix 4**. Flight line and activity areas mapping for each target species is available in **Appendix 5**. Annex I species are highlighted in bold.

4.2.2.1 Golden eagle

Golden eagle (*Aquila chrysaetos*) were observed on four occasions at VP1, VP2 and VP4 and was recorded twice in the month of April and twice in the month of September. The Golden eagle is Ireland's largest bird of prey and a red-listed species. These eagles were formerly bred in Ireland and recently re-introduced into Donegal. Wandering birds from this re-introduction project in Glenveagh National Park have been observed in upland areas throughout Ireland. All sightings appeared to be a 2nd calendar year bird. The first observation took place on 24th April during VP4 in which an individual

was seen northwest of the VP circling before flying northeast at heights between 30-40m along the edge of a plantation. The second sighting was on the same date at VP2; the bird flew in from the north and landed up on Cronaglack Mountain. The elevation of the mountain exceeds 300m. This eagle then flew west and landed on the ground after being mobbed by four hooded crows before flying east at heights between 0-50m until out of sight. It was not until September when there was another sighting of Golden Eagle. On 24th September an individual was observed on the ground of Cronaglack Mountain to the east of VP1. The eagle then circled and flew at heights between 30-40m before landing in a 1st rotation forest onsite and remained there perched in the trees. The bird moved from tree to tree after being mobbed by Magpies and Hooded crows at a height of 20m for almost an hour before flying in a south-westerly direction over heather moorland out of sight. Presumed to be the same bird the final sighting occurred on 25th September during VP2. The eagle was observed perched in 1st rotation forest to the northwest of VP2 for 51 seconds. The bird then flew in a north-easterly direction over heather moorland at a height of 20m and landed. The eagle remained on the ground for almost half an hour before flying round and circling the hill at heights between 20-50m and then gaining height to 50-100m and then flew north and out of sight. The majority of the activity was recorded in the north eastern portion of the site north of VP2 within the site boundary.

Bird surveys have been ongoing at the site since April 2018 and these were the first sightings of Golden eagle. A sheep carcass was subsequently observed in the area where the Golden eagle was seen and this may have attracted the juvenile Golden eagle for a period of time. This carcass was removed from the site shortly after as it could have been poisoned. Other sightings of Golden eagles occurred when field ecologists were in the area collecting water samples in July 2019; it is thought the birds drift southwest presumably from Glenveagh National Park. Additionally, holding pens close to the site for Red-legged partridge were observed in the area outside and to the northwest of the site. This is a likely explanation for increased Golden Eagle activity in this area. A map has been provided in **Section 4.4** below (See **Figure 4**). Golden eagle is an Annex I species of the Birds Directive.

4.2.2.2 Hen harrier

Hen harrier (*Circus cyaneus*) was only observed once in the month of September. On 24th September as surveyor got to the VP1 location a female Hen Harrier flew northeast across the VP. This female may have been disturbed by the presence of the surveyor. She flew low at heights between 2-5m off the ground through grassland moorland. Whilst flying she was then mobbed by a kestrel and 3 hooded crows. She then flew back and over the rear side of the hill for a further 3 minutes and the hooded crows continued to mob her until she went out of site for a few minutes. This female returned for a brief 20 seconds flying low at 1-5m until finally lost from sight. All activity occurred within the site boundary to the northeast of VP1. Hen harrier is amber-listed species in this country and is also an Annex I species of the Birds Directive. It is considered that the penned Red-legged partridge may have attracted the Hen harrier to the area on this date.

4.2.2.3 Merlin

Merlin (*Falco columbarius*) was observed on two occasions at VP2 during the breeding 2019 survey period. The first sighting was on 25th April where a male was seen west of VP2 flying in a north-westerly direction over forestry at heights between 24-40m. Two sightings of the same female were

recorded on 26th June west of VP2. She was first spotted flying from north to south at heights between 30-40m and later she was seen flying in a north-westerly direction at heights between 20-25m. It is considered that Merlin were breeding on the site. Merlin is an amber-listed species in this country and is also an Annex I species the Birds Directive.

4.2.2.4 Kestrel

Kestrel (*Falco tinnunculus*) was observed at all VP locations except VP5 in the months of June, July September only. In total seven observations of kestrels in flight were made, four flight paths occurred within the site boundary and three outside. The majority of observations pertained to single birds hunting, flying or perched. On one occasion 27th June a pair of kestrel (1 male and 1 female) were observed during VP1 which appeared to be a pair with possible nesting young fledglings in the tree to the west of VP1. Kestrel is an amber-listed species and common localised breeder in this region of Donegal and are known to nest to the east of Lough Deele.

4.2.2.5 Snipe

Snipe (*Gallinago galinago*) activity was recorded on four occasions in the months of April, May and June only and VP1, VP3 and VP4. Two observations occurred from within the site boundary and other two to the west of the site. The observations which occurred in May and June were of males drumming and chipping. Overall flight heights ranged from 0-150m. Snipe is an amber-listed species in Ireland.

4.2.2.6 Sparrowhawk

Sparrowhawk (*Accipiter nisus*) was observed at VP3 and VP4 in the months of April and June only. A total of 2 in flight observations of Sparrowhawks were made, both of which occurred outside the site boundary to the west. Both records comprised sightings of single birds with flight heights ranging from 10-150m. An additional sighting of Sparrowhawk occurred during a Merlin Nest Watch Survey in July, the details of this observation are presented in **Section 4.3.2.1.2** below Sparrowhawk is an amber-listed species in Ireland.

4.2.2.7 Buzzard

Buzzard (*Buteo buteo*), was recorded in the months of April, June, August and September only and was seen regularly at VP4 and less frequent at VP1 and VP2. A total of 7 flight-lines of Buzzard were recorded over the survey period. All of sightings consisted of 2 birds flying, hunting and circling and on one occasion 27th June displaying was recorded. Flight heights ranged between 20m and >200m and most of a flight activity was recorded west of the subject site close to VP1 and VP4. The majority of the flight paths occurred outside the site boundary. Buzzard is a green-listed species in Ireland and is known to be nesting in the area between VP1 and VP4.

4.2.2.8 Target Species Summary

The target species recorded during VP surveys in breeding 2019 can be categorised as follows (Annex I species are highlighted in bold):

- Raptors
 - **Golden eagle**
 - **Hen harrier**
 - **Merlin**

- Kestrel
- Sparrowhawk
- Buzzard
- Waders
 - Snipe

The following table (**Table 3**) shows monthly peak counts of all target species recorded during vantage point surveys over the breeding 2019 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 breeding 2019 VP surveys

Common Name	Latin Name	April	May	June	July	Aug	Sept
Golden eagle	<i>Aquila chrysaetos</i>	1	0	0	0	0	1
Hen harrier	<i>Circus cyaneus</i>	0	0	0	0	0	1
Merlin	<i>Falco columbarius</i>	1	0	1	0	0	0
Kestrel	<i>Falco tinnunculus</i>	0	0	2	1	0	1
Snipe	<i>Gallinago gallinago</i>	3	2	0	1	0	1
Sparrowhawk	<i>Accipter nisus</i>	1	0	1	0	0	0
Buzzard	<i>Buteo buteo</i>	2	0	2	0	2	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 breeding 2019 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 Common sandpiper

Common sandpiper (*Actitis hypoleucos*) activity was recorded in the month of July at VP5. On 24th July an adult was observed northeast of VP flying around Lough Deelee for a short period before landing on the shore and disappeared out of sight. Common sandpiper is an amber-listed species in Ireland.

4.2.3.2 Cormorant

Cormorant (*Phalacrocorax carbo*) activity was recorded in the month of July at VP5. On 24th July an adult was observed northeast of VP5 perched on a rocky spit on the northern shore of Lough Deelee.

After approximately 2 hours this individual took off flying back and forth over Lough Deele, bog and grassland moorland and gained height to over 150m before heading off in a north-westerly direction and out sight. Cormorant is an amber-listed species in Ireland.

4.2.3.3 Great Black-backed gull

Great black-backed gull (*Larus marinus*) activity was recorded in the month of April, one occurred at VP3 and the other occurred at VP5. On 26th April an individual was spotted west of VP3 flying at heights between 0-50m in a south-westerly direction over bog land outside of the site boundary. On 24th April at VP5 an adult was seen northeast of the VP on Lough Deele. This individual flew over the Lough in a south-westerly direction and circled over heather moorland and grassland moorland at heights of up to 150 before heading off in a north-westerly direction. Great Black-backed gull is an amber-listed species in Ireland.

4.2.3.4 Lesser Black-backed gull

Lesser black-backed gull (*Larus fuscus*) was recorded once in month of April at VP4 and once on the month of June at VP5. On 24th April a pair (1 male and 1 female) was seen circling above a field of improved grassland to the north-east of VP4 outside the boundary at heights between 15-20m. On 26th June was observed northeast of VP on Lough Deele splashing and washing initially and then flew closer to the shore and washed for a further 2 minutes before going out of view. Lesser Black-backed gull is an amber-listed species in Ireland.

4.2.3.5 Grey heron

Grey heron (*Ardea cinerea*) was recorded once in the month of April at VP1 and once in the month of September at VP5. On 25th April an individual was seen south of VP1 heading in a north-easterly direction over improved grassland, grassland moorland, and 1st rotation forest and clear fell. Initial flight height ranged from 20-50m and then the bird gained height to 50-80m as the bird flew across the north western portion of the site. On 26th September an individual was seen north of VP5 flying from the western shore of Lough Deele to the eastern shore at a height of 5m, once landed on the eastern shore the bird went out of view. Grey Heron is a green-listed species in Ireland.

4.2.3.6 Mallard

Mallard (*Anas platyrhynchos*) activity was recorded on two occasions on 24th April at VP4 and VP2. The observation at VP4 consisted of a lone male; he was spotted northwest of VP4 flying in a north-easterly direction at heights between 10-20m outside of the site boundary. The observation at VP2 was of a pair (1male and 1 female), they were seen south of VP2 flying west to east then southeast at heights between 30-40m inside the site boundary. Mallard is a green-listed species in Ireland.

4.2.3.7 Secondary Species VP Summary

The secondary species recorded during VP surveys in breeding 2019 can be categorised as follows:

- Gulls
 - Great black-backed gull
 - Lesser black-backed gull

- Waders
 - Common sandpiper

- Cormorant
- Grey heron
- Mallard

The following table (**Table 4**) shows monthly peak counts of all secondary species recorded during vantage point surveys over the breeding 2019 period. As above, species names are colour-coded to indicate conservation status (Colhoun and Cummins, 2013).

Table 4: Monthly peak counts of all secondary species recorded during breeding 2019 VP surveys

Common Name	Latin Name	April	May	June	July	Aug	Sept
Common Sandpiper	<i>Actitis hypoleucos</i>	2	0	0	1	0	0
Cormorant	<i>Phalacrocorax carbo</i>	1	0	0	1	0	0
Great black-backed gull	<i>Larus marinus</i>	1	0	0	1	0	0
Lesser black-backed gull	<i>Larus fuscus</i>	2	0	1	0	0	0
Grey heron	<i>Ardea cinerea</i>	1	0	0	0	0	1
Mallard	<i>Anas platyrhynchos</i>	2	0	0	0	0	0

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*) and Grey wagtail (*Motacilla cinerea*) were the only non-target red-listed species which were recorded. Meadow pipit was recorded in every month throughout the site with numbers peaking in September. Grey wagtail was only recorded in the month of August. Amber-listed non-target species recorded in every month included Goldcrest (*Regulus regulus*) and Robin (*Erithacus rubecula*). Amber-listed species which were frequently recorded included Swallow (*Hirundo rustica*), Skylark (*Alauda arvensis*) and Mistle thrush (*Turdus viscivorus*). While other less frequently recorded species comprised Starling (*Sturnus vulgaris*), Sand martin (*Riparia riparia*), Stonechat (*Saxicola torquata*), Swift (*Apus apus*), Linnet (*Carduelis cannabina*) and Grasshopper warbler (*Locustella naevia*).

Other than Buzzard, Grey heron and Mallard, 24 other green-listed species were recorded during the breeding 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 breeding visitors to Ireland.

All species recorded during VP surveys are provided in **Appendix 14**.

4.3 DISTRIBUTION AND ABUNDANCE SURVEY RESULTS

4.3.1 Transect and Point Count Surveys

A total of 30 species were recorded during the Transect and Point count surveys. Meadow pipit (*Anthus pratensis*), Golden plover (*Pluvialis apricaria*) and Grey wagtail (*Motacilla cinerea*) were the only three red-listed species recorded. Meadow pipit was recorded each month where Golden plover and Grey wagtail only appeared in one month. Seven amber-listed species were recorded in

total with Robin (*Erithacus rubecula*) and Goldcrest (*Regulus regulus*) being seen most frequently in all four months and all transect and point count locations. The remaining amber-listed species consisted of; Mistle thrush (*Turdus viscivorus*), Skylark (*Alauda arvensis*), Sparrowhawk (*Accipiter nisus*), Spotted flycatcher (*Muscicapa striata*) and Swallow (*Hirundo rustica*) all of which were only in one out of the four months. The most notable green-listed species recorded was Peregrine falcon (*Falco peregrinus*) which is an Annex I species under the Birds Directive. Apart from the Peregrine falcon a total of 19 green-listed species were recorded with Chaffinch (*Fringilla coelebs*), Coal tit (*Periparus ater*) and Wren (*Troglodytes troglodytes*) being the most frequently recorded species in all four months.

Survey summary details are provided in **Appendix 7** and tabulated results of peak counts for all species recorded during monthly transect and point count surveys are provided in **Appendix 8**.

4.3.2 Merlin Nest watch surveys

Merlin is Ireland's smallest species of falcon and their elusive behaviour often makes detection difficult. These petite raptors tend to be uncommon breeding birds in Ireland. They most commonly nest on the ground on moorland, mountain and blanket bog but have also been known to occasionally nest in woodland. This species has taken to nesting in forestry plantations adjacent to moorland also. Their distribution in Ireland is uneven with the majority of birds found in the west of the country. The Wicklow Mountains have good numbers also and there are scattered populations across the midlands too. This small raptor is extremely agile during flight making them successful predators when preying on smaller birds such as Meadow pipits. When hunting, Merlin mainly take prey from a perch, on the ground or in low flight. Occasionally birds fly upwards during a pursuit flight but this only on occasion, possibly due to increased energy expenditure. Recorded flight activity during VP surveys Merlin usually flew low and was never recorded at heights greater than 50m. Merlin are challenging to observe as they are difficult to detect due to their low flying behaviour.

As previously mentioned in **Section 2.4.3.3**, during the breeding season in 2018 a suspected Merlin nest was located just northwest of VP2. Adults and fledglings were observed interacting during this survey period. Since the first survey season in 2018 adult Merlin activity has been recorded in winter 2018/19 and breeding 2019 with all observations occurring exclusively at VP2. There were no juveniles recorded at Drumnahough VP locations however, there was an observation of a juvenile whilst a surveyor was carrying out a VP watch on 22nd July 2019 at an adjacent site, Lenalea. During VP3 at Lenalea an observation lasted approximately 1 minute in which a juvenile Merlin flew in a westerly direction towards the Drumnahough site. Flight heights ranged between 6-10m. It is possible that this juvenile was heading to a nest in the area close to the nest identified in breeding 2018. It is common for Merlin to breed within 300m of the previous year's nest and sometimes re-use the same one (Hardey *et al.* 2009).

During the breeding 2019 breeding season two nest watch surveys were carried out at VP2, one 27th June and the other 26th July for the duration of 4 hours each. On 27th June the only one very brief observation of Merlin occurred. This female flew past the surveyor as she was being mobbed by two Meadow pipits and then she was gone from sight. The weather was windy at times and the temperature much warmer than it had previously been which may have caused the Merlin's to stay cool in the shade. On 26th July the watch took place northwest of VP2 and to the west of the

proposed turbine T7. It was decided by the surveyor to move the watch point from VP2 to this location as it gave a better and closer view to the area where Merlin were seen most regularly during VP surveys. On this occasion no Merlin activity occurred.

Overall, there was little activity recorded during the nest watch surveys however, Merlin were recorded every season within the same general area. This suggests that the Merlin may favour this area to nest and forage. Details of surveys and maps are available in **Appendix 9, Appendix 10 and Appendix 11**.

4.3.2.1 Other species observed during Merlin Nest Watch Survey

During the 4 hour watch period two additional Target Species were observed; Peregrine and Sparrowhawk.

*4.3.2.1.1 Peregrine (*Falco peregrinus*)*

An adult male was observed early during the survey to the west of VP2 flying at a height of 5-10m over the tops of thicket/pole stage forest for 5 seconds. The bird flew in a north to south direction where he landed and perched in a dead tree for 20 seconds before flying off in south-westerly direction and out of sight. A while later the same male was seen west of VP2 flying in a south to north direction. The bird circled over forestry at heights between 40-60m for approximately 1 minute before flying off in a north-westerly direction and out of sight.

4.3.2.1.2 Sparrowhawk

An adult male was observed almost 2 hours later than the Peregrine in a similar area to the west of VP2. This individual was seen flying north/northwest to south/southeast at a height of 35m before dropping in to thicket/pole stage forest. A short while later the same male was seen flying at heights between 30-40m as he flew in to some trees west of VP with a prey item. He was recorded jumping around from branch to branch whilst chicks could be heard begging, this lead the surveyor to suggest there was a Sparrowhawk nest in that forested area to the west of VP2, outside the site boundary.

Details of flight activity and flight path maps are available in **Appendix 10 and Appendix 11**.

4.3.3 Walkover Surveys

4.3.3.1 Nightjar/Woodcock walkover survey

A Nightjar/Woodcock walkover survey was carried out on 28th August. The same route as Transects B and C were walked that evening for almost 2 hours. No Nightjar or Woodcock were observed during this survey. Details of the survey are presented in **Appendix 12** with maps of Transect B and Transect C presented in **Appendix 2**.

4.3.3.2 Merlin/Golden plover walkover survey

A Merlin/Golden plover walkover surveys were carried out on 27th June, one early afternoon and the other in the late evening. The routes walked, namely Walkover 1 route on potentially suitable breeding habitat within the site and Walkover 2 area on the Tullytresna bog, are presented in **Appendix 2**. No Merlin or Golden plover were observed during this survey. Details of survey are available in **Appendix 13**.

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:

- April VP1 – 3 Red grouse heard calling east and south of.
- April VP2 – Buzzard seen flying >3km to the west and Golden Eagle seen <5km to the northwest of VP.
- April VP3 – Snipe heard chipping in the bog south of the VP.
- April VP4 – Snipe heard chipping to the northeast of VP in grassland moorland.
- May VP3 – Snipe heard chipping to northwest of VP.
- May VP4 – Snipe heard chipping to southwest in rough grassland.
- June VP5 – Four Mallard were seen northeast of VP loafing on Lough Deele and Snipe was heard chipping in the valley to the northeast of VP.
- July VP5 – Mallard were observed on Lough Deele on two occasions, one group of 9 and a larger group of 20. An adult Great black-backed gull was seen perched on a rock on the north side of Lough Deele and 4 Teal were also seen on Lough Deele.
- August VP5 – 12 Mallard seen loafing on Lough Deele.
- September VP4 – 2 Buzzard were seen off site to the southwest of VP4.
- September VP5 – 4 Red grouse were flushed when the surveyor was walking from VP2 to VP5.
- September VP5 – 2 Mallard were seen on Lough Deele.
- Approximately 5km northwest of the site a pair of Curlew (*Numenius arquata*) is nesting.
- Approximately 5.5km northwest of the site Whinchat (*Saxicola rubetra*) are also nesting.

During a site visit in early December 2019 a Woodcock was flushed just outside the site boundary and Red grouse was flushed just inside the site boundary at the north-eastern portion of Drumnahough Site (See **Figure 4** below).

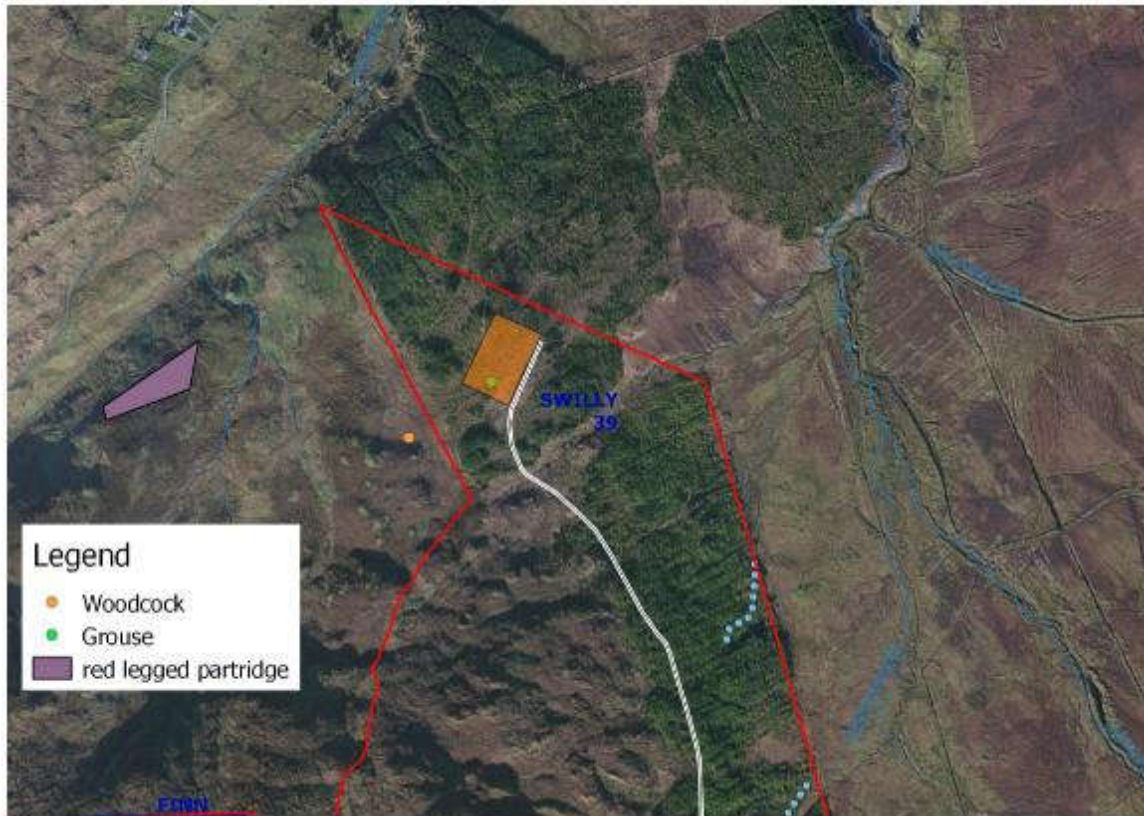


Figure 4. Red legged partridge holding pens

Just off to the west of the site boundary four holding pens containing Red-legged partridge were observed (See **Figure 4** above). As suggested in **Section 4.2.2.1** and **Section 4.2.2.2** these holding pens may explain the Golden eagle and Hen harrier activity in this area.

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Appendix 1

Statement of Surveyor Competency and Expertise

The summer 2019 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	Shane Cully (Ecologist, BSc. Wildlife Biology)
Field Surveyor	Austin Cooney (Ornithologist, Sole Trader)
Field Surveyor	John Collins (Ecologist, BSc.)
Field Surveyor	Brian Porter (Ornithologist)
Reporting	Fiona McKenna (Ecologist, BSc.)
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

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

Austin Cooney

Austin Cooney Austin has over 30 years of bird watching experience both in Ireland and abroad and is an active member of the Clare branch of BirdWatch Ireland, organising and leading several of the branch outings. Austin has over 10 years I-WeBS experience and has participated in numerous Common Bird Surveys. Austin has co-authored the book "Shannon Airport Lagoon – A Unique Irish Habitat" and has worked on and contributed to the production of wildlife documentaries for WaxWing productions.

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

Brian Porter

Brian Porter has a Diploma in Field Ecology and is an experienced ornithologist and bird surveyor. He has been involved in hen harrier surveys throughout the country for both private contractors and major wind farm developers with experience in Collision Risk Modelling and was an extensive contributor to National Hen Harrier Surveys conducted in 1998/2000, 2005, 2010 and 2015. He has experience in a suite of bird survey methods for wind farms, cable route and power line developments including vantage point surveys, breeding wader surveys, red grouse, Merlin, barn owl and wildfowl surveys and has been involved in the Countryside Bird Survey for BirdWatch Ireland since 1998.

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

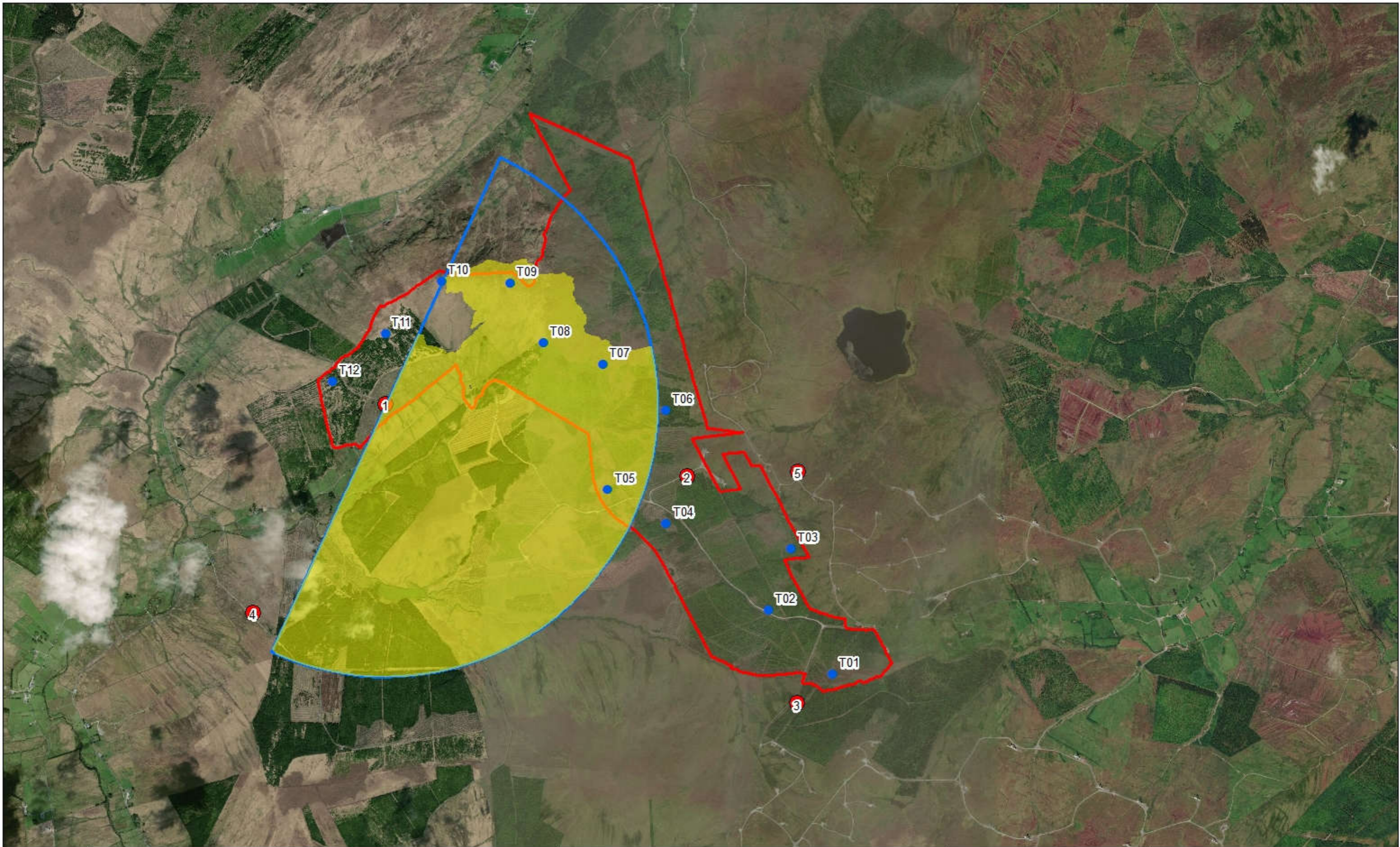
Valerie Heffernan

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



PROJECT	Drumhough 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
- View shed

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.

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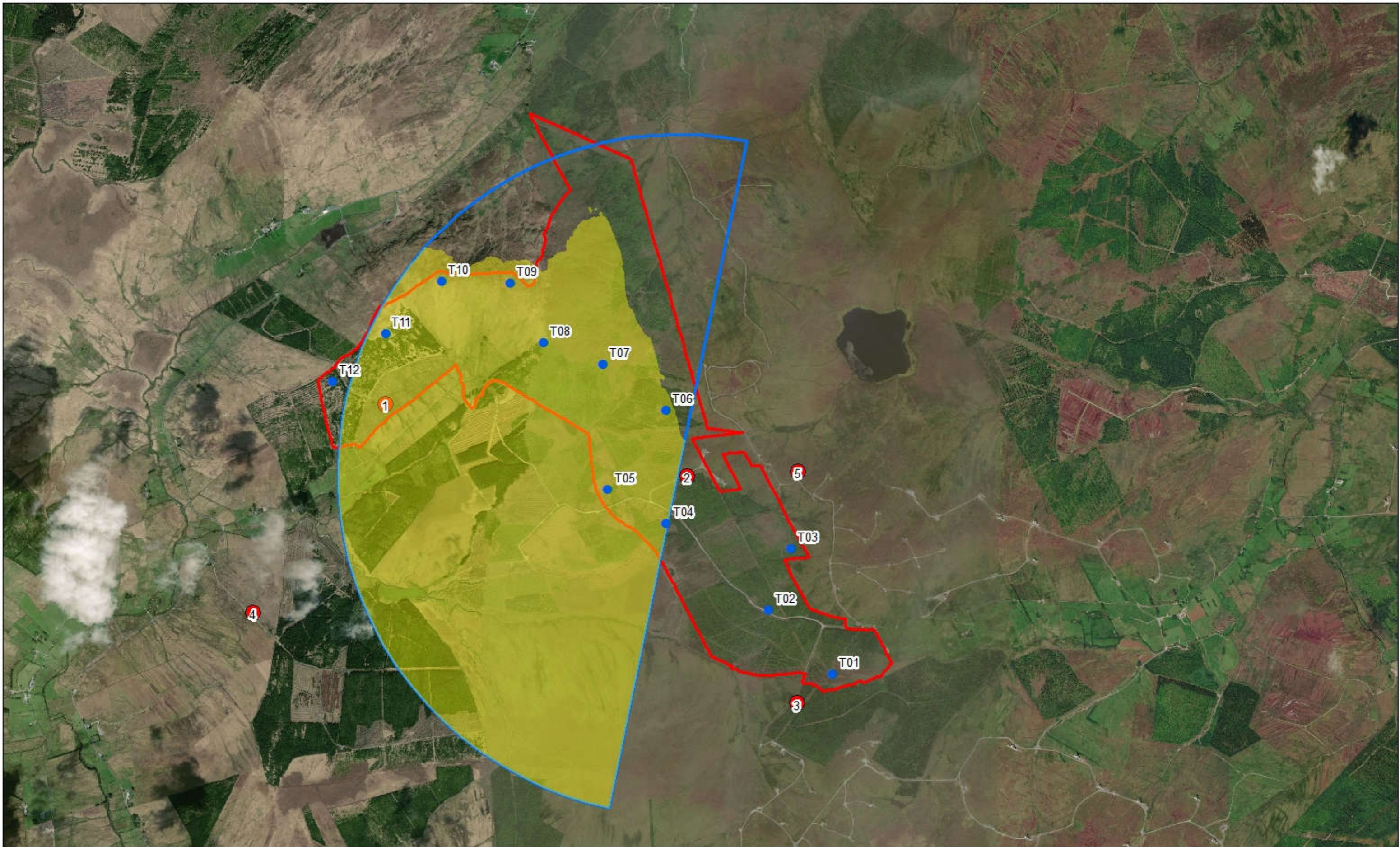
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PROJECT	Drumhough Veiwshed Analysis		
PROJECT NO.	19123		
TITLE	Viewsheds 2		
CLIENT	SSE		
DRAWN BY	VH	CHECKED BY	MK
DATE	05/02/2020		
DRAWING NO	Map 1	REF.	A

- ▭ Site Boundary
- ▭ Viewshed Extent
- Turbine layout
- Vantage Point
- ▭ View shed

1. All drawings are to be read in conjunction with all relevant Specifications, Bills of Quantities, Architectural, Services and Engineering drawings.
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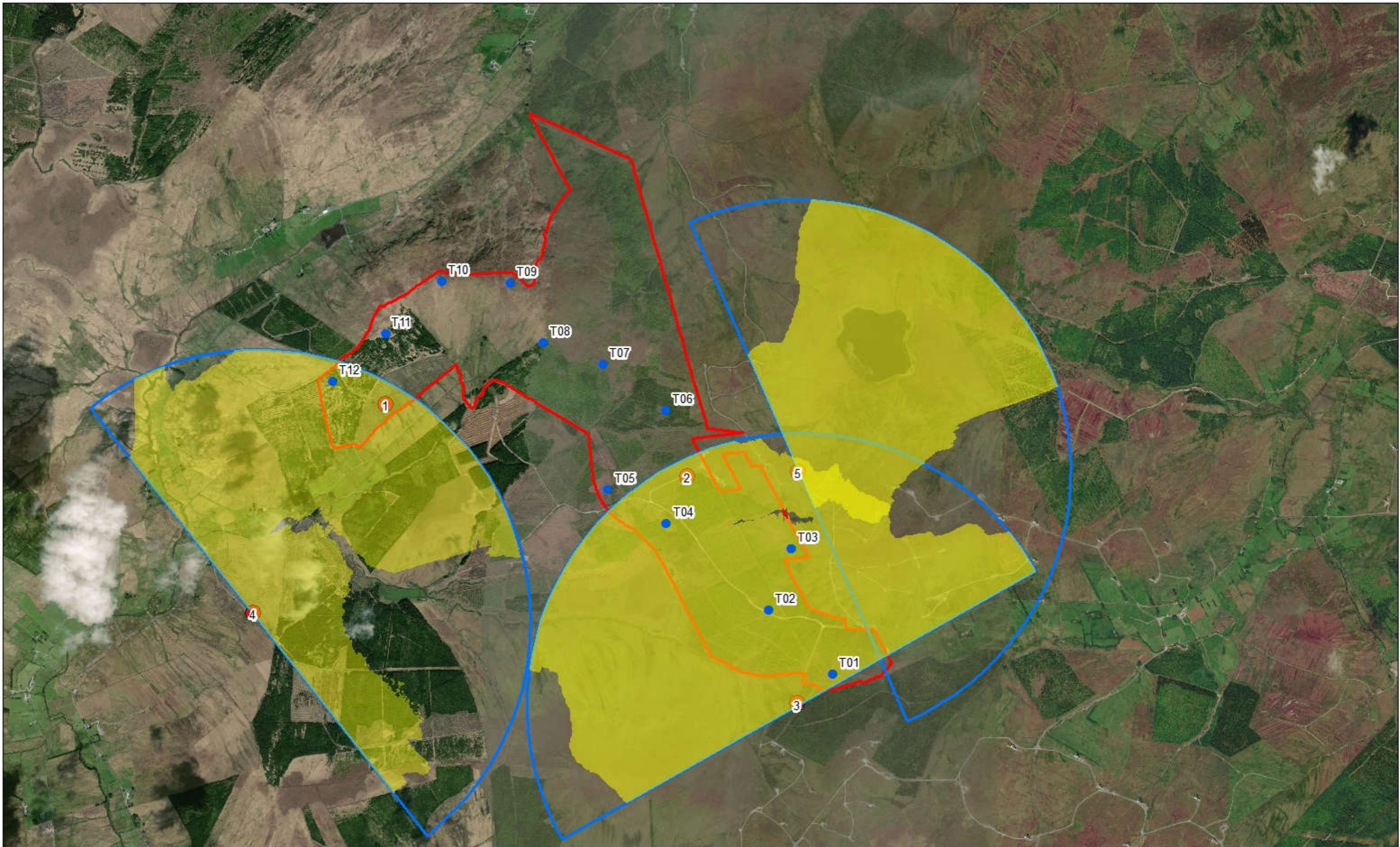
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PROJECT	Drumhough Veiwshed Analysis		
PROJECT NO.	19123		
TITLE	Viewsheds 3-5		
CLIENT	SSE		
DRAWN BY	VH	CHECKED BY	MK
DATE	05/02/2020		
DRAWING NO	Map 1	REF.	A

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

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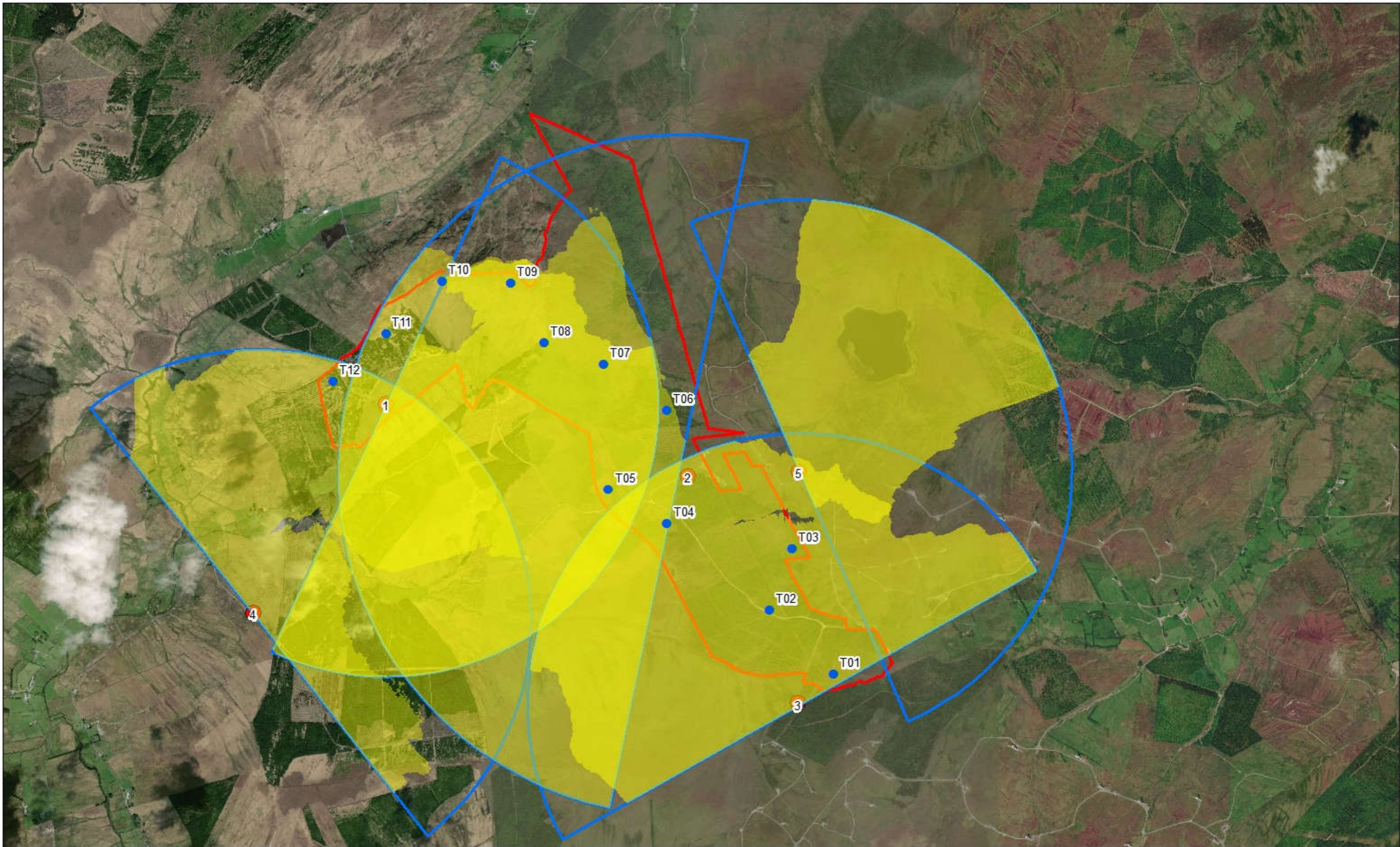
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PROJECT	Drumhough Veiwshed Analysis		
PROJECT NO.	19123		
TITLE	Viewsheds 1-5		
CLIENT	SSE		
DRAWN BY	VH	CHECKED BY	MK
DATE	05/02/2020		
DRAWING NO	Map 1	REF.	A

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


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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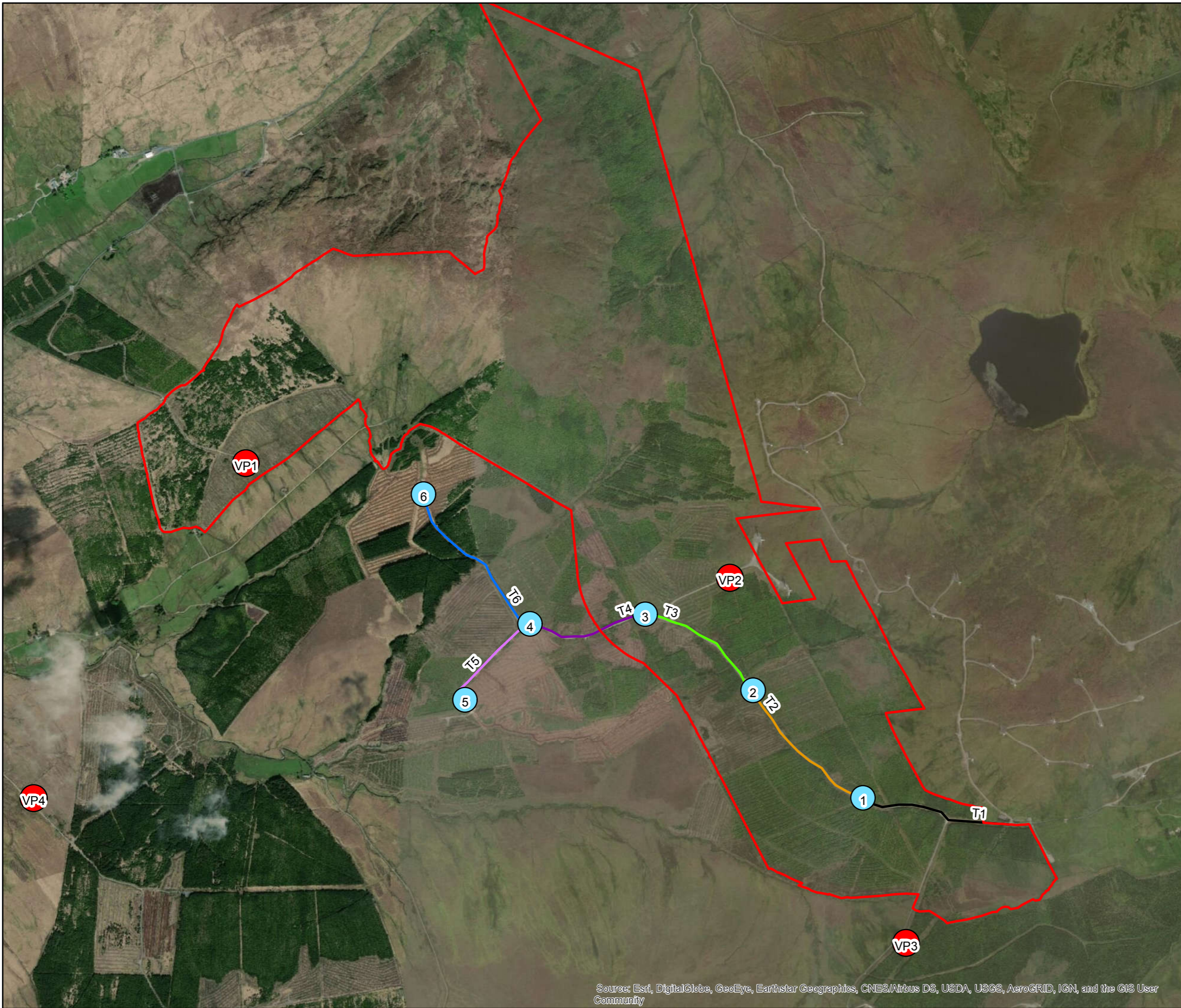
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Legend

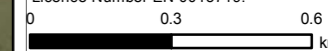
- VP Location
- Site Boundary
- Point Count B

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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Project Title:
 Drumnahough Wind Farm

Client: SSE Renewables

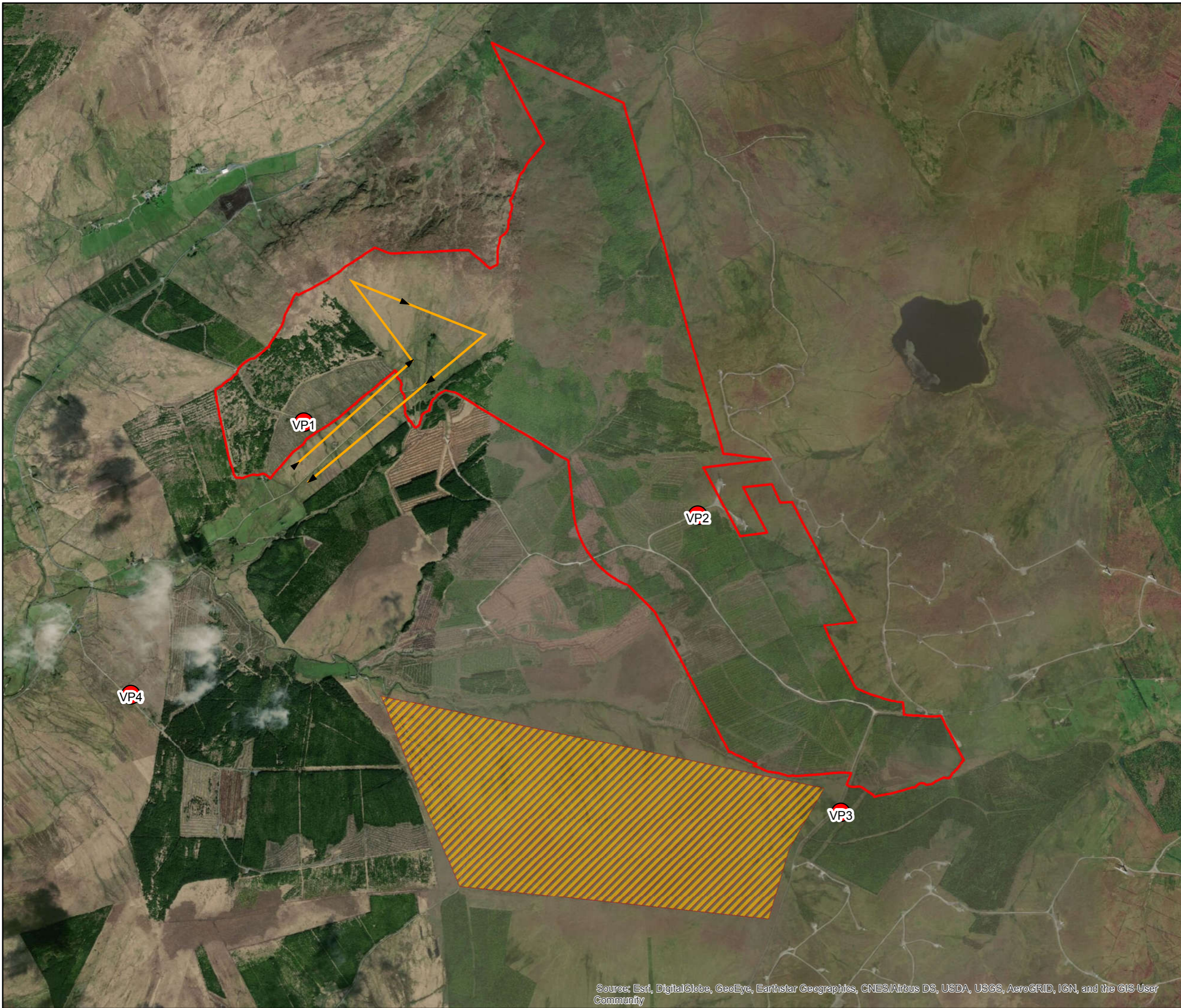
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Drawing No:
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Drawn: VH	Checked: FM
Date: 09/12/2019	Scale (A3): 1:15,000



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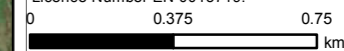


Legend

- Site Boundary
- VP Location
- Walkover 1
- ▶▶▶▶ Walkover 2



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Project Title:
Drumnahough Wind Farm

Client: SSE Renewables

Drawing Title:
Walkover Survey

Drawing No:
19123-MWP-

Drawn: VH	Checked: FM
Date: 08/01/2020	Scale (A3): 1:15,000



Appendix 3

Vantage Point Survey Summary

Vantage Point Survey Summary

VP	Date	Observer	Start Time	Finish Time	Length of VP watch (hours)	Weather
1	24/04/2019	SC	13.30	16.30	3	Cloud cover 8/8-5/8, overcast and hazy, clearing at times, E-SE wind F3-4, gust F5, temp 15-16oC, and visibility god/moderate.
1	25/04/2019	SC	19.00	22.00	3	Cloud cover 8/8, persistent light rain until 20.30 cleared thereafter but cold, SE wind F1-2, temp 10-7oc, visibility good.
2	25/04/2019	SC	11.00	14.00	3	Cloud cover 4/8-6/8, intermittent sunshine and clouds, with some very light showers, south east to E-SE wind F1-3, temp 13-14oC, visibility very good.
2	24/04/2019	SC	18.35	21.35	3	Cloud cover 5/8-8/8, mostly overcast with some sunny spells and haze, light rain gradually getting heavier from 20.45 – 21.35E-SE wind to south-east F1-2, temp 14-11oc, visibility moderate/good.
3	26/04/2019	SC	10.30	13.30	3	Cloud cover 8/8, persistent misty rain, overcast occasionally clearing, W-SW wind F4-5, temp 8-9oc, and visibility moderate.
3	23/04/2019	SC	18.31	21.31	3	Cloud cover 0/8-2/8, sunshine and hazy, E-SE wind to SE wind F1-3, temp 16-13oc, visibility moderate.
4	24/04/2019	SC	10.00	13.00	3	Cloud cover 8/8 – 6/8, overcast, warm and hazy, E-SE wind F1-3, temp 13-14oC, visibility good/moderate.
4	25/04/2019	SC	14.30	17.30	3	Cloud cover 8/8-4/8, mostly sunny with some heavy downpours of rain, wind SE F1-3, temp 13-12oC, visibility good.
5	25/04/2019	BP	10.00	13.00	3	Cloud cover 5/8-7/8, dry. Wind SE F3, te,p 8-12oC, visibility very good.
5	25/04/2019	BP	13.30	16.30	3	Cloud cover 7/8-8/8, occasional showers but mostly dry. Wind SE F3-2, bust gusty in showers. Temp 13-11oC, visibility very good.
1	29/05/2019	AC	05.10	08.10	3	Cloud cover 8/8, intermittent sunshine, wind SE F2-3, temp 6-9oC, visibility good
1	28/05/2019	SC	13.18	16.18	3	Cloud cover 7/8, overcast with some sun, wind N-NW F1-2, temp 11oC, visibility very good.
2	30/05/2019	AC	05.05	08.05	3	Cloud cover 8/8, continuous rain and mist, wind SW F3-4, temp 13-14oC, visibility poor <100m.
2	30/05/2019	SC	10.05	13.05	3	Cloud cover 8/8, overcast, heavy, dense mist and rain throughout, wind SW F2-3, temp 13oC, visibility poor <500m – 1km.
3	28/05/2019	SC	05.00	08.00	3	Cloud cover 8/8, overcast, wind N-NW F2-4, temp 5-8oC, visibility good.
3	29/05/2019	AC	14.50	17.50	3	Cloud cover 8/8, continuous rain and mist, wind S-SE F2-3, temp 13oC,

Vantage Point Survey Summary

VP	Date	Observer	Start Time	Finish Time	Length of VP watch (hours)	Weather
						visibility moderate to poor.
4	29/05/2019	SC	06.00	09.00	3	Cloud cover 8/8, mostly overcast with some bright spells with some light rain near VP end, wind SE F1-2, temp 7-9oC, visibility good.
4	28/05/2019	AC	12.30	15.30	3	Cloud cover 8/8, hazy sunshine, wind N-NW F2-3, temp 11-12oC, and visibility good.
5	30/05/2019	SC	05.15	08.15	3	Cloud cover 8/8, dense fog and persistent heavy rain. Wind W/SW-SW F2-5, temp 13oC, visibility very poor – poor (<50m-<1km).
5	30/05/2019	AC	10.05	13.05	3	Cloud cover 8/8, continuous rain and heavy mist. Wind SW F3-5, temp 13-14oC, visibility poor.
1	25/06/2019	JC	20.10	23.10	3	Cloud cover 8/8 and sunny spells. Wind N/NE F3-4, temp 10-12oC, visibility moderate.
1	27/06/2019	JC	15.20	18.20	3	Cloud 0/8 and sunny. Wind NE F4-5, temp 16-20oC, visibility good.
2	26/06/2019	SC	15.00	18.00	3	Cloud cover 4/8-1/8, sunshine and warm. Wind N/NE F2-3, temp 18-16, visibility very good.
2	26/06/2019	JC	20.00	23.00	3	Cloud 8/8 and cool. Wind NE F4-3, temp 8-9oC, visibility good.
3	25/06/2019	SC	15.15	18.15	3	Overcast with some sunny spells. Wind N/NE F1-3, temp 17-18oC, visibility good.
3	27/06/2019	AC	20.00	23.00	3	Cloud over 0/8 and continuous sunshine. Wind E F3-4, temp 21-17oC, and visibility good.
4	25/06/2019	SC	20.10	23.10	3	Cloud cover 5/8, intermittent sunshine and cloud. Wind N/NE, temp 14-10oC, visibility good-moderate.
4	27/06/2019	SC	15.15	18.15	3	Cloud cover 0/8, very warm with clear blue skies. Wind E F2-4, temp 22-21oC, visibility very good.
5	26/06/2019	JC	15.30	18.30	3	Cloud cover 3/8, sunny. Wind NE F3-4, temp 15oC, visibility good.
5	26/06/2019	SC	20.12	23.12	3	Cloud cover 7/8, mostly overcast. Wind N/NE F2-4, temp 12-9oC, visibility good.
1	23/07/2019	JNM	17.00	20.00	3	Cloud cover 5/8. A fine dry sunny afternoon and evening. Wind S F1-4, temp 17-12oC and visibility good.
1	24/07/2019	JC	09.00	12.00	3	Cloud cover 6/8. Wind SW F3-5, temp 16-18oC and visibility good.
2	24/07/2019	JNM	17.00	20.00	3	Cloud cover 6/8. A dry evening with sunny spells. Wind S F3/4, temp 20oC and visibility good.
2	25/07/2019	JC	07.30	10.30	3	Cloud cover /8. Wind SW F2-4, temp 14-15oC and visibility good.
3	24/07/2019	JC	17.00	20.00	3	Cloud cover 6/8. Dry and humid, wind SW F1, temp 16-71oC and visibility

Vantage Point Survey Summary

VP	Date	Observer	Start Time	Finish Time	Length of VP watch (hours)	Weather
						excellent.
3	25/07/2019	JNM	08.15	11.15	3	Cloud cover 7/8. A dull dry morning. Wind S-E F4-6, temp 19oC and visibility good.
4	23/07/2019	JC	17.00	20.00	3	Cloud cover 3/8. Wind S/SW F3-4, temp 25oC and visibility excellent
4	24/07/2019	JNM	09.00	12.00	3	Cloud cover 6/8. A dry dull morning with the odd light shower and some sunny spells. Wind S-W F4/5, temp 20oC and visibility good.
5	24/07/2019	SC	17.00	20.00	3	Cloud cover 8/8, overcast and warm. Wind S F2-4, temp 18-17oC, visibility good.
5	25/07/2019	SC	08.00	11.00	3	Cloud cover 8/8, overcast with strong winds. Wind SE F3-5, gusts F6, temp 17oC, visibility moderate.
1	28/08/2019	JC	14.20	17.20	3	Cloud cover 5/8 and sunny. Wind SW F3-4, temp 13-14oC and visibility good.
1	28/08/2019	JC	17.50	20.50	3	Cloud cover 8/8. Continuous heavy rain, wind SW F1-3, temp 14-10oC and visibility poor.
2	29/08/2019	JC	13.20	16.20	3	Cloud cover 8/8 with persistent rain. Wind SW F4-5, temp 16-14oC and visibility moderate.
2	29/08/2019	SC	18.10	21.10	3	Cloud cover 8/8. Mostly overcast, some continuous misty rain gradually getting heavier with string winds. Wind SW F4-5 gusts F6, temp 16-14oC and visibility moderate.
3	26/09/2019	SC	18.20	21.20	3	Cloud cover 8/8, overcast, odd scattered shower becoming more frequent. Wind S F2-4, temp 16-14oC and visibility good-poor.
3	30/08/2019	SC	08.00	11.00	3	Cloud cover 8/8-7/8. Overcast and continuous rain at times (status yellow rain warning) with string winds. Wind S/SW F4-6, temp 15-16oC and visibility poor-moderate.
4	28/08/2019	SC	13.55	16.55	3	Cloud cover 5/8. Intermittent sunshine with the odd occasional shower. Wind SW F3-4, temp 16oC and visibility good.
4	28/08/2019	SC	18.15	21.15	3	Cloud cover 8/8-6/8. Overcast with continuous rain until 20.10 and brightened up a increased visibility after that. Wind SW-SSW F1-3, temp 14-10oC and visibility poor to good.
5	29/08/2019	JC	18.10	21.10	3	Cloud cover 7/8, dry. Wind SW F4-6, temp 16-17oC, visibility good.
5	29/08/2019	SC	13.20	16.20	3	Cloud cover 7/8-8/8, mostly overcast with strong winds and some bright spells. Wind SW F4-6, temp 16-17oC, visibility good.
1	24/09/2019	JC	09.27	12.27	3	Cloud cover 5/8 with continuous light fog. Wind SW F2-3, temp 12-14oC

Vantage Point Survey Summary

VP	Date	Observer	Start Time	Finish Time	Length of VP watch (hours)	Weather
						and visibility moderate - good.
1	24/09/2019	SC	13.30	16.30	3	Cloud cover 5/8, mostly sunny. Wind SE F2-4, temp 18oC and visibility good.
2	25/09/2019	SC	09.10	12.10	3	Cloud cover 5/8-8/8. Dense fog <500m visibility, slowly clearing to overcast and clear visibility with light showers and sunny spells. Wind SW F0-1, temp 15-16oC and visibility very poor – good.
2	25/09/2019	JC	13.45	16.45	3	Light intermittent rain. Wind SW F1-3, temp 16-14oC and visibility moderate – excellent.
3	25/09/2019	JC	09.00	12.00	3	Cloud cover 7/8 with light intermittent rain. Wind SW F1-3, temp 10-14oC and visibility moderate – excellent.
3	25/09/2019	SC	12.45	15.45	3	Cloud cover 6/8, mostly cloudy with some sunny spells, wind SW-S F1-3, temp 16-17oC and visibility good.
4	24/09/2019	SC	09.00	12.00	3	Cloud cover 6/8-4/8, slightly foggy with sunshine to mostly sunny. Wind SE-SSE F1-3, temp 14-16oC, visibility moderate – good.
4	24/09/2019	JC	13.00	16.00	3	Cloud cover 5/8 with light continuous fog. Wind SW F2-3, temp 12-14oC and visibility moderate - excellent.
5	26/09/2019	SC	09.15	12.15	3	Cloud cover 8/8-5/8, overcast with persistent light rain, heavy at times. Later on sunshine and the occasional shower. Wind SW F2-4, temp 10-12oC, visibility moderate.
5	26/09/2019	JC	13.50	16.50	3	Cloud cover 7/8, heavy intermittent rain. Wind SW F2-4emp 10-13oC, visibility poor-excellent.

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Appendix 4

Target/Secondary Species Observations

Drumnahough Breeding 2019 Target Species

Golden eagle															
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
24/04/2019	4	Unknown	2 nd calendar year	1	Bog	1	11.19	Circling, flying	30-40	-	3	15	-	-	-
24/04/2019	2	Unknown	2 nd calendar year	2	Bog, grassland moorland	1	18.58	Flying, circling, on ground	0-50	3,720	-	120	-	-	-
24/09/2019	1	Unknown	2 nd calendar year	3	1 st rotation forest, 2 nd rotation forest, heather moorland	1	15.36	On ground, perched, flying	0-40	3,230	-	10	-	-	-
25/09/2019	2	Unknown	2 nd calendar year	4	1 st rotation forest, heather moorland	1	09.31	On ground, perched, flying	0-100	1,409	-	109	42	-	-

Hen harrier															
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
24/09/2019	1	Female	Adult	1	Grassland moorland	1	09.27	Hunting, flying	2-50	-	230	180	-	-	-

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
25/04/2019	2	Male	Adult	1	2 nd rotation forest, 1 st rotation forest	1	12.16	Flying	20-40	-	-	12	-	-	-
26/06/2019	2	Female	Adult	2a	Bog, clear fell,	1	15.29	Flying	30-40	-	-	9	-	-	-

Drumnaough Breeding 2019 Target Species

				2b	thicket pole stage forest, 1 st rotation forest		17.24		20-25			8			
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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
27/06/2019	1	Male Female	Adult Adult	1a 1b	Thicket/pole stage forest, 2 nd rotation forest, grassland moorland	2	17.00	Flying, soaring, Hunting and perched	>150 15-30	- -	- 60	- 1140	30 -	30 -	60 -
27/06/2019	4	Female	Adult	2	Improved grassland	1	15.42	Perched, flying	2-15	500	31	-	-	-	-
24/07/2019	1	Unknown	Adult	3	Grassland moorland and 2 nd rotation forest	1	10.55	Flying, hunting	20-30	-	20	40	-	-	-
24/09/2019	4	Unknown	Unknown	4	Rough grassland	1	09.00	Flying, perched	2-5	-	5	-	-	-	-
24/09/2019	1	Unknown	Unknown	5	Grassland moorland	1	09.31	Flying, mobbing	2-10	-	20	-	-	-	-
25/09/2019	2	Unknown	Unknown	6	2 nd rotation forest	1	14.36	Flying, hunting	5-50	-	10	10	-	-	-
25/09/2019	3	Unknown	Unknown	7	Heather moorland	1	14.40	Flying, hunting	150-200	-	-	-	-	-	60

Snipe															
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
23/04/2019	3	Unknown	Adults	1	Bog, grassland moorland	2	20.37	Flying, circling	>150	-	5	10	10	70	120
25/04/2019	1	Unknown	Adult	2	Clear fell, thicket,	1	21.34	Flying, circling	-	-	60	-	-	-	-

Drumnahough Breeding 2019 Target Species

					1 st rotation forest											
29/05/2019	4	Male	Adult	3	Rough grassland	1	08.20	Drumming and Flying	0-100	-	1	2	76	-	-	
25/06/2019	4	Male Male	Adult Adult	4	Rough grassland	2	22.55 23.05	Flying and displaying	150	-	-	-	-	-	240	

Sparrowhawk																
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	>150m	
24/04/2019	4	Female	Adult	1	Bog, grassland moorland	1	12.59	Flying	10-40	-	5	25	-	-		
25/06/2019	3	Unknown	Adult	2	Bog, 1 st rotation forest, clear fell	1	16.36	Flying	40-150	-	-	8	2	9		

Buzzard																
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	>150m	
24/04/2019	4	Unknown	Adults	1a 1b	1 st rotation forest, bog	2	11.43	Flying, circling	30-60 80-100	-	-	25 -	5 40	- -	- -	
24/04/2019	1	Unknown	Adults	2a 2b	Clear fell, 1 st rotation forest, grassland moorland, rough grassland, improved grassland	2	13.58 15.29	Flying, circling Flying	150	- -	- -	- 3	- -	90 -	- -	
25/04/2019	2	Unknown	Adult	3	1 st rotation forest, grassland moorland	1	12.20	Flying, soaring, circling	80-100	-	-	-	30	-	-	
25/06/2019	4	Female Male	Adult Adult	4a 4b	Improved grassland, rough grassland, 1 st	2	21.28 22.53	Perched, flying	25-30 100-150	720 -	- -	2 -	- -	- 120	- -	

Drumnahough Breeding 2019 Target Species

					rotation forest. 2 nd rotation forest										
27/06/2019	4	Female Male	Adult Adult	5	1 st rotation forest, rough grassland, improved grassland	2	16.12	Flying, displaying	>200	-	-	-	-	-	240
28/08/2019	4	Male Female	Adult Adult	6a 6b	Bog, grassland moorland	2	16.47	Hunting, flying	100-120 50-100	-	2	74	110	100 -	- -
24/09/2019	1	Unknown	Adult	7a 7b	1 st rotation forest, rough grassland, 2 nd rotation forest	2	15.20	Flying	20-150 30-50	-	-	5 5	106 -	126 -	- -

Common sandpiper (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	
24/07/2019	4	Unknown	Adult	1	Lake	1	18.15	Flying	>1	-	4	-	-	-	-

Cormorant (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	
24/07/2019	4	Unknown	Adult	1	Lake, bog, grassland moorland	1	17.49	Flying	>150	-	20	40	100	82	90

Drumnaough Breeding 2019 Target Species

Great 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
26/04/2019	3	Unknown	Adult	1	Bog	1	12.37	Flying	0-50	-	-	195	-	-	-

Great black-backed gull (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
25/04/2019	5	Unknown	Adult	1	Grass land moorland, heather moorland	1	14.11	Flying	-	-	28	41	92	21	-

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
24/04/2019	4	Male Female	Adult Adult	1	Improved grassland	2	11.23	Flying	15-20	-	15	-	-	-	-

Lesser black-backed gull (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
26/06/2019	5	Unknown	Adult	1	Lake	1	16.26	Flying, preening, washing	2	250	10	-	-	-	-

Drumnahough Breeding 2019 Target Species

Grey heron															
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
25/04/2019	1	Unknown	Adult	1	Improved grassland, grassland moorland, 1 st rotation forest, clear fell	1	20.18	Flying	20-80	-	-	191	15	-	-

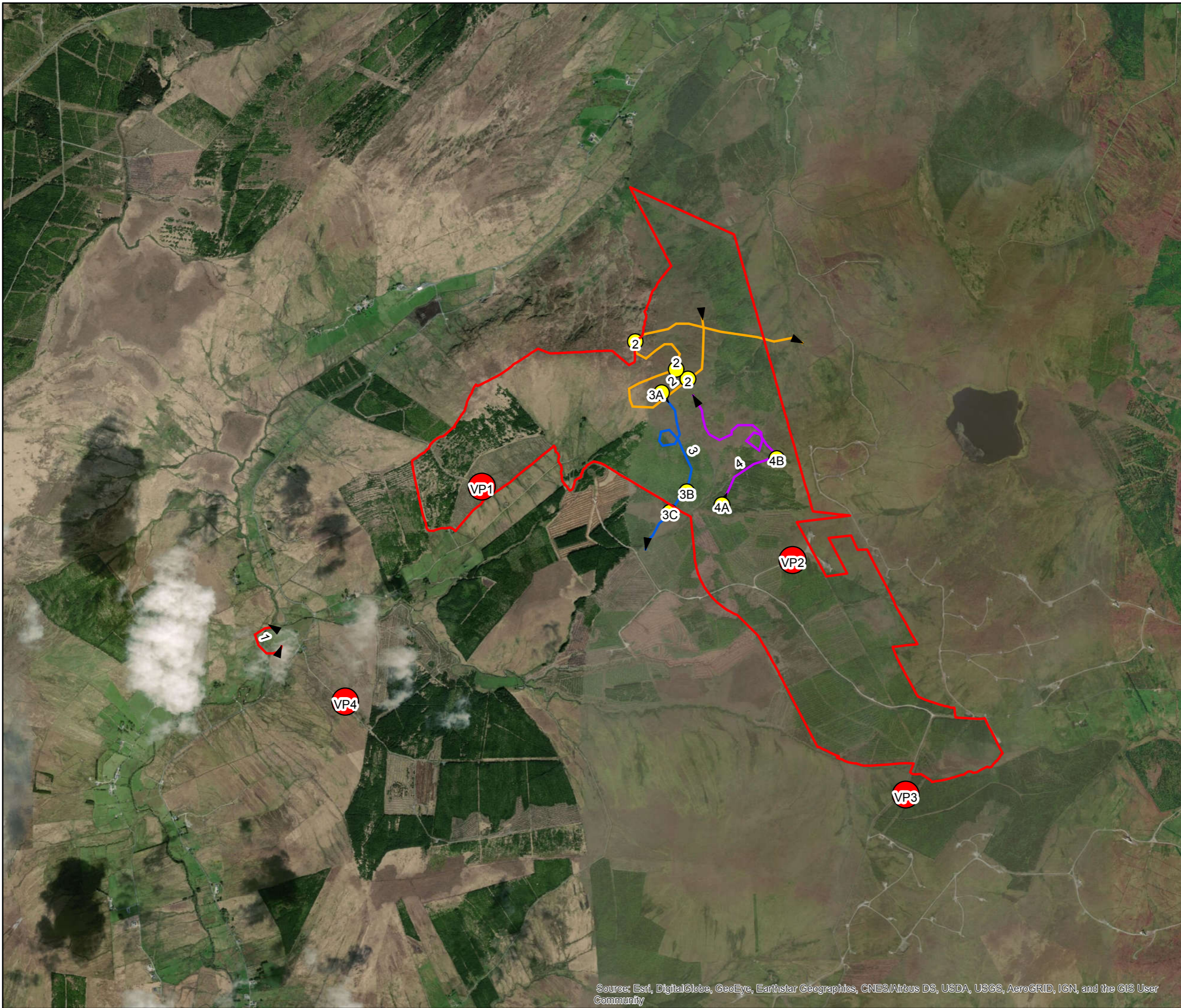
Grey heron (VP5)															
Date	VP	Sex	Age	Map Ref	Habitat	No. Of Birds	Time of Flight/ Obs.	Activity	Flight Height (m)	Time (sec) in Height Category					
										Non-flight	0-20m	20-50m	50 – 100m	100-150m	>150m
26/09/2019	4	Unknown	Adult	1	Lake, heather moorland	1	09.16	Flying, on ground	5	-	16	-	-	-	-

Mallard															
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
24/04/2019	4	Male	Adult	1	Improved grassland	1	12.12	Flying	10-20	-	5	-	-	-	-
24/04/2019	2	Male Female	Adult Adult	2	1 st rotation forest	2	21.20	Flying	30-40	-	-	10	-	-	-

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Appendix 5

Flight Paths and Activity Areas



Legend

- VP Location
- Site Boundary
- Golden Eagle Point

Golden Eagle Flight Path

- ▶ 1
- ▶ 2
- ▶ 3
- ▶ 4



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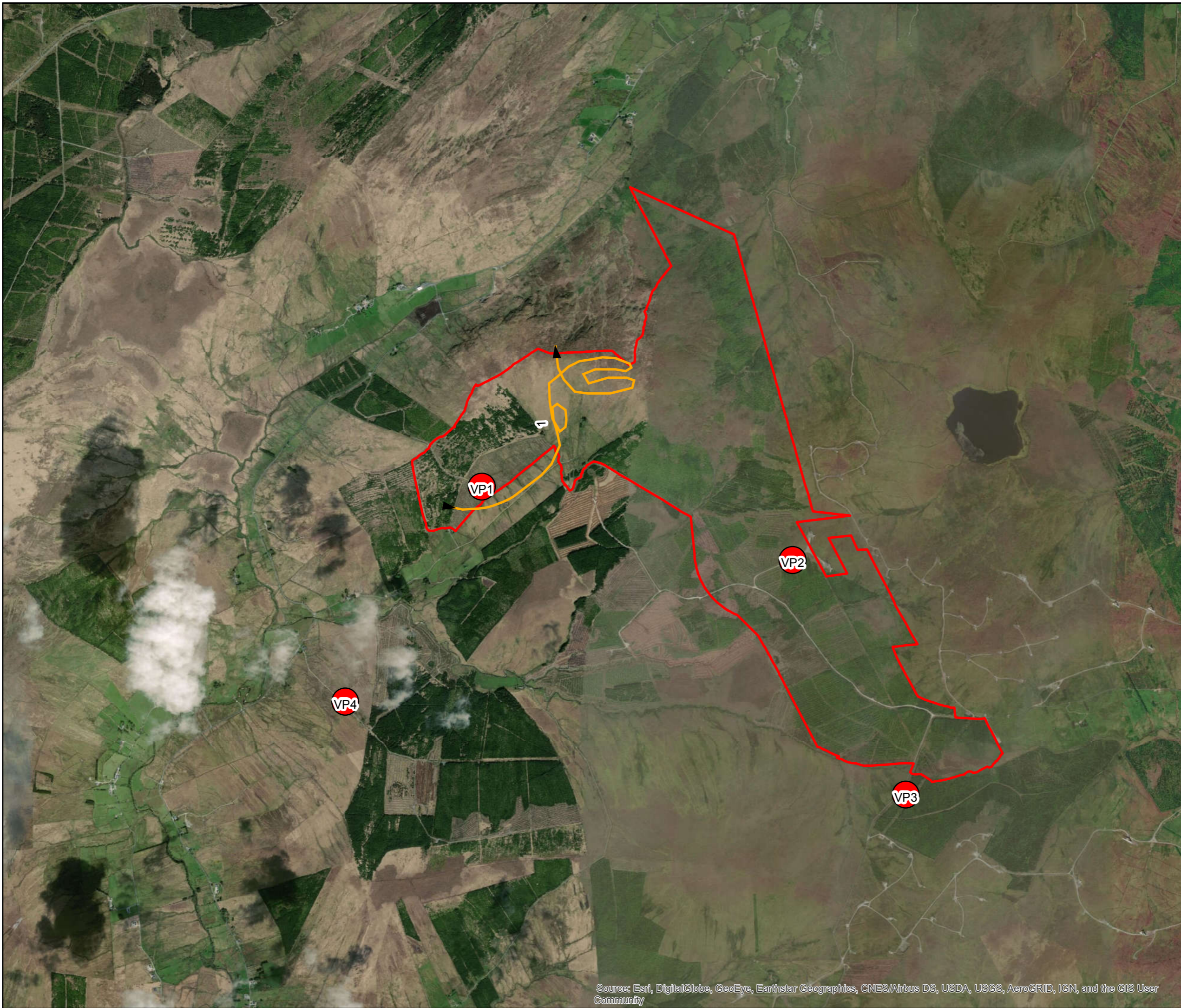


Project Title: Drumnahough Wind Farm	
Client: SSE Renewables	
Drawing Title: Golden Eagle	
Drawing No: 19123-MWP-	
Drawn: VH	Checked: FM
Date: 09/12/2019	Scale (A3): 1:15,000



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



Legend

 VP Location

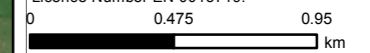
Hen Harrier Flight Path

 1

 Site Boundary



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Project Title:
Drumnahough Wind Farm

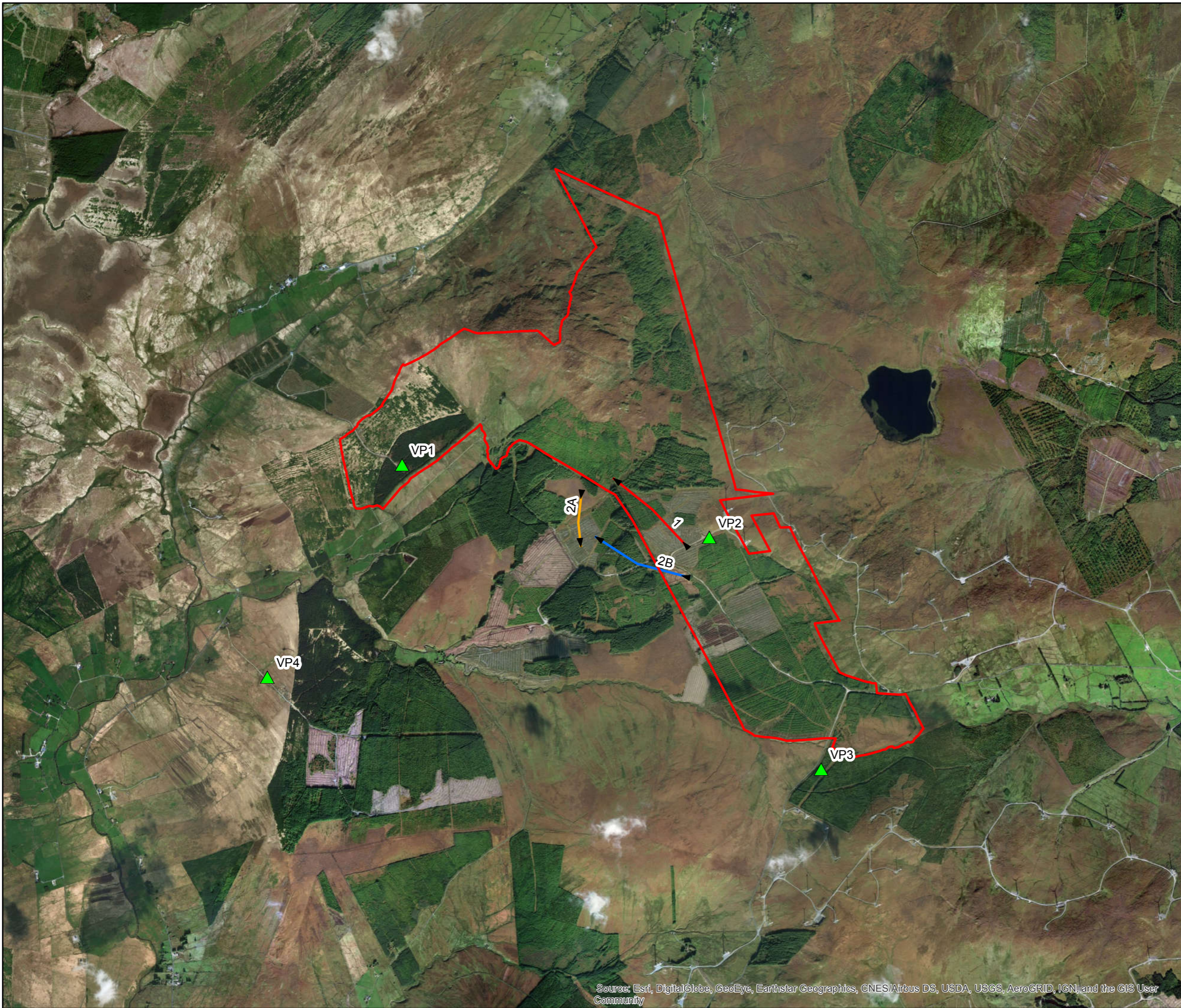
Client: SSE Renewables

Drawing Title:
Hen Harrier

Drawing No:
19123-MWP-

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



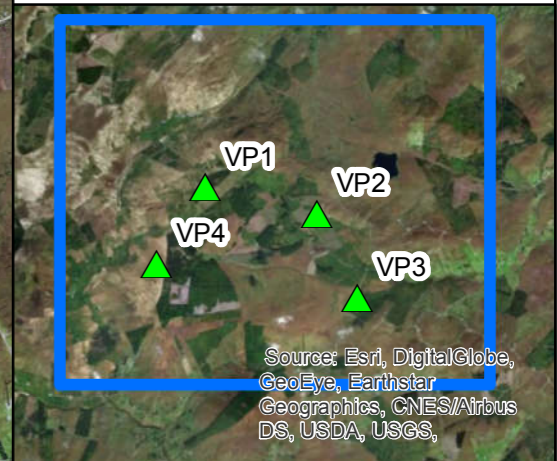


Legend

- Site Boundary
- ▲ VP Location

Merlin Flight Path

- 1
- 2A
- 2B



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0 0.475 0.95 km

Project Title:
Drumnahough Wind Farm

Client: SSE Renewables

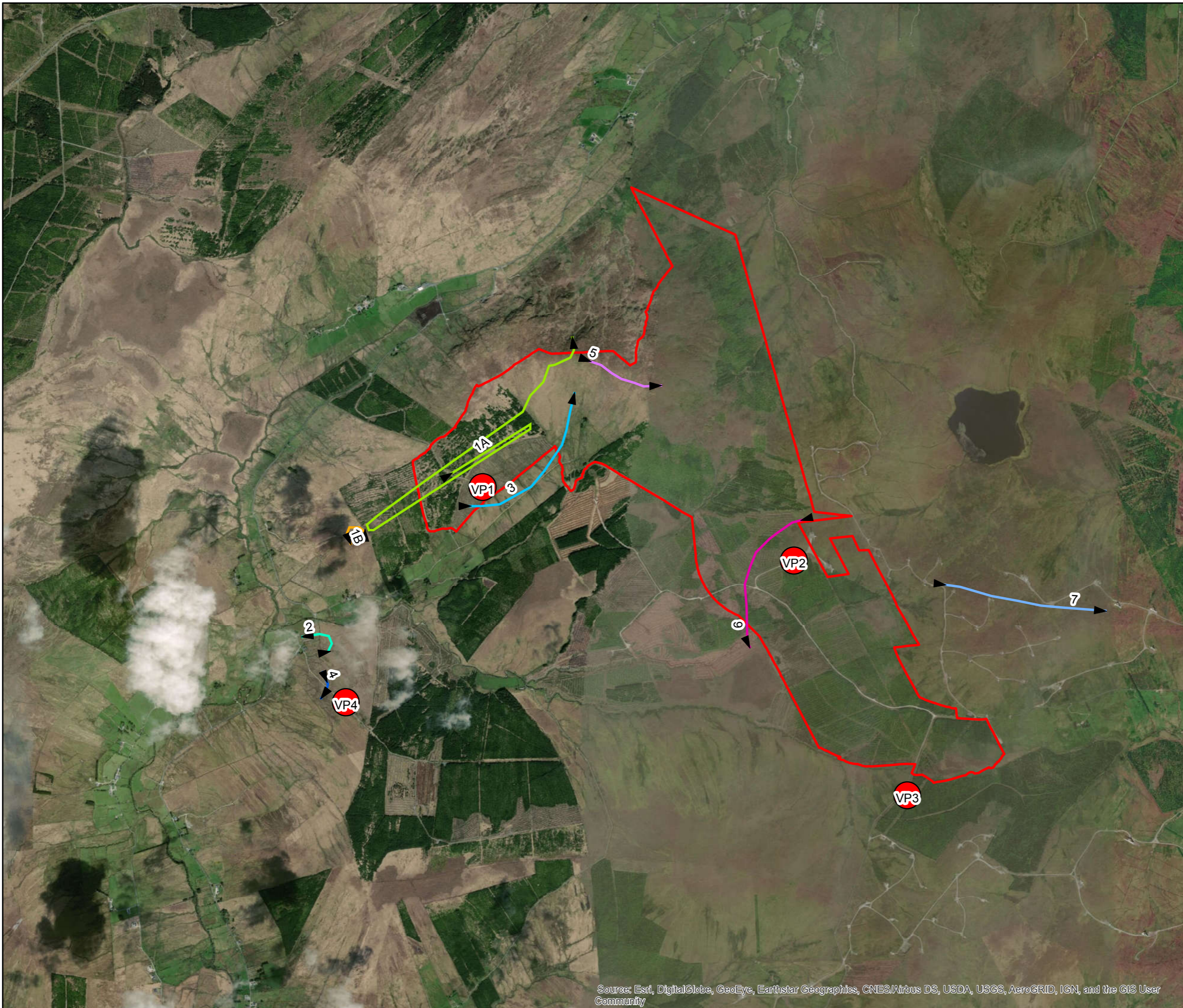
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Summer 2019
Merlin Flight Path

Drawing No:
19123-MWP-XX-XX-DR-V-0006-A

Drawn: VH	Checked: FMcK
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Date: 09/07/2019	Scale (A3): 1:25,305
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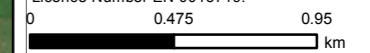


Legend

- VP Location
- Site Boundary
- Kestrel Flight Path**
- ▶ 1A
- ▶ 1B
- ▶ 2
- ▶ 3
- ▶ 4
- ▶ 5
- ▶ 6
- ▶ 7



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Project Title:
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Client: SSE Renewables

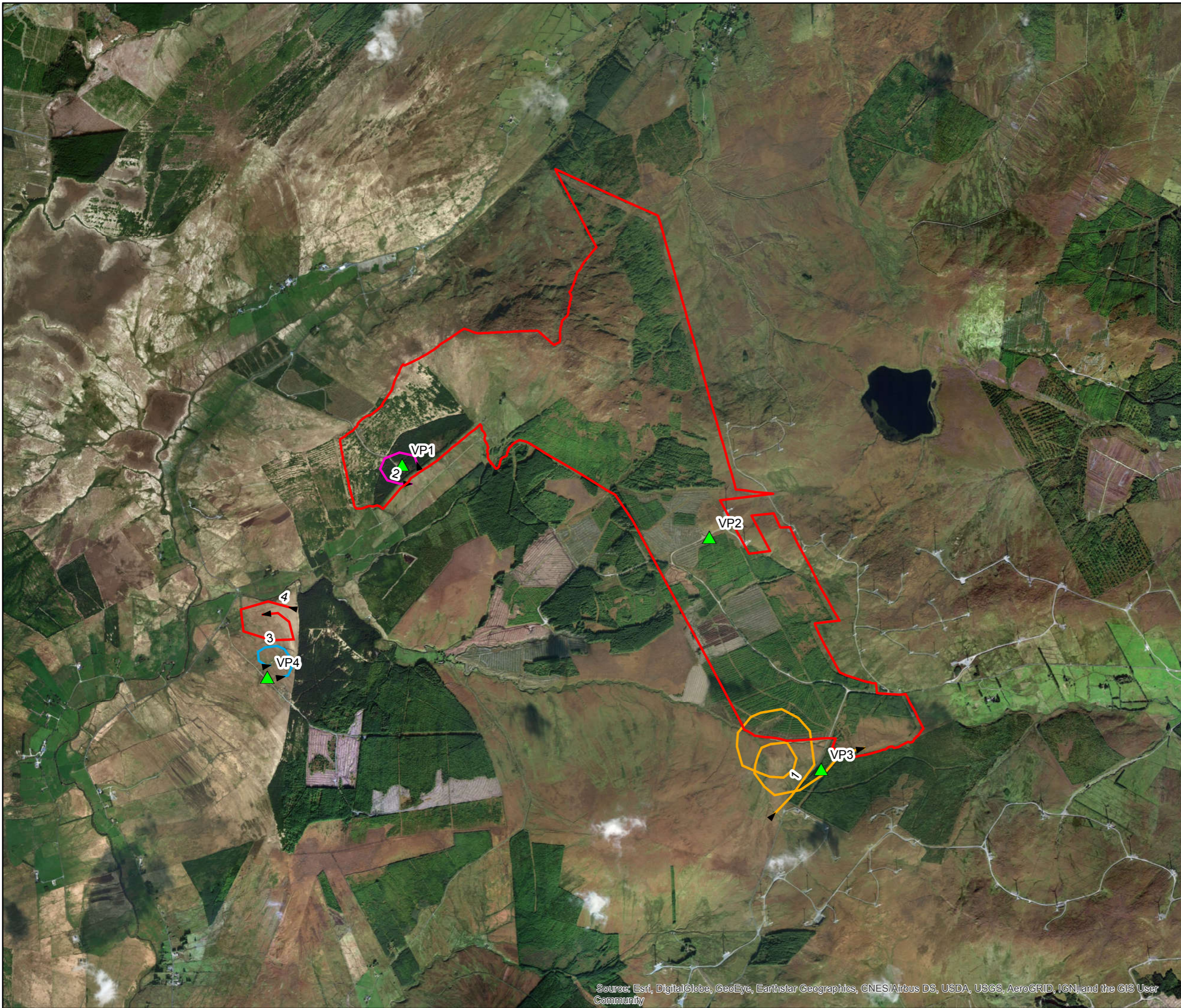
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Drawing No:
 19123-MWP-

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



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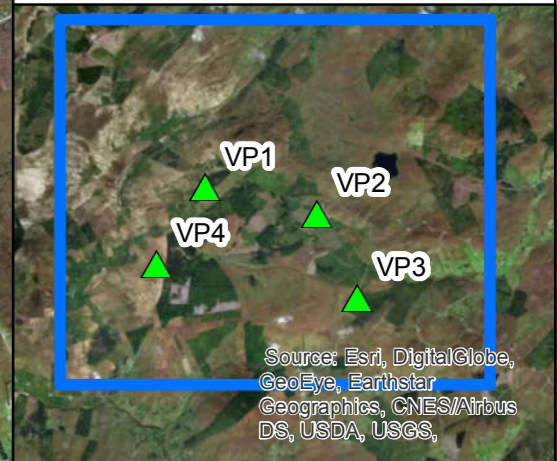


Legend

- Site Boundary
- ▲ VP Location

Snipe Flight Path

- 1
- 2
- 3
- 4



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0 0.475 0.95 km

Project Title:
Drumnahough Wind Farm

Client: SSE Renewables

Drawing Title:
Summer 2019
Snipe Flight Path

Drawing No:
19123-MWP-XX-XX-DR-V-0005-A

Drawn: VH	Checked: FMcK
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Date: 09/07/2019	Scale (A3): 1:25,305
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Legend

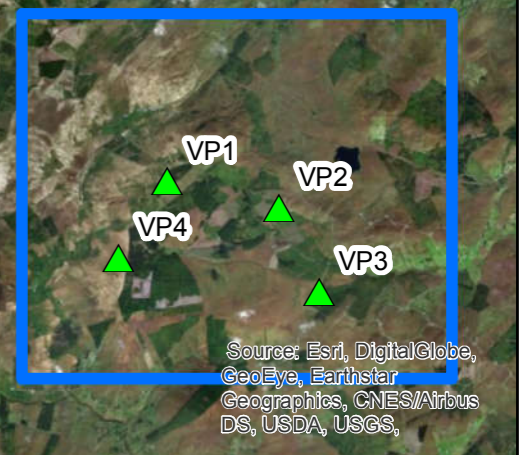
Site Boundary

VP Location

Sparrowhawk Flight Path

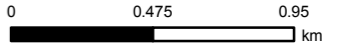
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2



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Project Title:
Drumnahough Wind Farm

Client: SSE Renewables

Drawing Title:
Summer 2019
Sparrowhawk Flight Path

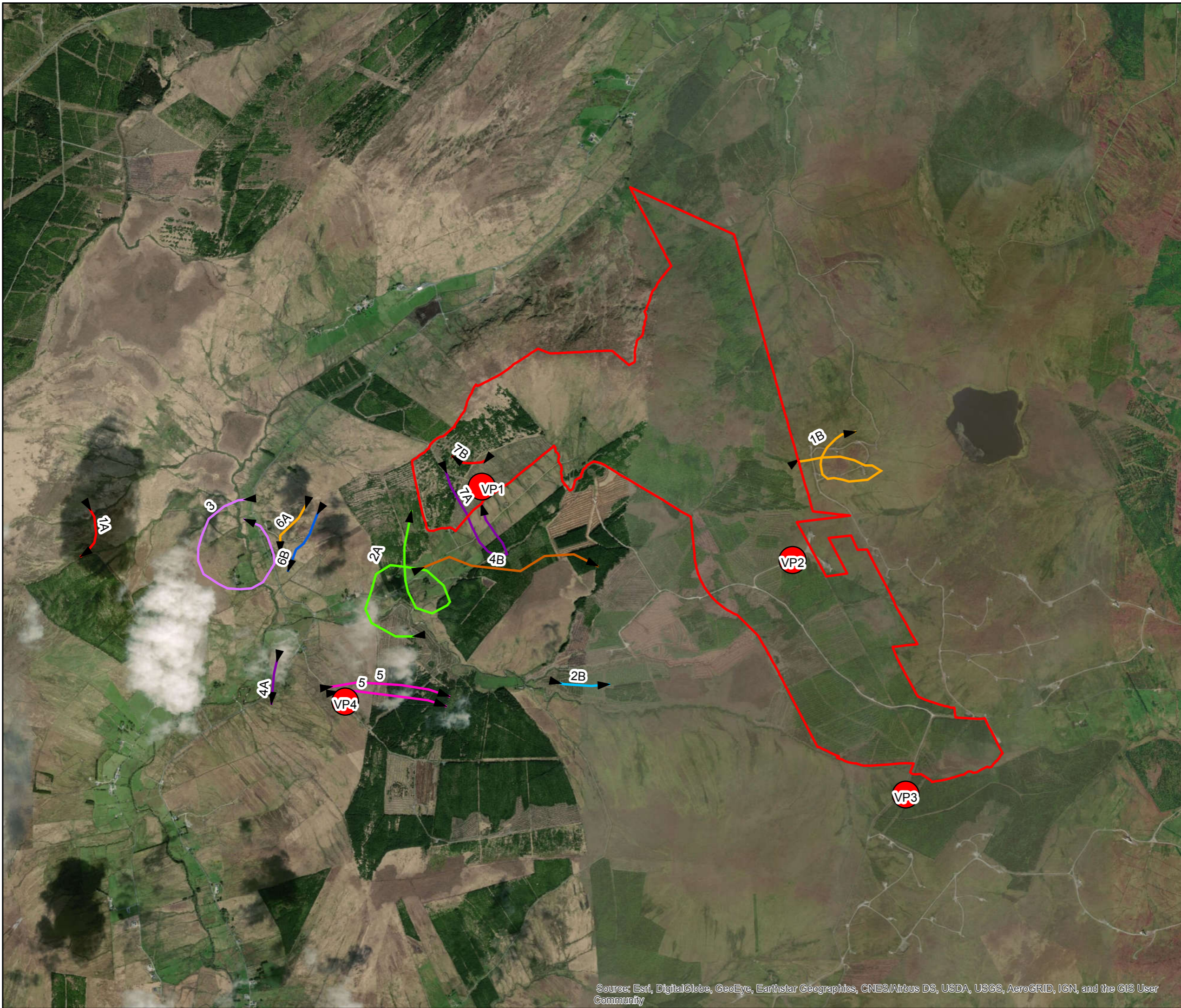
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Drawn: VH Checked: FMcK

Date: 09/07/2019 Scale (A3): 1:25,305

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





Legend

VP Location

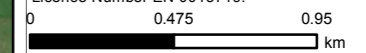
Site Boundary

Buzzard Flight Path

- 1A
- 1B
- 2A
- 2B
- 3
- 4A
- 4B
- 5
- 6A
- 6B
- 7A
- 7B



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Project Title:
Drumnahough Wind Farm

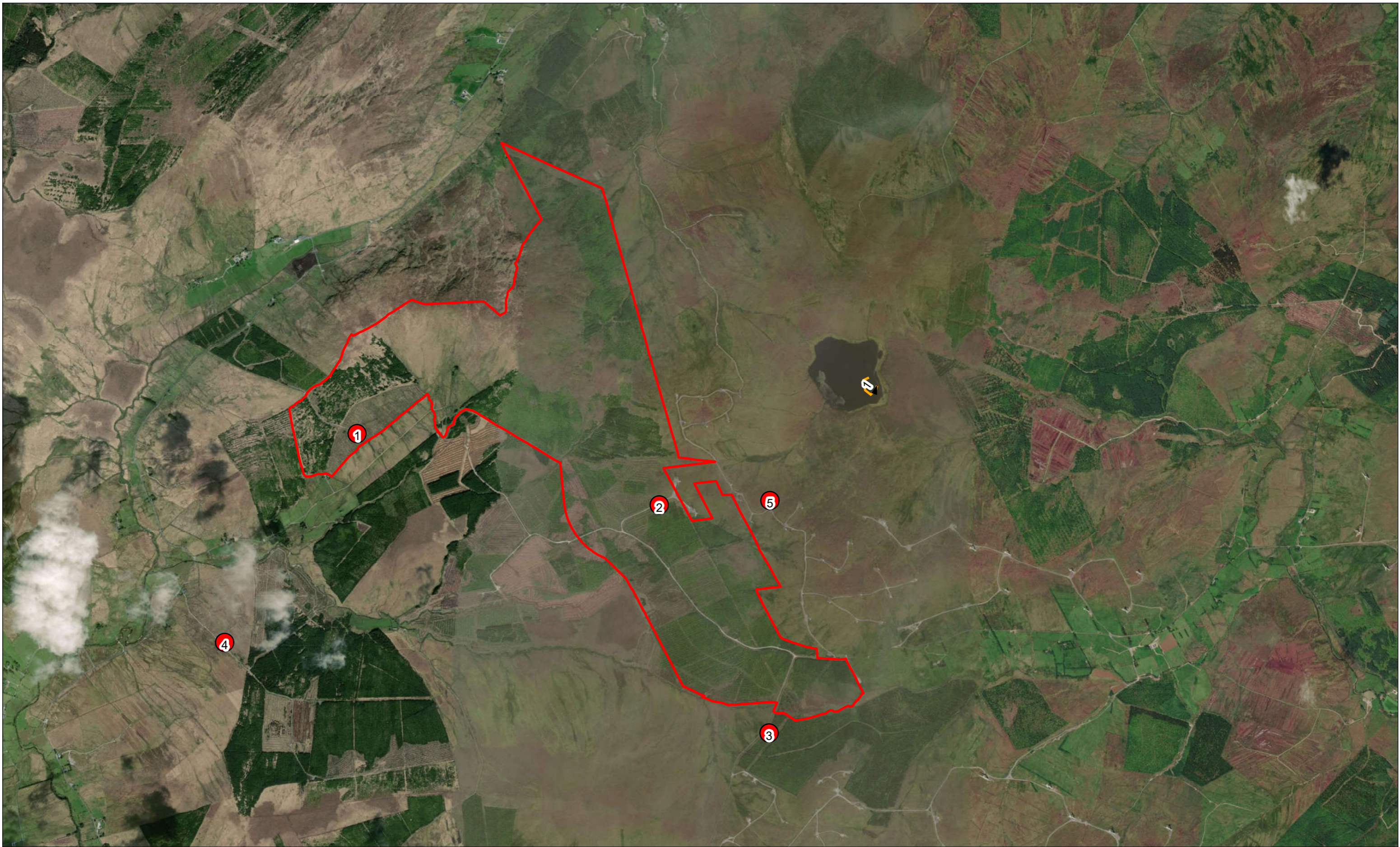
Client: SSE Renewables

Drawing Title:
Buzzard

Drawing No:
19123-MWP-

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





PROJECT	Drumnahough Bird Survey		
PROJECT NO.	19123		
TITLE	Common Sandpiper		
CLIENT	SSE Renwables Ireland		
DRAWN BY	VH	CHECKED BY	FM
DATE	07/02/2020		
DRAWING NO	Map 1	REF.	A


Legend	
	Vantage Point
	Common Sandpiper Flight Path
	Site Boundary

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Scale (A3): 1:25,000

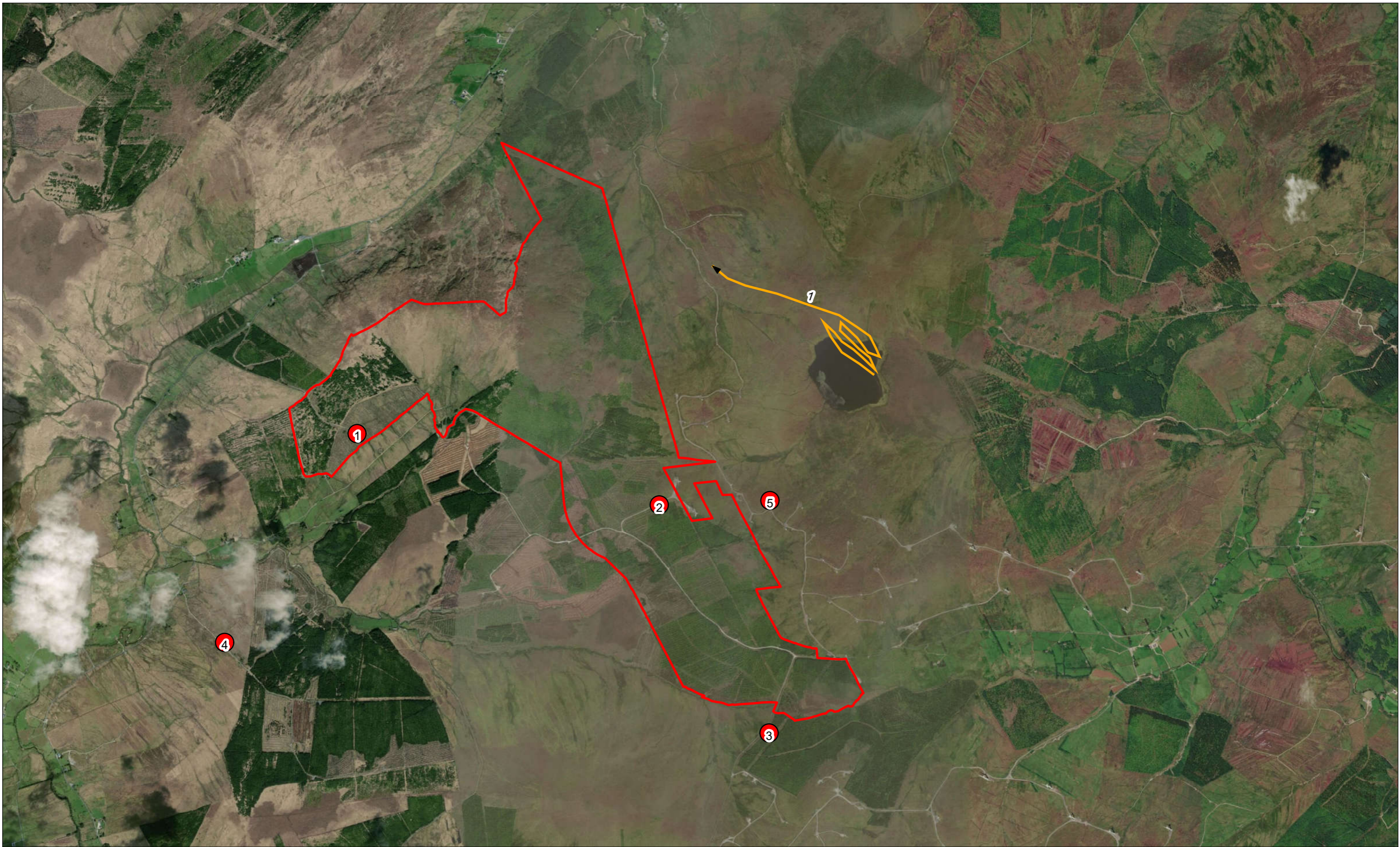
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Email: tralee@mwp.ie



PROJECT	Drumnahough Bird Survey		
PROJECT NO.	19123		
TITLE	Cormorant		
CLIENT	SSE Renwables Ireland		
DRAWN BY	VH	CHECKED BY	FM
DATE	07/02/2020		
DRAWING NO	Map 1	REF.	A


Legend	
	Vantage Point
	Cormorant Flight Path
	Site Boundary

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4. All levels are in metres related to Ordnance Datum.
5. Drawings are not to be scaled.

Scale (A3): 1:25,000

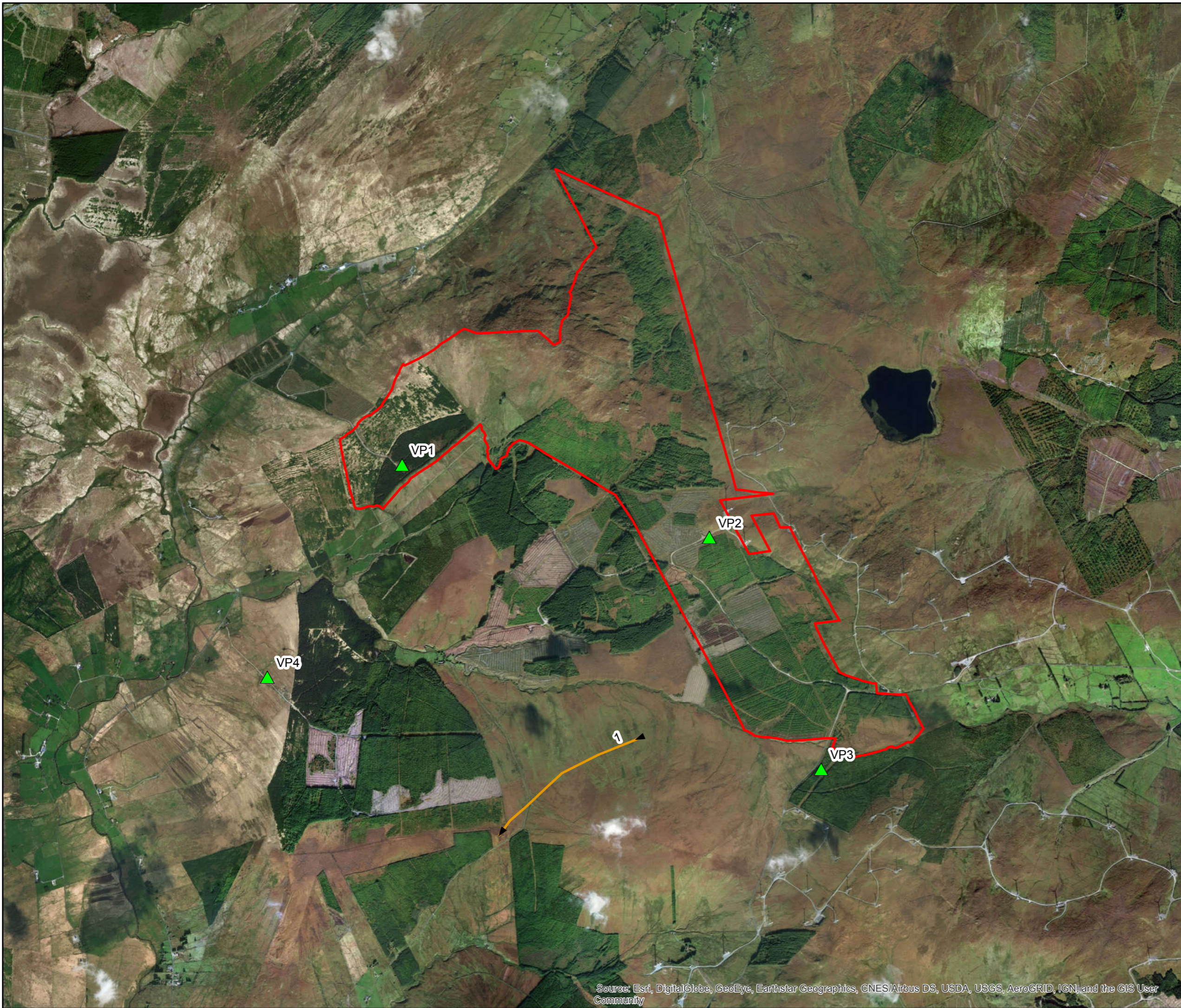
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Email: tralee@mwp.ie



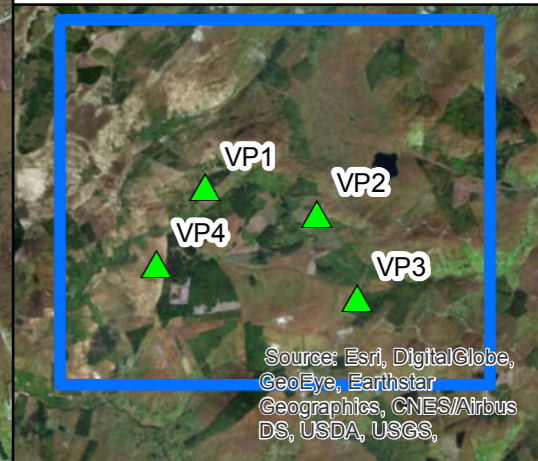
Legend

Site Boundary

VP Location

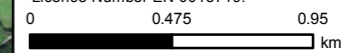
Great Black Backed Gull Flight Path

1



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Project Title:
Drumnahough Wind Farm

Client: SSE Renewables

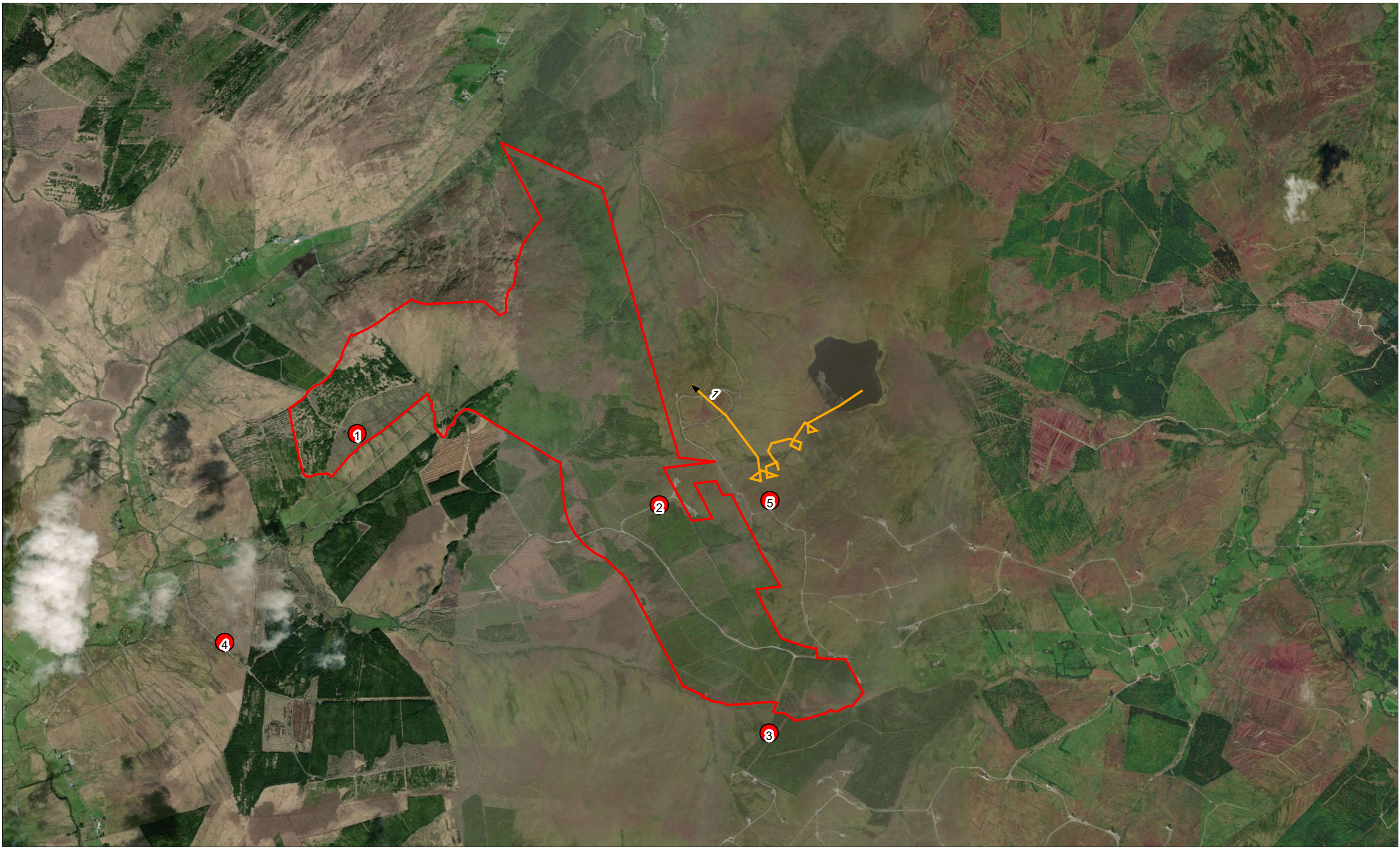
Drawing Title:
Summer 2019
Great Black Backed Gull Flight Path

Drawing No:
19123-MWP-XX-XX-DR-V-0010-A

Drawn: VH **Checked:** FMcK

Date: 08/07/2019 **Scale (A3):** 1:25,305





PROJECT	Drumnahough Bird Survey		
PROJECT NO.	19123		
TITLE	Great Black Backed Gull		
CLIENT	SSE Renwables Ireland		
DRAWN BY	VH	CHECKED BY	FM
DATE	07/02/2020		
DRAWING NO	Map 1	REF.	A

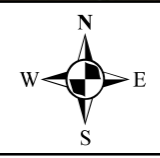

Legend	
	Vantage Point
	Great Black Backed Gull Flight Path
	Site Boundary

1. All drawings are to be read in conjunction with all relevant Specifications, Bills of Quantities, Architectural, Services and Engineering drawings.
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Scale (A3): 1:25,000

0 0.2 0.4 Kilometers

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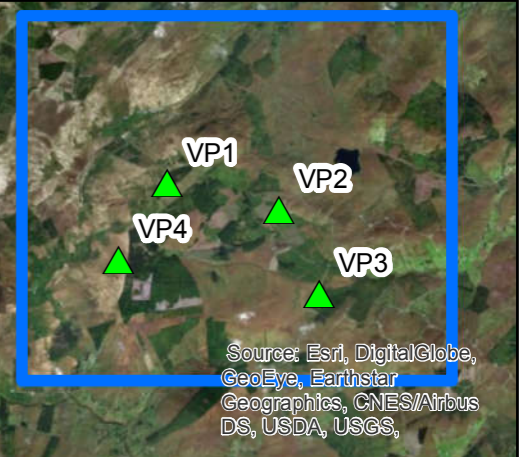
Legend

Site Boundary

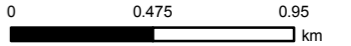
VP Location

Lesser Black Backed Gull Flight Path

1



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Project Title:
Drumnahough Wind Farm

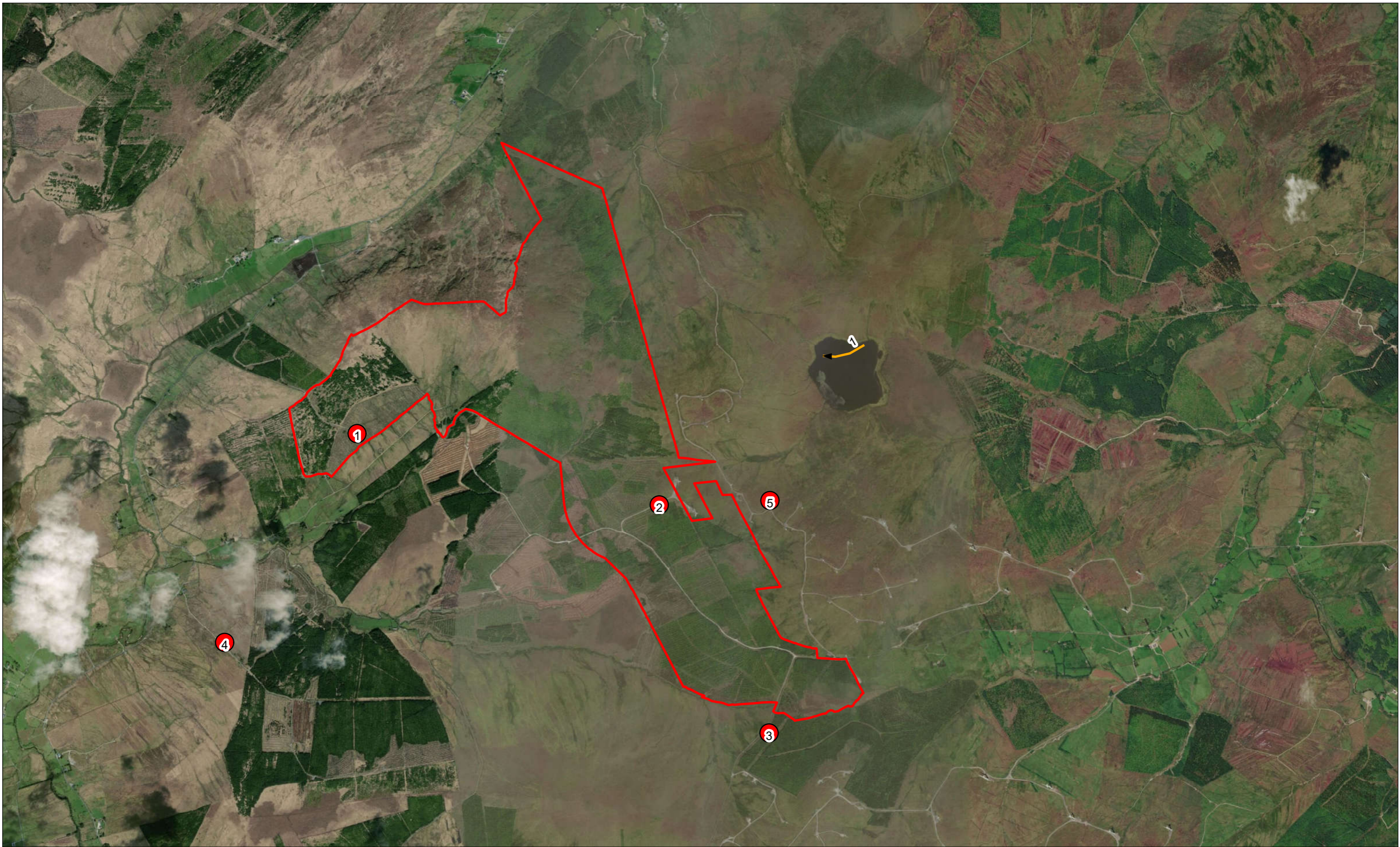
Client: SSE Renewables

Drawing Title:
Summer 2019
Lesser Black Backed Gull Flight Path

Drawing No:
19123-MWP-XX-XX-DR-V-0008-A

Drawn: VH **Checked:** FMcK

Date: 08/07/2019 **Scale (A3):** 1:25,305



PROJECT	Drumnahough Bird Survey		
PROJECT NO.	19123		
TITLE	Lesser Black Backed Gull		
CLIENT	SSE Renwables Ireland		
DRAWN BY	VH	CHECKED BY	FM
DATE	07/02/2020		
DRAWING NO	Map 1	REF.	A

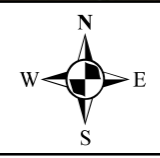

Legend	
	Vantage Point
	Lesser Black Backed Gull Flight Path
	Site Boundary

1. All drawings are to be read in conjunction with all relevant Specifications, Bills of Quantities, Architectural, Services and Engineering drawings.
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4. All levels are in metres related to Ordnance Datum.
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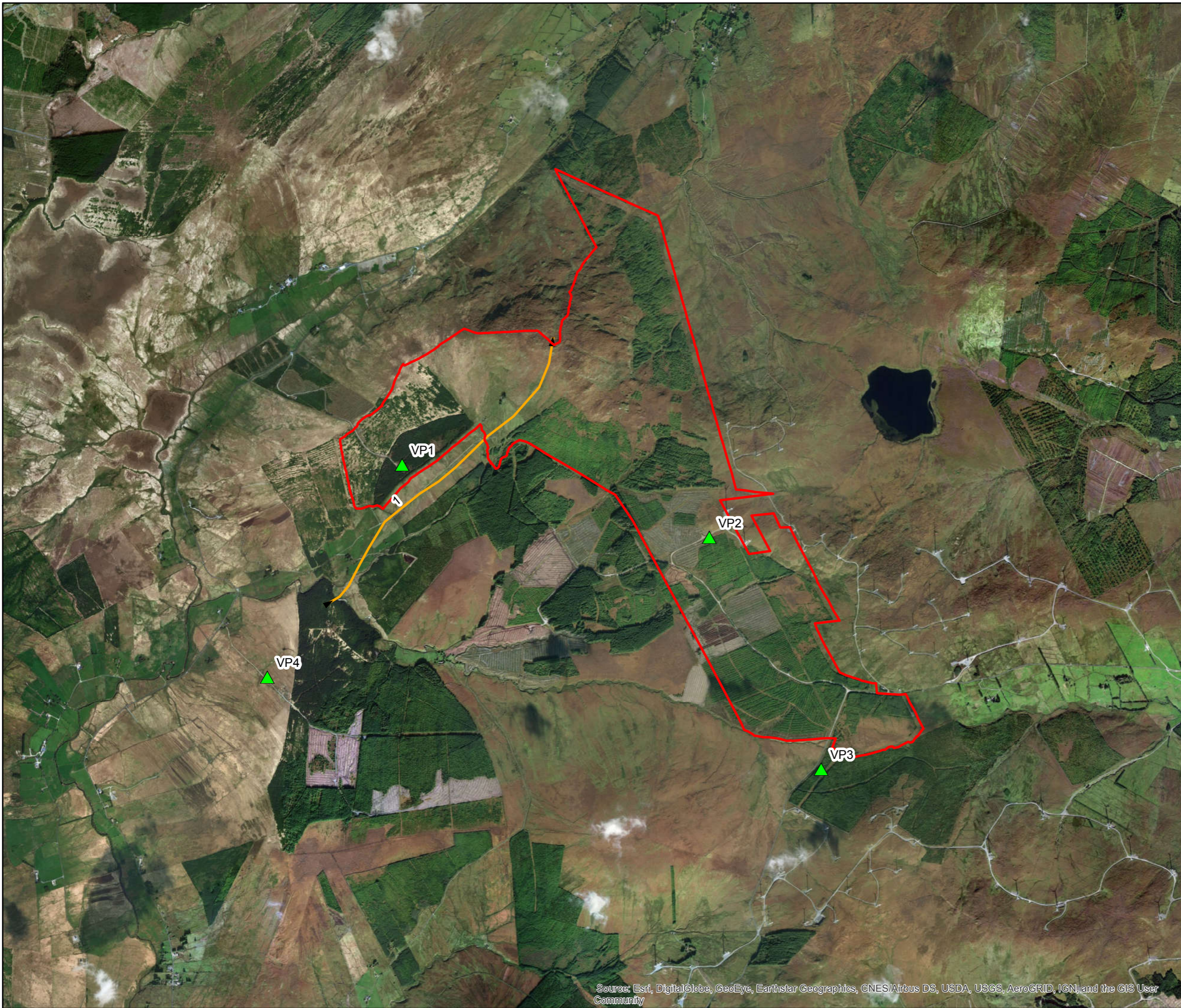
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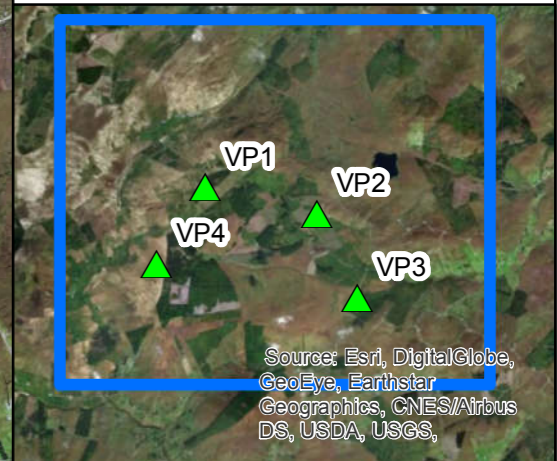
Legend

 Site Boundary

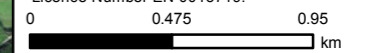
 VP Location

Grey Heron Flight Path

 1



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Project Title:
Drumnahough Wind Farm

Client: SSE Renewables

Drawing Title:
Summer 2019
Grey Heron Flight Path

Drawing No:
19123-MWP-XX-XX-DR-V-0009-A

Drawn: VH Checked: FMcK

Date: 08/07/2019 Scale (A3): 1:25,305





PROJECT	Drumnahough Bird Survey		
PROJECT NO.	19123		
TITLE	Grey Heron		
CLIENT	SSE Renewables Ireland		
DRAWN BY	VH	CHECKED BY	FM
DATE	07/02/2020		
DRAWING NO	Map 1	REF.	A


Legend	
	Vantage Point
	Grey Heron Flight Path
	Site Boundary

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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.

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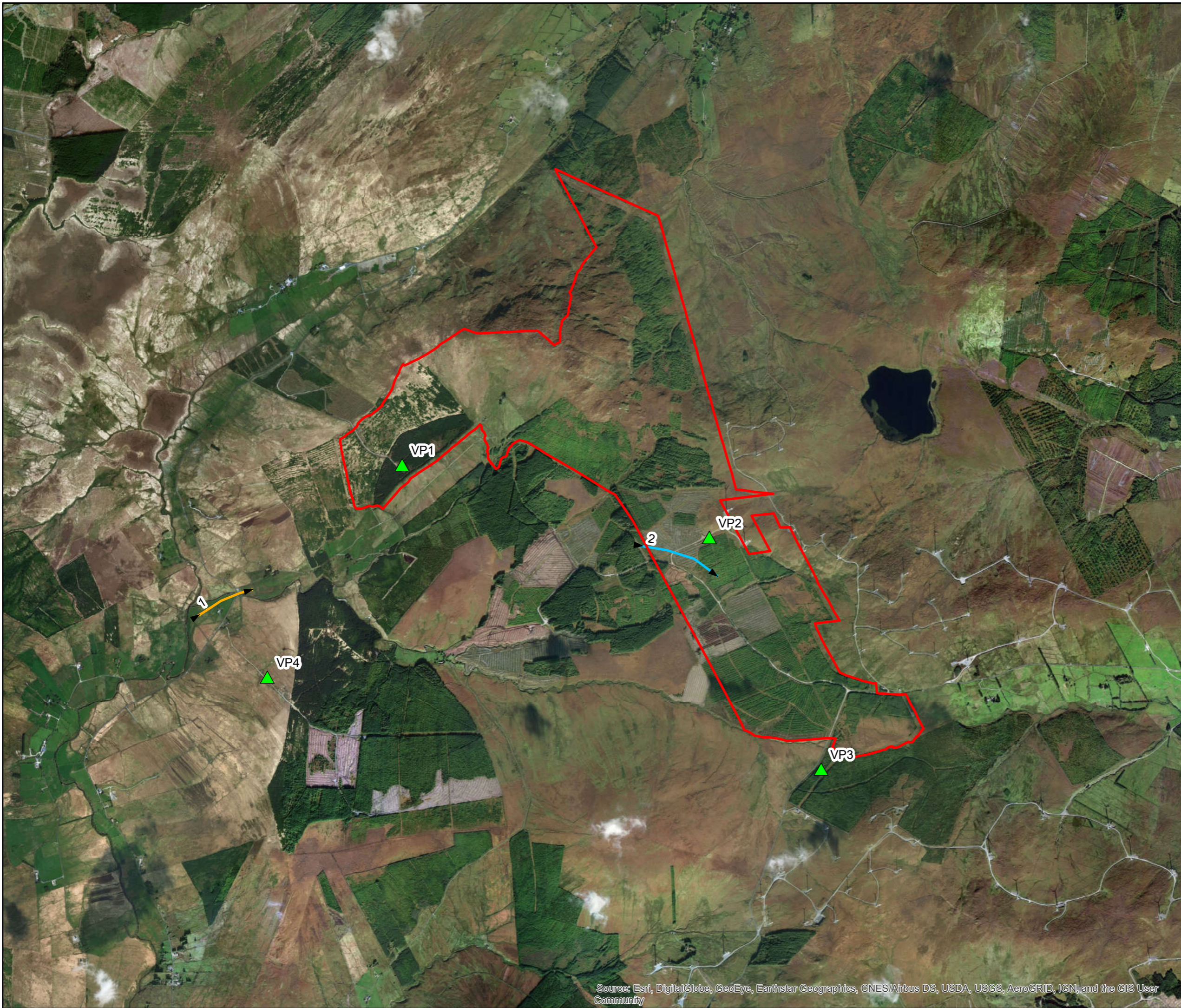
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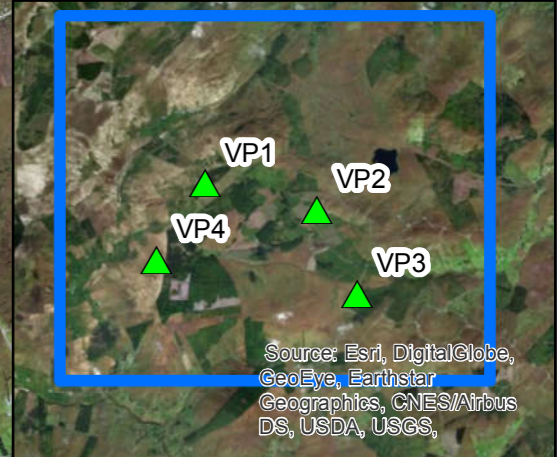


Legend

- Site Boundary
- ▲ VP Location

Mallard Flight Path

- 1
- 2



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0 0.475 0.95 km

Project Title:
 Drumnahough Wind Farm

Client: SSE Renewables

Drawing Title:
 Summer 2019
 Mallard Flight Path

Drawing No:
 19123-MWP-XX-XX-DR-V-0007-A

Drawn: VH	Checked: FMcK
Date: 08/07/2019	Scale (A3): 1:25,305

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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 Drumnaough summer 2019.

Common Name	Latin Name	April	May	June	July	Aug	Sept
Meadow pipit	<i>Anthus pratensis</i>	10	14	12	16	13	26
Grey wagtail	<i>Motacilla cinerea</i>					1	
Goldcrest	<i>Regulus regulus</i>	2	3	1	2	2	1
Grasshopper warbler	<i>Locustella naevia</i>	1					
House martin	<i>Delichon urbicum</i>	2	1		3		2
Linnet	<i>Carduelis cannabina</i>				2		
Mistle thrush	<i>Turdus viscivorus</i>	3	1	2	8		4
Robin	<i>Erithacus rubecula</i>	4	2	1	1	1	3
Sand martin	<i>Riparia riparia</i>	2			5		
Skylark	<i>Alauda arvensis</i>	5	7	4	2		5
Snipe	<i>Gallinago gallinago</i>	3	2		1		1
Starling	<i>Sturnus vulgaris</i>			54	54	50	
Stonechat	<i>Saxicola torquata</i>				6		3
Swallow	<i>Hirundo rustica</i>	4	1	4	18	3	
Swift	<i>Apus apus</i>			2	1		

Appendix 7

Transect Survey Summary

Transect Survey Summary

Transect	Date	Observer	Start Time	Finish Time	Weather
B	30/05/2019	SC	13.47	14.20	Cloud cover 8/8, continuous misty dense rain. Wind SR F2-5, temp 13oC and visibility poor.
C	28/05/2019	SC	12.45	13.17	Cloud cover 7/8, mostly overcast with some sunny spells. Wind NNW F2, temp 11oC and visibility good.
B	25/07/2019	SC	16.15	18.15	Cloud cover 8/8, mostly overcast with sting winds. Wind SE F4-6, temp 21oC and visibility good.
C	24/07/2019	JC	08.30	09.00	Cloud cover 7/8, wind SW F3-4. Temp 15oC, visibility excellent.
B	29/08/2019	SC & JC	11.10	12.50	Cloud cover 7/8, mostly overcast and windy. Wind SW F4-6, temp 15-16oC and visibility good.
C	28/08/2019	JC	13.40	14.19	Cloud cover 5/8, sunny. Temp 13-14oC, visibility good.
B	26/09/2019	SC	17.05	18.20	Cloud cover 6/8, mixture of sunshine, cloud and intermittent showers. Wind SW F3-5, temp 12-11oC and visibility good.
C	24/09/2019	SC	13.00	13.30	Cloud cover 5/8, mostly sunny. Wind SE F2-3, temp 18oC and visibility good.

Appendix 8

Transect/Point Counts Summary Results

The following table outlines peak counts of species recorded during the breeding 2019 Transect Routes B and C and Point Count surveys at Drumnaough. A total of 30 species were recorded.

Common Name	Latin Name	May		Jul		Aug		Sep	
		B	C	B	C	B	C	B	C
Blackbird	<i>Turdus merula</i>	1						1	
Blackcap	<i>Sylvia atricapilla</i>	2	1						
Bullfinch	<i>Pyrrhula pyrrhula</i>			1		1		1	
Chaffinch	<i>Fringilla coelebs</i>	6	7	4	3	4		2	1
Coal tit	<i>Periparus ater</i>	2	1	5	1	1	1	2	1
Crossbill	<i>Loxia curvirostra</i>				1				5
Cuckoo	<i>Cuculus canorus</i>		1						
Dunnock	<i>Prunella modularis</i>	1	3	2	1	1		1	1
Goldcrest	<i>Regulus regulus</i>	4	8	7	3	4	1	3	1
Golden plover	<i>Pluvialis apricaria</i>							15	
Grey wagtail	<i>Motacilla cinerea</i>					2			
Hooded crow	<i>Corvus cornix</i>		1						
Jay	<i>Garrulus glandarius</i>							2	
Mallard	<i>Anas platyrhynchos</i>							1	
Meadow pipit	<i>Anthus pratensis</i>	2	2	1		2		1	5
Mistle thrush	<i>Turdus viscivorus</i>					1			
Peregrine falcon	<i>Falco peregrinus</i>			1					
Raven	<i>Corvus corax</i>			3		2		2	2
Redpoll	<i>Carduelis cabaret</i>	1	3	1	1				6
Robin	<i>Erithacus rubecula</i>	4	2	4	3	1	1	3	5
Sedge warbler	<i>Acrocephalus schoenobaenus</i>	1							
Siskin	<i>Carduelis spinus</i>	3	2	1					
Skylark	<i>Alauda arvensis</i>							1	
Song thrush	<i>Turdus philomelos</i>	1	1		1				
Sparrowhawk	<i>Accipiter nisus</i>			1					
Spotted flycatcher	<i>Musciapa striata</i>			1					
Swallow	<i>Hirundo rustica</i>			1					
Willow warbler	<i>Phylloscopus trochilus</i>	2	3	2	2				
Woodpigeon	<i>Columba palumbus</i>	1	4	1	2	1	1		
Wren	<i>Troglodytes troglodytes</i>	2	3	4	1	1	1	1	1

Appendix 9

Merlin Nest Survey Summary

Merlin Nest Watch Survey Summary

Merlin Nest watch survey summary

Survey Type	Location	Date	Observer	Start Time	Finish Time	Length of VP watch (hours)	Weather
Merlin Nest watch	VP2	26/06/2019	AC	11.40	15.40	4	Cloud 2/8 continuous sunshine. Wind E F4-3, temp 18-22oC, and visibility good.
Merlin Nest watch	VP2	26/07/2019	SC	09.00	13.00	4	Cloud cover 8/8, mostly overcast with some misty showers reducing visibility. Wind S-S/SW F3-5, temp 17-18oC and visibility good/moderate, poor at times.

Appendix 10

Merlin Survey Results

Merlin Survey Results

Merlin Nest Watch Surveys June and July 2019

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
27/06/2019	2	Female	Adult	Appendix 11	Forest	1	11.50	Flying	3	-	3	-	-	-	-
26/07/2019	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Other Species observed during Merlin Nest Watch Survey

Peregrine															
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
26/07/2019	2	Male	Adult	Appendix 11	1 st rotation forest, thicket, clear fell	1	09.38 -	Flying, perched	5-10 40-60	- -	25 -	- 60	- -	- -	- -


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
26/07/2019	2	Male	Adult	Appendix 11	1 st rotation forest, thicket, clear fell	1	11.14 11.38	Flying	1-40 30-40	-	1 -	2 10	- -	- -	- -

Appendix 11

Merlin Watch Survey Flight Path Maps



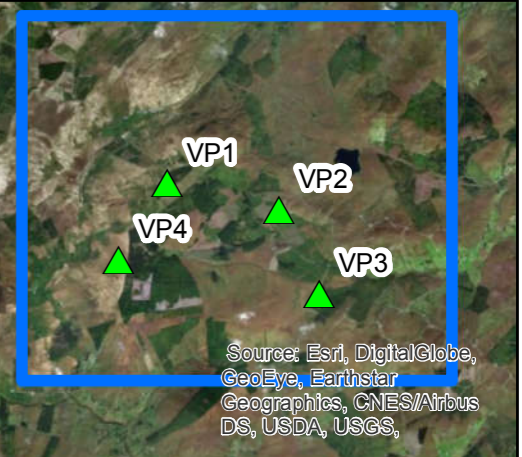
Legend

 Site Boundary

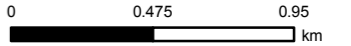
 VP Location

Merlin Watch Flight Path

 1



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Project Title:
Drumnahough Wind Farm

Client: SSE Renewables

Drawing Title:
Summer 2019
Merlin Watch Flight Path

Drawing No:
19123-MWP-XX-XX-DR-V-0011-A

Drawn: VH **Checked:** FMcK





Date: 09/07/2019 **Scale (A3):** 1:25,305





Legend


Peregrine Flight Path

-  1
-  2
-  VP Location
-  Site Boundary



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0 0.375 0.75 km



Project Title:
 Drumnahough Wind Farm

Client: SSE Renewables

Drawing Title:
 Summer 2019: Merlin Nest Watch

Drawing No:
 19123-MWP-

Drawn: VH	Checked: FM
Date: 26/02/2020	Scale (A3): 1:15,000








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



Legend


Sparrowhawk Flight Path

-  1
-  2
-  Sparrowhawk Nest Site
-  VP Location
-  Site Boundary



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0 0.375 0.75 km



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Appendix 12

Nightjar/Woodcock Walkover Survey Summary and Results

Nightjar/Woodcock Survey Summary and Results

Nightjar/Woodcock walkover survey summary

Survey Summary Details							
Survey Type	Location	Date	Observer	Start Time	Finish Time	Length of VP watch (hours)	Weather
Woodcock/ Nightjar walkover	Transect route B and C	28/08/2019	SC & JC	21.15	23.10	1.55	Calm night, damp with some light rain at the start and then becoming clear skies. Wind SSW F0-1, temp 10oC and visibility good.

Nightjar/Woodcock walkover survey results

Woodcock and Nighjar														
Date	Transect	Sex	Age	Map Ref	Habitat	No. Of Birds	Time of Flight/ Obs.	Activity	Flight Height (m)	Time (sec) in Height Category				
										Non-flight	0-50m	50 – 100m	>100m	>200m
28/08/2019	A	-	-	-	-	-	-	-	-	-	-	-	-	-
28/08/2019	B	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 13

Merlin/Golden plover Walkover Survey summary and Results

Merlin/Golden Plover Walkover Survey Summary and Results

Merlin/Golden plover walkover survey summary

Survey Type	Date	Observer	Start Time	Finish Time	Length of VP watch (hours)	Weather
Merlin/Golden plover walkover 1	27/06/2019	SC	13.34	14.10	0.36	Cloud cover 1/8, clear blue skies, warm with sunshine. Wind E F2-5, temp 20-22oC, visibility very good.
Merlin/Golden plover walkover 2	27/06/2019	SC	20.25	22.10	1.45	Cloud cover 0/8, sunshine and clear blue skies. Wind E F2-5, temp 17-15oC, visibility very good.

Merlin/Golden plover walkover survey results

Merlin and Golden plover														
Date	Walkover No.	Sex	Age	Map Ref	Habitat	No. Of Birds	Time of Flight/ Obs.	Activity	Flight Height (m)	Time (sec) in Height Category				
										Non-flight	0-50m	50 – 100m	>100m	>200m
27/06/2019	1	-	-	-	-	-	-	-	-	-	-	-	-	-
27/06/2019	2	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 14

List of all Species Recorded

The following table outlines all species recorded during the breeding 2019 surveys at Drumnahough. A total of 53 species were recorded.

Common Name	Latin Name	April	May	June	July	Aug	Sept
Blackbird	<i>Turdus merula</i>						
Blackcap	<i>Sylvia atricapilla</i>						
Buzzard	<i>Buteo buteo</i>						
Chaffinch	<i>Fringilla coelebs</i>						
Chiffchaff	<i>Phylloscopus collybita</i>						
Coal Tit	<i>Periparus ater</i>						
Common sandpiper	<i>Actitis hypoleucos</i>						
Cormorant	<i>Phalacrocorax carbo</i>						
Crossbill	<i>Loxia curvirostra</i>						
Cuckoo	<i>Cuculus canorus</i>						
Dunnock	<i>Prunella modularis</i>						
Goldcrest	<i>Regulus regulus</i>						
Golden eagle	<i>Aquila chrysaetos</i>						
Grasshopper warbler	<i>Locustella naevia</i>						
Great black-backed gull	<i>Larus marinus</i>						
Great tit	<i>Parus major</i>						
Grey heron	<i>Ardea cinerea</i>						
Grey wagtail	<i>Motacilla cinerea</i>						
Hen harrier	<i>Circus cyaneus</i>						
Hooded crow	<i>Corvus cornix</i>						
House martin	<i>Delichon urbicum</i>						
Jackdaw	<i>Corvus monedula</i>						
Jay	<i>Garrulus glandarius</i>						
Kestrel	<i>Falco tinnunculus</i>						
Lesser black-backed gull	<i>Larus fuscus</i>						
Linnet	<i>Carduelis cannabina</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>						
Peregrine	<i>Falco peregrinus</i>						
Pheasant	<i>Phasianus colchicus</i>						
Pied wagtail	<i>Motacilla alba</i>						
Raven	<i>Corvus corax</i>						
Red grouse	<i>Lagopus lagopus scotica</i>						
Redpoll	<i>Carduelis cabaret</i>						
Reed bunting	<i>Emberiza schoeniclus</i>						
Robin	<i>Erithacus rubecula</i>						
Sand martin	<i>Riparia riparia</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>						
Swallow	<i>Hirundo rustica</i>						
Swift	<i>Apus apus</i>						

Common Name	Latin Name	April	May	June	July	Aug	Sept
Teal (Eurasian)	<i>Anas crecca</i>						
Willow warbler	<i>Phylloscopus trochilus</i>						
Woodpigeon	<i>Columba palumbus</i>						
Wren	<i>Troglodytes troglodytes</i>						