



APPENDIX 1

INLAND FISHERIES IRELAND OBSERVATION



Iascach Intíre Éireann
Inland Fisheries Ireland

24th of February 2022

Our Ref: P/02/22/Lk.

Your Ref: 190114

The Offices of An Bord Pleanála,
64 Marlborough Street,
Dublin 1,
D01 V902

AN BORD PLEANÁLA	
LDG-	050 222 - 22
ABP-	312659 - 22
02 MAR 2022	
Fee: €	Type:
Time:	By: Post

Re: Section 37E Application to An Bord Pleanála for a Wind Farm Development & Associated Works, at Glenard and other townlands, County Donegal.

Dear Sir/Madam,

Inland Fisheries Ireland is the statutory authority tasked under section 7(1) of the Inland Fisheries Act 2010 (No. 10 of 2010) with responsibility for the protection, management, and conservation of the inland fisheries resource

In relation to the above development, the following observations are of relevance:

- The main surface water receptors within the catchment of the project are as follows: (Glenard River, Crana River, Owenkillew River, Mill River, Donagh River and Cabry River)

These river systems provide habitat and spawning habitat for various species of freshwater fish, these include:

- Atlantic Salmon (*Salmo salar*) listed in Annex II of the EU Habitats Directive (92/43/EEC),
- Brown Trout (*Salmo trutta*),
- Sea Trout (*Salmo trutta*)
- Eel (*Anguilla anguilla*) which is protected Evaluation of Council Regulation (EC) No 1100/2007 of 18 September 2007 establishing measures for the recovery of the stock of European eel and the Conservation of Eel Fishing Bye-Law No. C.S. 319, 2015.



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Although some of the outlined streams may be small and of limited fisheries value for Atlantic Salmon, all the small streams within the catchment area of the windfarm development play a significant role in providing aquatic habitat for species like Eel and Trout. These small streams are important sources for the food of fish or may provide spawning grounds during winter months. It must also be noted that in the event of poor land use practices or poorly managed development projects, small streams can become vectors for negative impacts such as water pollution or invasive species within catchments. The discharge of contaminated surface water runoff has the potential to result in negative impacts to water quality, invertebrates, plant life and on all life stages of fish.

The Following Guidance must be followed throughout the duration of the development:

If it is intended that oil or fuel be stored in or adjacent to the construction site, it must be kept in a bunded area (providing 110% capacity of the largest storage unit), 100m from any watercourse which appears on a 6" O.S. map of the site. Vehicle maintenance should not occur within 100m of any watercourse and all machinery must be in good working order, free from any leakage of fuel, oil or hydraulic fluid.

Roadside drains should not intercept large volumes of water from ground above. Any watercourse, however small that is intercepted by the access routes should preferably be bridged or culverted at that point. The use of fords must be avoided. Culverts should be of a size sufficient to avoid overloading, blocking or washout. The profile of any stream that is crossed must remain the same and any fish movement remain unhindered. Shooting velocities must be avoided. Floating roads must be considered where any peat encountered is one metre or more in depth. Piling may be considered for turbine bases at deep peat locations and these bases should be a minimum 50 metres from watercourses. This separation distance must be increased where fisheries sensitive waters occur.

Erosion of roadside embankments and cuttings should be avoided by using intercepting trenches or terracing. Embankments and cuttings should be kept at no greater slope than the normal angle of repose to encourage re-vegetation, otherwise added stabilisation may be required. It is essential that silt traps and settlement ponds are utilised and are capable of settling out materials prior to discharge off site. These ponds must take into account high precipitation events and designed accordingly, incorporating other treatment measures where necessary. The traps and ponds must be regularly inspected and maintained as required.



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Existing drainage channels should remain untouched. During the construction period cement and wet concrete must be kept out of all watercourses and drains. Concrete trucks must not wash out on site. These materials are extremely toxic to aquatic life and the construction team must be made fully aware of this. This will be especially important during the construction of the turbine bases.

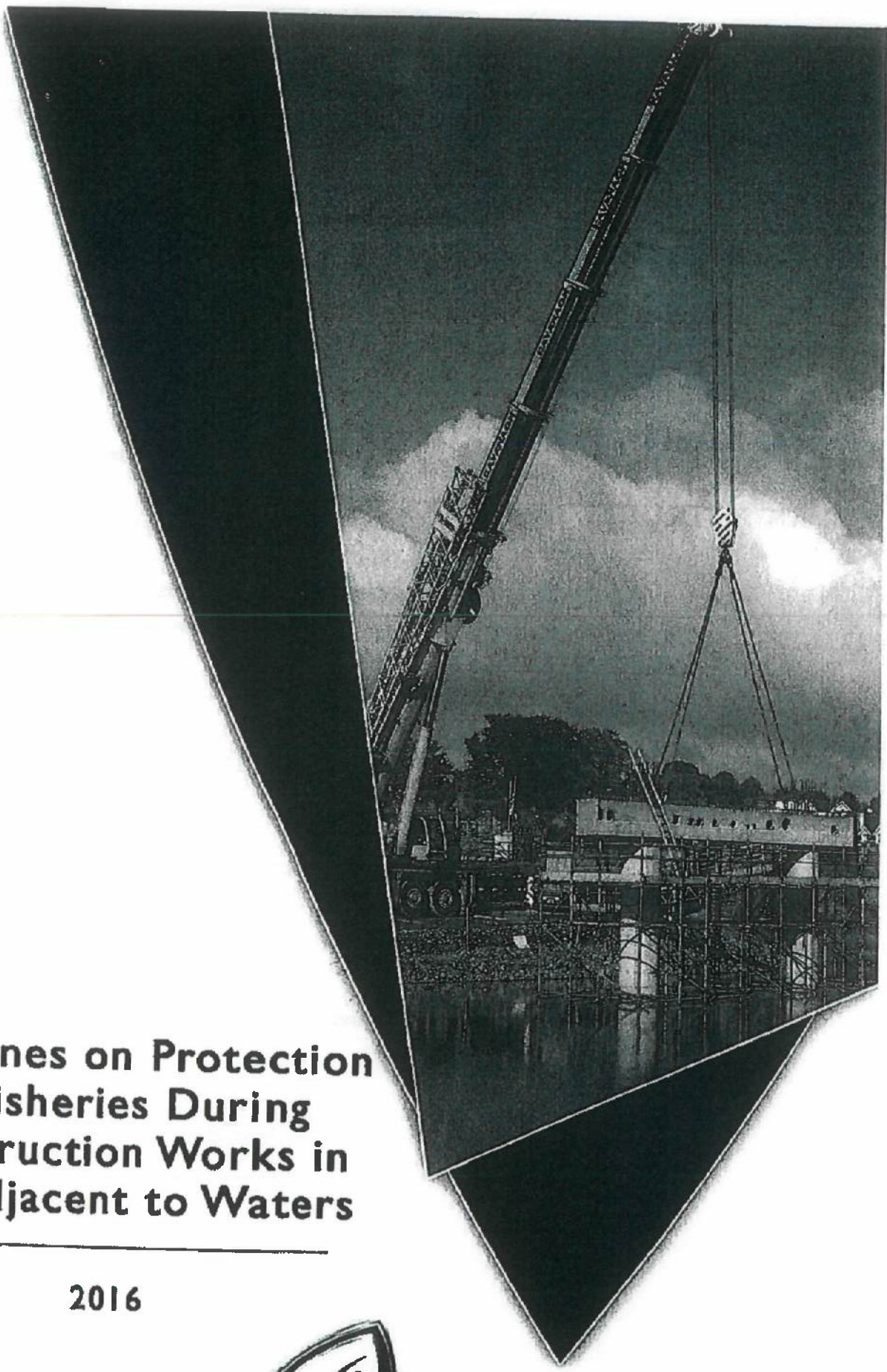
Track rutting's by machinery movement must be kept to a minimum and no discharge or run off containing high sediment loads must occur from the site. In this regard a contingency plan should be established and strictly adhered to. Any stockpiling of peat or other site materials will require careful management to ensure that slippage or collapse to any adjacent watercourses will not occur. A construction methodology is recommended prior to any works commencing with a view to, among others, minimising the volumes of excavation that will be required. Site preparation and construction must adhere to best practice and conform to the publication 'Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites.'

The monitoring of all surface flows during construction is essential and remote sensing equipment should be considered as a normal precaution and extended into the post construction phase. Full implementation of the mitigation measures as identified in the Natura Impact Statement (NIS), the Environmental Impact Report (EIR) and the Construction Environmental Management Plan (CEMP) is a requirement and must be referred to by way of condition should a grant of permission be forthcoming in this case.

Consideration should be afforded to the likely increase in surface water flow from the site which has the potential to alter the downstream prevailing hydrological regime and impact on the fisheries resource. In this regard attenuation measures should be identified and implemented in the surface water drainage arrangements.

Mitigation measures for the interception of suspended solids must be designed so as to comply with an upper limit of 25mg per litre for the discharge of Total Suspended Solids (TSS) to surface waters as specified in the Salmonid Waters Regulations, SI 293 of 1988. Buffer zones should not be used for the storage of any materials. Works should be suspended during heavy rains or when there is high risk of pollutants entering adjacent surface waters. Run-off volumes should not exceed the assimilative capacity of the receiving waters.

Consideration must be afforded to the possible presence of invasive species and appropriate action taken in eradication utilising current best practice.



Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters

2016





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It would be recommended that a suitably qualified person as described in the application documentation be on site for the duration of works to ensure:

- (a) All mitigation measures identified are implemented prior to and during the construction phase, as appropriate. This is essential in relation to possible peat shear.
- (b) Continual assessment to ensure the mitigation measures are effective including assessment of adjacent peats for cracking/instability.
- (c) Cessation of works should slippage indicators develop and/or settlement arrangements are inadequate for suspended solid removal in surface waters.
- (d) Peat reinstatement is completed according to a detailed restoration plan.
- (e) Arrangements are established in relation to a contact protocol for the relevant statutory bodies on progress of works.

Yours sincerely

James Doherty
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**GUIDELINES ON PROTECTION OF FISHERIES DURING
CONSTRUCTION WORKS IN AND ADJACENT TO WATERS**

INLAND FISHERIES IRELAND

2016

**GUIDELINES ON PROTECTION OF FISHERIES DURING
CONSTRUCTION WORKS IN AND ADJACENT TO WATERS.**

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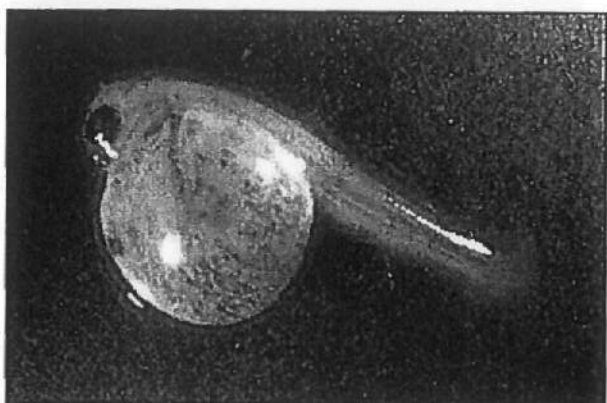
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GUIDELINES ON PROTECTION OF FISHERIES DURING CONSTRUCTION WORKS IN AND ADJACENT TO WATERS

1. INTRODUCTION.

1.1 Inland Fisheries Ireland (IFI) is responsible for the protection, management and conservation of the inland fisheries resource in Ireland, which includes over 70,000 kilometres of rivers and streams and 144,000 hectares of lakes. The agency is also responsible for sea angling. The waters concerned contain a wide range of fish species, which are particularly sensitive in terms of threats to their physical habitat and to water quality such as arise during construction works in and adjacent to waters.

1.2 IFI policy is aimed at maintaining a sustainable fisheries resource through preserving the productive capacity of fish habitat by avoiding habitat loss, and harmful alteration to habitat. Construction works particularly those entailing the installation of new river and stream crossing structures and the realignment of river channels have the potential to significantly impact both in the short and long term on fisheries resources if they are not carried out in an environmentally sensitive manner.



A brown trout at the alevin stage shortly after hatching. This life stage is very sensitive to pollution and physical disturbance.

1.3 These guidelines identify the main issues of concern in terms of construction impacts and their prevention. They set out *inter alia* requirements in relation to bridges and culverts and the need for such structures to allow for unhindered upstream and downstream movement of fish and aquatic life.

2 OBLIGATIONS ON DEVELOPERS DESIGNERS AND CONTRACTORS TO CONSULT IFI.

2.1 Contact should be made with IFI at the earliest possible stage in the planning and design process where works such as road construction, installation of culverts and bridges, the crossing of rivers/streams with pipelines and works on and in the environs of waters are planned. Such consultation will enable those concerned to comply with the provisions of the Fisheries Acts and Habitats Regulations.

2.2 In addition to the general guidance and requirements detailed herein, there will be design and construction issues specific to individual projects and locations. In such cases IFI will issue detailed operational and construction requirements.

3. THE ISSUES OF CONCERN.

3.1 Damage to the Aquatic and Associated Riparian Habitat, e.g.

- Removal and loss of instream spawning gravels and larger stones.

- Loss of submerged and emergent aquatic vegetation.
- Loss or damage to bankside cover including removal of trees, shrubs and bankside root masses.
- Undesirable changes in watercourse morphology and hydrology.



Drip tray is undersized, dangerously positioned and leaking oil. Unacceptable practice.

3.2 Pollution of Waters.

Pollutant	Examples of Construction Source
Silts and solids.	Earthworks, new drainage networks and instream works.
Cementitious residues.	Bridge, culvert and drainage headwall construction, etc.
Oils and greases. Anti freeze.	Construction plant and equipment.
Wood preservative.	Treatment of new timber fencing.

3.3 Introduction of Non Native Species.

Invasive Species	Construction Source
Plants, algae, fish and shellfish.	Earthmoving equipment, pumps, boats, ropes etc, previously used perhaps unknowingly in waters containing Invasive species.
Plants and algae.	Imported materials such as top soil.

Further information on Invasive species their impact and control, and on bio-security is available at www.inlandfisheriesireland.ie

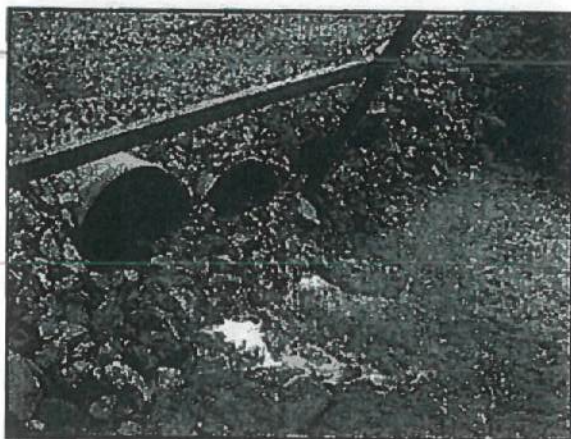


It is a serious offence to discharge deleterious matter such as oil contaminated residues to waters.

3.4 Interference with Upstream and Downstream Movement of Aquatic Life.

- Improperly designed or installed temporary and/or permanent watercourse crossing structures. For example, insufficient water depth in culverts, culverts with perched inlets, outfalls and excessive slope.

- Insufficient water depth over bridge aprons/scour slabs.
- Physical alteration of stream channels resulting in:
 - Altered hydraulic characteristics.
 - Changes in stream profile, particularly in width, depth, gradient and current speed.



Temporary crossing impassable to fish life.

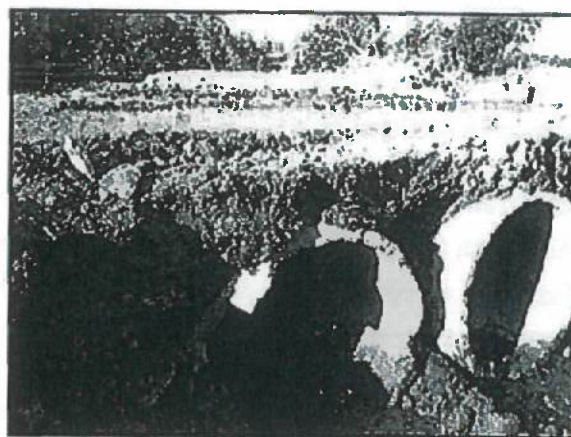
4. TIMING OF INSTREAM WORKS.

4.1 There are significant variations in the timing and duration of salmonid (Salmon and Trout) spawning activity throughout the Republic of Ireland. To minimise adverse impacts on the fisheries resource works in rivers, streams, watercourses, lakes, reservoirs and ponds should normally (except in exceptional circumstances and with the agreement of IFI) be carried out during the period July-September.

4.2 The appropriate 'window' for instream works can vary depending on the nature of the fishery resource concerned and the existence of other factors such as catchment or sub catchment specific Bye Laws and Regulations.

5. TEMPORARY CROSSING STRUCTURES ON WATERS.

5.1 All watercourses which have to be traversed during construction projects should be effectively bridged prior to commencement of works. There is sometimes a serious misconception that in installing temporary crossing structures, the only issue is keeping water flowing from above a temporary crossing to below it. Design and choice of temporary crossing structures must provide for passage of fish and macroinvertebrates, the requirement to protect important fish habitats e.g. spawning and over wintering areas, as well as preventing erosion and sedimentation. In certain circumstances, access for angling or commercial fishing purposes may also be required.



Temporary crossing structure. Impassable for aquatic life and emitting silt to waters as construction equipment traverses the crossing. Unacceptable practice.

5.2 No temporary crossing on any watercourse shall be installed without the approval of IFI as regards sizing, location, duration and timing.

5.6.3 Ensure no significant alteration in current speed or hydraulic characteristics, in particular not result in scouring, deposition or erosion upstream or downstream the temporary crossing location.

5.6.4 Have capacity to convey the full range of flows including flood flows likely to be encountered without the crossing being overtopped.

5.6.5 Be covered with clean inert material such as to allow for the safe crossing of the widest items of plant and equipment without cover material being dislodged and entering waters.

5.7 The approach and departure routes to temporary crossing structures should be designed and installed so that drainage will fall away from the watercourse being crossed. In the event that the fall of ground does not permit sufficient control on drainage, additional earthworks settlement areas shall be provided.

5.8 Temporary crossing structures should be fenced with terram or similar material to prevent wind blow carrying dusts and other potentially polluting matter to waters.

5.9 Side armour (e.g. reinforced concrete traffic barriers) should be provided on temporary crossing structures to ensure machinery cannot drive over its edge, or force the discharge of material from the bridge deck to waters.

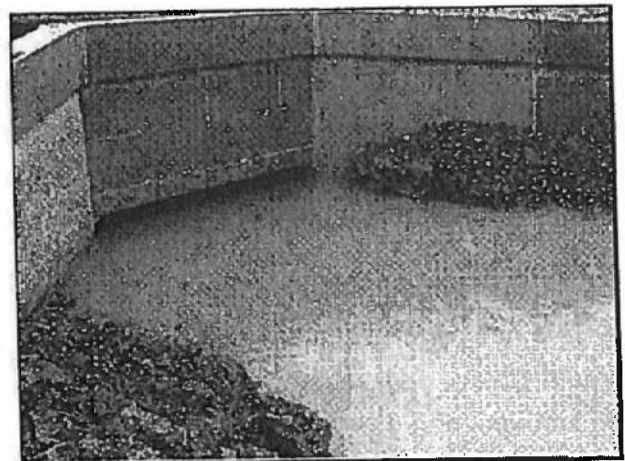
5.10 IFI wish to emphasise that site selection for temporary crossings should have regard to all access and construction needs ranging from those of fencing contractors vehicles to the longest wheelbase of multi-axle cranes.



A crossing structure over a designated salmonid water. Note: terram covered fencing, reinforced concrete traffic barriers and fall back from the watercourse.

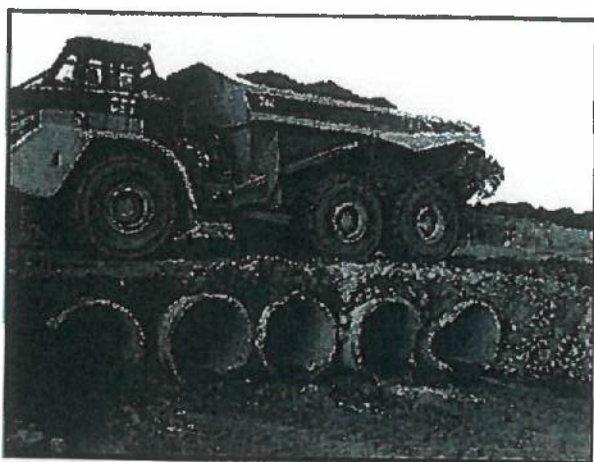
5.11 It is not permissible, except in exceptional circumstances, to reposition temporary crossing structures where these are not of a clear span type.

6. RIVER AND STREAM PERMANENT CROSSING STRUCTURES.



Is the culvert adequately sized?

6.1 Structures should not damage fish habitat or create blockages to fish and macroinvertebrate passage. Design and choice of structure should be based on its technical



The same temporary crossing location as shown on the previous page, but with a laden dumper dislodging and causing loss of cover material to waters.

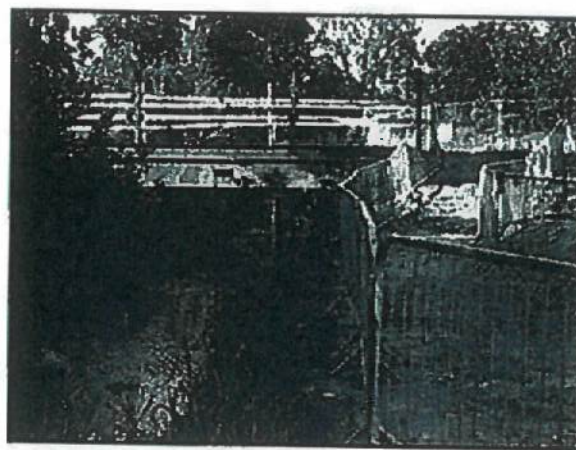


The inevitable result from the crossing shown above. Continuous silt discharges. Unacceptable practice.

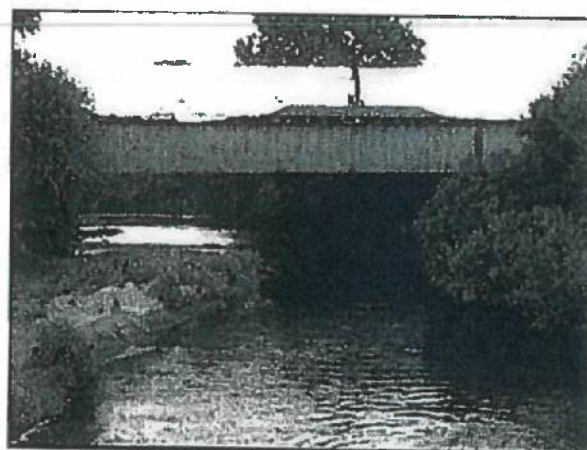
5.3 The preferred option is for clear span 'bridge type' structures on fisheries waters.

5.4 The crossing of watercourses at natural fords is not permitted because of the amount of uncontrolled sedimentation that can be generated.

5.5 The creation of fords on streams and rivers through the introduction of stone is prohibited.



Temporary clear span 'bailey bridge' ensuring free upstream and downstream movement of aquatic life. The streamside fencing should be 5 metres from the watercourse, not immediately alongside as in this photograph.



A clear span temporary crossing capable of carrying heavy axle loadings and long wheel base vehicles.

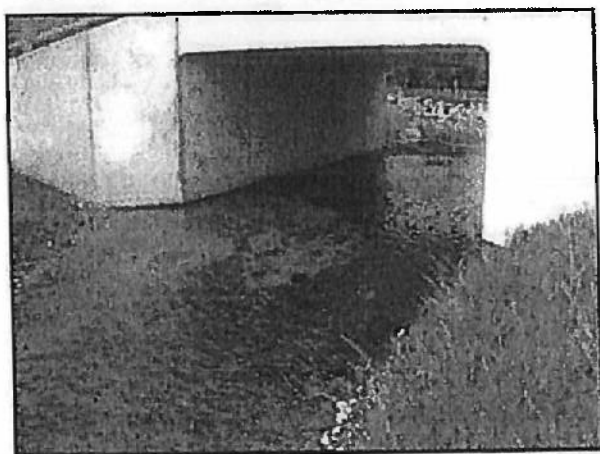
5.6 Where circumstances such as space or access difficulties preclude use of clear span structures, temporary crossings structures shall:

5.6.1 Comprise one or more metal or concrete pipes, prefabricated culverts or such other material as IFI may permit of minimum diameter 900 mm. Pipes or culverts may be vertically stacked.

5.6.2 Be laid in such manner as to maintain the existing stream profile.

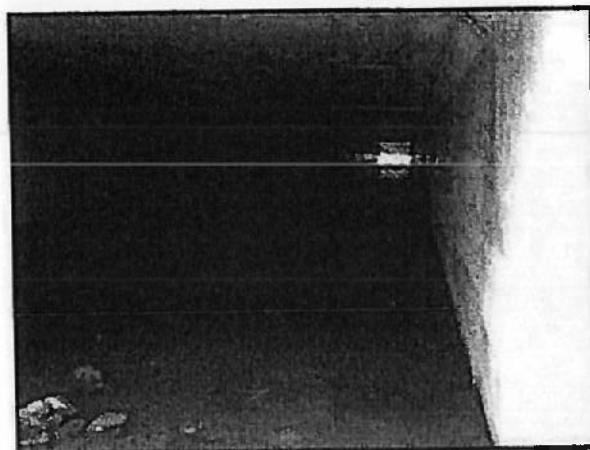
and economic feasibility to pass fish and macroinvertebrates, the requirement to protect important fish habitats e.g. spawning and overwintering areas, provision in certain areas of angling and commercial fishing access including boat access and prevention of erosion and sedimentation.

6.2 Culverts are the most frequently used river/stream crossing structures and are associated with some of the most common fish passage problems. The culverting of long stretches of fisheries water is extremely undesirable and can result in significant loss of valuable habitat. In the case of crossing structures over fishery waters, the preferred position is for clear span structures (bridges), so as not to interfere in any way with the bed or bank of the watercourses in question.



Excessively wide culverts can result in reduced current speed, ponding, and siltation of instream gravels.

6.3 Bridge foundations should be designed and positioned at least 2.5 metres from the river bank so as not to impact on the riparian habitat.



Excessively long culvert resulting in habitat loss and reduced productivity due to inadequate light penetration.

6.4 Generally, bridges and bottomless culverts are the best option for maintaining natural stream channel characteristics and have the least impact on habitat. However, because of design and load bearing considerations, bottomless culverts may not always be suitable for installation particularly on narrow river channels, as foundations may encroach on the channel itself and possibly result in future scouring or erosion.

6.5 Taking account of recent advances and investigations in the area of climate change and flood studies, designs should be such as to verifiably have carrying capacity for a 1 in 100 year fluvial flood flow whilst maintaining a minimum freeboard of 300 mm.

6.6 The Office of Public Works (OPW) is the lead agency for flood risk management in the Republic of Ireland. Design and capacity of structures must also be in accordance with their requirements. IFI strongly recommends that contact be made with OPW at the earliest stage in the planning and design process. (www.opw.ie)



An embedded box culvert sized to match existing stream profile.

6.7 Clear span designs maintain channel profile, do not alter gradients, readily pass sediment and debris and provide unrestricted passage for all size classes of fish by retaining the natural stream bed and gradient. Water velocity is not changed and they can be designed to maintain the normal stream width. Foundations should be positioned at least 2.5 metres from waters.

6.8 Embedded box and pipe culverts are less preferable to bridges and bottomless culverts. Embedded culverts must maintain the natural channel gradient, width and substrate configuration. They should be buried to a minimum of 500 mm. below the stream bed at the natural gradient. Box and pipe culverts must be sized to maintain the natural stream channel width. The gradient should not exceed 3%. The availability of suitably sized material (depending on hydraulic conditions) to initiate "simulation" of the stream bed is the most preferable approach to establish fish and faunal passage through culverts.

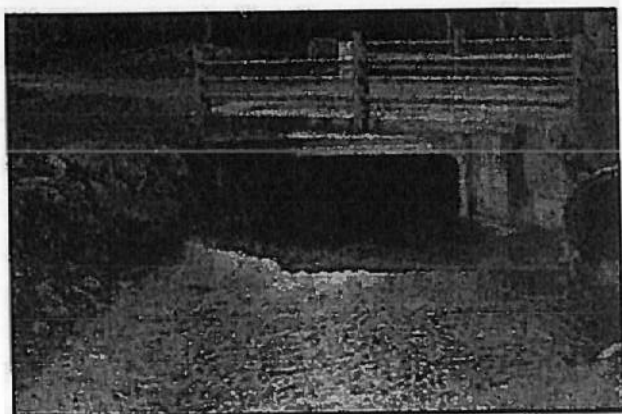
6.9 Culverts should be positioned where the watercourse is straightest and aligned with its bed.



Off-line culvert at construction stage back filled with gravel. The size range and depth of fill required will be site specific.

6.10 In the case of bridges and bottomless culverts, structures should be designed and installed so as to:

- 6.10.1 Allow for the maintenance of channel profile and existing gradient.
- 6.10.2 Be capable of passing such debris as might arise during flood flow conditions.
- 6.10.3 Ensure adequate light penetration to minimise loss in primary productivity.
- 6.10.4 Not result in damage to the riparian habitat or necessitate construction within 2.5 metres of waters.
- 6.10.5 Provide at locations specified by IFI, angling access and/or access for commercial fishing purposes.



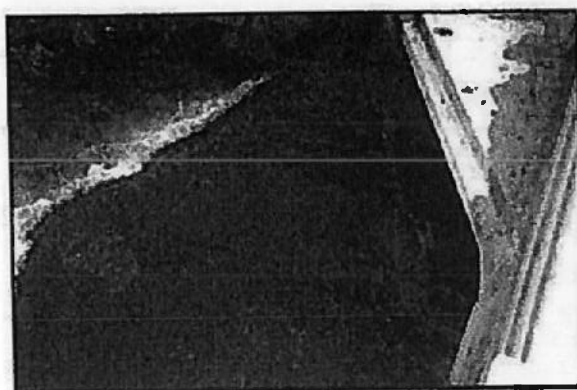
Box culvert positioned at incorrect level. Upstream fish passage is made difficult. Culvert invert should be 500 mm. below existing bed level and back filled with clean gravel to match the existing stream profile.

6.11 While the preferred option is for bottomless culverts, IFI is prepared in certain circumstances to consider proposals for the installation of box or pipe culverts on fisheries waters. These may be installed subject to structures being sized so as to meet the requirements at 6.10 in terms of channel profile, gradient, flood debris capacity, light, access and:

6.11.1 Be positioned such that both the upstream and downstream invert shall be 500 mm. below the upstream and downstream river bed invert levels respectively.

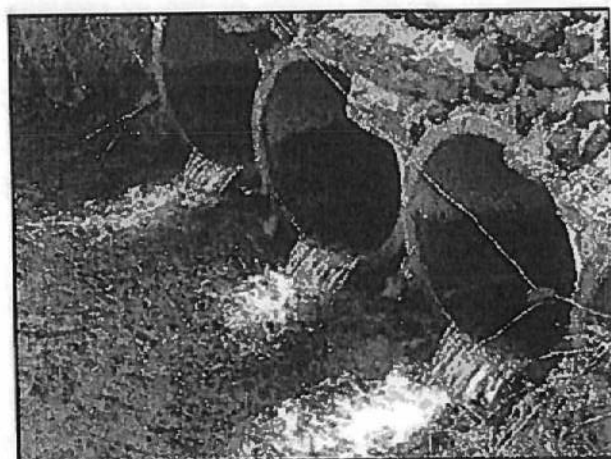
6.11.2 Never exceed a slope of 5%, in which circumstances baffles generally are required, and preferably not exceed a slope of 3%. As baffles can reduce the hydraulic efficiency of culverts, appropriate capacity provision must be included in the overall design.

6.11.3 In the case of box culverts on angling waters, be 3 meters in height.



The smooth concrete finish is totally unsuitable for fish passage.

6.12 Pipe culverts are not generally considered acceptable on fisheries waters. They are normally only appropriate for use on minor watercourses and drainage ditches where these can be demonstrated as not being significant in terms of fisheries habitat.



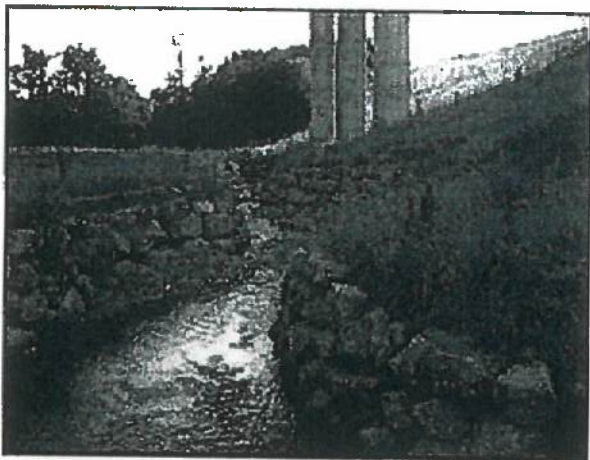
Unacceptable culverting practice. These pipes are totally impassable to fish.

6.13 Bank protection works are often required upstream and downstream of new structures, to ensure no undercutting or destabilisation of either the structure or riparian bank areas occurs. In carrying out bank protection works, it is essential that large enough boulders are selected and strategically positioned, to ensure they cannot be undercut. Normally this entails part burying boulders up to one third of their depth below stream bed

level and securing them into their final position. In areas of high water energy, to ensure stability, boulders size should be a minimum of 0.5 ton.



The boulders in these bank protection works are not large enough, not sunken below stream bed level and likely to be undercut and dislodged in a storm event.



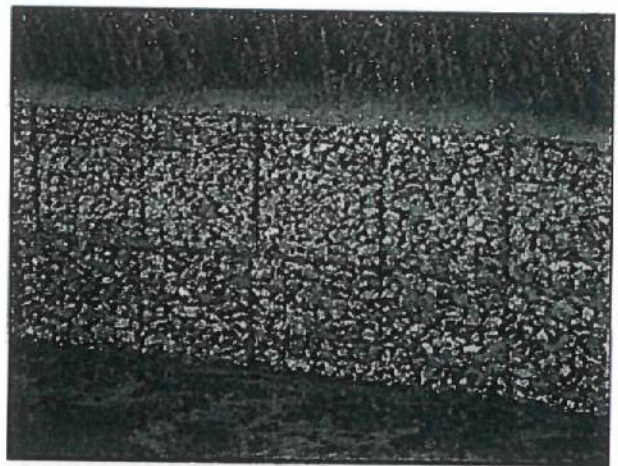
Suitably sized rock armour built to high water level at a location influenced by tidal back-up.

6.14 To facilitate revegetation, each course of boulders laid should be back filled with a layer of top soil. Selection of boulders in terms of shape to facilitate their placement and stability is a major consideration. Irregularly shaped boulders are very difficult to work with in terms of building multiple stable courses.



Revegetation of rock armour facilitated by the placing of locally sourced topsoil (to ensure no importation of non local grasses and shrubs) between each layer or course of boulders at installation time.

6.15 The height to which rock armour is built must take account not only of the riparian zone requiring protection, but also in certain circumstances of the need to protect e.g. kingfisher and sand martin habitat. In many instances, one or two layers of armour will be sufficient to protect and stabilise the toe of embankments while allowing nesting.



Visually unsightly stone filled gabion baskets.

6.16 Gablons are not a preferred option when it comes to bank protection. They can easily be vandalised and once the mesh is cut or broken, baskets can collapse. Gablon baskets can be unsightly and it is difficult to successfully

establish and maintain vegetation on side walls. Gabion baskets are normally only acceptable at locations where due to access constraints it is not possible to install rock armour.

7. CONSTRUCTION IMPACTS.

7.1 Uncured concrete can kill fish, plant life and macroinvertebrates by altering the pH of the water. Pre-cast concrete should be used whenever possible, to eliminate the risk to all forms of aquatic life.

7.2 Discharge of silt-laden waters to fisheries streams is of particular concern. Silt can clog fish spawning beds and juvenile fish species are particularly sensitive. Plant and macroinvertebrate communities can literally be blanketed over, and this can lead to loss or degradation of valuable habitat. It is important to incorporate best practices into construction methods to minimise discharges of silt/suspended solids to waters.



Construction sites require careful management. Is this the optimal haul route in terms of impact minimisation?



Silt discharge minimisation by providing retention areas to reduce discharge velocity and allow settlement during rainfall events.

7.3 Discharges of fuels and oils can be directly toxic to aquatic life and at sub lethal levels lead to tainting of fish tissues, rendering fish inedible. Oil films on water can seriously interfere with the diffusion of oxygen from the atmosphere into waters and in extreme cases result in oxygen depletion.



The practical impact of poor silt control.

7.4 IFI require that:

7.4.1 When cast-in-place concrete is required, all work must be done in the dry and effectively isolated from any flowing water (or water that may enter streams

and rivers) for a period sufficient to ensure no leachate from the concrete.



Silt control pond. The blue hose conveying pumped silt laden waters has its outlet securely anchored within the stone aggregate thereby dissipating energy, minimising disturbance, and preventing pond contents being disturbed and re-suspended.



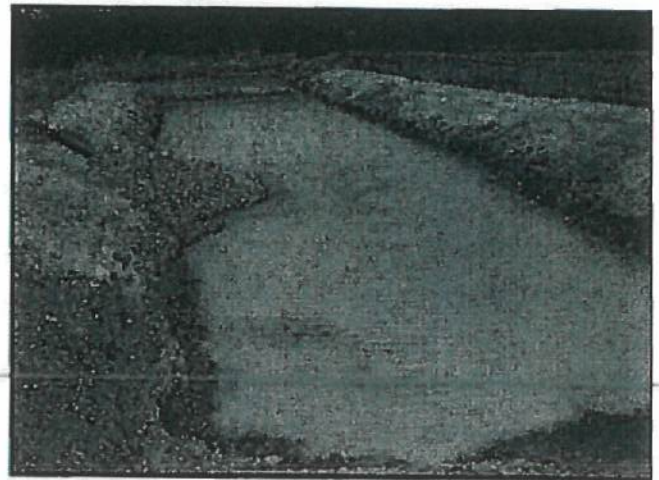
Poor work practice. The drip tray is undersized, constructed of too light a material, and accordingly overly flexible, easily damaged, and unlikely to retain oil residues.

7.4.2 No direct discharges be made to waters where there is potential for cement or residues in discharges.

7.4.3 Designated impermeable cement washout areas must be provided.

7.4.4 The pH of any and all discharges made from and during construction works shall be in the range 6.0 - 9.0 units and not

alter the pH of any receiving fisheries waters by more than ± 0.5 pH units.



Silt control pond. Note hose conveying pumped silt laden waters with its outlet positioned within the gravel mound thus ensuring no disturbance of pond contents.

7.4.5 Silt traps/settlement ponds or other forms of containment and treatment shall be constructed at locations that will intercept run-off to streams. Traps shall not be constructed immediately adjacent to natural watercourses. A buffer zone should remain between the silt trap and the watercourse with natural vegetation left intact. Alternatively, imported materials such as terram, straw bales, coarse to fine gravel should be used either separately or in combination as appropriate to remove suspended matter from discharges.

7.4.6 The level of suspended solids in any discharges to fisheries waters as a consequence of construction works shall not exceed 25 mg/l, nor result in the deposition of silts on gravels or any element of the aquatic flora or fauna.

7.4.7 All oils and fuels shall be stored in secure bunded areas and care and attention taken during refuelling and maintenance operations. Particular

attention shall be paid to gradient and ground conditions which could increase the risk of discharge to waters.

7.4.8 Temporary oil interceptor facilities shall be installed and maintained where site works involve the discharge of drainage water to receiving rivers and streams.

7.4.9 There shall be no visible oil film in any discharges from construction works to waters.

7.4.10 That all containment and treatment facilities are regularly inspected and maintained.

7.4.11 Waterproofing and other chemical treatment to structures in close proximity to waters shall be applied by hand.

7.4.12 Hydroseeding shall not be carried out in close proximity to water. These areas shall be seeded by hand.

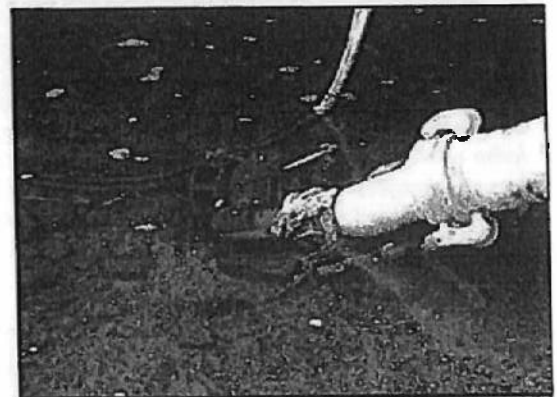


Terram lined (to prevent erosion) silt control pond outlet channel showing gravel acting as filter medium for silt removal.

8. DUST SUPPRESSION AND WATER ABSTRACTION.

8.1 It is accepted in the interests of protection of terrestrial ecosystems and so as to avoid a wide range of impacts on

persons and property, that dust control measures sometimes may be required. This is normally achieved by abstraction from watercourses adjacent to the site of earthworks. In such circumstances it is essential that the aquatic resource is protected and that over-abstraction does not take place especially in low flow summer conditions at locations supporting important fish populations.



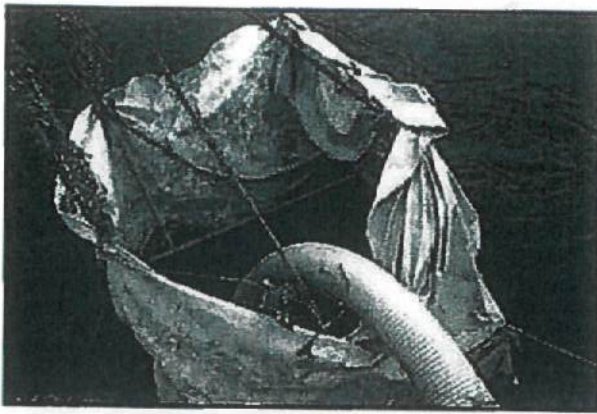
Continuous abstraction using submersible pump. No screening in place to prevent the entry of e.g. juvenile fish species to the pump. Unacceptable practice.

8.2 IFI require that:

8.2.1 Water abstraction for dust suppression shall not take place from any water body containing or suspected to contain aquatic invasive species.

8.2.2 Abstraction is confined to only those larger waters identified and agreed as being of sufficient size and volume so as to allow abstraction without adverse impact.

8.2.3 Abstraction points shall be screened so as to ensure that fish and aquatic plants are not removed from waters in the abstraction process.



A screened abstraction point using terram fitted over a fabricated support frame.

9. PLANNING, DESIGN AND CONSTRUCTION ISSUES.

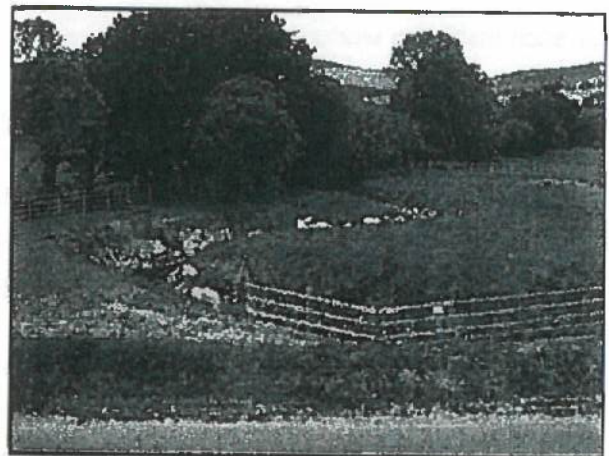
9.1 The preferred position from the fisheries perspective is for clear span river and stream crossing structures thereby allowing for installation/construction without the need to alter or move existing watercourses. In the case of bridges and bottomless culverts, designers should ensure proposals are such that foundations and abutments including wing walls can be constructed without entering on or damaging the riparian zone, or existing channel profile.

9.2 Where on-line construction is proposed or taking place, it may be necessary for IFI, following an assessment of on the ground conditions with the contractors involved, to temporarily remove using electro-fishing equipment, fish from the reaches involved.

9.3 Where on line box or pipe culvert construction is proposed, it will be necessary to install a temporary by-pass channel so as to allow for stream continuity and the normal upstream and downstream movement of fish and aquatic life depending on location and seasonality.

9.4 Temporary long term by-pass channels shall be excavated and sized such as to replicate existing upstream and downstream channel conditions as regards width, depth, gradient and instream materials. Where necessary, rock armouring will be provided. In terms of capacity, by-pass channels shall be sized so as to accommodate such flood event as might reasonably be expected based on examination of hydrometric data and catchment characteristics.

9.5 In newly constructed by-pass channels the process of diverting waters and associated movement of fish stocks may only take place under the direction and supervision of IFI or its agents. Adequate advance notice of all such proposed works shall be given to IFI.



Extreme meanders installed during excavation of a new channel to overcome excessive gradient between the original course of the stream (in the background at tree line) and the point of entry of the newly created channel to a culvert (in foreground under the timber fencing). In this instance there was inadequate provision at the planning and design stage for the necessary land take.

9.6 Where temporary short term by-pass channels are required for a number of days, these shall be excavated and sized such as to accommodate such flood event as might reasonably be expected over the period in question.

9.7 Where a structure installed on line is completed within the period during which instream works normally may be undertaken (July-September), flow may be re-established through the new structure, fish transferred from the temporary by-pass channel back to the original channel, and the by-pass decommissioned immediately on completion of the fish removal with the area levelled and landscaped as appropriate. Such works may only take place following the giving of advance notice to IFI and under its supervision.

9.8 Where a structure installed on line is not completed within the period during which instream works normally may be undertaken, flow may not except in exceptional circumstances be re-established through the new structure until the next approved 'window' for such instream works.

9.9 Where on-line construction is not feasible and a structure is constructed off-line (subject to IFI approval), the course of the existing stream can be altered and new approach/departure channels designed and installed to link into the original stream channel

9.10 IFI require where box and/or pipe culverts are installed off-line on fisheries waters that:

9.10.1 Particular attention shall be given by designers and contractors to survey pre-existing upstream and downstream stream bed levels at appropriate locations, taking account of the requirement to ensure newly installed box or pipe culverts are laid with their invert level 500 mm. below bed level, so that in overall terms the newly created section of stream shall replicate and

where appropriate, improve on that which it replaces.

9.10.2 The approach and departure channels for newly installed culverts shall be excavated and sized such as to replicate and be compatible with existing upstream and downstream channel conditions as regards width, depth, gradient and instream materials. Bends and meanders shall be incorporated into the new channel.

9.10.3 The approach and departure channels for newly installed culverts are back filled to a depth of up to 500 mm with clean round gravel in such size range as required where IFI determine that the material in the newly formed channel is unsuitable in terms of fish habitat.

9.11 Where as an exceptional measure consequent on limited land availability or other space constraints a culvert having a gradient greater than 5% is permitted, IFI require as follows:

9.11.1 Water velocity through the culvert should not exceed 1.2m/sec. in the case of salmonid habitat and 0.8 m/sec. in the case of cyprinid habitat.

9.11.2 Baffles should be provided within the culvert structure to locally reduce flow velocity thus aiding fish swimming upstream without undue stress.

9.11.3 The entry and exit points of the structure must be drowned out to a minimum depth of 150 mm. in the case of salmon waters and 100 mm. for trout waters.

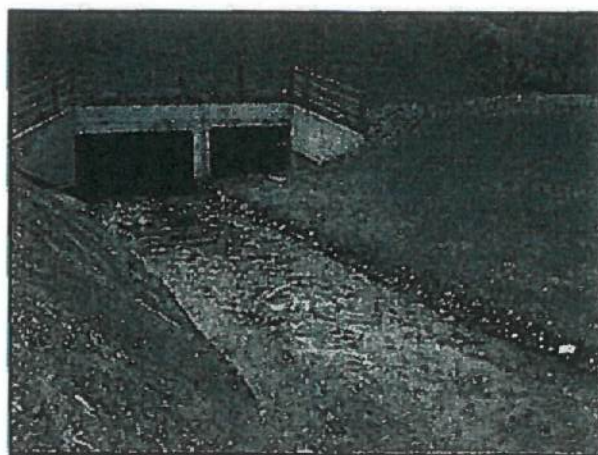
9.11.4 Where culvert gradient is too steep to achieve backwatering, the downstream water level should be raised by providing one or more ponding weirs below the culvert outfall. Ponding weirs should have fish notches to facilitate upstream movement and the pools formed by them should provide resting and take-off conditions for fish.

9.12 The fitting of mesh or screens to culverts, albeit with the intention of intercepting instream debris is prohibited.

9.13 Newly constructed river and stream channels shall have banks battered to a finished angle of not greater than 45° on one bank and not greater than 30° on the opposite bank, (to allow for maintenance of a low flow channel, an overflow and a flood flow channel). Banks shall be top soiled and seeded so as to ensure the growth and development of a broad range of local grasses and shrubs thereby facilitating development of stable bank root structures.



Well vegetated newly established river channel, with broadleaves planted to within 5 meters of the overflow channel. The root structures aid bankside stability.



Looking from upstream towards a culvert arrangement. Moderate and flood flows are conveyed in the right hand culvert. Entry to that culvert is dictated by the invert and contour of the right hand portion of the newly created river channel. The left hand bank finished batter angle is approx. 45°. The first portion of the right hand bank to convey the moderate flow is battered to approx. 30°. The extreme right bank area is battered to approx. 45° to convey flood flows.

9.14 Broadleaves shall, where prescribed by IFI, be planted along newly created channels so as to provide a mixture of dapple and shade conditions. Planting shall be a minimum of 5 meters from the watercourse channel.

9.15 In the case of culverts, low flows can be accommodated in an appropriately sized structure, thereby sustaining the fisheries resource. Moderate and flood flows should be directed through a culvert that becomes operable only at a pre-determined discharge level. Moderate and flood flow culverts should be installed such that the culvert empties in its entirety when the flood has passed.

9.16 To aid in the colonisation and development of newly created river channels, it is desirable to transfer established riparian plants, shrubs and trees together with living root structures as well as boulders, stones and gravels from decommissioned to new channels where they can be positioned, inserted and replanted as appropriate.



Newly created channel. The riparian grasses on the right bank have been transferred from the previous course of the now redundant original channel. The root structures stabilise the bank area while the grasses provide a degree of cover and shade and provide habitat for aquatic insects which form part of the food for fish.

9.17 In the case of newly created stream and river channels IFI require that:

9.17.1 Such transfer of riparian plants, trees and instream material(s) as necessary, is carried out under IFI's direct supervision.

9.17.2 Gravels and stones are removed from the dried out river channels and securely stored for re-use in the newly created river channels.

9.18 Stock proof and mammal proof fencing shall not cause an obstruction to fish passage or angling.

9.19 IFI shall be reimbursed the cost of fish removal and replacement operations associated with river and stream diversions and associated works.

10.0 REPAIRS TO EXISTING BRIDGES, CULVERTS AND SCOUR SLABS.

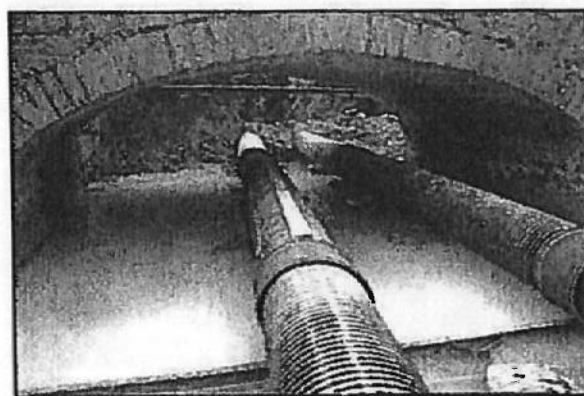
10.1 There are within Ireland very many old stone bridges in need of strengthening and

repair works. The most commonly used methods for such works include pressure grouting, guniting and pointing of joints



Grout loss to waters is normally stopped by placing dry cement over the leak, with sand bags on top to restrict grout flow until the leak solidifies. (This photograph was taken after water flow was re-established following solidification of the grout.)

10.2 The concerns as regards sensitivity of aquatic life to pollutants and physical disturbance set out earlier in this document all apply, particularly as regards loss of grout and gunite rebound, both of which are highly alkaline.



Repairs to a single arch bridge and scour slab with stream flow piped from upstream to downstream (foreground) during both grouting and slab repair.

10.3 Grouting is a high risk process, as it is not always possible to pre-determine the route that grout will follow. It may travel through

fissures and appear upstream or downstream of the structures under repair, sometimes metres from the location of injection. Particular vigilance is required. During grout injection at least one member of a repair crew should be closely monitoring for grout losses both upstream and downstream of the structure. Portable pH monitoring facilities should always be available and staff trained in its use.

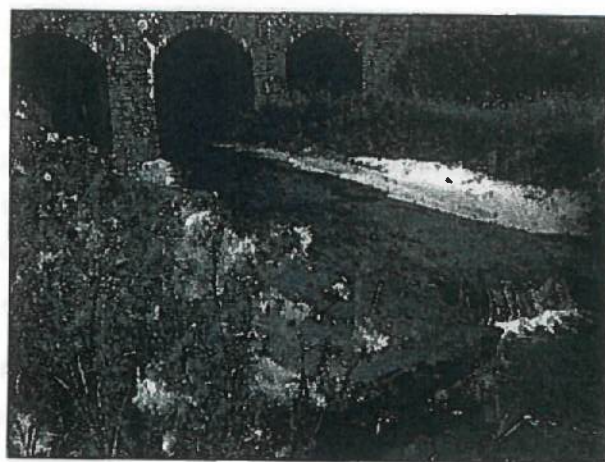
10.4 Where the structure to be grouted comprises a number of arches, water flow should be diverted away from the arch being repaired so as to allow working in the dry. Diversion of water by means of temporary damming should be undertaken. Sand bags in conjunction with e.g. plastic sheeting, marine plywood and other suitable materials may be used. A number of manufacturers provide heavy duty rubber type aqua dams which can readily be deployed, linked together and filled on site with river water thus forming a very effective seal to a bunded area. While such damming and diversion of water as is required will normally be only for a short period, the dam or berm must nonetheless be high enough not to be over topped in the event of a rainfall event and increased water levels.

10.5 Where a single arch structure is under repair, to achieve grouting in the dry, water may be diverted from upstream to downstream by means of a secure flume arrangement, or through piping, or in very limited circumstances, by means of over pumping. Screening to preclude entry of aquatic life to pumps must be carried out.



Gunite rebound on a stream bed where no precautions were taken to prevent its entry to waters. Rebound having a pH >11.5 would have entered the actively flowing stream with dire environmental consequences.

10.6 In all instances of guniting and repair works including repointing and masonry cleaning, the entirety of the area of water over which works are taking place should be protected from gunite rebound, mortar and vegetation loss by installation of a sealed and secure decking which shall extend upstream and downstream the structure concerned so as to ensure no losses to water.

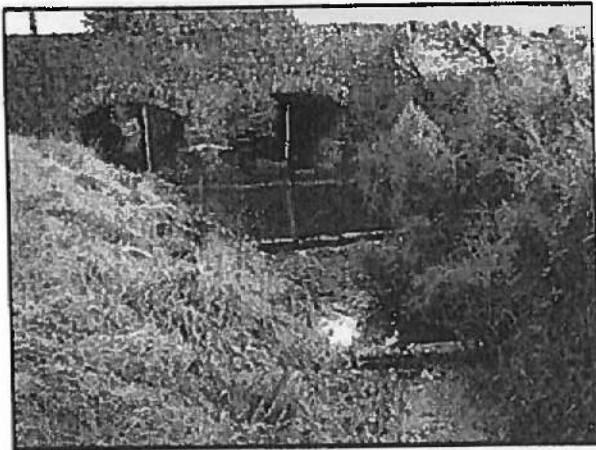


Apron/scour slab inaccessible on its downstream end to fish life because of the extent of perching and impassable due to a combination of excessive water velocity and lack of water depth across its surface.

10.7 Approved forms of scaffolding are required to support decking. It is essential that

the decking completely captures all falling debris and rebound. All materials captured must be removed for safe disposal.

10.8 Repairs to bridge aprons/scour slabs must be undertaken so as to ensure upstream and downstream passage of fish is possible in all flow conditions. Particular care must be exercised to ensure perching does not result where new concrete slabs are poured.



Low level stone weirs installed on a salmonid nursery stream to back water the bridge apron /scour slab originally installed at too high a level.

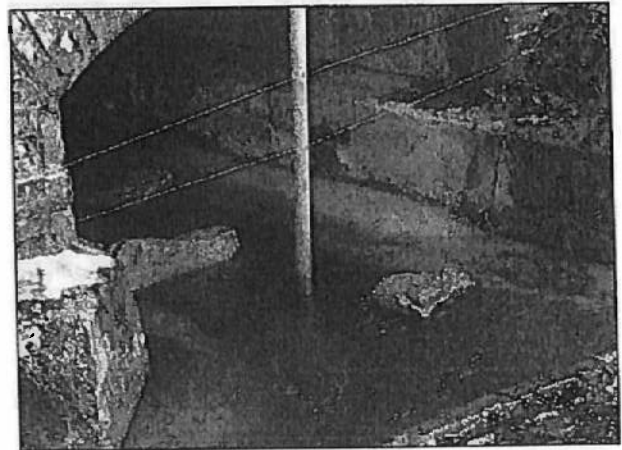
10.9 Existing stream bed materials (stones and boulders depending on conditions) should be set into new concrete aprons/slabs thereby providing for non uniform baffled flow of varying depth across the structure which will allow for the weakest fish species to swim upstream through the deeper water area.

10.10 Scour slabs should be dished so as to provide a deeper zone and consequently deeper water to facilitate fish passage.

10.11 It is difficult and costly to retrospectively render a poorly installed apron/scour slab passable, especially where it has been installed at too high a level. In some instances the installation of one or more low level weir type structures in the river downstream may assist in

back-flooding the apron thereby rendering it passable.

10.12 The installation of baffles can assist where excessive water velocity over an apron/scour slab prohibits free upstream fish movement. Baffles should be positioned so as to reduce velocity and provide temporary rest areas for weaker fish attempting to swim upstream.



Large stone baffles held in position on concrete apron with stainless steel dowel rods drilled into both the apron and stones. (Poor placement of the livestock fencing as shown in the photograph has the potential to cause blockage by catching debris.)

11.0 PIPELINE INSTALLATION.

11.1 In the case of pipeline crossings under fisheries waters, the preferred method is by way of trenchless crossings using techniques such as horizontal directional drilling, auger boring or micro-tunnelling. There are many advantages from use of such methods. Apart from the obvious avoidance of impacts on the fisheries resource, works do not have to be confined to the July-September 'window' period.

11.2 Where circumstances such as site size and contour or the existence of buildings

preclude trenchless methodologies, open cut or trench type crossings may be undertaken.

11.3 In the case of trenchless crossing of waters IFI require as follows:

11.3.1 Locations for drill rig positioning and pipeline pull areas shall be chosen or engineered such that the fall is away from the waters in question, thereby facilitating installation of pollution containment and control facilities.

11.3.2 Where drilling fluids are being returned for cleaning and re-use or recirculation through a temporary fluid return line, pneumatic leak testing shall be carried out to confirm the integrity of the return line.

11.3.3 Where circumstances necessitate the running of a return fluid line across the bed of the waters being under bored, the pipeline shall be sunken and weighted down by means of prefabricated concrete collars or by sand bags attached using web construction straps, or such other means as appropriate and securely anchored. Marker buoys and on-land marker posts will be required and all such fluid return pipelines and markers shall not interfere with or constitute a fouling risk to licensed and legally used fishing equipment.

11.3.4 Spent drilling fluids including separated drill materials shall be contained in secure bunded areas for off-site disposal at a licensed disposal facility.

11.4 In the case of open cut or trench type crossing of waters IFI require as follows:

11.4.1 Water shall be diverted from upstream to downstream the pipeline crossing location by means of a secure open flume arrangement, or through piping, or in limited circumstances, by means of over pumping.

11.4.2 Screening to preclude entry to pumps of aquatic life must be carried out.

11.4.3 The waters being crossed shall be effectively dammed both upstream and downstream of the trench location so as to ensure that works are undertaken in the dry.

11.4.4 Where concrete ballast is used to prevent pipelines rising as a result of buoyancy, it should be precast.

11.4.5 Following completion of backfilling, river bed and banks shall be reformed to match their original profile.

11.5 It will normally be necessary to temporarily remove, using electrofishing equipment, fish from the reaches involved.

12. ANGLING AND COMMERCIAL FISHING ACCESS.

12.1 In circumstances where crossings of important angling waters are concerned, it will often be necessary to provide for angling access to and from stretches of water during the construction phase of projects. It is important to note that fishing rights are property rights and that it is a legal right for anglers to access fisheries. Additionally, certain commercial fishing activities may have entry and access requirements. In such site specific circumstances, IFI will issue project and location specific requirements.



A tidal water with access for vehicles and on the opposite side, access for anglers.

12.2 IFI require:

12.2.1 In the case of permanent crossing structures on waters recognised as of angling importance, that a minimum walkway through or under the structure 1.5 meters in width and 2.5 meters in height be provided. The walkway shall be self draining and have a non slip finish.

12.2.2 In the case of a bridge spanning a specific salmon angling site, up to 7 meters clearance above water level and in the case of trout angling, up to 4 metres clearance to allow casting.

13.0 PROVISION OF DOCUMENTS.

13.1 In the case of structures and pipelines crossing waters, IFI shall be provided in Excel spreadsheet format with precise details of all watercourse crossings including seasonal streams. The spreadsheet shall in respect of each watercourse contain:

13.1.1 The number, code or other means of identification of the location.

13.1.2 Easting and northing coordinates (Irish Grid Ref).

13.1.3 Dimensions including width, height, length and gradient of proposed structures and the estimated discharge.

13.1.4 A description of the proposed structure including its shape.

13.2 Contractors/developers shall provide or have provided to IFI:

13.2.1 In the case of road construction, a copy of the Discovery 1:50,000 map(s) showing the proposed road scheme.

13.2.2 In the case of road construction, engineering drawings and OS maps in A3 size showing mainline and side road plans, chainage and profiles for all locations where watercourse crossings and drainage issues arise.

13.2.3 Engineering drawings and OS maps in A3 size of all crossing structures and pipelines in final proposal stage for construction. These shall include dimensions, setting out points, and where necessary gradient expressed as a percentage.

13.2.4 Such other details and method statements as may reasonably be required.

14.0 CONTACT BETWEEN DESIGNERS, DEVELOPERS, CONTRACTORS AND IFI.

14.1 IFI is committed in the national interest to working in a positive and cooperative manner with all relevant parties including

representatives of State and public authorities undertaking works in order to ensure that impacts on the fisheries resource are minimised. IFI is obliged to ensure that all structures are designed, installed and maintained so as to ensure the free upstream and downstream movement of aquatic life and the sustainable maintenance of the aquatic and associated riparian zone.

14.2 IFI require that contact be established and maintained between senior representatives of the developer, designer and contractor with responsibility for earthworks, structures and environmental management issues and relevant river basin district personnel in advance of commencement and for the duration of the specified construction project.

14.3 IFI has offices located within each of the River Basin Districts situated wholly or partly in the Republic of Ireland. Contact details and a map showing the locations of IFI's regional offices and areas covered are given in Appendix 1.

14.4 Responsibility for waters in the Republic of Ireland which form parts of the North Western, Neagh Bann and Shannon International River Basin Districts lies with IFI Ballyshannon, IFI Blackrock and IFI Limerick respectively.

APPENDIX 1

CONTACT DETAILS AND LOCATIONS OF IFI REGIONAL OFFICES

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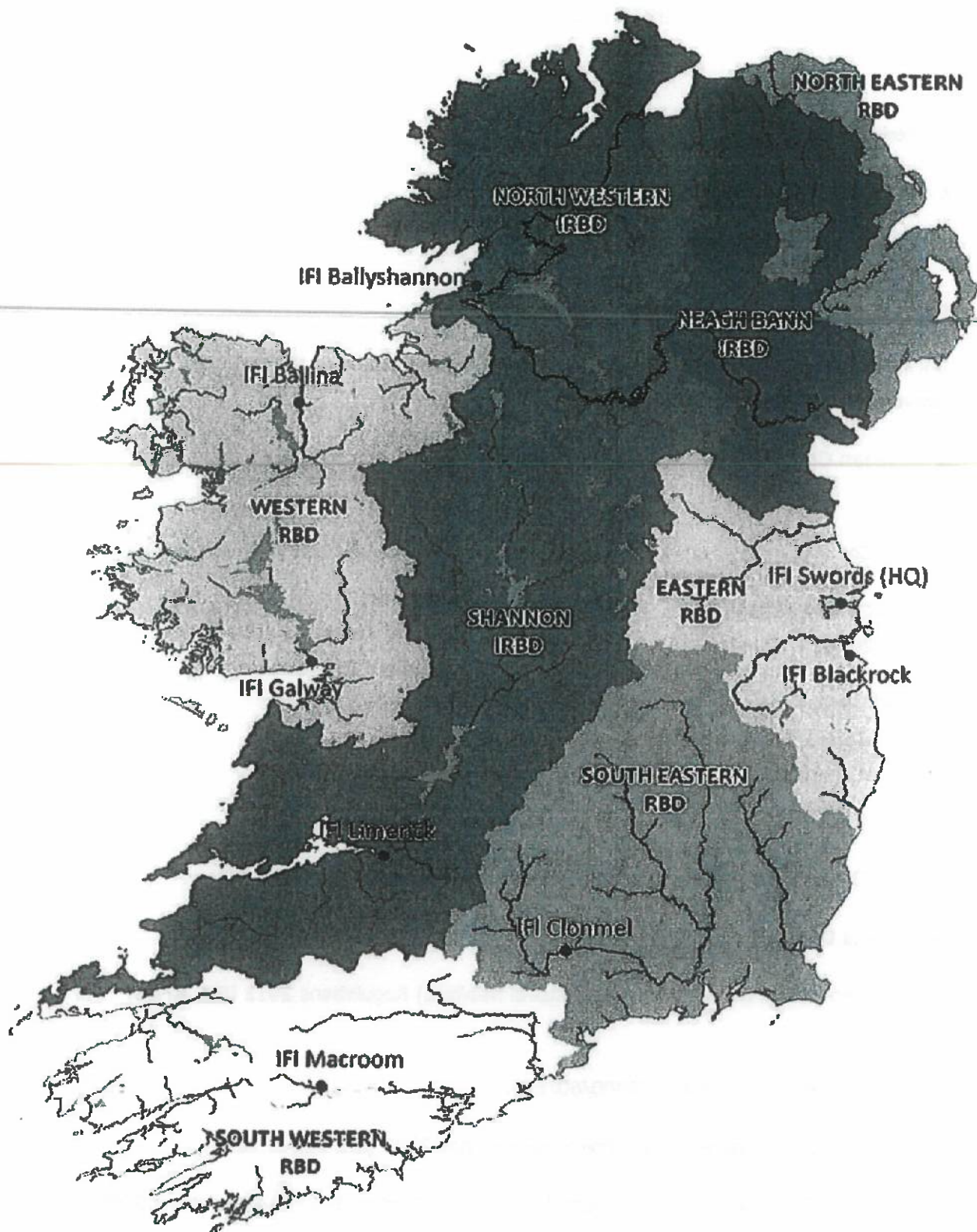
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APPENDIX 2

RELEVANT LEGISLATION

The Arterial Drainage Act 1945.

The Fisheries Consolidation Act 1959 (as amended).

The Fisheries (Amendment) Act 1997.

The Inland Fisheries Act 2010.

Council Directive 78/659/EEC on the Quality of Freshwaters Needing Protection or Improvement In Order to Support Fish Life.

The European Communities (Quality of Salmonid Waters) Regulations 1988 (S.I. 293 of 1988).

European Communities (Quality of Shellfish Waters) Regulations 2006 (S.I. 268 of 2006).

European Communities (Quality of Shellfish Waters) (Amendment) Regulations 2009 (S.I. No. 55 of 2009).

The Wildlife Act 1976.

The Wildlife (Amendment) Act 2000.

The Local Government (Water Pollution) Act 1977.

The Local Government (Water Pollution) Amendment) Act 1990.

The Habitats Directive (92/43/EEC).

The European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011).

The Water Framework Directive (2000/60/EC).

The European Communities (Water Policy Regulations 2003 (S.I. 722 of 2003).

The European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. 272 of 2009).

The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 (S.I. 296 of 2009).

GLOSSARY

Alevin Newly hatched salmon, trout or related fish usually with a yolk sac attached which acts as a primary nutrient source, before it emerges from the spawning gravel to begin swimming freely.

Armouring Lining of watercourse banks with rock or other material to protect from scour.

Apron Erosion protection placed below watercourse bed level in an area of high velocity such as downstream of a bridge or culvert.

Cyprinid Belonging to the largest European freshwater fish family. Common examples in Irish waters include roach, rudd, dace, minnow, gudgeon, bream and carp.

Ecosystem Any combination of living and non living components that with a supply of matter and energy is self sustaining over a defined period of time

Electrofishing Fishing with electrical devices based on electro-taxis and electro-narcosis (state of immobility resulting from muscular slackening of fish due to electric current).

Gabions Baskets normally made of woven wire and filled with stone/rock or other hard material generally used to form erosion resistant structures.

Habitat The natural abode of a plant or animal, especially the particular location where it normally grows or lives.

Invasive species Species that have been introduced, generally by human intervention, outside their natural range and whose establishment and spread can threaten native ecosystems

Perched Set at an elevated level, or in a higher position, and in the context of culverts – and scour slabs, the tendency to develop a water fall or cascade due to erosion of a watercourse downstream of a structure.

Riparian The terrestrial aquatic interphase or area immediately alongside the bank of a watercourse.

Salmonids The only two indigenous fishes in the genus *Salmo* in Ireland – Atlantic salmon (*Salmo salar* L.) and brown trout (*Salmo trutta* L.).

Terram A geotextile cloth type permeable material normally made from polypropylene or polyester used in construction as a separation layer.

Toe The point at which the bottom of a bank and the bed of the alongside watercourse intersect.

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- National Roads Authority, 2004.** *Guidelines for the Assessment of Ecological Impacts of National Road Schemes.* National Roads Authority, Dublin.
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APPENDIX 1

BIRD SURVEY DATA



APPENDIX 2

ORNITHOLOGY APPENDICES:

APPENDIX 2(1) – SURVEY DATA

**APPENDIX 2(2) – CONFIDENTIAL
APPENDIX**

**APPENDIX 2(3) – COLLISION
RISK ASSESSMENT**

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Appendix 1 Table 1 Survey Effort

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
20/10/2021	Vantage Point Survey	VP2	3:00 starting at 07:45	Visibility: good; Wind speed and direction: light air SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
20/10/2021	Vantage Point Survey	VP2	3:00 starting at 11:15	Visibility: good; Wind speed and direction: light air SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
22/10/2021	Vantage Point Survey	VP7	3:00 starting at 07:30	Visibility: moderate; Wind speed and direction: moderate breeze SE; Cloud cover and height: 66-100% 150-500m; Rain: drizzle; Frost: none; Snow: none		MM
22/10/2021	Vantage Point Survey	VP7	3:00 starting at 11:00	Visibility: moderate; Wind speed and direction: moderate breeze SE; Cloud cover and height: 66-100% 150-500m; Rain: drizzle; Frost: none; Snow: none		MM
23/10/2021	Vantage Point Survey	VP3	3:00 starting at 07:50	Visibility: good; Wind speed and direction: moderate breeze S; Cloud cover and height: 66-100% >500m; Rain: drizzle; Frost: none; Snow: none		MM
23/10/2021	Vantage Point Survey	VP6	3:00 starting at 08:10	Visibility: good; Wind speed and direction: fresh breeze S; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
23/10/2021	Vantage Point Survey	VP3	3:00 starting at 11:20	Visibility: good; Wind speed and direction: moderate breeze S; Cloud cover and height: 66-100% >500m; Rain: drizzle; Frost: none; Snow: none		MM
23/10/2021	Vantage Point Survey	VP6	3:00 starting at 11:40	Visibility: good; Wind speed and direction: fresh breeze S; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
24/10/2021	Vantage Point Survey	VP5	3:00 starting at 08:25	Visibility: good; Wind speed and direction: gentle breeze S; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
24/10/2021	Vantage Point Survey	VP5	3:00 starting at 11:55	Visibility: good; Wind speed and direction: gentle breeze S; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
26/10/2021	Vantage Point Survey	VP4	3:00 starting at 08:10	Visibility: moderate; Wind speed and direction: moderate breeze S; Cloud cover and height: 66-100% >500m; Rain: light showers; Frost: none; Snow: none		DM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
26/10/2021	Vantage Point Survey	VP4	3:00 starting at 11:40	Visibility: moderate; Wind speed and direction: moderate breeze S; Cloud cover and height: 66-100% >500m; Rain: light showers; Frost: none; Snow: none		DM
27/10/2021	Vantage Point Survey	VP1	3:00 starting at 08:40	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% >500m; Rain: drizzle; Frost: none; Snow: none		DM
27/10/2021	Vantage Point Survey	VP1	3:00 starting at 12:10	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% >500m; Rain: drizzle; Frost: none; Snow: none		DM
27/10/2021	Hen Harrier Roost Survey	C43016 33793	3:00 starting at 15:35	Visibility: moderate; Wind speed and direction: light breeze S; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
28/10/2021	Hen Harrier Roost Survey	C42290 33630	3:00 starting at 15:40	Visibility: moderate; Wind speed and direction: light breeze S; Cloud cover and height: 66-100% >500m; Rain: drizzle; Frost: none; Snow: none		MM
29/10/2021	Hen Harrier Roost Survey	C40789 29342	3:00 starting at 08:00	Visibility: poor; Wind speed and direction: calm SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
04/11/2021	Vantage Point Survey	VP2	3:00 starting at 10:45	Visibility: good; Wind speed and direction: moderate breeze NW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
04/11/2021	Vantage Point Survey	VP2	3:00 starting at 14:15	Visibility: good; Wind speed and direction: moderate breeze NW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
05/11/2021	Vantage Point Survey	VP7	3:00 starting at 10:45	Visibility: good; Wind speed and direction: light breeze SE; Cloud cover and height: 66-100% 150-500m; Rain: none; Frost: none; Snow: none		MM
05/11/2021	Vantage Point Survey	VP7	3:00 starting at 14:15	Visibility: good; Wind speed and direction: light breeze SE; Cloud cover and height: 66-100% 150-500m; Rain: none; Frost: none; Snow: none		MM
08/11/2021	Vantage Point Survey	VP5	3:00 starting at 10:35	Visibility: moderate; Wind speed and direction: moderate breeze SW; Cloud cover and height: 66-100% 150-500m; Rain: light showers; Frost: none; Snow: none		DM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
08/11/2021	Vantage Point Survey	VP5	3:00 starting at 14:05	Visibility: moderate; Wind speed and direction: moderate breeze SW; Cloud cover and height: 66-100% 150-500m; Rain: light showers; Frost: none; Snow: none		DM
09/11/2021	Vantage Point Survey	VP3	3:00 starting at 10:20	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
09/11/2021	Vantage Point Survey	VP6	3:00 starting at 10:30	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
09/11/2021	Vantage Point Survey	VP3	3:00 starting at 13:50	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
09/11/2021	Vantage Point Survey	VP6	3:00 starting at 14:00	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
13/11/2021	Hen Harrier Roost Survey	C40739 29342	3:00 starting at 13:40	Visibility: good; Wind speed and direction: light air SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
16/11/2021	Hen Harrier Roost Survey	C42294 33632	3:00 starting at 13:45	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 66-100% 150-500m; Rain: none; Frost: none; Snow: none		MM
17/11/2021	Hen Harrier Roost Survey	C41992 33878	3:00 starting at 13:35	Visibility: moderate; Wind speed and direction: moderate breeze SW; Cloud cover and height: 66-100% >500m; Rain: light showers; Frost: none; Snow: none		MM
18/11/2021	Vantage Point Survey	VP1	3:00 starting at 10:10	Visibility: good; Wind speed and direction: light breeze SW; Cloud cover and height: 66-100% 150-500m; Rain: light showers; Frost: none; Snow: none		DM
18/11/2021	Vantage Point Survey	VP1	3:00 starting at 13:40	Visibility: good; Wind speed and direction: light breeze SW; Cloud cover and height: 66-100% 150-500m; Rain: light showers; Frost: none; Snow: none		DM
01/12/2021	Vantage Point Survey	VP5	3:00 starting at 07:55	Visibility: good; Wind speed and direction: gentle breeze NW; Cloud cover and height: 66-100% 150-500m; Rain: none; Frost: none; Snow: none		DM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
01/12/2021	Vantage Point Survey	VP5	3:00 starting at 11:25	Visibility: good; Wind speed and direction: gentle breeze NW; Cloud cover and height: 66-100% 150-500m; Rain: none; Frost: none; Snow: none		DM
04/12/2021	Vantage Point Survey	VP6	3:00 starting at 08:15	Visibility: moderate; Wind speed and direction: moderate breeze SSW; Cloud cover and height: 66-100% 150-500m; Rain: light showers; Frost: none; Snow: none		DM
04/12/2021	Vantage Point Survey	VP6	3:00 starting at 11:45	Visibility: moderate; Wind speed and direction: moderate breeze SSW; Cloud cover and height: 66-100% 150-500m; Rain: light showers; Frost: none; Snow: none		DM
05/12/2021	Vantage Point Survey	VP3	3:00 starting at 08:15	Visibility: good; Wind speed and direction: light air N; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
05/12/2021	Vantage Point Survey	VP3	3:00 starting at 11:45	Visibility: good; Wind speed and direction: light air N; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
09/12/2021	Vantage Point Survey	VP7	3:00 starting at 08:30	Visibility: good; Wind speed and direction: gentle breeze SE; Cloud cover and height: 66-100% 150-500m; Rain: none; Frost: none; Snow: none		MM
09/12/2021	Vantage Point Survey	VP7	3:00 starting at 12:00	Visibility: good; Wind speed and direction: gentle breeze SE; Cloud cover and height: 66-100% 150-500m; Rain: none; Frost: none; Snow: none		MM
10/12/2021	Vantage Point Survey	VP1	3:00 starting at 08:05	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		DM
10/12/2021	Vantage Point Survey	VP1	3:00 starting at 11:35	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		DM
10/12/2021	Hen Harrier Roost Survey	C42365 33593	3:00 starting at 13:15	Visibility: good; Wind speed and direction: fresh breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
13/12/2021	Vantage Point Survey	VP2	3:00 starting at 08:30	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
13/12/2021	Vantage Point Survey	VP2	3:00 starting at 12:00	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
15/12/2021	Hen Harrier Roost Survey	C40741 29323	3:00 starting at 13:10	Visibility: moderate; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% 150-500m; Rain: none; Frost: none; Snow: none		MM
16/12/2021	Hen Harrier Roost Survey	C43023 33783	3:00 starting at 13:15	Visibility: good; Wind speed and direction: light breeze NE; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
07/01/2022	Vantage Point Survey	VP4	3:00 starting at 10:25	Visibility: moderate; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% 150-500m; Rain: drizzle; Frost: none; Snow: none		DM
07/01/2022	Vantage Point Survey	VP4	3:00 starting at 13:55	Visibility: moderate; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% 150-500m; Rain: drizzle; Frost: none; Snow: none		DM
08/01/2022	Vantage Point Survey	VP5	3:00 starting at 10:20	Visibility: moderate; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% 150-500m; Rain: drizzle; Frost: none; Snow: none		DM
08/01/2022	Vantage Point Survey	VP5	3:00 starting at 13:50	Visibility: moderate; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% 150-500m; Rain: drizzle; Frost: none; Snow: none		DM
09/01/2022	Vantage Point Survey	VP6	3:00 starting at 10:15	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 33-66% 150-500m; Rain: none; Frost: none; Snow: none		DM
09/01/2022	Vantage Point Survey	VP6	3:00 starting at 13:45	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 33-66% 150-500m; Rain: none; Frost: none; Snow: none		DM
12/01/2022	Vantage Point Survey	VP7	3:00 starting at 10:15	Visibility: good; Wind speed and direction: moderate breeze SE; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
12/01/2022	Vantage Point Survey	VP1	3:00 starting at 10:20	Visibility: good; Wind speed and direction: moderate breeze SE; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
12/01/2022	Vantage Point Survey	VP7	3:00 starting at 13:45	Visibility: good; Wind speed and direction: moderate breeze SE; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
12/01/2022	Vantage Point Survey	VP1	3:00 starting at 13:50	Visibility: good; Wind speed and direction: moderate breeze SE; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
13/01/2022	Vantage Point Survey	VP2	3:00 starting at 10:00	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
13/01/2022	Vantage Point Survey	VP2	3:00 starting at 13:30	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
17/01/2022	Hen Harrier Roost Survey	C 42370 33586	3:00 starting at 14:00	Visibility: good; Wind speed and direction: gentle breeze S; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
19/01/2022	Vantage Point Survey	VP3	3:00 starting at 10:30	Visibility: good; Wind speed and direction: moderate breeze NW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
19/01/2022	Vantage Point Survey	VP3	3:00 starting at 14:00	Visibility: good; Wind speed and direction: moderate breeze NW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
22/01/2022	Hen Harrier Roost Survey	C41995 33876	3:00 starting at 13:50	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% 150-500m; Rain: none; Frost: none; Snow: none		MM
24/01/2022	Hen Harrier Roost Survey	C 40743 29334	3:00 starting at 13:50	Visibility: good; Wind speed and direction: light breeze S; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
01/02/2022	Vantage Point Survey	VP1	3:00 starting at 08:05	Visibility: good; Wind speed and direction: strong breeze W; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
01/02/2022	Vantage Point Survey	VP7	3:00 starting at 08:10	Visibility: good; Wind speed and direction: strong breeze W; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
01/02/2022	Vantage Point Survey	VP1	3:00 starting at 11:35	Visibility: good; Wind speed and direction: strong breeze W; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
01/02/2022	Vantage Point Survey	VP7	3:00 starting at 11:40	Visibility: good; Wind speed and direction: strong breeze W; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
03/02/2022	Hen Harrier Roost Survey	C 40786 29332	3:00 starting at 14:15	Visibility: good; Wind speed and direction: fresh breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
04/02/2022	Hen Harrier Roost Survey	C 43021 33796	3:00 starting at 14:20	Visibility: good; Wind speed and direction: gentle breeze NW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
07/02/2022	Vantage Point Survey	VP5	3:00 starting at 08:00	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
07/02/2022	Vantage Point Survey	VP5	3:00 starting at 11:30	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
08/02/2022	Vantage Point Survey	VP4	3:00 starting at 08:00	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		DM
08/02/2022	Vantage Point Survey	VP2	3:00 starting at 08:05	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
08/02/2022	Vantage Point Survey	VP4	3:00 starting at 11:30	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		DM
08/02/2022	Vantage Point Survey	VP2	3:00 starting at 11:35	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
10/02/2022	Hen Harrier Roost Survey	C 42366 33591	3:00 starting at 14:10	Visibility: good; Wind speed and direction: light breeze NW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
14/02/2022	Vantage Point Survey	VP6	3:00 starting at 07:50	Visibility: good; Wind speed and direction: gentle breeze NW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		DM
14/02/2022	Vantage Point Survey	VP3	3:00 starting at 07:55	Visibility: good; Wind speed and direction: gentle breeze NW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
14/02/2022	Vantage Point Survey	VP6	3:00 starting at 11:20	Visibility: good; Wind speed and direction: gentle breeze NW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		DM
14/02/2022	Vantage Point Survey	VP3	3:00 starting at 11:25	Visibility: good; Wind speed and direction: gentle breeze NW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
01/03/2022	Vantage Point Survey	VP2	3:00 starting at 11:20	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
01/03/2022	Vantage Point Survey	VP2	3:00 starting at 14:50	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
02/03/2022	Vantage Point Survey	VP7	3:00 starting at 11:35	Visibility: good; Wind speed and direction: light breeze SE; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
02/03/2022	Vantage Point Survey	VP7	3:00 starting at 15:05	Visibility: good; Wind speed and direction: light breeze SE; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
03/03/2022	Hen Harrier Roost Survey	C 42370 33586	3:00 starting at 15:15	Visibility: good; Wind speed and direction: light breeze SE; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
04/03/2022	Vantage Point Survey	VP3	3:00 starting at 11:35	Visibility: good; Wind speed and direction: light breeze NW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none	Making cutting trees in Glenard Forest. Area with thinned trees, probably suitable goshawk nesting area	MM
04/03/2022	Vantage Point Survey	VP3	3:00 starting at 15:05	Visibility: good; Wind speed and direction: light breeze NW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none	Making cutting trees in Glenard Forest. Area with thinned trees, probably suitable goshawk nesting area	MM
05/03/2022	Vantage Point Survey	VP5	3:00 starting at 11:45	Visibility: good; Wind speed and direction: light breeze SSW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		DM
05/03/2022	Vantage Point Survey	VP5	3:00 starting at 15:15	Visibility: good; Wind speed and direction: light breeze SSW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		DM
06/03/2022	Vantage Point Survey	VP4	3:00 starting at 11:35	Visibility: good; Wind speed and direction: light breeze SE; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		DM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
06/03/2022	Vantage Point Survey	VP4	3:00 starting at 15:05	Visibility: good; Wind speed and direction: light breeze SE; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		DM
07/03/2022	Vantage Point Survey	VP1	3:00 starting at 11:40	Visibility: good; Wind speed and direction: moderate breeze S; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none		DM
07/03/2022	Vantage Point Survey	VP1	3:00 starting at 15:10	Visibility: good; Wind speed and direction: moderate breeze S; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none		DM
08/03/2022	Vantage Point Survey	VP6	3:00 starting at 11:45	Visibility: good; Wind speed and direction: moderate breeze SE; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
08/03/2022	Vantage Point Survey	VP6	3:00 starting at 15:15	Visibility: good; Wind speed and direction: moderate breeze SE; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
08/03/2022	Hen Harrier Roost Survey	C 43016 33765	3:00 starting at 15:40	Visibility: good; Wind speed and direction: gentle breeze S; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
10/03/2022	Hen Harrier Roost Survey	C 40751 29302	3:00 starting at 15:15	Visibility: good; Wind speed and direction: moderate breeze SE; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none		MM
04/04/2022	Breeding Raptor Survey	BR1	6:30 starting at 12:00	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 66-100% 150-500m; Rain: persistent; Frost: none; Snow: none	(C43861 36377)	MM
07/04/2022	Breeding Raptor Survey	BR4	6:30 starting at 12:20	Visibility: good; Wind speed and direction: moderate breeze NW; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none	(C40731 29317)	MM
08/04/2022	Breeding Raptor Survey	BR2	6:30 starting at 13:20	Visibility: good; Wind speed and direction: moderate breeze N; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none	(C44388 73257)	MM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
09/04/2022	Vantage Point Survey	VP5	3:00 starting at 06:25	Visibility: good; Wind speed and direction: light breeze WNW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
09/04/2022	Breeding Raptor Survey	BR3	6:30 starting at 10:45	Visibility: good; Wind speed and direction: light breeze W; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none	(C4664 3347)	DM
11/04/2022	Vantage Point Survey	VP1	3:00 starting at 06:30	Visibility: good; Wind speed and direction: gentle breeze SE; Cloud cover and height: 66-100% 150-500m; Rain: none; Frost: none; Snow: none		DM
11/04/2022	Breeding Raptor Survey	BR5	6:30 starting at 11:20	Visibility: good; Wind speed and direction: gentle breeze SE; Cloud cover and height: 66-100% 150-500m; Rain: none; Frost: none; Snow: none	(C4639 3103)	DM
12/04/2022	Vantage Point Survey	VP2	3:00 starting at 06:45	Visibility: good; Wind speed and direction: light air SE; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
12/04/2022	Vantage Point Survey	VP4	3:00 starting at 06:50	Visibility: good; Wind speed and direction: light air SE; Cloud cover and height: 66-100% 150-500m; Rain: none; Frost: none; Snow: none		DM
12/04/2022	Breeding Walkover Survey	T2	5:40 starting at 11:30	Visibility: good; Wind speed and direction: light air SE; Cloud cover and height: 66-100% 150-500m; Rain: none; Frost: none; Snow: none		MM
12/04/2022	Breeding Walkover Survey	T1	5:45 starting at 12:05	Visibility: good; Wind speed and direction: light air SE; Cloud cover and height: 66-100% 150-500m; Rain: none; Frost: none; Snow: none		DM
13/04/2022	Vantage Point Survey	VP6	3:00 starting at 06:45	Visibility: good; Wind speed and direction: light breeze SW; Cloud cover and height: 66-100% 150-500m; Rain: none; Frost: none; Snow: none		DM
13/04/2022	Breeding Walkover Survey	T3	5:35 starting at 12:50	Visibility: good; Wind speed and direction: light breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
14/04/2022	Vantage Point Survey	VP7	3:00 starting at 06:35	Visibility: good; Wind speed and direction: moderate breeze SE; Cloud cover and height: 66-100% >500m; Rain: drizzle; Frost: none; Snow: none		MM
15/04/2022	Vantage Point Survey	VP3	3:00 starting at 06:40	Visibility: good; Wind speed and direction: light breeze SE; Cloud cover and height: 66-100% 150-500m; Rain: none; Frost: none; Snow: none		MM
11/05/2022	Breeding Raptor Survey	BR1	3:00 starting at 09:15	Visibility: good; Wind speed and direction: moderate breeze W; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none	(C43861 36377)	MM
11/05/2022	Breeding Raptor Survey	BR1	3:00 starting at 12:45	Visibility: good; Wind speed and direction: moderate breeze W; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none	(C43861 36377)	MM
11/05/2022	Vantage Point Survey	VP1	3:00 starting at 18:45	Visibility: moderate; Wind speed and direction: gentle breeze N; Cloud cover and height: 66-100% <150m; Rain: drizzle; Frost: none; Snow: none		DM
12/05/2022	Breeding Raptor Survey	BR4	3:00 starting at 09:50	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none	(C40731 29317)	MM
12/05/2022	Breeding Raptor Survey	BR4	3:00 starting at 13:20	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none	(C40731 29317)	MM
12/05/2022	Vantage Point Survey	VP4	3:00 starting at 18:55	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none		DM
13/05/2022	Vantage Point Survey	VP5	3:00 starting at 19:05	Visibility: moderate; Wind speed and direction: light breeze SW; Cloud cover and height: 66-100% >500m; Rain: light showers; Frost: none; Snow: none		DM
15/05/2022	Breeding Raptor Survey	BR2	3:00 starting at 08:40	Visibility: good; Wind speed and direction: light breeze NE; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none	(C44388 73257)	DM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
15/05/2022	Breeding Raptor Survey	BR2	3:00 starting at 12:10	Visibility: good; Wind speed and direction: light breeze NE; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none	(C44388 73257)	DM
16/05/2022	Breeding Raptor Survey	BR3	3:00 starting at 09:10	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 33-66% >500m; Rain: drizzle; Frost: none; Snow: none	(4664 3347)	DM
16/05/2022	Breeding Raptor Survey	BR3	3:00 starting at 12:40	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 33-66% >500m; Rain: drizzle; Frost: none; Snow: none	(4664 3347)	DM
16/05/2022	Vantage Point Survey	VP7	3:00 starting at 18:00	Visibility: moderate; Wind speed and direction: moderate breeze N; Cloud cover and height: 66-100% <150m; Rain: light showers; Frost: none; Snow: none		MM
17/05/2022	Breeding Walkover Survey	T1	5:25 starting at 08:20	Visibility: good; Wind speed and direction: gentle breeze SSE; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
17/05/2022	Breeding Walkover Survey	T2	5:05 starting at 08:30	Visibility: good; Wind speed and direction: gentle breeze SSE; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
17/05/2022	Breeding Woodcock Survey	T1	3:00 starting at 19:20	Visibility: good; Wind speed and direction: light breeze SE; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
18/05/2022	Breeding Walkover Survey	T3	5:25 starting at 10:20	Visibility: poor; Wind speed and direction: light breeze S; Cloud cover and height: 66-100% >500m; Rain: light showers; Frost: none; Snow: none		DM
18/05/2022	Breeding Woodcock Survey	T2	3:00 starting at 19:25	Visibility: good; Wind speed and direction: light breeze S; Cloud cover and height: 66-100% >500m; Rain: drizzle; Frost: none; Snow: none		DM
21/05/2022	Vantage Point Survey	VP2	3:00 starting at 19:00	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
25/05/2022	Breeding Raptor Survey	BR5	3:00 starting at 13:30	Visibility: good; Wind speed and direction: strong breeze W; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none	(C6464 9310)	MM
25/05/2022	Breeding Raptor Survey	BR5	3:00 starting at 17:00	Visibility: good; Wind speed and direction: strong breeze W; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none	(C6464 9310)	MM
27/05/2022	Vantage Point Survey	VP3	3:00 starting at 19:15	Visibility: good; Wind speed and direction: gentle breeze NW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
10/06/2022	Vantage Point Survey	VP1	1:00 starting at 08:50	Visibility: good; Wind speed and direction: strong breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		DM
10/06/2022	Vantage Point Survey	VP1	1:00 starting at 09:50	Visibility: good; Wind speed and direction: strong breeze SW; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none		DM
10/06/2022	Vantage Point Survey	VP1	1:00 starting at 10:50	Visibility: good; Wind speed and direction: fresh breeze SW; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none		DM
10/06/2022	Vantage Point Survey	VP7	1:00 starting at 11:05	Visibility: good; Wind speed and direction: strong breeze SW; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none		MM
10/06/2022	Vantage Point Survey	VP7	1:00 starting at 12:05	Visibility: good; Wind speed and direction: strong breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
10/06/2022	Vantage Point Survey	VP4	1:00 starting at 12:40	Visibility: good; Wind speed and direction: strong breeze SW; Cloud cover and height: 33-66% >500m; Rain: drizzle; Frost: none; Snow: none		DM
10/06/2022	Vantage Point Survey	VP7	1:00 starting at 13:05	Visibility: good; Wind speed and direction: strong breeze SW; Cloud cover and height: 33-66% >500m; Rain: drizzle; Frost: none; Snow: none		MM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
10/06/2022	Vantage Point Survey	VP4	1:00 starting at 13:40	Visibility: good; Wind speed and direction: fresh breeze SW; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none		DM
10/06/2022	Vantage Point Survey	VP2	1:00 starting at 14:35	Visibility: good; Wind speed and direction: strong breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
10/06/2022	Vantage Point Survey	VP4	1:00 starting at 14:40	Visibility: good; Wind speed and direction: strong breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
10/06/2022	Vantage Point Survey	VP2	1:00 starting at 15:35	Visibility: good; Wind speed and direction: fresh breeze SW; Cloud cover and height: 66-100% >500m; Rain: drizzle; Frost: none; Snow: none		MM
10/06/2022	Vantage Point Survey	VP2	1:00 starting at 16:35	Visibility: good; Wind speed and direction: fresh breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
10/06/2022	Breeding Woodcock Survey	T2	1:00 starting at 19:30	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none		MM
10/06/2022	Breeding Woodcock Survey	T1	1:00 starting at 19:40	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none		DM
10/06/2022	Breeding Woodcock Survey	T2	1:00 starting at 20:30	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
10/06/2022	Breeding Woodcock Survey	T1	1:00 starting at 20:40	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
10/06/2022	Breeding Woodcock Survey	T2	1:00 starting at 21:30	Visibility: good; Wind speed and direction: fresh breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
10/06/2022	Breeding Woodcock Survey	T1	1:00 starting at 21:40	Visibility: good; Wind speed and direction: fresh breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
11/06/2022	Vantage Point Survey	VP5	1:00 starting at 09:10	Visibility: moderate; Wind speed and direction: moderate breeze SW; Cloud cover and height: 33-66% 150-500m; Rain: light showers; Frost: none; Snow: none		DM
11/06/2022	Vantage Point Survey	VP5	1:00 starting at 10:10	Visibility: poor; Wind speed and direction: moderate breeze SW; Cloud cover and height: 66-100% 150-500m; Rain: light showers; Frost: none; Snow: none		DM
11/06/2022	Vantage Point Survey	VP5	1:00 starting at 11:10	Visibility: moderate; Wind speed and direction: fresh breeze SW; Cloud cover and height: 33-66% 150-500m; Rain: light showers; Frost: none; Snow: none		DM
11/06/2022	Vantage Point Survey	VP6	1:00 starting at 14:20	Visibility: moderate; Wind speed and direction: moderate breeze SW; Cloud cover and height: 33-66% 150-500m; Rain: none; Frost: none; Snow: none		DM
11/06/2022	Vantage Point Survey	VP6	1:00 starting at 15:20	Visibility: moderate; Wind speed and direction: moderate breeze SW; Cloud cover and height: 66-100% 150-500m; Rain: drizzle; Frost: none; Snow: none		DM
11/06/2022	Vantage Point Survey	VP6	1:00 starting at 16:20	Visibility: good; Wind speed and direction: fresh breeze SW; Cloud cover and height: 66-100% 150-500m; Rain: none; Frost: none; Snow: none		DM
13/06/2022	Breeding Raptor Survey	BR2	1:00 starting at 07:45	Visibility: good; Wind speed and direction: light air W; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none	(C44388 73257)	DM
13/06/2022	Breeding Raptor Survey	BR2	1:00 starting at 08:45	Visibility: good; Wind speed and direction: light breeze W; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none	(C44388 73257)	DM
13/06/2022	Breeding Raptor Survey	BR2	1:00 starting at 09:45	Visibility: good; Wind speed and direction: light air W; Cloud cover and height: 66-100% >500m; Rain: drizzle; Frost: none; Snow: none	(C44388 73257)	DM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
13/06/2022	Breeding Raptor Survey	BR2	1:00 starting at 11:15	Visibility: good; Wind speed and direction: light breeze W; Cloud cover and height: 66-100% >500m; Rain: drizzle; Frost: none; Snow: none	(C44388 73257)	DM
13/06/2022	Breeding Raptor Survey	BR2	1:00 starting at 12:15	Visibility: good; Wind speed and direction: light breeze W; Cloud cover and height: 66-100% >500m; Rain: drizzle; Frost: none; Snow: none	(C44388 73257)	DM
13/06/2022	Vantage Point Survey	VP3	1:00 starting at 12:45	Visibility: good; Wind speed and direction: light breeze W; Cloud cover and height: 66-100% >500m; Rain: drizzle; Frost: none; Snow: none		MM
13/06/2022	Breeding Raptor Survey	BR2	1:00 starting at 13:15	Visibility: good; Wind speed and direction: light breeze W; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none	(C44388 73257)	DM
13/06/2022	Vantage Point Survey	VP3	1:00 starting at 13:45	Visibility: good; Wind speed and direction: light breeze W; Cloud cover and height: 66-100% >500m; Rain: drizzle; Frost: none; Snow: none		MM
13/06/2022	Vantage Point Survey	VP3	1:00 starting at 14:45	Visibility: good; Wind speed and direction: light breeze W; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
13/06/2022	Vantage Point Survey	VP3	1:00 starting at 15:45	Visibility: good; Wind speed and direction: light breeze W; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
14/06/2022	Breeding Raptor Survey	BR3	1:00 starting at 09:10	Visibility: good; Wind speed and direction: light breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none	(C4664 3347)	DM
14/06/2022	Breeding Raptor Survey	BR3	1:00 starting at 10:10	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none	(C4664 3347)	DM
14/06/2022	Breeding Raptor Survey	BR3	1:00 starting at 11:10	Visibility: good; Wind speed and direction: light breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none	(C4664 3347)	DM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
14/06/2022	Breeding Raptor Survey	BR3	1:00 starting at 12:40	Visibility: good; Wind speed and direction: light breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none	(C4664 3347)	DM
14/06/2022	Breeding Raptor Survey	BR3	1:00 starting at 13:40	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none	(C4664 3347)	DM
14/06/2022	Breeding Raptor Survey	BR3	1:00 starting at 14:40	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none	(C4664 3347)	DM
14/06/2022	Vantage Point Survey	VP6	3:00 starting at 19:00	Visibility: moderate; Wind speed and direction: light breeze NE; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
15/06/2022	Breeding Raptor Survey	BR5	1:00 starting at 08:25	Visibility: good; Wind speed and direction: light air S; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none	(C4639 3103)	DM
15/06/2022	Breeding Raptor Survey	BR5	1:00 starting at 09:25	Visibility: good; Wind speed and direction: light air S; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none	(C4639 3103)	DM
15/06/2022	Breeding Raptor Survey	BR5	1:00 starting at 10:25	Visibility: good; Wind speed and direction: light breeze S; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none	(C4639 3103)	DM
15/06/2022	Breeding Raptor Survey	BR5	1:00 starting at 11:55	Visibility: good; Wind speed and direction: light breeze S; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none	(C4639 3103)	DM
15/06/2022	Breeding Raptor Survey	BR5	1:00 starting at 12:55	Visibility: good; Wind speed and direction: light breeze SSW; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none	(C4639 3103)	DM
15/06/2022	Breeding Raptor Survey	BR5	1:00 starting at 13:55	Visibility: good; Wind speed and direction: gentle breeze SSW; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none	(C4639 3103)	DM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
16/06/2022	Breeding Walkover Survey	T1	1:00 starting at 09:10	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
16/06/2022	Breeding Walkover Survey	T2	1:00 starting at 09:25	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
16/06/2022	Breeding Walkover Survey	T1	1:00 starting at 10:10	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
16/06/2022	Breeding Walkover Survey	T2	1:00 starting at 10:25	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% 150-500m; Rain: none; Frost: none; Snow: none		MM
16/06/2022	Breeding Walkover Survey	T1	1:00 starting at 11:10	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
16/06/2022	Breeding Walkover Survey	T2	1:00 starting at 11:25	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
16/06/2022	Breeding Walkover Survey	T2	1:00 starting at 12:25	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 66-100% >500m; Rain: drizzle; Frost: none; Snow: none		MM
16/06/2022	Breeding Walkover Survey	T1	1:00 starting at 12:40	Visibility: moderate; Wind speed and direction: moderate breeze SW; Cloud cover and height: 66-100% >500m; Rain: drizzle; Frost: none; Snow: none		DM
16/06/2022	Breeding Walkover Survey	T2	1:00 starting at 13:25	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 66-100% 150-500m; Rain: light showers; Frost: none; Snow: none		MM
16/06/2022	Breeding Walkover Survey	T1	1:00 starting at 13:40	Visibility: moderate; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% >500m; Rain: light showers; Frost: none; Snow: none		DM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
16/06/2022	Breeding Walkover Survey	T2	0:15 starting at 14:25	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% 150-500m; Rain: light showers; Frost: none; Snow: none		MM
16/06/2022	Breeding Walkover Survey	T1	1:00 starting at 14:40	Visibility: moderate; Wind speed and direction: moderate breeze SW; Cloud cover and height: 66-100% >500m; Rain: light showers; Frost: none; Snow: none		DM
17/06/2022	Breeding Walkover Survey	T3	1:00 starting at 08:05	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
17/06/2022	Breeding Walkover Survey	T3	1:00 starting at 09:05	Visibility: good; Wind speed and direction: light breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
17/06/2022	Breeding Walkover Survey	T3	1:00 starting at 10:05	Visibility: good; Wind speed and direction: gentle breeze WSW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
17/06/2022	Breeding Walkover Survey	T3	1:00 starting at 12:20	Visibility: good; Wind speed and direction: gentle breeze WSW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
17/06/2022	Breeding Walkover Survey	T3	1:00 starting at 13:20	Visibility: good; Wind speed and direction: moderate breeze W; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		DM
17/06/2022	Breeding Walkover Survey	T3	1:00 starting at 14:20	Visibility: moderate; Wind speed and direction: moderate breeze W; Cloud cover and height: 66-100% 150-500m; Rain: heavy showers; Frost: none; Snow: none		DM
20/06/2022	Breeding Raptor Survey	BR4	1:00 starting at 09:00	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none	(40371 29317)	MM
20/06/2022	Breeding Raptor Survey	BR4	1:00 starting at 10:00	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none	(40371 29317)	MM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
20/06/2022	Breeding Raptor Survey	BR4	1:00 starting at 11:00	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none	(40371 29317)	MM
20/06/2022	Breeding Raptor Survey	BR4	1:00 starting at 12:30	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none	(40371 29317)	MM
20/06/2022	Breeding Raptor Survey	BR4	1:00 starting at 13:30	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none	(40371 29317)	MM
20/06/2022	Breeding Raptor Survey	BR4	1:00 starting at 14:30	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none	(40371 29317)	MM
20/06/2022	Breeding Woodcock Survey	T2	1:00 starting at 19:40	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
20/06/2022	Breeding Woodcock Survey	T1	1:00 starting at 19:55	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		DM
20/06/2022	Breeding Woodcock Survey	T2	1:00 starting at 20:40	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
20/06/2022	Breeding Woodcock Survey	T1	1:00 starting at 20:55	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		DM
20/06/2022	Breeding Woodcock Survey	T2	1:00 starting at 21:40	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
20/06/2022	Breeding Woodcock Survey	T1	1:00 starting at 21:55	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		DM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
23/06/2022	Breeding Raptor Survey	BR1	1:00 starting at 10:25	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none	(C43861 36377)	MM
23/06/2022	Breeding Raptor Survey	BR1	1:00 starting at 11:25	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none	(C43861 36377)	MM
23/06/2022	Breeding Raptor Survey	BR1	1:00 starting at 12:25	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none	(C43861 36377)	MM
23/06/2022	Breeding Raptor Survey	BR1	1:00 starting at 13:55	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none	(C43861 36377)	MM
23/06/2022	Breeding Raptor Survey	BR1	1:00 starting at 14:55	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none	(C43861 36377)	MM
23/06/2022	Breeding Raptor Survey	BR1	1:00 starting at 15:55	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none	(C43861 36377)	MM
11/07/2022	Vantage Point Survey	VP3	3:00 starting at 10:10	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
13/07/2022	Vantage Point Survey	VP7	3:00 starting at 10:45	Visibility: good; Wind speed and direction: gentle breeze W; Cloud cover and height: 66-100% >500m; Rain: light showers; Frost: none; Snow: none		MM
14/07/2022	Vantage Point Survey	VP2	3:00 starting at 09:10	Visibility: good; Wind speed and direction: gentle breeze W; Cloud cover and height: 66-100% 150-500m; Rain: light showers; Frost: none; Snow: none		DM
16/07/2022	Breeding Raptor Survey	BR3 (C4664 3347)	6:30 starting at 07:20	Visibility: good; Wind speed and direction: light breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		DM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
17/07/2022	Vantage Point Survey	VP1	3:00 starting at 07:30	Visibility: good; Wind speed and direction: light air S; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none		DM
17/07/2022	Vantage Point Survey	VP4	3:00 starting at 11:15	Visibility: good; Wind speed and direction: light air S; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		DM
18/07/2022	Vantage Point Survey	VP5	3:00 starting at 07:20	Visibility: good; Wind speed and direction: light breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		DM
18/07/2022	Vantage Point Survey	VP6	3:00 starting at 12:05	Visibility: good; Wind speed and direction: light breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		DM
19/07/2022	Breeding Raptor Survey	BR2 (C44388 73257)	6:30 starting at 07:40	Visibility: good; Wind speed and direction: gentle breeze NW; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none		DM
20/07/2022	Breeding Raptor Survey	BR5 (C4639 3103)	6:30 starting at 09:10	Visibility: moderate; Wind speed and direction: gentle breeze NW; Cloud cover and height: 66-100% 150-500m; Rain: light showers; Frost: none; Snow: none		DM
21/07/2022	Breeding Walkover Survey	T1	5:25 starting at 08:05	Visibility: poor; Wind speed and direction: moderate breeze NW; Cloud cover and height: 66-100% 150-500m; Rain: light showers; Frost: none; Snow: none		DM
22/07/2022	Breeding Walkover Survey	T3	5:20 starting at 10:50	Visibility: good; Wind speed and direction: light breeze NW; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none		DM
22/07/2022	Breeding Raptor Survey	BR4 (40371 29317)	6:30 starting at 11:25	Visibility: good; Wind speed and direction: light breeze NW; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none		MM
23/07/2022	Breeding Walkover Survey	T2	5:05 starting at 08:35	Visibility: good; Wind speed and direction: light air NW; Cloud cover and height: 33-66% >500m; Rain: light showers; Frost: none; Snow: none		DM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
27/07/2022	Breeding Raptor Survey	BR1 (C43861 36377)	6:30 starting at 10:10	Visibility: good; Wind speed and direction: light air S; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
05/08/2022	Vantage Point Survey	VP8	3:00 starting at 08:05	Visibility: good; Wind speed and direction: light breeze NW; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none		MM
05/08/2022	Vantage Point Survey	VP3	3:00 starting at 11:35	Visibility: good; Wind speed and direction: light breeze NW; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none		MM
06/08/2022	Vantage Point Survey	VP3	3:00 starting at 08:35	Visibility: good; Wind speed and direction: light breeze W; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		MM
08/08/2022	Vantage Point Survey	VP3	3:00 starting at 07:50	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
08/08/2022	Vantage Point Survey	VP3	3:00 starting at 11:20	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
12/08/2022	Vantage Point Survey	VP2	3:00 starting at 10:20	Visibility: good; Wind speed and direction: gentle breeze E; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
13/08/2022	Vantage Point Survey	VP2	3:00 starting at 08:55	Visibility: good; Wind speed and direction: light air SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
13/08/2022	Vantage Point Survey	VP2	3:00 starting at 12:25	Visibility: good; Wind speed and direction: light air SW; Cloud cover and height: 0-33% >500m; Rain: none; Frost: none; Snow: none		MM
14/08/2022	Vantage Point Survey	VP1	3:00 starting at 06:00	Visibility: good; Wind speed and direction: light breeze NW; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none		PW

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
14/08/2022	Vantage Point Survey	VP1	3:00 starting at 09:30	Visibility: good; Wind speed and direction: light breeze NW; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none		PW
15/08/2022	Vantage Point Survey	VP5	3:00 starting at 09:00	Visibility: moderate; Wind speed and direction: light breeze NW; Cloud cover and height: 66-100% 150-500m; Rain: drizzle; Frost: none; Snow: none		PW
15/08/2022	Vantage Point Survey	VP5	3:00 starting at 12:30	Visibility: moderate; Wind speed and direction: light breeze NW; Cloud cover and height: 66-100% 150-500m; Rain: drizzle; Frost: none; Snow: none		PW
15/08/2022	Vantage Point Survey	VP6	3:00 starting at 16:45	Visibility: moderate; Wind speed and direction: gentle breeze NNW; Cloud cover and height: 66-100% 150-500m; Rain: drizzle; Frost: none; Snow: none		PW
16/08/2022	Vantage Point Survey	VP6	3:00 starting at 14:00	Visibility: good; Wind speed and direction: gentle breeze N; Cloud cover and height: 66-100% >500m; Rain: drizzle; Frost: none; Snow: none		DM
16/08/2022	Vantage Point Survey	VP6	3:00 starting at 17:30	Visibility: good; Wind speed and direction: gentle breeze N; Cloud cover and height: 66-100% >500m; Rain: drizzle; Frost: none; Snow: none		DM
18/08/2022	Vantage Point Survey	VP1	3:00 starting at 07:15	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% >500m; Rain: drizzle; Frost: none; Snow: none		PW
18/08/2022	Vantage Point Survey	VP1	3:00 starting at 10:45	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 66-100% >500m; Rain: drizzle; Frost: none; Snow: none		PW
18/08/2022	Vantage Point Survey	VP2	3:00 starting at 11:05	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none		MM
18/08/2022	Vantage Point Survey	VP2	3:00 starting at 14:35	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none		MM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
19/08/2022	Vantage Point Survey	VP5	3:00 starting at 06:55	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 33-66% >500m; Rain: drizzle; Frost: none; Snow: none		PW
19/08/2022	Vantage Point Survey	VP5	3:00 starting at 10:25	Visibility: good; Wind speed and direction: gentle breeze SW; Cloud cover and height: 33-66% >500m; Rain: drizzle; Frost: none; Snow: none		PW
20/08/2022	Vantage Point Survey	VP4	3:00 starting at 12:30	Visibility: good; Wind speed and direction: fresh breeze W; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		PW
20/08/2022	Vantage Point Survey	VP4	3:00 starting at 16:00	Visibility: good; Wind speed and direction: fresh breeze W; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		PW
21/08/2022	Vantage Point Survey	VP6	3:00 starting at 06:00	Visibility: good; Wind speed and direction: light breeze W; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		PW
21/08/2022	Vantage Point Survey	VP6	3:00 starting at 09:30	Visibility: good; Wind speed and direction: light breeze W; Cloud cover and height: 66-100% >500m; Rain: none; Frost: none; Snow: none		PW
21/08/2022	Vantage Point Survey	VP4	3:00 starting at 17:20	Visibility: good; Wind speed and direction: gentle breeze N; Cloud cover and height: 33-66% >500m; Rain: none; Frost: none; Snow: none		PW
22/08/2022	Vantage Point Survey	VP4	3:00 starting at 08:35	Visibility: moderate; Wind speed and direction: gentle breeze S; Cloud cover and height: 66-100% 150-500m; Rain: light showers; Frost: none; Snow: none		DM
22/08/2022	Vantage Point Survey	VP4	3:00 starting at 12:05	Visibility: moderate; Wind speed and direction: gentle breeze S; Cloud cover and height: 66-100% 150-500m; Rain: light showers; Frost: none; Snow: none		DM
23/08/2022	Vantage Point Survey	VP1	3:00 starting at 09:40	Visibility: moderate; Wind speed and direction: light breeze SW; Cloud cover and height: 33-66% >500m; Rain: drizzle; Frost: none; Snow: none		DM

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
23/08/2022	Vantage Point Survey	VP5	3:00 starting at 14:20	Visibility: good; Wind speed and direction: light breeze SW; Cloud cover and height: 66-100% >500m; Rain: drizzle; Frost: none; Snow: none		DM
13/09/2022	Vantage Point Survey	VP1	3:00 starting at 14:24	Visibility: good; Wind speed and direction: moderate breeze NW; Cloud cover and height: 0-33% 150-500m; Rain: none; Frost: none; Snow: none		LD
13/09/2022	Vantage Point Survey	VP1	3:00 starting at 14:24	Visibility: good; Wind speed and direction: moderate breeze NW; Cloud cover and height: 33-66% 150-500m; Rain: none; Frost: none; Snow: none		LD
14/09/2022	Vantage Point Survey	VP2	2:00 starting at 14:21	Visibility: good; Wind speed and direction: moderate breeze NW; Cloud cover and height: 66-100% <150m; Rain: drizzle; Frost: none; Snow: none		LD
14/09/2022	Vantage Point Survey	VP2	1:00 starting at 16:21	Visibility: good; Wind speed and direction: moderate breeze NW; Cloud cover and height: 66-100% 150-500m; Rain: drizzle; Frost: none; Snow: none		LD
14/09/2022	Vantage Point Survey	VP2	1:00 starting at 17:51	Visibility: good; Wind speed and direction: moderate breeze NW; Cloud cover and height: 66-100% 150-500m; Rain: none; Frost: none; Snow: none		LD
14/09/2022	Vantage Point Survey	VP2	2:00 starting at 18:51	Visibility: good; Wind speed and direction: gentle breeze NW; Cloud cover and height: 66-100% 150-500m; Rain: none; Frost: none; Snow: none		LD
20/09/2022	Vantage Point Survey	VP5	3:00 starting at 14:05	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 66-100% 150-500m; Rain: none; Frost: none; Snow: none		LD
20/09/2022	Vantage Point Survey	VP5	1:00 starting at 17:35	Visibility: good; Wind speed and direction: moderate breeze SW; Cloud cover and height: 66-100% 150-500m; Rain: none; Frost: none; Snow: none		LD
20/09/2022	Vantage Point Survey	VP5	2:00 starting at 18:35	Visibility: good; Wind speed and direction: fresh breeze SW; Cloud cover and height: 66-100% 150-500m; Rain: drizzle; Frost: none; Snow: none		LD

Date	Survey	Location	Duration (h)	Weather Conditions	Comments	Surveyor
21/09/2022	Vantage Point Survey	VP6	3:00 starting at 14:02	Visibility: good; Wind speed and direction: moderate breeze NW; Cloud cover and height: 66-100% 150-500m; Rain: none; Frost: none; Snow: none		LD
21/09/2022	Vantage Point Survey	VP6	3:00 starting at 17:32	Visibility: good; Wind speed and direction: fresh breeze NW; Cloud cover and height: 66-100% 150-500m; Rain: light showers; Frost: none; Snow: none		LD
22/09/2022	Vantage Point Survey	VP7	3:00 starting at 14:00	Visibility: good; Wind speed and direction: moderate breeze NW; Cloud cover and height: 33-66% 150-500m; Rain: none; Frost: none; Snow: none		LD
22/09/2022	Vantage Point Survey	VP7	1:00 starting at 17:30	Visibility: good; Wind speed and direction: moderate breeze NW; Cloud cover and height: 66-100% 150-500m; Rain: light showers; Frost: none; Snow: none		LD
22/09/2022	Vantage Point Survey	VP7	2:00 starting at 18:30	Visibility: good; Wind speed and direction: gentle breeze NW; Cloud cover and height: 66-100% 150-500m; Rain: drizzle; Frost: none; Snow: none		LD
26/09/2022	Vantage Point Survey	VP4	3:00 starting at 13:49	Visibility: good; Wind speed and direction: strong breeze NW; Cloud cover and height: 66-100% 150-500m; Rain: light showers; Frost: none; Snow: none		LD
26/09/2022	Vantage Point Survey	VP4	1:00 starting at 17:19	Visibility: good; Wind speed and direction: strong breeze NW; Cloud cover and height: 66-100% 150-500m; Rain: light showers; Frost: none; Snow: none		LD
26/09/2022	Vantage Point Survey	VP4	2:00 starting at 18:19	Visibility: good; Wind speed and direction: fresh breeze NW; Cloud cover and height: 66-100% 150-500m; Rain: light showers; Frost: none; Snow: none		LD
27/09/2022	Vantage Point Survey	VP3	3:00 starting at 13:47	Visibility: good; Wind speed and direction: moderate breeze NW; Cloud cover and height: 66-100% 150-500m; Rain: light showers; Frost: none; Snow: none		LD
27/09/2022	Vantage Point Survey	VP3	3:00 starting at 17:17	Visibility: good; Wind speed and direction: gentle breeze NW; Cloud cover and height: 66-100% 150-500m; Rain: light showers; Frost: none; Snow: none		LD

Appendix 1 Table 2 Vantage Point Flight Observations

Ref	VP	Date	Time	Species	Number	Duration of flight (s)	Band 1 (0-10m)	Band 2 (10-25m)	PCH (25-175m)	Band 4 (>175m)	Habitat and activity	Surveyor
HH062	VP2	20/10/2021	08:08	Hen Harrier	2	0	0	0	0	0	bogs; sitting on fence post	MM
HH063	VP2	20/10/2021	08:25	Hen Harrier	1	30	30	0	0	0	bogs; perched/flying, one bird flew and landed on fence post beside forest male	MM
HH064	VP2	20/10/2021	08:30	Hen Harrier	1	30	30	0	0	0	bogs; perched/flying, second bird flew and landed on fence post beside forest male	MM
HH065	VP2	20/10/2021	08:50	Hen Harrier	1	40	0	40	0	0	bogs; flying, flew behind trees out of sight male	MM
HH066	VP2	20/10/2021	10:00	Hen Harrier	1	390	120	270	0	0	bogs and conifer plantation; bird had been sitting preening near bottom of tree then flew over moorland and then over forest, the bird went over the roost at Glenard at one stage male	MM
WS019	VP7	22/10/2021	08:15	Whooper Swan	5	300	0	120	180	0	conifer plantation and bogs; flying, flying over hill towards Eskaneen	MM
WS020	VP7	22/10/2021	11:05	Whooper Swan	1	60	0	0	60	0	conifer plantation and bogs; flying, bird flew along Eskaneen mountain	MM
HH067	VP3	23/10/2021	08:40	Hen Harrier	1	45	45	0	0	0	bogs; flight, male	MM
SH057	VP3	23/10/2021	09:15	Sparrowhawk	1	240	0	0	240	0	conifer plantation and improved agricultural grassland; flight, mobbed by hooded crow	MM
KT001	VP3	23/10/2021	10:10	Red Kite	1	300	0	300	0	0	bogs and conifer plantation; flight, mobbed by hooded crow	MM
PE014	VP6	23/10/2021	10:21	Peregrine Falcon	1	26	0	0	26	0	bogs and conifer plantation; travelling, female travelling in s direction @circa 150m	DM
SH058	VP3	23/10/2021	11:25	Sparrowhawk	1	30	30	0	0	0	improved agricultural grassland; flight	MM
SH059	VP6	23/10/2021	13:11	Sparrowhawk	1	124	0	8	116	0	; circling, female circling over Aught Modreo by Naus as it dropped altitude into forestry	DM
SH060	VP3	23/10/2021	13:30	Sparrowhawk	1	40	40	0	0	0	bogs; flight, flew low and fast over bog and went into forest	MM

Ref.	VP	Date	Time	Species	Number	Duration of flight (s)	Band 1 (0-10m)	Band 2 (10-25m)	PCH (25-175m)	Band 4 (>175m)	Habitat and activity	Surveyor
BZ234	VP3	23/10/2021	13:35	Buzzard	1	180	0	180	0	0	bogs; hunting	MM
K.086	VP5	24/10/2021	09:37	Kestrel	1	293	64	189	36	0	conifer plantation and bogs; hunting, ad male hunting; lost view over Feernick	DM
SH061	VP5	24/10/2021	12:44	Sparrowhawk	1	33	0	33	0	0	conifer plantation and bogs; commuting, female travelling in a n direction	DM
BZ235	VP1	27/10/2021	10:26	Buzzard	1	369	0	134	235	0	conifer plantation and bogs; circling, female circling - mobbed by hooded crows	DM
HH068	VP2	04/11/2021	16:13	Hen Harrier	1	60	60	0	0	0	bogs; flew in low and landed on a fence post. dropped to roost at 16:58, ad male	MM
HH069	VP2	04/11/2021	16:15	Hen Harrier	1	180	180	0	0	0	bogs; flew in low and landed on a fence post dropped to roost @ 17:01 beside first male, ad male	MM
HH070	VP2	04/11/2021	16:40	Hen Harrier	1	0	0	0	0	0	bogs; sitting on a fence post, sub adult male roosted @ 17:04	MM
HH071	VP5	08/11/2021	10:42	Hen Harrier	1	226	205	0	0	0	conifer plantation and bogs; foraging, ad male flying over Glenard restock. began hunting over bog behind VP. lost out of sight in a southerly direction towards aught	DM
K.087	VP5	08/11/2021	14:49	Kestrel	1	54	0	54	0	0	bogs; travelling, ad female travelling in a NNE direction	DM
SH062	VP3	09/11/2021	12:15	Sparrowhawk	1	0	0	0	0	0	conifer plantation; perched on Sitka Spruce at forest edge	MM
GH001	VP3	09/11/2021	12:55	Goshawk	2	300	60	240	0	0	conifer plantation and bogs; both birds flew in close proximity	MM
K.088	VP3	09/11/2021	13:50	Kestrel	1	120	40	80	0	0	bogs; hunting over Crockahenny hill. dived at prey and lost from view	MM
SH063	VP3	09/11/2021	14:15	Sparrowhawk	1	30	0	30	0	0	bogs and conifer plantation;	MM
HH072	VP6	09/11/2021	16:17	Hen Harrier	1	493	440	53	0	0	bogs and conifer plantation; foraging/travelling, ad male observed foraging through Meengranly before gaining altitude and flying over Glenard complex in nw direction	DM

Ref.	VP	Date	Time	Species	Number	Duration of flight (s)	Band 1 (0-10m)	Band 2 (10-25m)	PCH (25-175m)	Band 4 (>175m)	Habitat and activity	Surveyor
BZ236	VP1	18/11/2021	12:21	Buzzard	1	264	0	101	163	0	bogs and conifer plantation; circling, female circling over Glenard forestry and Some Hill, moved off in NW direction	DM
HH073	VP1	18/11/2021	14:26	Hen Harrier	1	72	0	35	37	0	; travelling, sub ad male travelling in a NW direction over Glenard	DM
HH074	VP5	01/12/2021	09:43	Hen Harrier	1	209	209	0	0	0	bogs; foraging, ad male lost from view in the direction of Glackmore	DM
ML015	VP5	01/12/2021	13:11	Merlin	1	29	0	23	0	0	bogs and conifer plantation; travelling, ad male flying fast in n direction before moving into forestry	DM
K.089	VP6	04/12/2021	10:26	Kestrel	1	483	232	251	0	0	bogs; hunting, ad male observed hunting down Meenyan in a SW direction	DM
BZ237	VP3	05/12/2021	11:46	Buzzard	1	120	40	80	0	0	bogs and conifer plantation; travelling, male, calling as he travelled	MM
BZ238	VP3	05/12/2021	11:50	Buzzard	1	45	45	0	0	0	bogs; travelling, male, flew very low mobbed by 2 hooded crow	MM
SH064	VP3	05/12/2021	12:00	Sparrowhawk	1	45	45	0	0	0	bogs and conifer plantation; travelling, mobbed by hooded crow	MM
PE015	VP4	07/12/2021	09:31	Peregrine Falcon	1	39	0	0	39	0	conifer plantation and bogs; travelling, ad female travelling in NE direction @ circa 100m	DM
HH075	VP4	07/12/2021	09:54	Hen Harrier	1	24	24	0	0	0	bogs; travelling, brief observation of adult male travelling in NE direction before loosing from view down slope	DM
K.090	VP7	09/12/2021	09:35	Kestrel	1	120	30	90	0	0	bogs and conifer plantation; hunting, adult male	MM
K.091	VP7	09/12/2021	11:25	Kestrel	2	90	30	0	60	0	conifer plantation and bogs; travelling, both birds were adult males	MM
K.092	VP7	09/12/2021	11:25	Kestrel	2	0	0	0	0	0	conifer plantation; perched, two adults, male k. perched on sitka spruce trees at the edge of the forest, they sat for approx. 15mins before flying off. both birds at c41834 30820	MM

Ref.	VP	Date	Time	Species	Number	Duration of flight (s)	Band 1 (0-10m)	Band 2 (10-25m)	PCH (25-175m)	Band 4 (>175m)	Habitat and activity	Surveyor
BZ239	VP7	09/12/2021	12:10	Buzzard	1	360	30	120	210	0	bogs; hunting; hunting over bog and dived to ground	MM
BZ240	VP7	09/12/2021	12:55	Buzzard	1	15	15	0	0	0	bogs; hunting; same bird as above. rose up and dived to ground again	MM
HH076	VP1	10/12/2021	08:39	Hen Harrier	1	40	0	0	40	0	bogs and conifer plantation; travelling, ad male, flying over Glenard forestry in SSE direction	DM
K.093	VP1	10/12/2021	09:43	Kestrel	1	264	85	179	0	0	Bogs; Hunting, Female Hunting Over Some Hill	DM
WE002	VP5	08/01/2022	15:21	White-tailed Eagle	1	234	39	166	29	0	bogs; travelling/hunting, juv. green/yellow tagged "1," travelling in NE direction, lost from view whilst moving around Crockaheeny	DM
HH077	VP5	08/01/2022	15:43	Hen Harrier	1	103	46	57	0	0	bogs; foraging/travelling, ad male hunting; gained altitude and flew past Crockaheeny turbines in ne direction	DM
K.094	VP6	09/01/2022	11:21	Kestrel	1	243	79	164	0	0	bogs; hunting, ad male hunting moved off in ne direction	DM
HH078	VP6	09/01/2022	15:09	Hen Harrier	1	51	51	0	0	0	bogs; foraging, ad male observed hunting over Glackmore close to observer, lost from view travelling in n direction @ circa 5 meters	DM
BZ241	VP7	12/01/2022	14:40	Buzzard	1	120	20	100	0	0	bogs; hunting, circling over bog then dived to ground	MM
HH079	VP2	13/01/2022	16:20	Hen Harrier	1	15	15	0	0	0	bogs; travelling, brief glimpse of bird travelling very low	MM
HH080	VP2	13/01/2022	16:28	Hen Harrier	1	60	60	0	0	0	bogs; circling low over bog; birds went down to roost	MM
BZ242	VP3	19/01/2022	11:25	Buzzard	1	240	0	60	180	0	bogs; travelling, bird went over bog circling at times	MM
BZ243	VP3	19/01/2022	11:30	Buzzard	1	60	0	60	0	0	bogs; soaring, 2nd bird soaring	MM
SH065	VP3	19/01/2022	12:10	Sparrowhawk	1	45	45	0	0	0	bogs and improved agricultural grassland; travelling, bird flew very low along hedgerow	MM

Ref.	VP	Date	Time	Species	Number	Duration of flight (s)	Band 1 (0-10m)	Band 2 (10-25m)	PCH (25-175m)	Band 4 (>175m)	Habitat and activity	Surveyor
BZ244	VP3	19/01/2022	12:50	Buzzard	1	300	0	40	260	0	conifer plantation and bogs; hunting, hovered at times	MM
HH081	VP3	19/01/2022	12:55	Hen Harrier	1	270	270	0	0	0	bogs; hunting, ringtail, flying very low	MM
BZ245	VP3	19/01/2022	14:10	Buzzard	1	60	60	0	0	0	bogs; travelling, flew towards forest	MM
BZ246	VP3	19/01/2022	16:15	Buzzard	1	40	40	0	0	0	bogs; travelling, flew very low towards forest	MM
SH066	VP1	01/02/2022	10:23	Sparrowhawk	1	136	0	0	136	0	conifer plantation and bogs; circling, female circling over forestry, lost from view travelling ENE	MM
PE016	VP7	01/02/2022	10:45	Peregrine Falcon	1	30	25	5	0	0	bogs and conifer plantation; travelling, bird flew very low and fast, lost from view travelling in a west direction	MM
GI002	VP5	07/02/2022	10:42	Goshawk	1	206	0	33	173	0	conifer plantation; circling, ad female circling high (circa 130m) over site, dived steeply back into forestry and lost from view	DM
WE003	VP6	14/02/2022	09:11	White-tailed Eagle	1	364	0	0	364	0	conifer plantation and bogs; circling/travelling, juvenile, wing tagged (tags not identifiable) circled over Meenyanly briefly before flying over Glenard in WNW direction at c. 100m	DM
BZ247	VP3	14/02/2022	11:35	Buzzard	1	420	30	60	240	90	bogs, conifer plantation and bogs; hunting, bird went over bog and forest, stopped to hover at intervals	MM
BZ248	VP3	14/02/2022	12:32	Buzzard	1	90	90	0	0	0	bogs; hunting, circling very low then went to ground, didn't rise so probably caught prey	MM
SH067	VP3	14/02/2022	14:10	Sparrowhawk	1	3	30	0	0	0	bogs; hunting, travelling very low and fast over hill	MM
WE004	VP3	14/02/2022	14:15	White-tailed Eagle	1	464	464	0	464	0	bogs; circling/travelling, wing tagged (green 8 yellow h) juvenile male circling over Glackmore by c. 30 ravens	MM

Ref.	VP	Date	Time	Species	Number	Duration of flight (s)	Band 1 (0-10m)	Band 2 (10-25m)	PCH (25-175m)	Band 4 (>175m)	Habitat and activity	Surveyor
GI003	VP2	01/03/2022	14:10	Goshawk	1	45	0	45	0	0	conifer plantation; travelling, the bird flew just above the canopy of the trees and then descended into the forest	MM
GI004	VP2	01/03/2022	14:25	Goshawk	1	120	0	120	0	0	conifer plantation; travelling, flew over forest and soared a few times	MM
BZ249	VP7	02/03/2022	12:20	Buzzard	1	90	0	90	0	0	bogs and conifer plantation; travelling, bird flew over hill and forest and landed on tree at forest edge	MM
BZ250	VP7	02/03/2022	12:22	Buzzard	1	0	0	0	0	0	conifer plantation; perched, bird landed on a tree at forest edge	MM
K.095	VP7	02/03/2022	14:12	Kestrel	1	150	80	70	0	0	bogs; hunting, bird flew over hill hovering at times	MM
K.096	VP7	02/03/2022	15:10	Kestrel	1	180	0	180	0	0	bogs; hunting, hovering a lot	MM
BZ251	VP7	02/03/2022	15:22	Buzzard	3	900	0	300	600	0	conifer plantation and bogs; travelling, birds were soaring and calling, one began displaying with undulating flight over hill	MM
K.097	VP7	02/03/2022	15:56	Kestrel	1	240	15	225	0	0	bogs; hunting, hovering every few minutes, eventually dived to ground at prey	MM
K.098	VP7	02/03/2022	16:01	Kestrel	1	0	0	0	0	0	bogs; perched, male landed on FSB pole	MM
K.099	VP7	02/03/2022	16:10	Kestrel	1	30	15	15	0	0	bogs; hunting, bird dived at speed to ground possibly caught prey as did not see it rise	MM
BZ252	VP7	02/03/2022	16:35	Buzzard	1	0	0	0	0	0	bogs; perched, sat on a fence post for 65mins before flying off	MM
K.100	VP7	02/03/2022	17:08	Kestrel	1	180	0	180	0	0	bogs; travelling, bird flew over hill	MM
BZ253	VP7	02/03/2022	17:40	Buzzard	1	30	30	0	0	0	bogs; travelling, the bird had been sitting on a fence post for 65mins and then flew off	MM
BZ254	VP3	04/03/2022	12:25	Buzzard	1	65	65	0	0	0	bogs; circling, mobbed by a buzzard	MM
BZ255	VP3	04/03/2022	13:01	Buzzard	3	780	0	480	300	0	bogs and conifer plantation; soaring, two males and a female calling as they soared	MM

Ref.	VP	Date	Time	Species	Number	Duration of flight (s)	Band 1 (0-10m)	Band 2 (10-25m)	PCH (25-175m)	Band 4 (>175m)	Habitat and activity	Surveyor
SH068	VP3	04/03/2022	17:55	Sparrowhawk	1	45	0	45	0	0	bogs and conifer plantation; travelling, bird flew over bog and went down to forest, probably to roost	MM
GI005	VP5	05/03/2022	12:06	Goshawk	1	193	0	23	170	0	conifer plantation; circling, ad female goshawk circling over area of restock before diving past back into canopy	DM
BZ256	VP5	05/03/2022	16:09	Buzzard	1	36	0	36	0	0	bogs and conifer plantation; travelling, male - flew into plantation	DM
PE017	VP4	06/03/2022	12:43	Peregrine Falcon	1	26	0	0	0	26	bogs; travelling, ad female travelling past in ne direction at c. 200m	DM
SH069	VP4	06/03/2022	13:26	Sparrowhawk	1	183	0	64	119	0	conifer plantation and bogs; circling, ad female circling overhead, lost from view whilst dropping in altitude towards canopy	DM
BZ257	VP1	07/03/2022	13:12	Buzzard	1	264	0	0	153	111	bogs; circling, female circling high over Some Wind Farm	DM
HH082	VP6	08/03/2022	12:42	Hen Harrier	1	264	264	0	0	0	bogs; foraging, ad male hunting at c. 5m in NE direction	DM
SH070	VP6	08/03/2022	13:29	Sparrowhawk	1	176	0	0	176	0	conifer plantation; circling, ad female circling - mobbed by hooded crows	DM
BZ258	VP5	09/04/2022	07:11	Buzzard	1	319	0	46	273	0	conifer plantation; circling, male circling over plantation.	DM
GI006	VP5	09/04/2022	07:37	Goshawk	1	19	19	0	0	0	improved agricultural grassland and conifer plantation; travelling, adult male with prey (magpie) flying low into forestry, mobbed by hooded crow.	DM
GJ006	VP2	12/04/2022	09:10	Greylag Goose	100	240	0	0	240	0	bogs; travelling, skein flying in long line calling loudly.	MM
BZ259	VP3	15/04/2022	07:10	Buzzard	1	70	0	70	0	0	conifer plantation and bogs; travelling, flew over forest and bog and landed on ESB pole.	MM
BZ260	VP3	15/04/2022	08:48	Buzzard	1	30	0	30	0	0	bogs and conifer plantation; travelling, bird flew up to the forest edge and perched.	MM

Ref.	VP	Date	Time	Species	Number	Duration of flight (s)	Band 1 (0-10m)	Band 2 (10-25m)	PCH (25-175m)	Band 4 (>175m)	Habitat and activity	Surveyor
K001	VP1	11/05/2022	19:23	Kestrel	1	226	84	139	0	0	bogs; hunting, adult male hunting near turbines on Some Hill.	DM
BZ261	VP5	13/05/2022	19:31	Buzzard	1	394	0	0	126	268	bogs; circling, adult male circling over Glenard, mobbed by hooded crows.	DM
WE005	VP5	13/05/2022	20:21	White-tailed Eagle	1	84	0	0	0	84	conifer plantation and bogs; travelling, sub adult male travelling in ese direction.	DM
BZ262	VP5	13/05/2022	20:42	Buzzard	1	36	0	0	36	0	bogs and conifer plantation; travelling, male flying into conifers with prey	DM
ML016	VP6	14/05/2022	20:16	Merlin	1	28	0	28	0	0	bogs; travelling, adult male	DM
BZ263	VP2	21/05/2022	14:39	Buzzard	1	660	30	160	320	150	bogs; travelling, bird circled, scanning for prey, eventually went to ground.	MM
BZ264	VP3	27/05/2022	19:40	Buzzard	1	180	0	100	80	0	conifer plantation; soaring, mobbed by a jackdaw	MM
K002	VP1	10/06/2022	09:34	Kestrel	1	216	0	54	142	0	bogs; hunting, adult male lost from view whilst dropping in altitude in SW direction.	DM
BZ265	VP7	10/06/2022	11:45	Buzzard	1	0	0	0	0	0	conifer plantation; perched, bird sat for at least 15 mins	MM
BZ266	VP2	10/06/2022	14:43	Buzzard	1	120	0	30	90	0	bogs and conifer plantation; travelling, bird flew over hill and forest	MM
BZ267	VP2	10/06/2022	15:35	Buzzard	1	90	0	25	65	0	bogs and conifer plantation; travelling, flew over bog and forest strip	MM
BZ268	VP5	11/06/2022	10:14	Buzzard	1	316	0	0	56	260	conifer plantation; circling, male circling before descending into canopy	DM
WE006	VP5	11/06/2022	11:36	White-tailed Eagle	1	169	0	0	0	169	bogs; travelling, juvenile, wing tagged, drifted in NNE direction	DM
BZ269	VP6	11/06/2022	14:42	Buzzard	1	31	0	0	31	0	bogs and conifer plantation; travelling, male travelling with prey	DM
ML017	VP6	11/06/2022	15:29	Merlin	1	29	29	0	0	0	bogs; travelling, low flight into forestry	DM
BZ270	VP3	13/06/2022	13:40	Buzzard	1	150	0	0	150	0	bogs; travelling, hunting/ hovering	MM
BZ271	VP3	13/06/2022	14:28	Buzzard	1	300	10	30	260	0	bogs and conifer plantation; travelling, hunting/ hovering, dived at prey,	MM

Ref.	VP	Date	Time	Species	Number	Duration of flight (s)	Band 1 (0-10m)	Band 2 (10-25m)	PCH (25-175m)	Band 4 (>175m)	Habitat and activity	Surveyor
BZ272	VP3	13/06/2022	14:45	Buzzard	1	45	0	0	45	0	conifer plantation and bogs; travelling, flew over forest and bog	MM
BZ273	VP3	13/06/2022	15:07	Buzzard	1	90	0	90	0	0	bogs and conifer plantation; travelling, hunting	MM
BZ274	VP3	13/06/2022	15:28	Buzzard	1	80	20	60	0	0	bogs, travelling, hunting	MM
BZ275	VP3	11/07/2022	10:11	Buzzard	1	900	0	60	840	0	conifer plantation and bogs; hunting, hunting, hovering at times	MM
BZ276	VP3	11/07/2022	10:31	Buzzard	1	180	30	150	0	0	bogs and conifer plantation; travelling, flew low over hill	MM
BZ277	VP3	11/07/2022	10:54	Buzzard	1	240	0	240	0	0	conifer plantation and bogs; travelling, mobbed by a sparrowhawk	MM
SH071	VP3	11/07/2022	10:54	Sparrowhawk	1	240	0	240	0	0	bogs and conifer plantation; travelling, mobbed a buzzard	MM
BZ278	VP3	11/07/2022	11:45	Buzzard	1	60	0	60	0	0	conifer plantation; hunting, hunting	MM
BZ279	VP3	11/07/2022	12:00	Buzzard	1	420	0	120	300	0	bogs and conifer plantation; hunting, hunting	MM
BZ280	VP7	13/07/2022	11:47	Buzzard	1	45	5	40	0	0	conifer plantation; travelling, hunting over restock forest then dived at prey.	MM
BZ281	VP7	13/07/2022	11:55	Buzzard	1	300	0	90	210	0	conifer plantation; travelling, hunting over forest hovering every few minutes.	MM
BZ282	VP7	13/07/2022	13:11	Buzzard	1	120	0	120	0	0	bogs and conifer plantation; travelling, flew over forest and landed on tree.	MM
WE007	VP7	13/07/2022	13:20	White-tailed Eagle	1	150	0	0	150	0	bogs soaring, soaring over Crockahenny hill.	MM
SH072	VP2	14/07/2022	11:15	Sparrowhawk	1	30	30	0	0	0	bogs, hunting, she chased a meadow pipit narrowly missing it.	MM
SH073	VP2	14/07/2022	11:17	Sparrowhawk	1	20	20	0	0	0	bogs; travelling, after landing on fence post she flew off.	MM
BZ283	VP2	14/07/2022	11:45	Buzzard	1	120	0	120	0	0	bogs; hunting, hunting over Crockahenny hill	MM
BZ284	VP1	17/07/2022	08:14	Buzzard	1	342	0	0	342	0	bogs and conifer plantation; circling, male circling over Some	DM

Ref.	VP	Date	Time	Species	Number	Duration of flight (s)	Band 1 (0-10m)	Band 2 (10-25m)	PCH (25-175m)	Band 4 (>175m)	Habitat and activity	Surveyor
BZ285	VP1	17/07/2022	09:22	Buzzard	1	289	0	0	0	289	conifer plantation and bogs; circling, female circling circa 250m over Glenard	DM
WE008	VP1	17/07/2022	10:03	White-tailed Eagle	1	144	0	0	0	144	conifer plantation and bogs; travelling, juvenile- heavy moult, wing tagged, travelling over Glenard at c. 200m.	DM
WE009	VP5	18/07/2022	07:42	White-tailed Eagle	1	429	0	0	0	236	conifer plantation and bogs; travelling/soaring, juvenile- wing tagged (purple and green) soaring over Glenard. moved off in an easterly direction, mobbed by hooded crows.	DM
WE010	VP5	18/07/2022	08:11	White-tailed Eagle	1	74	0	0	74	0	bogs and conifer plantation; travelling, sub adult male not tagged, 3rd year bird travelling over Glenard.	DM
PE018	VP5	18/07/2022	09:22	Peregrine Falcon	1	50	0	0	0	50	conifer plantation and bogs; travelling, tiercel	DM
BZ286	VP5	18/07/2022	10:14	Buzzard	1	84	0	0	74	0	bogs and conifer plantation; travelling, male	DM
ML018	VP5	18/07/2022	10:19	Merlin	1	29	0	29	0	0	bogs; travelling, adult female travelling with prey	DM
BZ287	VP6	18/07/2022	12:42	Buzzard	1	296	0	89	207	0	bogs and conifer plantation; circling, male	DM
WE011	VP6	18/07/2022	14:22	White-tailed Eagle	1	384	0	0	124	260	conifer plantation and bogs; soaring, juvenile wing tagged soaring over augh/Meenyanly. drifted over edge of Glenard in NE direction	DM
SH074	VP3	05/08/2022	09:08	Sparrowhawk	2	45	15	30	0	0	bogs and conifer plantation; travelling, both birds flew fast along the forest. one attacked wood pigeon but missed. other one continued flying.	MM
WE012	VP3	05/08/2022	09:25	White-tailed Eagle	1	90	20	30	40	0	bogs; travelling, flew over hill and landed on ground.	MM
WE013	VP3	05/08/2022	10:24	White-tailed Eagle	2	360	10	20	330	0	bogs; soaring, both birds soaring over hill. birds came very close to each other	MM

Ref.	VP	Date	Time	Species	Number	Duration of flight (s)	Band 1 (0-10m)	Band 2 (10-25m)	PCH (25-175m)	Band 4 (>175m)	Habitat and activity	Surveyor
BZ288	VP3	06/08/2022	09:54	Buzzard	1	60	0	60	0	0	at times, one landed on hill but rose again.	MM
BZ289	VP3	06/08/2022	10:13	Buzzard	1	420	0	0	200	220	bogs; travelling, flew from ESB pole to bush beside river bank	MM
K003	VP3	08/08/2022	08:05	Kestrel	1	180	0	180	0	0	conifer plantation and bogs; soaring, soared over forest and hill	MM
SH075	VP3	08/08/2022	08:12	Sparrowhawk	1	50	0	50	0	0	bogs; hunting, bird was hovering at intervals	MM
BZ290	VP3	08/08/2022	14:10	Buzzard	1	90	0	90	0	0	improved agricultural grassland; travelling, flew along riverbank and landed on spruce tree	MM
BZ291	VP2	12/08/2022	12:52	Buzzard	2	300	0	90	210	0	bogs and conifer plantation; travelling, flew over bog and landed on tree in forest	MM
SH076	VP2	12/08/2022	12:55	Sparrowhawk	1	180	0	0	180	0	conifer plantation; soaring, both birds soaring together, one mobbed by sparrowhawk	MM
WE014	VP2	12/08/2022	13:11	White-tailed Eagle	1	420	0	20	400	0	conifer plantation; travelling, mobbed buzzard then soared high over forest.	MM
WE015	VP2	13/08/2022	11:47	White-tailed Eagle	1	630	0	90	420	120	bogs; soaring, mobbed by a gull then flew down to hill beside Eddie Fullerton Dam off map.	MM
WE016	VP2	13/08/2022	12:35	White-tailed Eagle	1	900	0	0	800	100	bogs; soaring, bird soared over hill, went very high.	MM
BZ292	VP1	14/08/2022	08:11	Buzzard	2	410	0	40	280	90	bogs; travelling, flew over bog then soared over Crookahenny Hill.	PW
BZ293	VP1	14/08/2022	11:25	Buzzard	1	290	0	0	290	0	bogs and conifer plantation; soaring, flew low together, soared high and drifted. male and female.	PW
BZ294	VP5	15/08/2022	09:21	Buzzard	1	235	5	20	210	0	conifer plantation; travelling/soaring, travel over forestry and soared out of sight. (male)	PW

Ref.	VP	Date	Time	Species	Number	Duration of flight (s)	Band 1 (0-10m)	Band 2 (10-25m)	PCH (25-175m)	Band 4 (>175m)	Habitat and activity	Surveyor
K004	VP5	15/08/2022	13:01	Kestrel	1	35	0	0	35	0	bogs and conifer plantation; hunting, seen hovering then flew off	PW
BZ295	VP5	15/08/2022	14:33	Buzzard	1	50	10	40	0	0	bogs and conifer plantation; travelling, flew low over trees	PW
K005	VP6	16/08/2022	14:15	Kestrel	1	95	15	20	60	0	bogs and conifer plantation; hunting, flew low and then hunted over tree plantation	PW
K006	VP6	16/08/2022	14:31	Kestrel	1	40	0	40	0	0	bogs; hunting, hunting over hill crest	PW
WE017	VP6	16/08/2022	14:42	White-tailed Eagle	1	11	0	11	0	0	conifer plantation; flying, rose from treeline and dropped again. juvenile or sub adult (bad light)	PW
WE018	VP6	16/08/2022	15:05	White-tailed Eagle	1	125	0	0	125	0	conifer plantation and bogs; soaring, seen mobbed by raven and flew se over the hill and out of view	PW
EA012	VP6	16/08/2022	16:10	Golden Eagle	1	30	0	30	0	0	conifer plantation and bogs; flying, flew NE direction and dipped behind treeline. adult male.	PW
ML019	VP6	16/08/2022	19:21	Merlin	1	50	50	0	0	0	conifer plantation and bogs; hunting, came from treeline and flew along crest	PW
K007	VP5	19/08/2022	09:36	Kestrel	1	760	40	220	500	0	conifer plantation; hunting, dropped several times. seen hunting for several minutes	PW
ML020	VP5	19/08/2022	11:25	Merlin	1	12	12	0	0	0	bogs; hunting, aerial pursuit of passerine. disappeared when went low.	PW
BZ296	VP4	20/08/2022	12:41	Buzzard	2	95	0	0	95	0	bogs and conifer plantation; soaring, adult female flying with calling juv.	PW
K008	VP6	21/08/2022	08:12	Kestrel	1	55	0	55	0	0	bogs and conifer plantation; hunting, male hunting and went to ground, lost from view	PW
SH077	VP6	21/08/2022	10:56	Sparrowhawk	1	60	0	25	35	0	bogs and conifer plantation; flying, mobbed by raven	PW
WE019	VP4	22/08/2022	09:14	White-tailed Eagle	1	244	0	0	244	0	bogs and conifer plantation; travelling/soaring, sub adult male (3rd year) circling over Glenard, mobbed by	DM

Ref.	VP	Date	Time	Species	Number	Duration of flight (s)	Band 1 (0-10m)	Band 2 (10-25m)	PCH (25-175m)	Band 4 (>175m)	Habitat and activity	Surveyor
BZ297	VP4	22/08/2022	09:15	Buzzard	1	32	0	0	32	0	buzzard. appeared to land into forestry complex	DM
WE020	VP4	22/08/2022	12:29	White-tailed Eagle	2	93	0	0	72	21	conifer plantation and bogs; travelling, sub adult male and juvenile female wing tagged, both travelling in a se direction	DM
K009	VP5	23/08/2022	14:58	Kestrel	1	219	0	79	140	0	bogs and conifer plantation; hunting, adult male moved off over canopy in NW direction	DM
PE019	VP5	23/08/2022	15:22	Peregrine Falcon	1	79	0	0	0	79	conifer plantation and bogs; travelling, tiercel	DM
WE021	VP5	23/08/2022	16:42	White-tailed Eagle	1	364	0	0	159	205	conifer plantation and bogs; circling/ travelling, juvenile female purple and green wing tagged.	DM
MP001	VP1	13/09/2022	18:30	Meadow Pipit	1	10	10	0	0	0	wet grassland; travelling, birds seen on site.	LD
BZ298	VP2	14/09/2022	17:46	Buzzard	1	130	126	4	0	0	improved agricultural grassland, wet grassland and conifer plantation; hunting, buzzard observed a good distance away to the north over farmland, scrub and forestry on two occasions	LD
BZ299	VP2	14/09/2022	18:08	Buzzard	1	75	70	5	0	0	improved agricultural grassland, wet grassland and conifer plantation; hunting, buzzard seen hunting a good distance away to the north over farmland, scrub and forestry on two occasions	LD
HG014	VP7	20/09/2022	14:20	Herring Gull	9	180	180	0	0	0	wet grassland and lakes and ponds; foraging, seen a long way off site, around the local reservoir.	LD
MP002	VP5	20/09/2022	14:30	Meadow Pipit	3	10	10	0	0	0	wet grassland; travelling, birds seen on site.	LD
H001	VP5	20/09/2022	17:47	Grey Heron	1	28	28	0	0	0	lakes and ponds and wet grassland; travelling, along the line of the river.	LD

Ref.	VP	Date	Time	Species	Number	Duration of flight (s)	Band 1 (0-10m)	Band 2 (10-25m)	PCH (25-175m)	Band 4 (>175m)	Habitat and activity	Surveyor
HH083	VP6	21/09/2022	16:02	Hen Harrier	1	7	7	0	0	0	wet grassland, dry siliceous heath and conifer plantation; travelling, male hen harrier seen briefly to the south-east around the edge of forestry.	LD
HH084	VP6	21/09/2022	16:02	Hen Harrier	1	4	4	0	0	0	wet grassland, dry siliceous heath and conifer plantation; travelling, followed by a brief view of a female or ringtail flying close by.	LD
HH085	VP6	21/09/2022	16:19	Hen Harrier	1	36	36	0	0	0	wet grassland, dry siliceous heath and conifer plantation; hunting and travelling, both birds seen again at a distance flying towards the plateaux off Glackmore Hill.	LD
HH086	VP6	21/09/2022	16:20	Hen Harrier	1	7	7	0	0	0	wet grassland; travelling, birds seen on site.	LD
MP003	VP6	21/09/2022	18:00	Meadow Pipit	1	15	15	0	0	0	wet grassland and dry siliceous heath; travelling, birds seen on site.	LD
MP004	VP7	22/09/2022	18:30	Meadow Pipit	7	15	15	0	0	0	wet grassland, lakes and ponds and scrub; travelling, seen alongside the Crana River	LD
H002	VP3	26/09/2022	15:44	Grey Heron	1	8	8	0	0	0	wet grassland and conifer plantation; travelling, around the edge of farmland and forestry.	LD
BZ300	VP4	26/09/2022	16:17	Buzzard	1	7	7	0	0	0	wet grassland and conifer plantation; travelling, around the edge of farmland and forestry.	LD
BZ301	VP4	26/09/2022	16:30	Buzzard	1	94	4	90	0	0	wet grassland and conifer plantation; hunting, around the edge of farmland and forestry.	LD
MP005	VP4	26/09/2022	18:30	Meadow Pipit	3	15	15	0	0	0	travelling	LD
GL001	VP3	27/09/2022	14:34	Grey Wagtail	1	12	12	0	0	0	wet grassland and lakes and ponds; travelling, along the Crana River.	LD
HG015	VP3	27/09/2022	15:06	Herring Gull	2	9	0	9	0	0	wet grassland and conifer plantation; travelling, seen travelling over the moorland.	LD

Ref.	VP	Date	Time	Species	Number	Duration of flight (s)	Band 1 (0-10m)	Band 2 (10-25m)	PCH (25-175m)	Band 4 (>175m)	Habitat and activity	Surveyor
H003	VP3	27/09/2022	16:08	Grey Heron	1	22	22	0	0	0	wet grassland, lakes and ponds and scrub; travelling, second grey heron observed alongside the river.	LD
H004	VP3	27/09/2022	16:08	Grey Heron	2	12	12	0	0	0	wet grassland, lakes and ponds and scrub; travelling, a short while later, two herons went up together, so there is a pair roosting in scrub or close to the riverside.	LD
BZ302	VP3	27/09/2022	16:40	Buzzard	1	11	11	0	0	0	wet grassland, scrub and conifer plantation; travelling, an adult buzzard was also seen perched in scrub, before travelling away north out of view.	LD

Map Legend

- Wind Farm Site
- Turbine Layout
- 500m Turbine Buffer
- Vantage Point Surveys
- Flightline

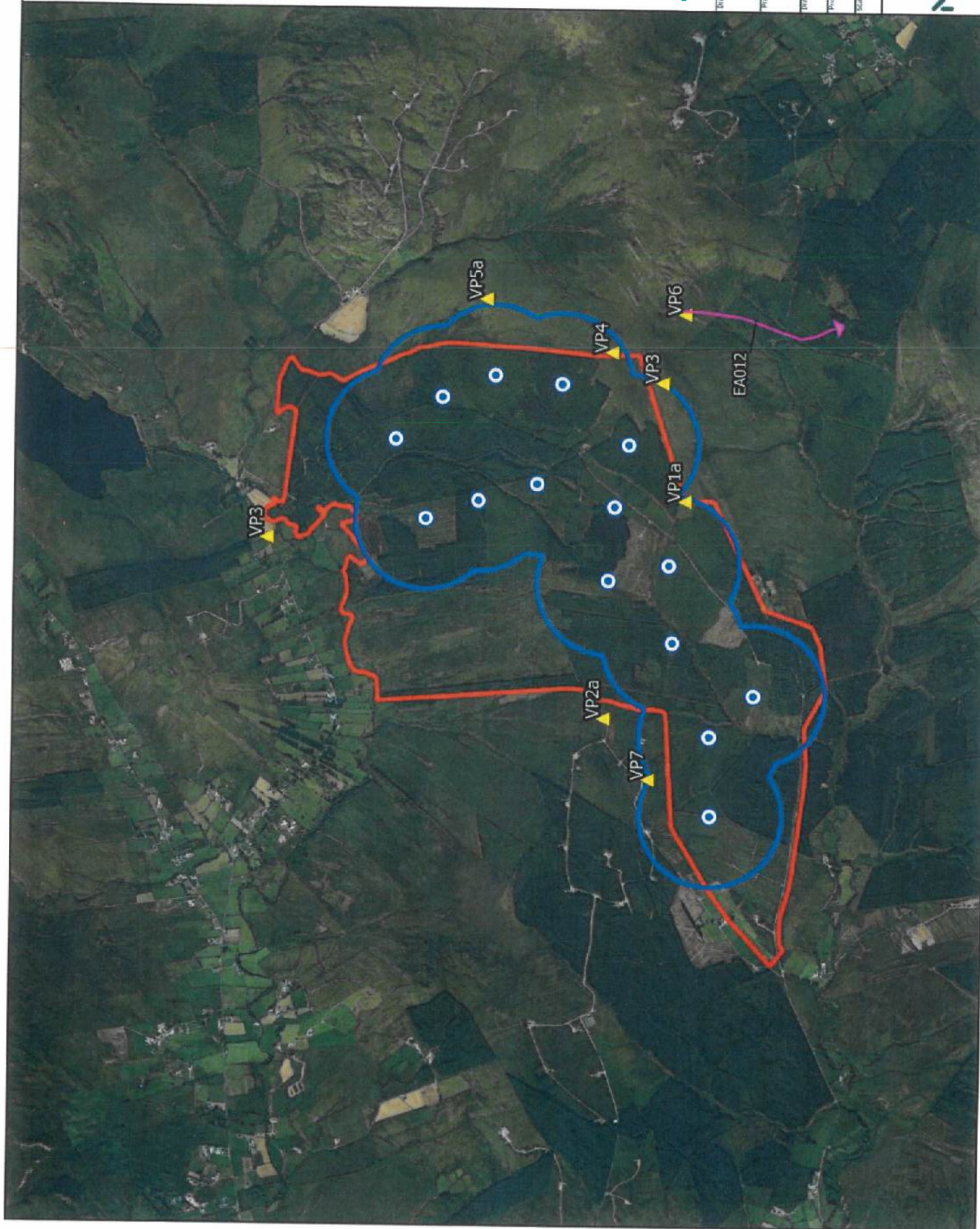
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Drawing Title
Golden Eagle Observations
Vantage Point Surveys

Drawn By	Checked By
S. Duff	P. Manley
Project No.	Drawing No.
190114	11
Scale	Date
1:35,000	04/04/2023

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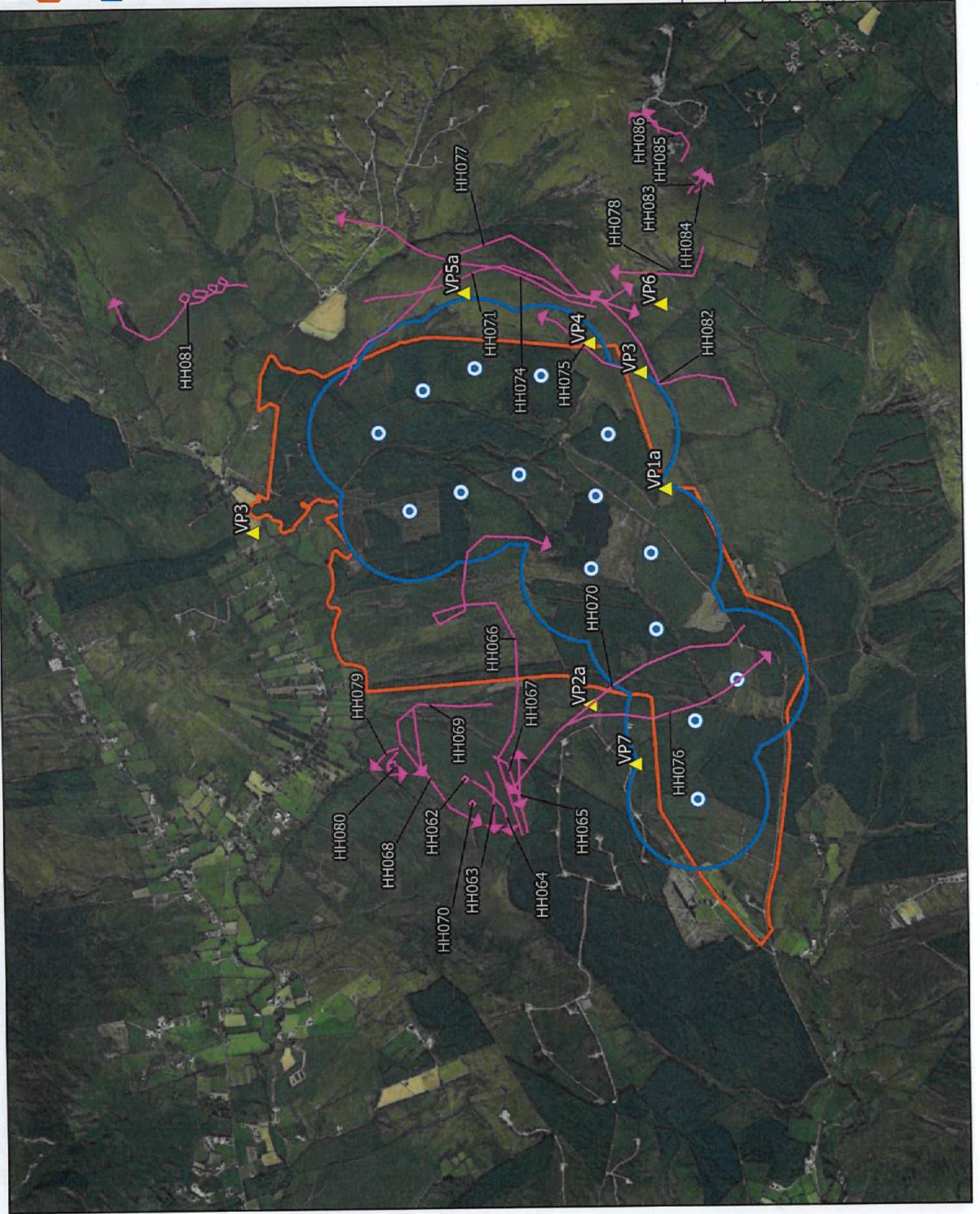
Map Legend

- Wind Farm Site
- Turbine Layout
- 500m Turbine Buffer
- Vantage Point Locations
- Flightline
- Nonflight Observation



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Drawing Title Hen Harrier Observations Vantage Point Surveys	
Project No.	190114
Scale	1:35,000
Drawn By	S. Duff
Checked By	P. Manley
Project No.	190114
Scale	1:35,000
Date	04/04/2023
MKO Planning and Environmental Consultants Tully Road, Carr Hill, Carrickmacross, Co. Wick, Ireland Tel: +353 (0) 91 735611 Email: info@mkoland.ie Website: www.mkoland.ie	



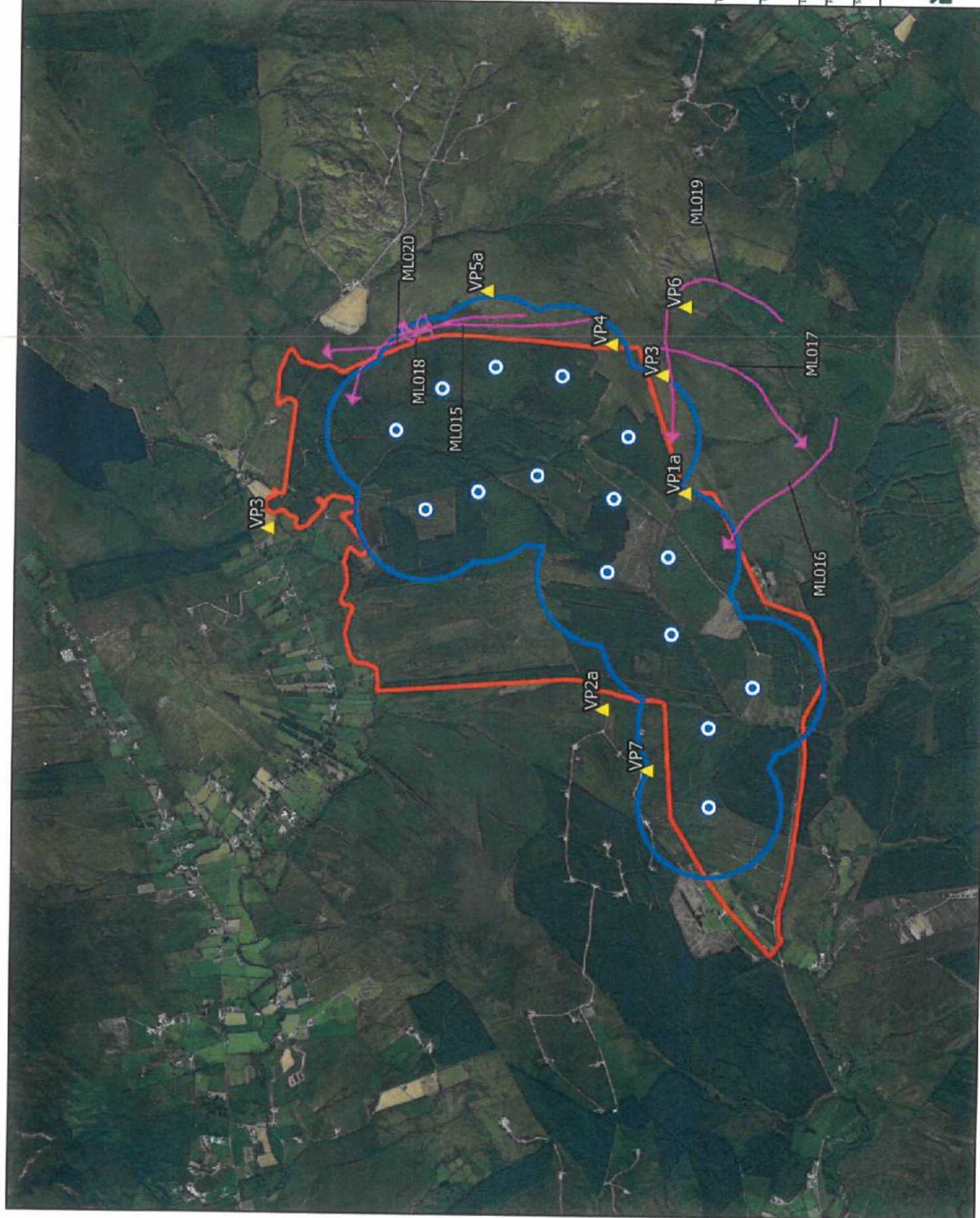
Map Legend

- Wind Farm Site
- Turbine Layout
- 500m Turbine Buffer
- Vantage Point Surveys
- Flightline



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Merlin Observations Vantage Point Surveys	
Glenard Wind Farm	
Drawn By	Checked By
S. Duff	P. Manley
Project No.	Drawing No.
190114	1.4
Scale	Date
1:35,000	04/04/2023
MKO Planning and Environmental Consultants 10000 10th Street Suite 100, WY84 +353 (0)91 725611 info@mkocorp.com	



Map Legend

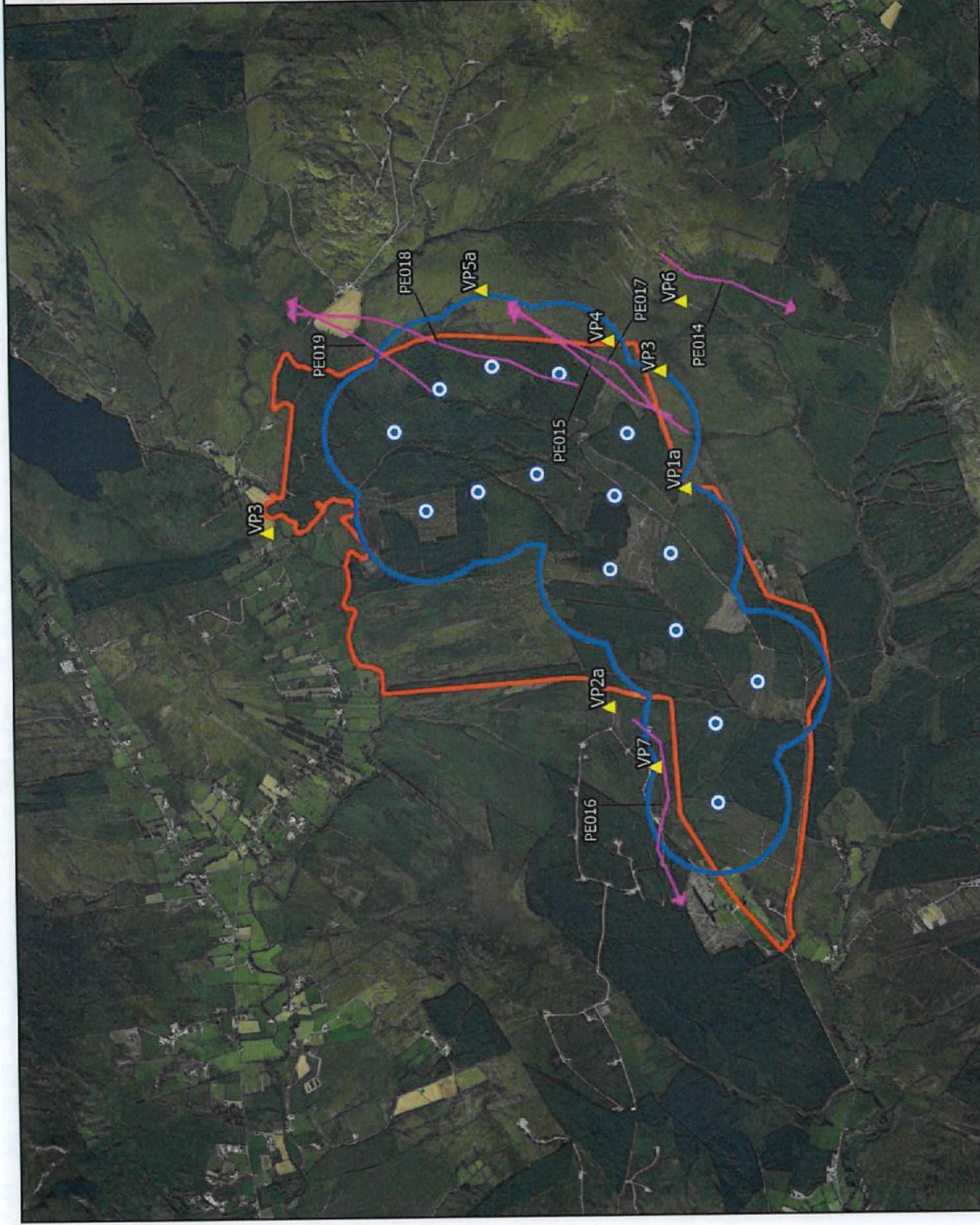
- Wind Farm Site
- Turbine Layout
- 500m Turbine Buffer
- Vantage Point Surveys
- Flightline



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Drawing Title	Peregrine Observations Vantage Point Surveys		
Project Name	Glenard Wind Farm		
Drawn By	S. Duff	Checked By	P. Manley
Project No.	190114	Drawn Date	15
Scale	1:35,000	Date	04/04/2023

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Map Legend

- Wind Farm Site
- Turbine Layout
- 500m Turbine Buffer
- Vantage Point Surveys
- Rightline

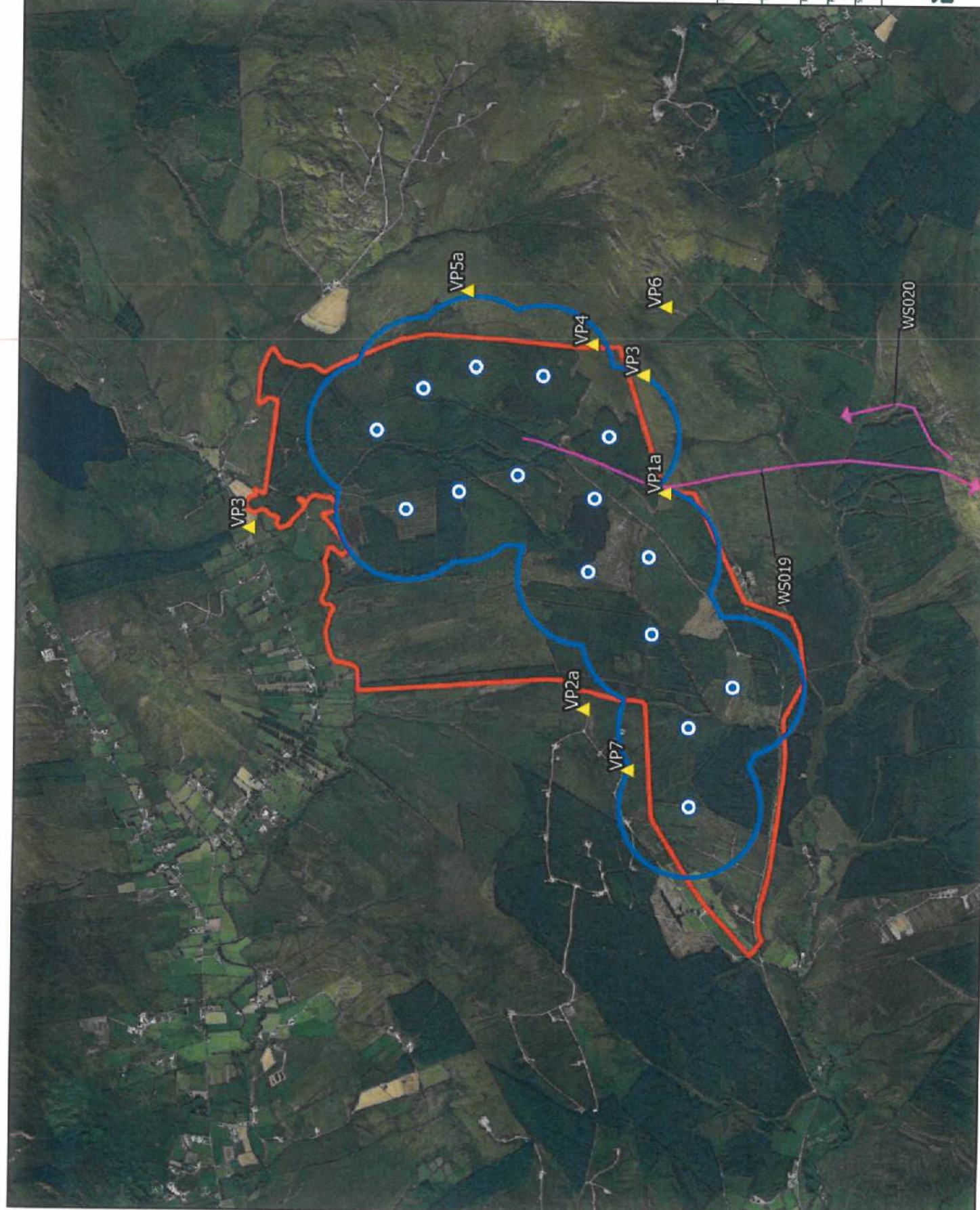
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Whooper Swan Observations
Vantage Point Surveys

Glenard Wind Farm	
Drawn By	S. Duff
Checked By	P. Manley
Project No.	190114
Scale	1:35,000
Date	04/04/2023

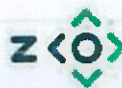

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Map Legend

- Wind Farm Site
- Turbine Layout
- 500m Turbine Buffer
- Vantage Point Surveys
- Flightline

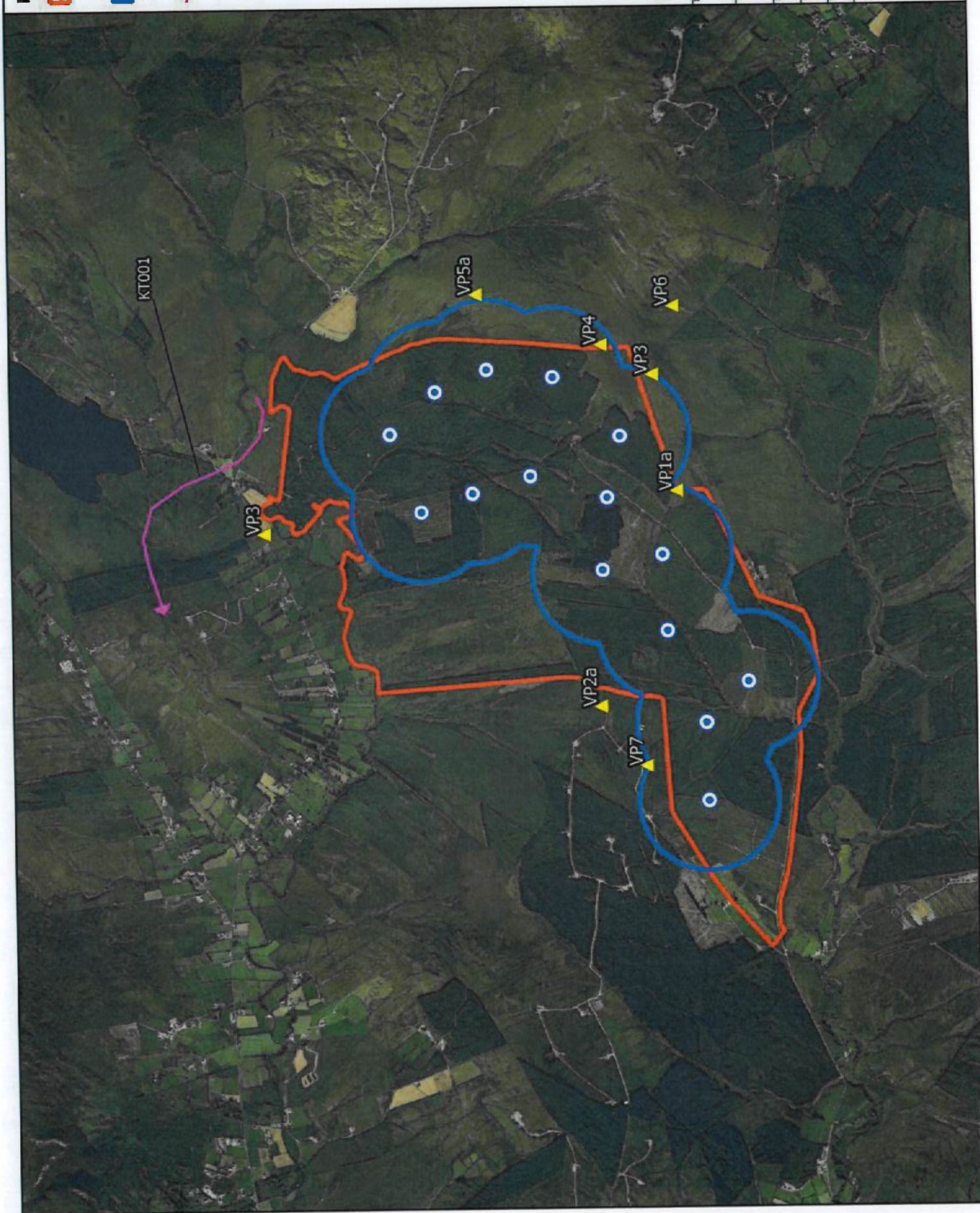
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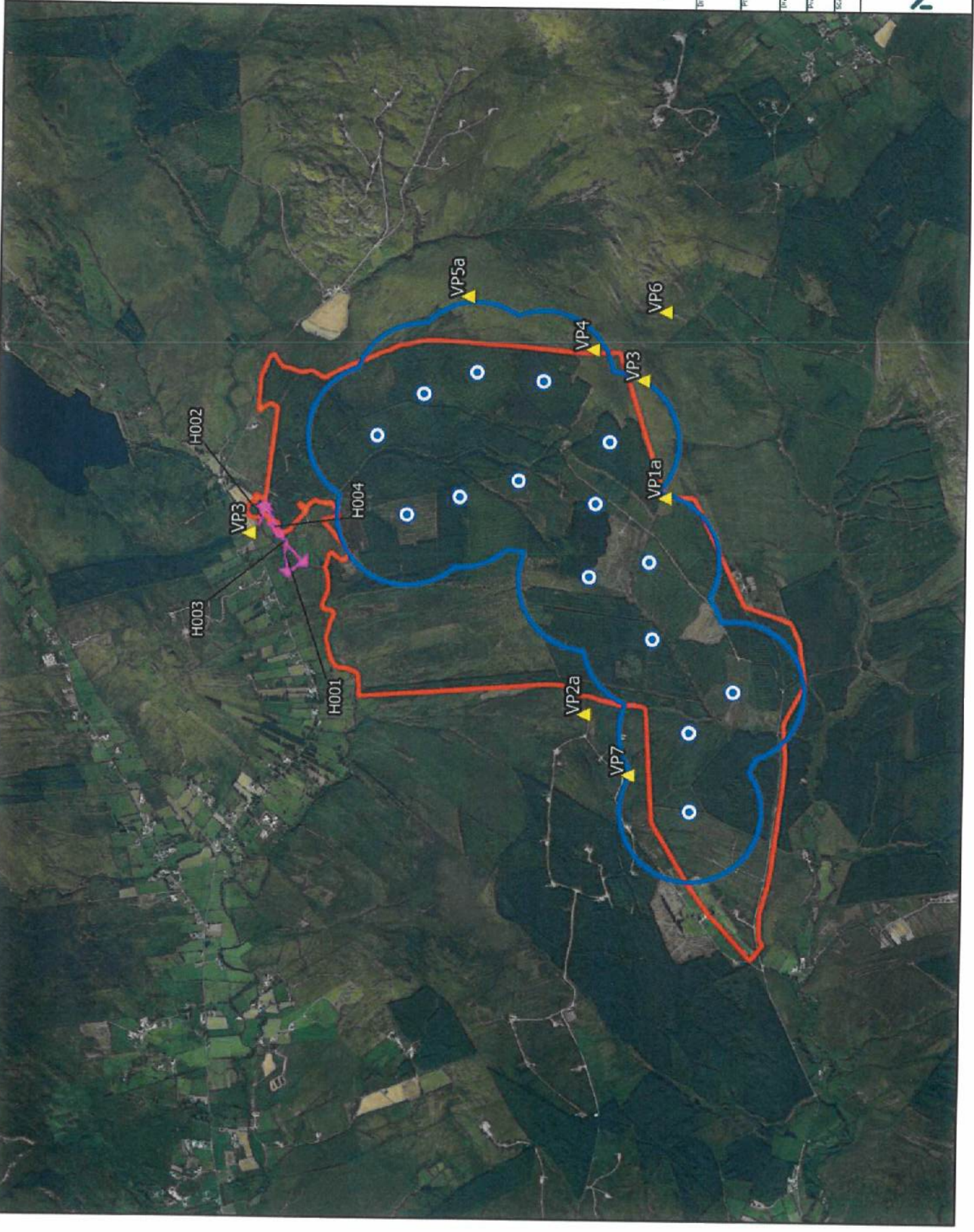


Map Title	Red Kite Observations Vantage Point Surveys		
Project Name	Glenard Wind Farm		
Drawn By	S. Duff	Checked By	P. Manley
Project No.	190114	Drawing No.	1.7
Scale	1:35,000	Date	04/04/2023



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Map Legend

- Wind Farm Site
- Turbine Layout
- 500m Turbine Buffer
- Vantage Point Surveys
- Flightline



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Grey Heron Observations
Vantage Point Surveys

Project Name	Glenard Wind Farm
Client	S. Duff
Consultant	P. Manley
Project No	190114
Scale	1:35,000
Date	04/04/2023

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Map Legend

- Wind Farm Site
- Turbine Layout
- 500m Turbine Buffer
- Vantage Point Surveys
- Flightline

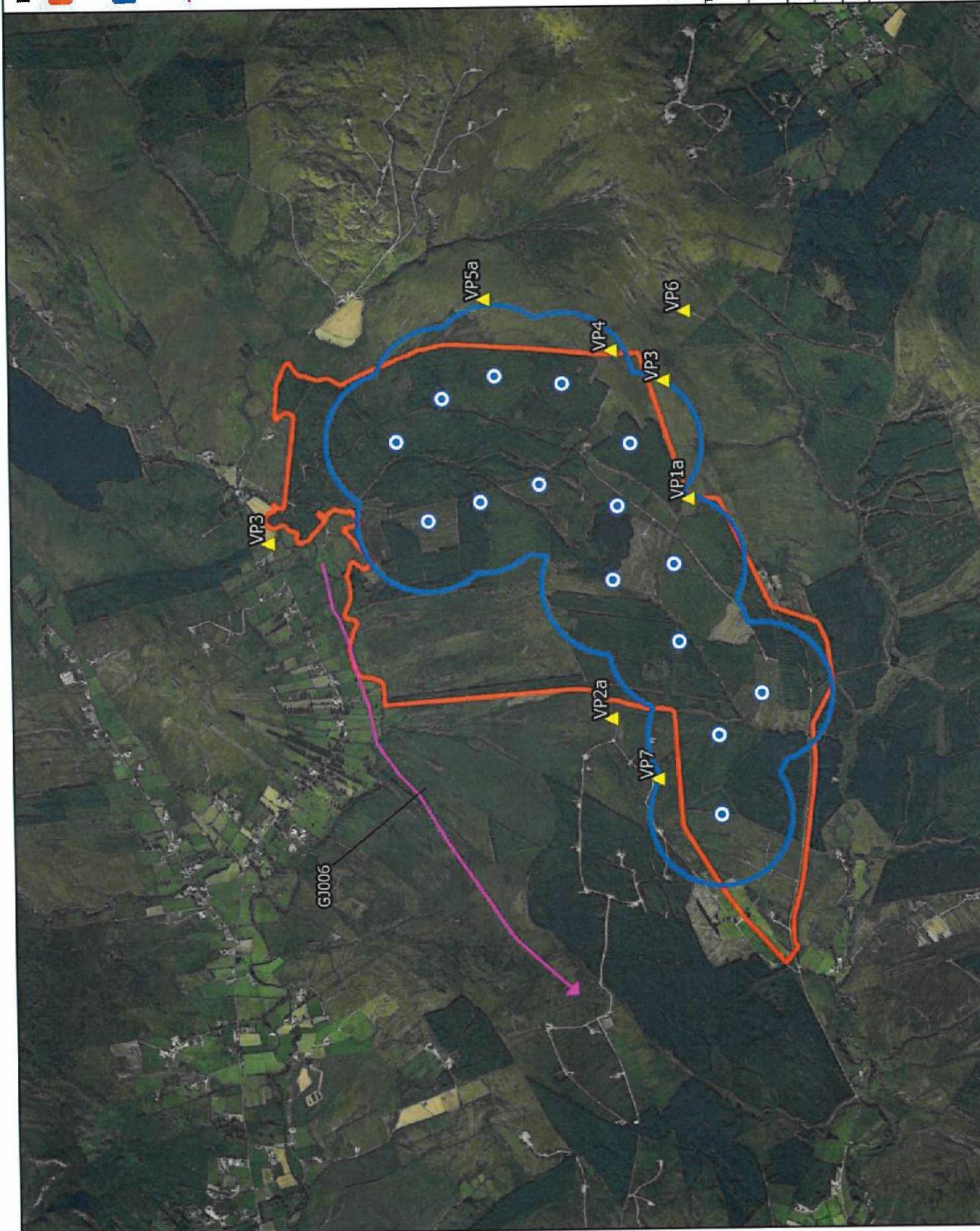


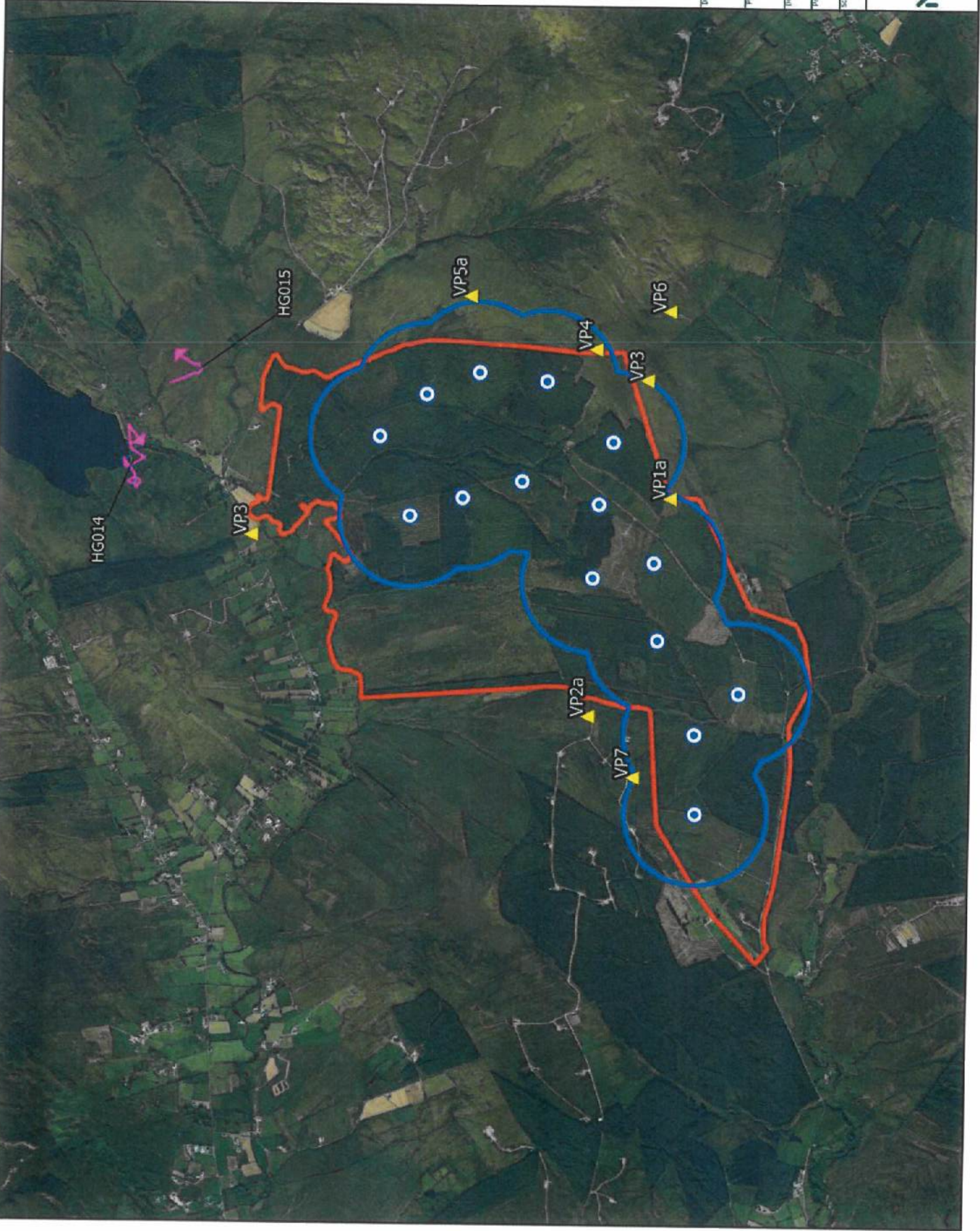
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Draining Lake
 Greylag Goose Observations
 Vantage Point Surveys
 Project 1166

Glenard Wind Farm	
Prepared By	UPROGAB
Author	S. Duff
Project No.	190114
Scale	1:35,000
Date	04/04/2023

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Map Legend

- Wind Farm Site
- Turbine Layout
- 500m Turbine Buffer
- Vantage Point Surveys
- Flightline

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Drawing Title
Herring Gull Observations
Vantage Point Surveys

Project ID#

Glenard Wind Farm	
Drawn By	Checked By
S. Duff	P. Manley
Project No.	Drawing No.
190114	1.10
Scale	Date
1:35,000	04/04/2023

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Map Legend

- Wind Farm Site
- Turbine Layout
- 500m Turbine Buffer
- Vantage Point Surveys
- Flightline

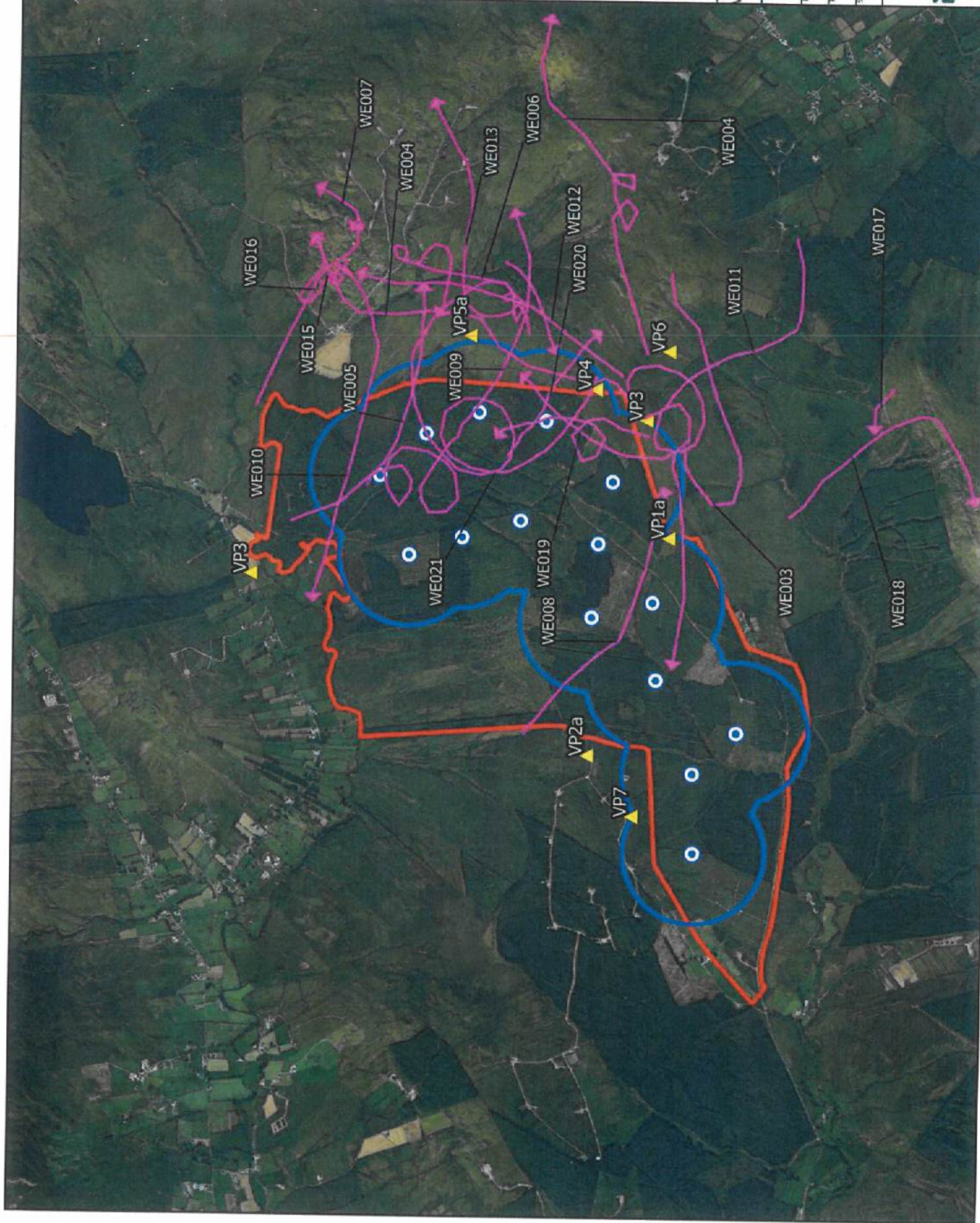


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White-tailed Eagle Observations
Vantage Point Surveys

Glenard Wind Farm	
Drawn By	S. Duff
Checked By	P. Manley
Project No	190114
Scale	1:35,000
Date	04/04/2023

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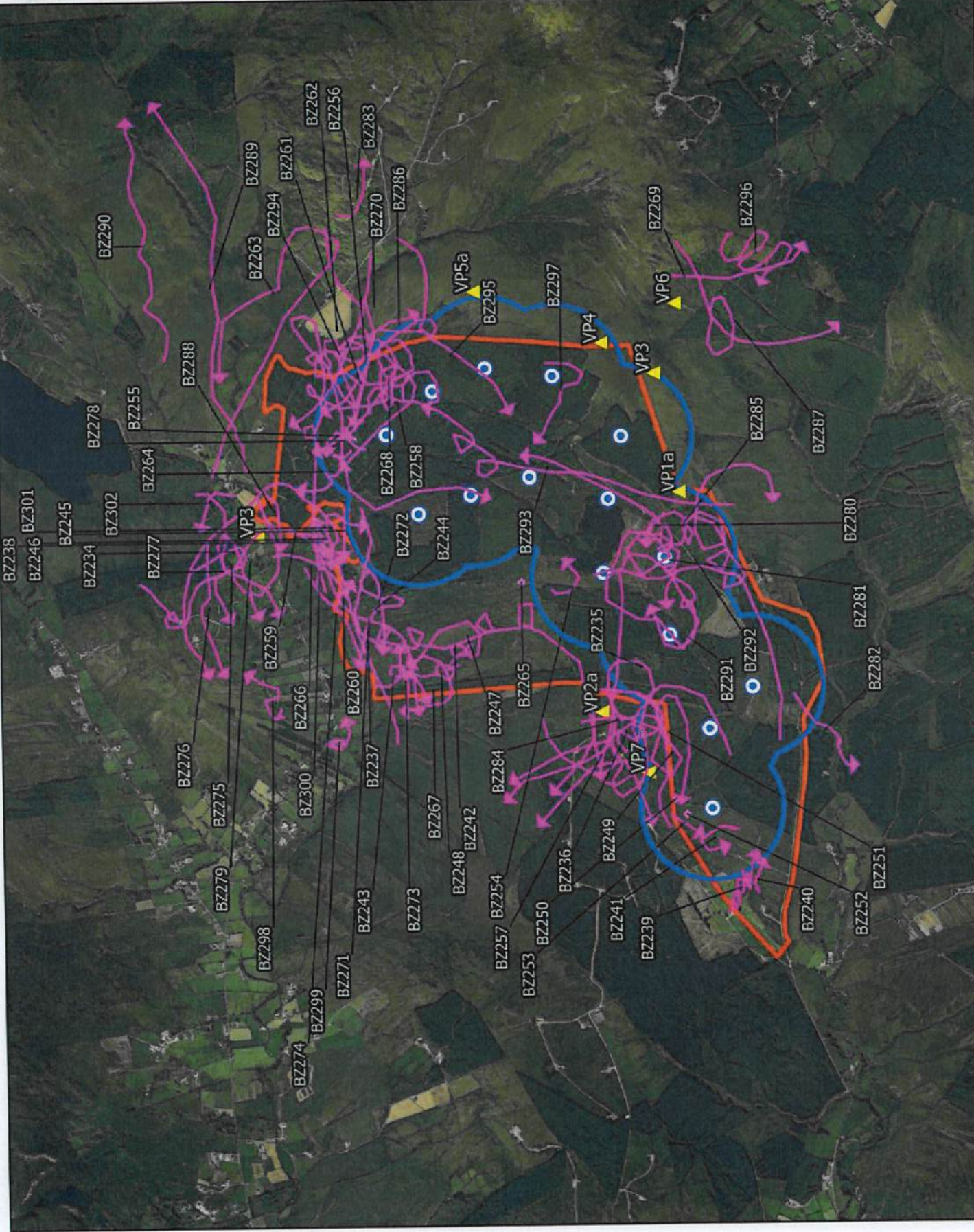
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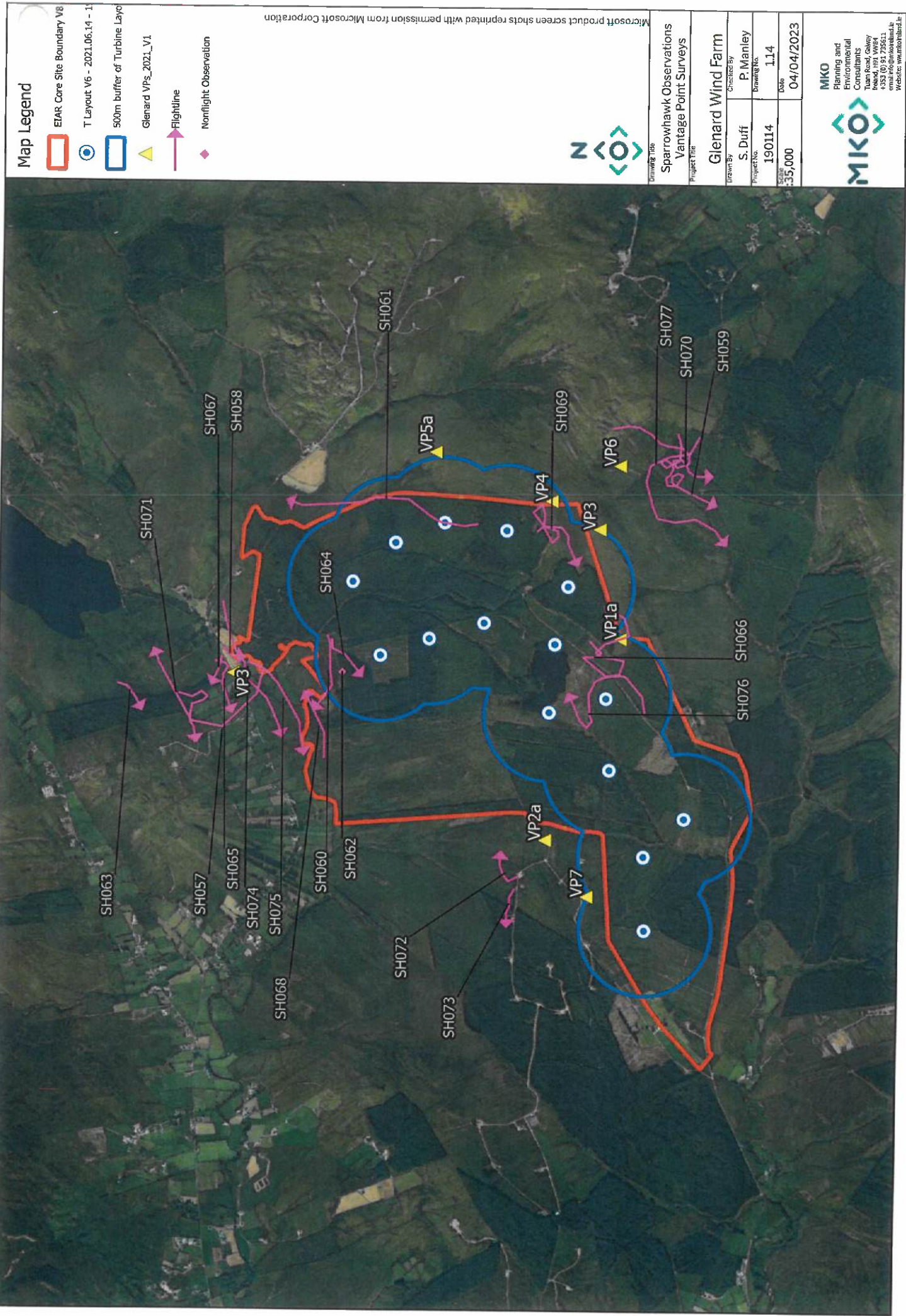
- Wind Farm Site
- Turbine Layout
- 500m Turbine Buffer
- Vantage Point Surveys
- Flightline
- Nonflight Observation



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Buzard Observations Vantage Point Surveys	
Project No.	190114
Scale	1:35,000
Date	04/04/2023
Glenard Wind Farm	
Prepared By	S. Duff
Checked By	P. Manley
Project No.	190114
Scale	1:35,000
Date	04/04/2023
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Appendix 1 Table 3 Breeding Walkover Observations

Ref.	Date	Time	Species	Number	Habitat and activity	Surveyor
GL004	12/04/2022	12:06	Grey Wagtail	1	lakes and ponds; feeding in river (suitable nesting habitat; possible breeder)	DM
SN041	12/04/2022	12:39	Snipe	1	bogs; flushed (suitable nesting habitat; possible breeder)	DM
SN042	12/04/2022	13:15	Snipe	1	bogs; flushed (suitable nesting habitat; possible breeder)	DM
MP003	12/04/2022	13:40	Meadow Pipit	7	bogs; on ground (suitable nesting habitat; possible breeder)	DM
WE001	12/04/2022	14:16	White-tailed Eagle	1	bogs; soaring (flyover; non-breeding)	DM
K.009	12/04/2022	14:49	Kestrel	1	conifer plantation; hunting, adult male (suitable nesting habitat; possible breeder)	MM
SN043	12/04/2022	15:45	Snipe	1	bogs; flushed (suitable nesting habitat; possible breeder)	DM
MP004	12/04/2022	16:04	Meadow Pipit	6	bogs; on ground/ flushed (suitable nesting habitat; possible breeder)	MM
SN044	12/04/2022	17:01	Snipe	1	improved agricultural grassland; flushed (suitable nesting habitat; possible breeder)	DM
MP005	13/04/2022	13:29	Meadow Pipit	8	bogs; on ground/ flushed (suitable nesting habitat; possible breeder)	DM
SN045	13/04/2022	14:11	Snipe	1	bogs; flushed (suitable nesting habitat; possible breeder)	DM
SN046	13/04/2022	14:51	Snipe	1	bogs; flushed (suitable nesting habitat; possible breeder)	DM
K.010	13/04/2022	15:24	Kestrel	1	bogs; hunting, male, several unsuccessful hunting attempts (suitable nesting habitat; possible breeder)	DM
BZ050	13/04/2022	16:01	Buzzard	1	bogs and conifer plantation; circling, male, circling over Some. (suitable nesting habitat; possible breeder)	DM
SN047	13/04/2022	17:49	Snipe	1	bogs; flushed (suitable nesting habitat; possible breeder)	DM
GL005	17/05/2022	08:59	Grey Wagtail	1	lakes and ponds; in river (suitable nesting habitat; possible breeder)	DM
SN048	17/05/2022	09:32	Snipe	1	bogs; flushed (suitable nesting habitat; possible breeder)	DM
SH021	17/05/2022	10:11	Sparrowhawk	1	conifer plantation; travelling, female (suitable nesting habitat; possible breeder)	DM
MP006	17/05/2022	10:44	Meadow Pipit	1	bogs; on ground/ flying (suitable nesting habitat; possible breeder)	DM
SN049	17/05/2022	11:01	Snipe	1	bogs; flushed (suitable nesting habitat; possible breeder)	DM
BZ051	17/05/2022	11:58	Buzzard	1	conifer plantation; circling, male (suitable nesting habitat; possible breeder)	DM
BZ052	17/05/2022	12:39	Buzzard	1	bogs; flying, male (suitable nesting habitat; possible breeder)	DM
SN050	17/05/2022	14:01	Snipe	1	bogs; flushed (suitable nesting habitat; possible breeder)	DM
SH022	17/05/2022	14:43	Sparrowhawk	1	conifer plantation; circling, female (suitable nesting habitat; possible breeder)	DM
MP007	18/05/2022	11:05	Meadow Pipit	6	bogs; on ground/ flying (suitable nesting habitat; possible breeder)	DM

Ref.	Date	Time	Species	Number	Habitat and activity	Surveyor
SN051	18/05/2022	11:46	Snipe	1	bogs; flushed (suitable nesting habitat; possible breeder)	DM
SN052	18/05/2022	12:51	Snipe	1	bogs; flushed (suitable nesting habitat; possible breeder)	DM
MP008	18/05/2022	13:21	Meadow Pipit	6	bogs; on ground/ flying (suitable nesting habitat; possible breeder)	DM
BZ053	18/05/2022	14:01	Buzzard	1	bogs; circling (suitable nesting habitat; possible breeder)	DM
MP009	18/05/2022	14:51	Meadow Pipit	8	bogs; on ground/ flying (suitable nesting habitat; possible breeder)	DM
SN053	18/05/2022	15:36	Snipe	1	bogs; circling (suitable nesting habitat; possible breeder)	DM
BZ054	10/06/2022	09:59	Buzzard	1	conifer plantation; circling, male (suitable nesting habitat; possible breeder)	MM
BZ055	10/06/2022	11:49	Buzzard	1	bogs; circling, female (suitable nesting habitat; possible breeder)	MM
K.011	10/06/2022	14:11	Kestrel	1	conifer plantation; perched, adult male (suitable nesting habitat; possible breeder)	MM
GL006	16/06/2022	09:10	Grey Wagtail	1	lakes and ponds; in river (suitable nesting habitat; possible breeder)	DM
MP010	16/06/2022	10:14	Meadow Pipit	5	bogs; on ground (fledged young; confirmed breeding)	DM
BZ056	16/06/2022	10:17	Buzzard	1	bogs; hunting, male (suitable nesting habitat; possible breeder)	DM
MP011	16/06/2022	11:42	Meadow Pipit	6	bogs; on ground (fledged young; confirmed breeding)	DM
BZ057	16/06/2022	13:36	Buzzard	1	conifer plantation; circling, male (suitable nesting habitat; possible breeder)	DM
SN054	16/06/2022	14:49	Snipe	1	improved agricultural grassland; flushed (suitable nesting habitat; possible breeder)	DM
MA002	16/06/2022	15:11	Mallard	2	lakes and ponds; in river (fledged young; confirmed breeding)	DM
MP012	17/06/2022	08:36	Meadow Pipit	7	bogs; on ground (fledged young; confirmed breeding)	DM
SH023	17/06/2022	09:22	Sparrowhawk	1	bogs; flying (suitable nesting habitat; possible breeder)	DM
K.012	17/06/2022	10:34	Kestrel	1	bogs; hunting (suitable nesting habitat; possible breeder)	DM
MP013	17/06/2022	11:21	Meadow Pipit	5	bogs; on ground (fledged young; confirmed breeding)	DM
SN055	17/06/2022	11:39	Snipe	1	bogs; flushed (suitable nesting habitat; possible breeder)	DM
BZ058	17/06/2022	12:06	Buzzard	1	bogs; circling, female (suitable nesting habitat; possible breeder)	DM
BZ059	17/06/2022	12:28	Buzzard	1	bogs; hunting (suitable nesting habitat; possible breeder)	DM
SN056	17/06/2022	13:31	Snipe	1	bogs; flushed (suitable nesting habitat; possible breeder)	DM
MP014	21/07/2022	08:36	Meadow Pipit	5	bogs; on ground (suitable nesting habitat; possible breeder)	DM
BZ060	21/07/2022	09:04	Buzzard	1	conifer plantation; perched (suitable nesting habitat; possible breeder)	DM
ML001	21/07/2022	09:32	Merlin	3	conifer plantation; flying/perched (fledged young; confirmed breeding)	DM

Ref.	Date	Time	Species	Number	Habitat and activity	Surveyor
SN057	21/07/2022	09:39	Snipe	1	bogs; flushed (suitable nesting habitat; possible breeder)	DM
WE002	21/07/2022	09:47	White-tailed Eagle	1	bogs; soaring, juvenile (wintering)	DM
K.013	21/07/2022	10:11	Kestrel	1	bogs; hunting (suitable nesting habitat; possible breeder)	DM
SN058	21/07/2022	10:49	Snipe	1	bogs; flushed (suitable nesting habitat; possible breeder)	DM
BZ061	21/07/2022	11:19	Buzzard	1	bogs; circling (suitable nesting habitat; possible breeder)	DM
SN059	21/07/2022	12:31	Snipe	1	improved agricultural grassland; flushed (suitable nesting habitat; possible breeder)	DM
BZ062	22/07/2022	10:52	Buzzard	1	bogs; circling, female (suitable nesting habitat; possible breeder)	DM
PE002	22/07/2022	11:29	Peregrine Falcon	1	bogs; travelling, tiercel (suitable nesting habitat; possible breeder)	DM
K.014	22/07/2022	11:42	Kestrel	1	bogs; hunting, female (suitable nesting habitat; possible breeder)	DM
SN060	22/07/2022	12:39	Snipe	1	bogs; flushed (suitable nesting habitat; possible breeder)	DM
BZ063	22/07/2022	13:26	Buzzard	1	bogs; travelling, male (suitable nesting habitat; possible breeder)	DM
MP015	22/07/2022	14:11	Meadow Pipit	5	bogs; on ground (fledged young; confirmed breeding)	DM
SN061	22/07/2022	14:52	Snipe	1	bogs; flushed (suitable nesting habitat; possible breeder)	DM
SH024	22/07/2022	15:17	Sparrowhawk	1	bogs; flying, adult female (suitable nesting habitat; possible breeder)	DM
SH025	23/07/2022	08:42	Sparrowhawk	1	conifer plantation; hunting, adult female (suitable nesting habitat; possible breeder)	DM
BZ064	23/07/2022	09:11	Buzzard	1	conifer plantation; circling, juvenile (suitable nesting habitat; possible breeder)	DM
WE003	23/07/2022	10:21	White-tailed Eagle	1	conifer plantation; travelling, juvenile female/ wing tagged (wintering)	DM
BZ065	23/07/2022	11:37	Buzzard	1	bogs; circling, male (suitable nesting habitat; possible breeder)	DM
MA003	23/07/2022	13:09	Mallard	2	bogs; flying/perched, pair (pair; probable breeding)	DM

Map Legend

- Wind Farm Site
- Turbine Layout
- 500m Turbine Buffer
- Flightline

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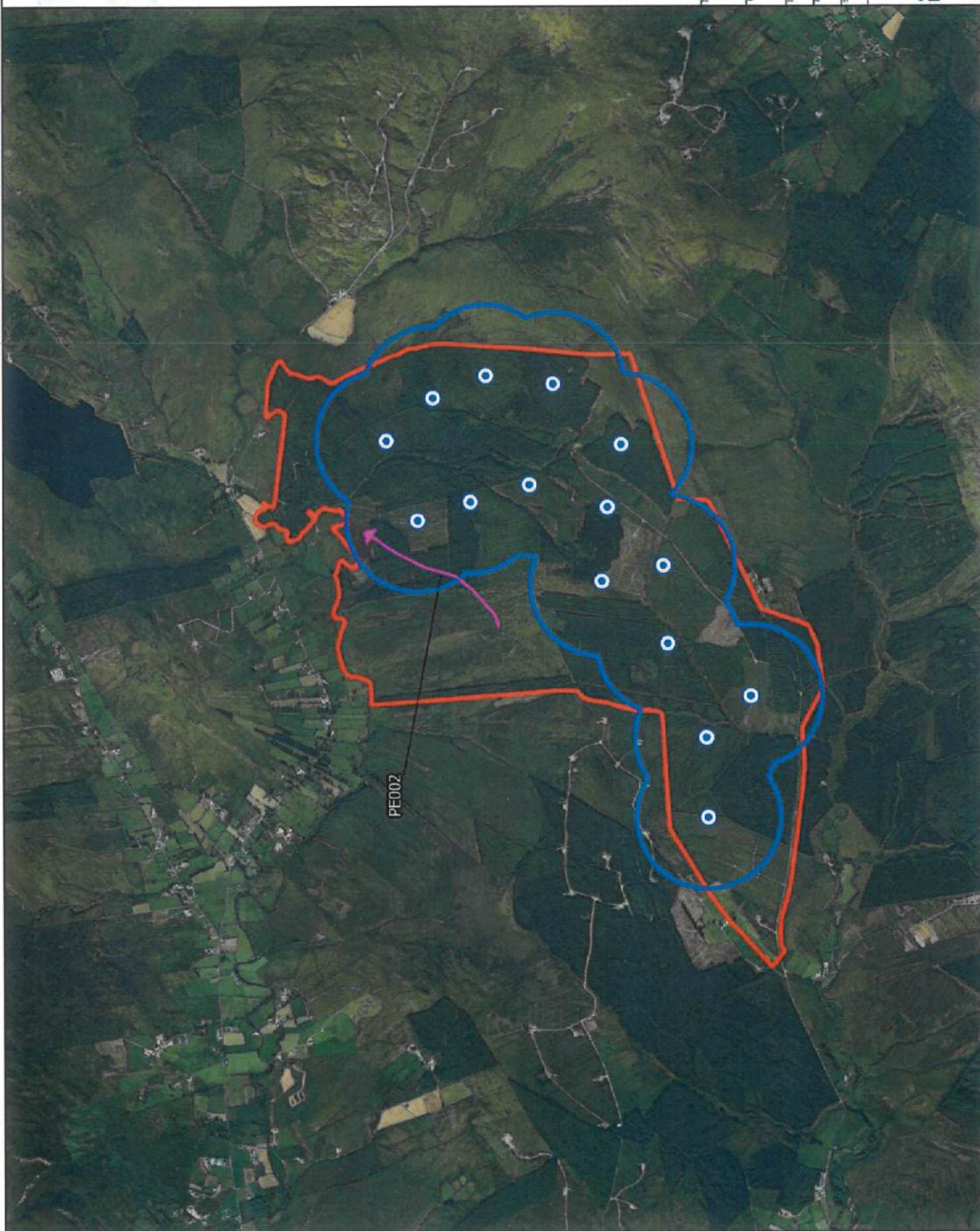


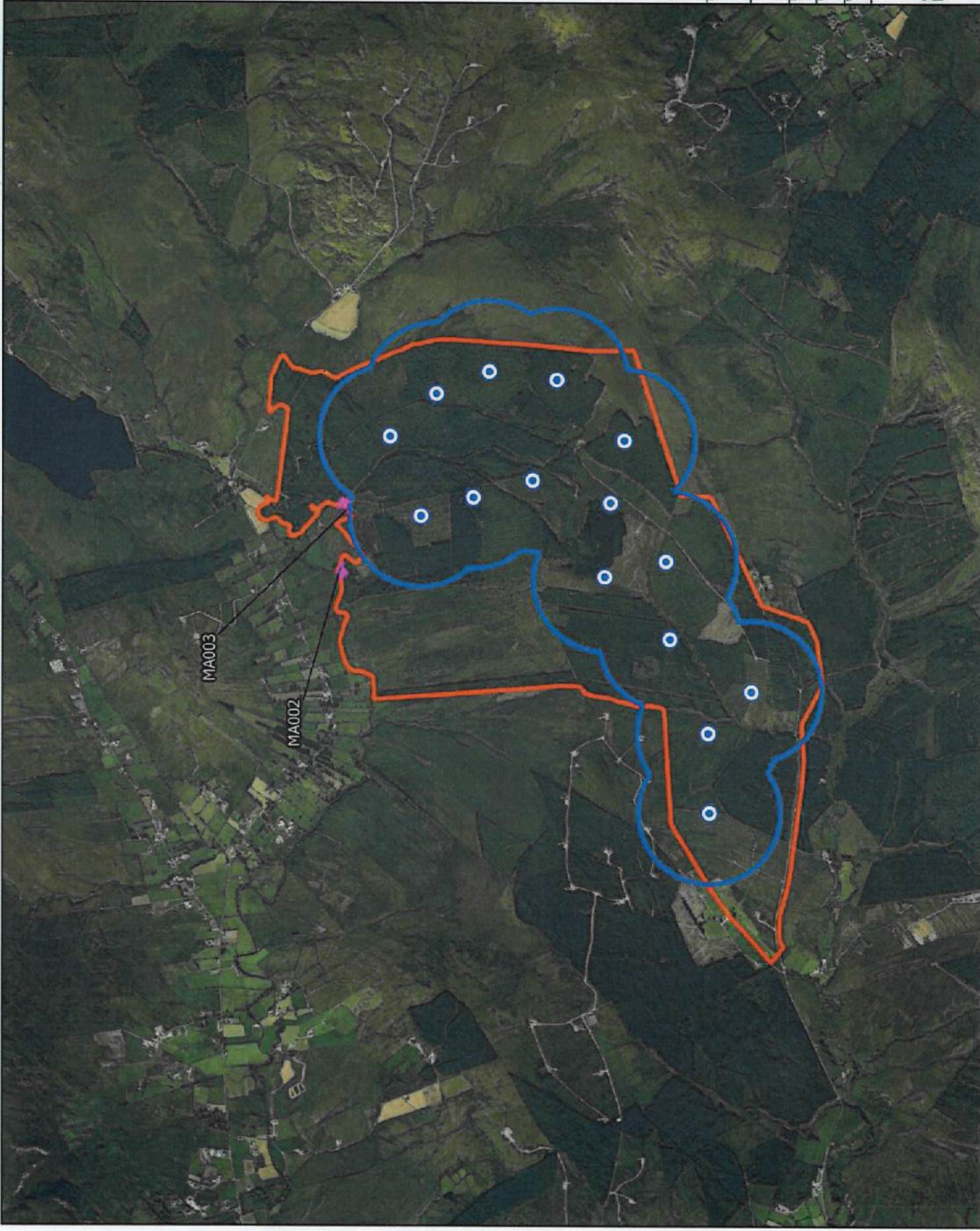
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Project No	Glenard Wind Farm
Drawn By	S. Duff
Checked By	P. Manley
Project No	190114
Drawing No.	2.2
Date	05/04/2023
Scale	1:35,000

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Map Legend

- Wind Farm Site
- Turbine Layout
- 500m Turbine Buffer
- Flightline



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Drawing Title		Mallard Observations Breeding Walkover Surveys	
Project Title		Glenard Wind Farm	
Drawn By	Checked By	P. Manley	
S. Duff	P. Manley	Date: 05/04/2023	
190114	2.3	Scale	
1:35,000	05/04/2023	 MKO Planning and Environmental Consultants Team Lead: GWR Inland: 861 7555, 861 7556, 861 7557 Cell: 403 222 1111 Website: www.mkocanada.ca	

Map Legend

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- 500m Turbine Buffer
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Drawing Title
Kestrel Observations
Breeding Walkover Surveys

Project Name
Glenard Wind Farm

Drawn By
S. Duff

Project No.
190114

Scale
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Date
05/04/2023

Checked By
P. Manley

Drawing No.
24

Project Name
Glenard Wind Farm

Project No.
190114

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1:35,000

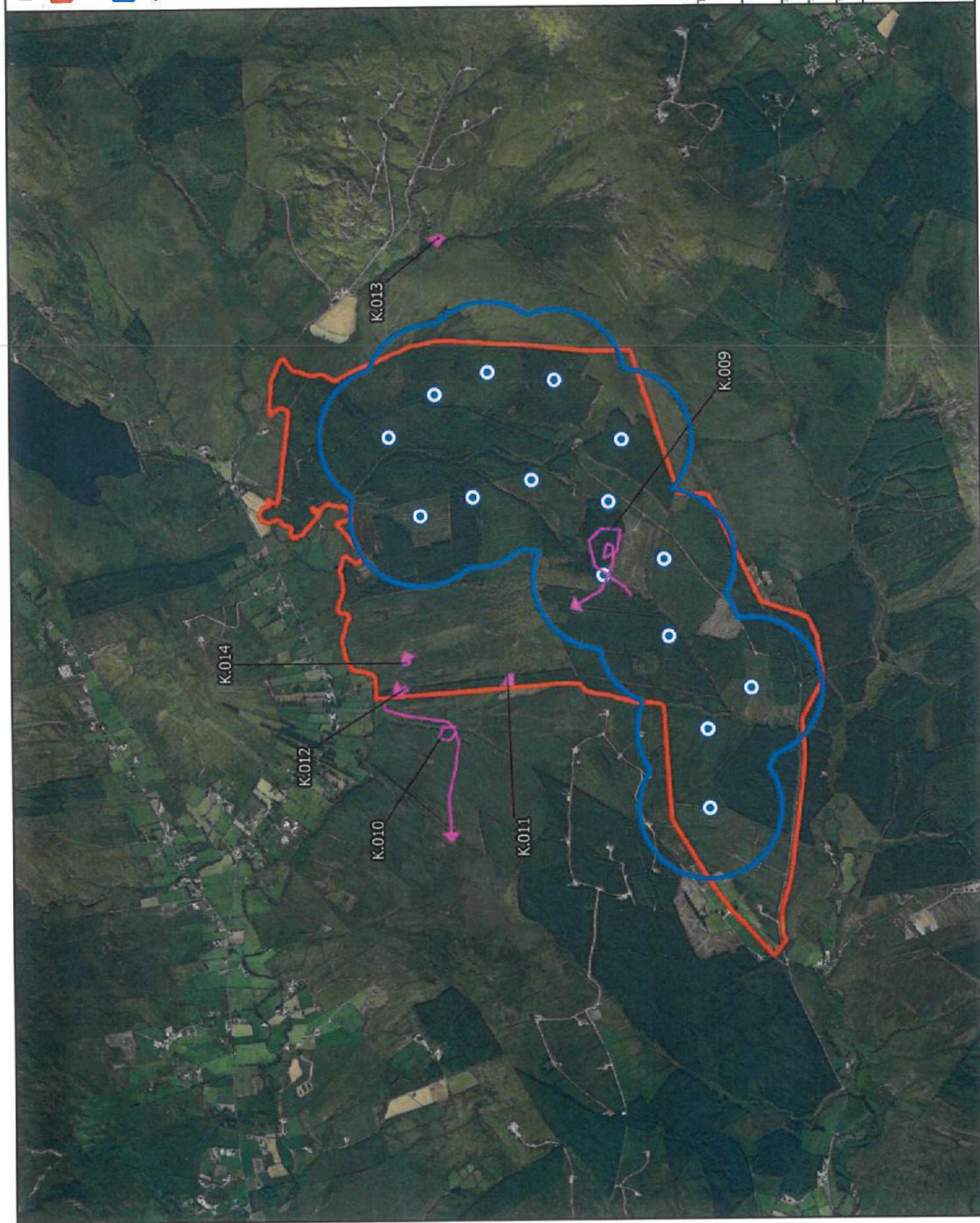
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05/04/2023

Project Name
Glenard Wind Farm

Project No.
190114

Scale
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Date
05/04/2023



Map Legend

- Wind Farm Site
- Turbine Layout
- 500m Turbine Buffer
- Flightline

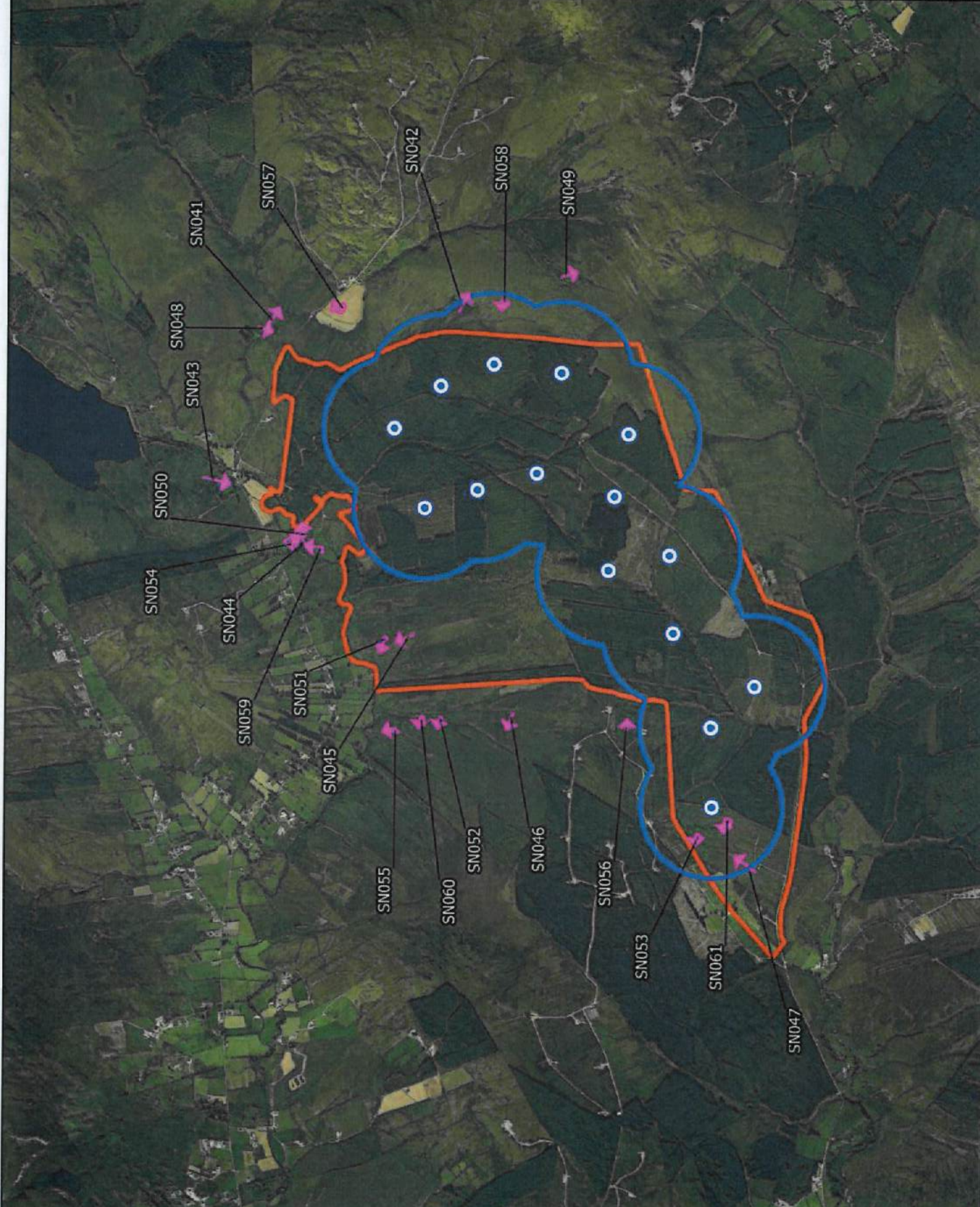


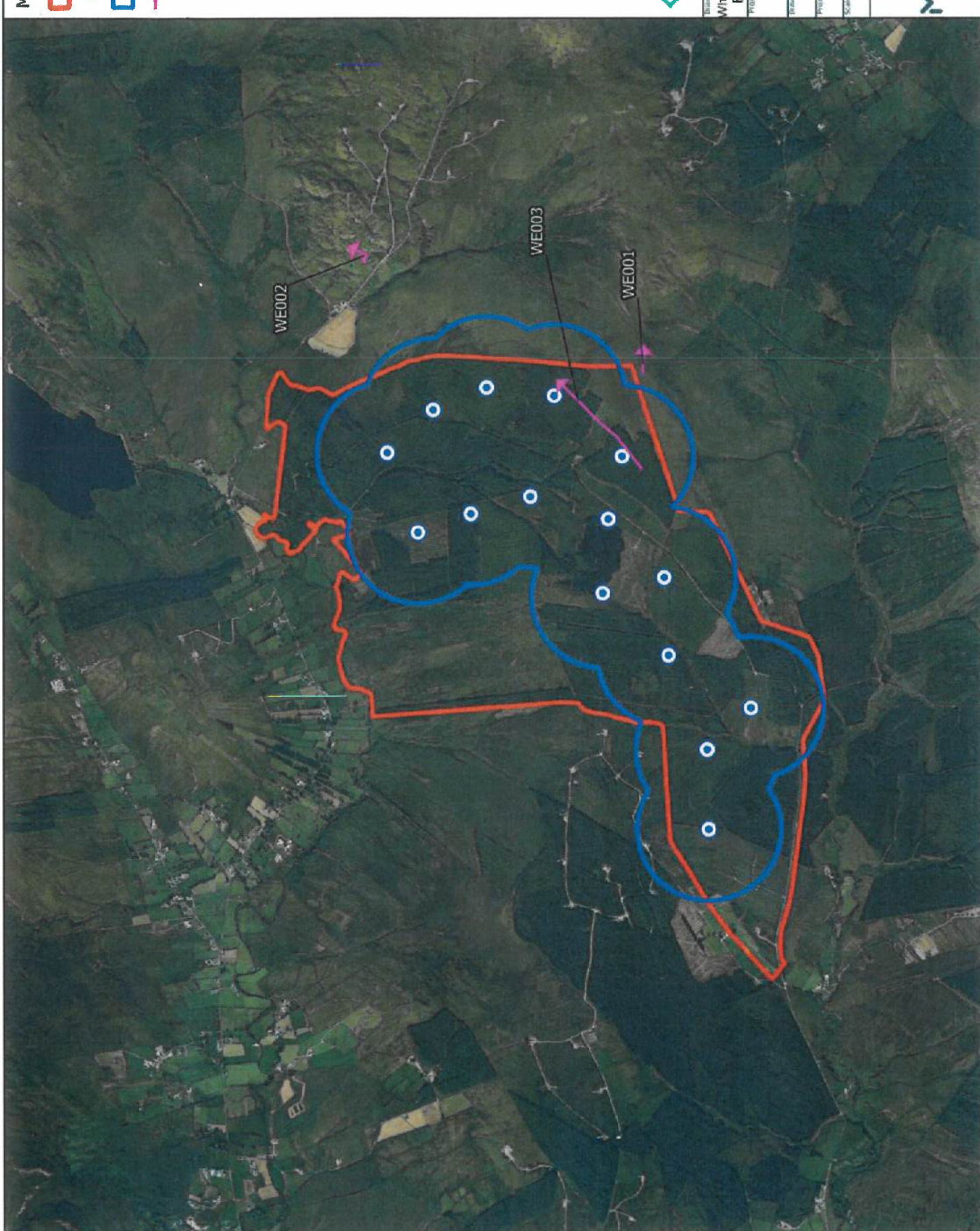
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Shipe Observations
Breeding Walkover Surveys

Glenard Wind Farm	
Drawn By	S. Duff
Checked By	P. Manley
Project No.	190114
Drawing No.	25
Date	05/04/2023
Scale	1:35,000

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Map Legend

- Wind Farm Site
- Turbine Layout
- 500m Turbine Buffer
- Flightline

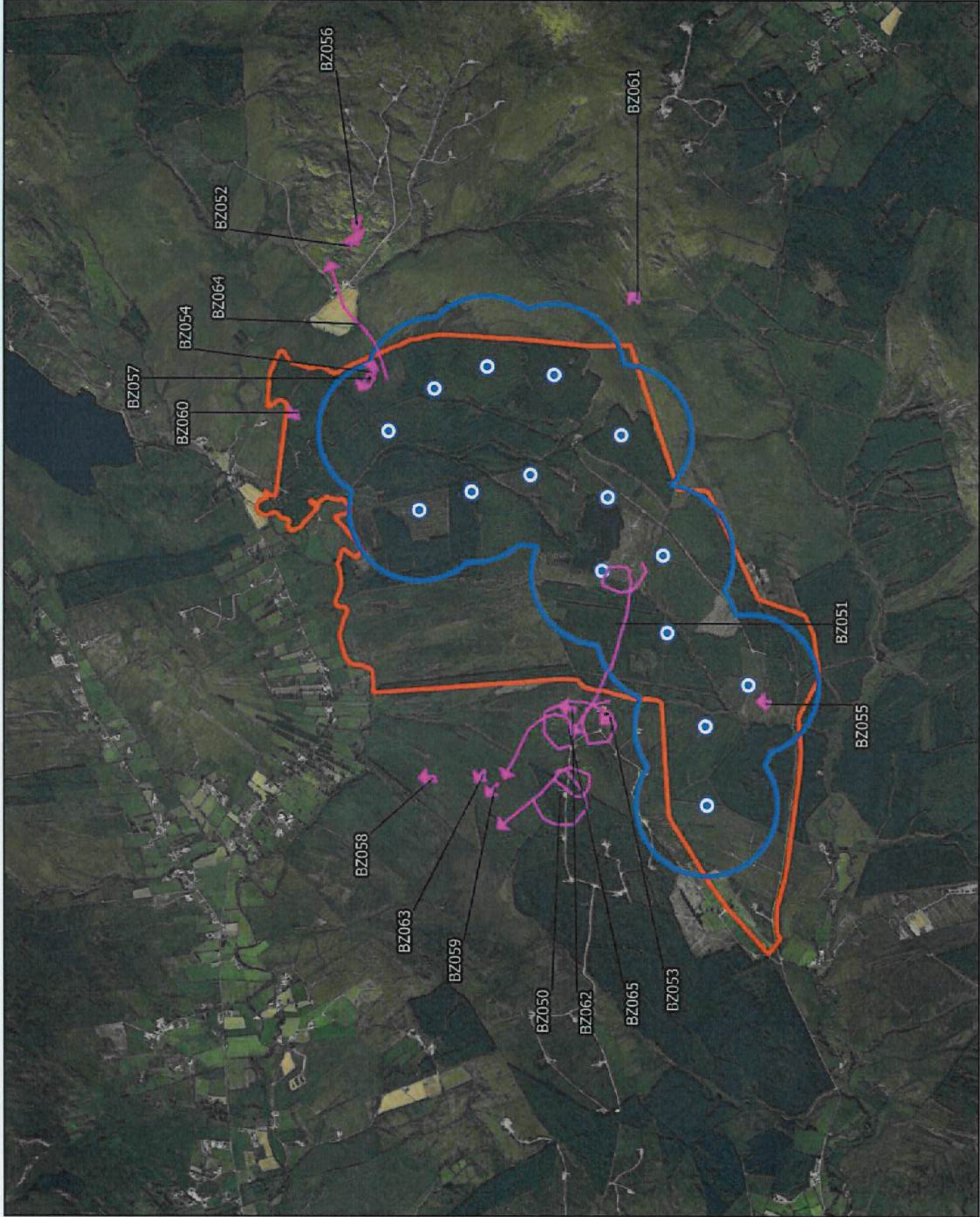
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**White-tailed Eagle Observations
Breeding Walkover Surveys**

Glenard Wind Farm

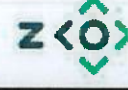
Project No.	190114
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Date	05/04/2023

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Map Legend

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- Turbine Layout
- 500m Turbine Buffer
- Flightline



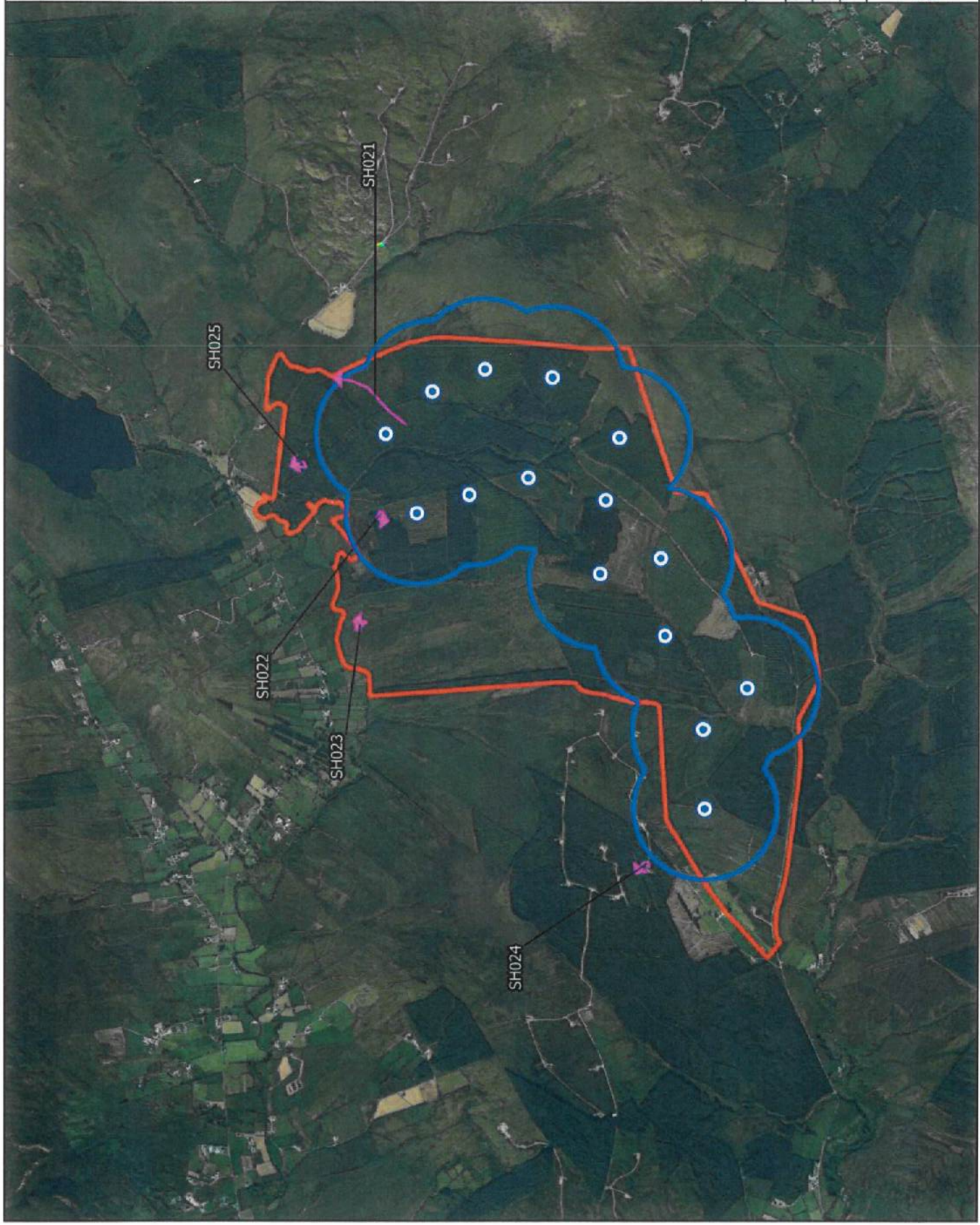
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Buzzard Observations
Breeding Walkover Surveys
Project 118

Glenard Wind Farm	
Prepared by	S. Duff
Checked by	P. Manley
Project No.	190114
Drawing No.	2.7
Scale	1:35,000
Date	05/04/2023

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Drawing Title
Sparrowhawk Observations
Breeding Walkover Surveys
Project Name

Drawn by	Checked by
S. Duff	P. Manley
Project No.	Drawing No.
190114	28
Scale	Date
1:35,000	05/04/2023

Glenard Wind Farm

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Appendix 1 Table 4 Breeding Raptor Observations

Ref.	BR	Date	Time	Species	Number	Habitat and activity	Breeding status	Surveyor
ML011	BR4	07/04/2022	12:32	Merlin	1	bogs, travelling, bird flew low and fast over road and bog.	suitable nesting habitat; possible breeder	MM
BZ119	BR4	07/04/2022	13:06	Buzzard	1	bogs, travelling, flew over bog towards river.	suitable nesting habitat; possible breeder	MM
BZ120	BR4	07/04/2022	13:34	Buzzard	1	conifer plantation, hunting, hunting over restock forestry, hovering at intervals.	probable nest site; probable breeding	MM
BZ121	BR4	07/04/2022	13:50	Buzzard	1	bogs and conifer plantation, travelling, moving high over bog and forest.	suitable nesting habitat; possible breeder	MM
BZ122	BR4	07/04/2022	14:08	Buzzard	1	conifer plantation, travelling, flew over forest.	suitable nesting habitat; possible breeder	MM
BZ123	BR4	07/04/2022	14:15	Buzzard	2	conifer plantation, soaring, soaring over hill	pair; probable breeding	MM
ML012	BR4	07/04/2022	15:21	Merlin	1	bogs, travelling, flew fast and low, gave small scream.	suitable nesting habitat; possible breeder	MM
SH030	BR4	07/04/2022	15:33	Sparrowhawk	1	conifer plantation, travelling, soaring over forest then went down steeply into forest	probable nest site; probable breeding	MM
BZ124	BR4	07/04/2022	15:56	Buzzard	1	bogs, travelling, flew close to forest edge	suitable nesting habitat; possible breeder	MM
K.029	BR4	07/04/2022	17:28	Kestrel	1	bogs, hunting, hovering at times then dived to ground. rose up and flew along river	suitable nesting habitat; possible breeder	MM
K.030	BR2	08/04/2022	13:36	Kestrel	1	bogs and conifer plantation, hunting, hovering over bog.	suitable nesting habitat; possible breeder	MM
ML013	BR2	08/04/2022	13:38	Merlin	1	conifer plantation and bogs, travelling, she mobbed the kestrel. breed successfully in this location in 2021.	probable nest site; probable breeding	MM
ML014	BR2	08/04/2022	14:04	Merlin	1	bogs and conifer plantation, travelling, flew low and fast and west into forest. woodpigeon flew out startled.	suitable nesting habitat; possible breeder	MM
ML015	BR2	08/04/2022	14:25	Merlin	1	bogs and conifer plantation, travelling, flew over bog to forest	suitable nesting habitat; possible breeder	MM
K.031	BR2	08/04/2022	14:41	Kestrel	1	bogs, hunting, went to ground 3-4 times. caught prey, landed on hummock and ate prey.	suitable nesting habitat; possible breeder	MM
K.032	BR2	08/04/2022	14:54	Kestrel	1	bogs, travelling, flew low and fast over bog. went to ground and appeared to catch prey. flew off fast.	suitable nesting habitat; possible breeder	MM
ML016	BR2	08/04/2022	15:03	Merlin	1	conifer plantation and bogs, travelling, attacked hooded crows repeatedly diving at them, probably intending to nest in forest.	probable nest site; probable breeding	MM
K.033	BR2	08/04/2022	15:43	Kestrel	1	bogs, travelling, flew quickly over bog.	suitable nesting habitat; possible breeder	MM
K.034	BR2	08/04/2022	16:12	Kestrel	1	bogs, travelling, flew low and fast over bog.	suitable nesting habitat; possible breeder	MM
ML017	BR3	09/04/2022	12:14	Merlin	1	bogs, travelling, adult male travelling low. lost from view in NE direction.	suitable nesting habitat; possible breeder	DM

Ref.	BR	Date	Time	Species	Number	Habitat and activity	Breeding status	Surveyor
SH031	BR3	09/04/2022	15:31	Sparrowhawk	1	conifer plantation, circling, female circling over forestry, mobbed by mt.	probable nest site; probable breeding	DM
WE001	BR5	11/04/2022	12:29	White-tailed Eagle	1	bogs, soaring, soaring over Glackmore Hill, immature male. satellite and wing tagged (unidentifiable) drifted off in NE direction.	flyover; non-breeding	DM
BZ125	BR5	11/04/2022	15:19	Buzzard	1	conifer plantation, circling, male circling over Crockaheeny forestry.	probable nest site; probable breeding	DM
K.035	BR1	11/05/2022	10:05	Kestrel	1	bogs, hunting, bird hunting, hovering at intervals.	suitable nesting habitat; possible breeder	MM
WE002	BR1	11/05/2022	10:35	White-tailed Eagle	1	bogs, perched, sitting on fence post. mobbed by buzzard	suitable nesting habitat; possible breeder	MM
BZ126	BR1	11/05/2022	10:35	Buzzard	1	bogs, territorial, mobbed we on fence.	probable nest site; probable breeding	MM
WE003	BR1	11/05/2022	10:40	White-tailed Eagle	1	bogs and conifer plantation, travelling, flew to forest	summering; non-breeding	MM
WE004	BR1	11/05/2022	10:50	White-tailed Eagle	1	bogs and conifer plantation, travelling, flew to forest and perched briefly	summering; non-breeding	MM
WE005	BR1	11/05/2022	12:10	White-tailed Eagle	1	bogs and conifer plantation, travelling, flew to forest and perched briefly	summering; non-breeding	MM
BZ127	BR1	11/05/2022	12:50	Buzzard	1	bogs and conifer plantation, travelling, flew over bog and forest	probable nest site; probable breeding	MM
BZ128	BR1	11/05/2022	13:20	Buzzard	1	bogs and conifer plantation, travelling, flew over bog and forest	probable nest site; probable breeding	MM
BZ129	BR4	12/05/2022	11:15	Buzzard	1	bogs, hunting, bird was hunting and hovering at times. went lower and dived at prey.	suitable nesting habitat; possible breeder	MM
SH032	BR4	12/05/2022	11:33	Sparrowhawk	1	highly modified/non-native woodland and bogs, travelling, flying high circling at times scanning the ground for prey.	suitable nesting habitat; possible breeder	MM
K.036	BR4	12/05/2022	14:20	Kestrel	1	bogs, hunting, bird flew over bog and hovered before diving to ground.	suitable nesting habitat; possible breeder	MM
BZ130	BR4	12/05/2022	15:35	Buzzard	1	conifer plantation and bogs, travelling, bird flew over forest	suitable nesting habitat; possible breeder	MM
BZ131	BR4	12/05/2022	15:40	Buzzard	1	bogs, travelling, flew along forest edge	suitable nesting habitat; possible breeder	MM
WE006	BR2	15/05/2022	08:40	White-tailed Eagle	3	conifer plantation, perched, 2x juveniles- 1 male (wing tagged green/purple'z'). 1 female (wing tagged green/purple 'a') 1 sub adult male- not tagged.	summering; non-breeding	DM
ML018	BR2	15/05/2022	09:41	Merlin	1	conifer plantation, mobbing we, mobbed we before flying towards 2021 nest site.	probable nest site; probable breeding	DM

Ref.	BR	Date	Time	Species	Number	Habitat and activity	Breeding status	Surveyor
HF010	BR2	15/05/2022	12:55	Hen Harrier	1	bogs, travelling, ringtail	suitable nesting habitat; possible breeder	DM
BZ132	BR3	16/05/2022	10:29	Buzzard	1	conifer plantation, circling, male circling over wd4	suitable nesting habitat; possible breeder	DM
PE007	BR3	16/05/2022	11:19	Peregrine Falcon	1	bogs, travelling, fierce with prey travelling in northerly direction.	probable nest site; probable breeding	DM
WE007	BR5	25/05/2022	14:00	White-tailed Eagle	1	bogs and conifer plantation, travelling, flew over hill and landed in forest	flyover; non-breeding	MM
WE008	BR5	25/05/2022	14:06	White-tailed Eagle	1	bogs, travelling, flew over hill	flyover; non-breeding	MM
WE009	BR5	25/05/2022	14:10	White-tailed Eagle	2	bogs, travelling, both birds circled over hill	flyover; non-breeding	MM
K.037	BR5	25/05/2022	14:30	Kestrel	1	bogs, travelling, flew towards forest	flyover; non-breeding	MM
OP001	BR2	13/06/2022	07:46	Osprey	1	conifer plantation, perched, adult - colour ringed, perched on conifer next to reservoir	migrating; non-breeding	DM
WE010	BR2	13/06/2022	10:14	White-tailed Eagle	1	bogs and conifer plantation, flying/perched, non-breeding juvenile flew over reservoir before landing in conifers close to op	summering; non-breeding	DM
SH033	BR3	14/06/2022	10:54	Sparrowhawk	1	conifer plantation, circling, adult female circling for 296 seconds before descending into canopy	probable nest site; probable breeding	DM
BZ133	BR3	14/06/2022	13:15	Buzzard	1	bogs, travelling, male.	suitable nesting habitat; possible breeder	DM
BZ134	BR5	15/06/2022	09:54	Buzzard	1	bogs and conifer plantation, travelling with prey, male travelling with prey to probable nest site in conifer plantation	probable nest site; probable breeding	DM
WE011	BR5	15/06/2022	13:14	White-tailed Eagle	1	bogs and conifer plantation, wing tagged juvenile female circling, juvenile female circling over Crookmore before moving off in NW direction towards Glenard	summering; non-breeding	DM
BZ135	BR4	20/06/2022	10:35	Buzzard	1	bogs and conifer plantation, travelling, flew in a direct line towards forest	suitable nesting habitat; possible breeder	MM
BZ136	BR4	20/06/2022	11:05	Buzzard	1	bogs, travelling, circling over hill	suitable nesting habitat; possible breeder	MM
BZ137	BR4	20/06/2022	11:15	Buzzard	2	bogs, travelling, soaring together over hill. mobbed by hooded crow	suitable nesting habitat; possible breeder	MM
BZ138	BR4	20/06/2022	12:56	Buzzard	1	bogs, travelling, soaring then flew over hill	permanent territory; probable breeding	MM
BZ139	BR4	20/06/2022	13:05	Buzzard	1	conifer plantation, travelling, hunting over restock forest	suitable nesting habitat; possible breeder	MM
BZ140	BR4	20/06/2022	13:15	Buzzard	1	bogs, travelling, soaring over hill	permanent territory; probable breeding	MM

Ref.	BR	Date	Time	Species	Number	Habitat and activity	Breeding status	Surveyor
BZ141	BR4	20/06/2022	13:33	Buzzard	1	conifer plantation and bogs, travelling, hunting over restock and bog	permanent territory; probable breeding	MM
BZ142	BR4	20/06/2022	13:50	Buzzard	2	bogs, travelling, soaring	suitable nesting habitat; possible breeder	MM
BZ143	BR4	20/06/2022	13:51	Buzzard	2	conifer plantation, travelling, soaring over forest. one bird stooped at the other, both birds calling loudly	courtship and display; probable breeding	MM
BZ144	BR4	20/06/2022	14:30	Buzzard	1	conifer plantation, travelling, bird was flying over hill then went into a rapid stoop to ground	suitable nesting habitat; possible breeder	MM
BZ145	BR1	23/06/2022	10:48	Buzzard	1	bogs, travelling, hunting	suitable nesting habitat; possible breeder	MM
BZ146	BR1	23/06/2022	11:05	Buzzard	1	bogs, travelling, hunting/hovering at times	suitable nesting habitat; possible breeder	MM
ML019	BR1	23/06/2022	11:25	Merlin	1	bogs, travelling, male flew very low and fast. dived to ground probably at prey.	permanent territory; probable breeding	MM
ML020	BR3	16/07/2022	07:20	Merlin	6	conifer plantation and bogs, fledged ml being provisioned, 4x recently fledged ml being provisioned by both adults for duration of VP	fledged young; confirmed breeding	DM
WE012	BR3	16/07/2022	10:02	White-tailed Eagle	1	conifer plantation and bogs, travelling, sub adult (non-tagged) male travelling over Glenard and landing in forestry to east	suitable nesting habitat; possible breeder	DM
ML021	BR2	19/07/2022	08:11	Merlin	4	bogs and conifer plantation, travelling with prey, adult male travelling with prey. 3x fledged young sitting on fence post before conifer plantation	fledged young; confirmed breeding	DM
WE013	BR2	19/07/2022	08:19	White-tailed Eagle	1	bogs, perched, sub adult male (3rd year bird) perched	summering; non-breeding	DM
PE008	BR2	19/07/2022	09:23	Peregrine Falcon	1	conifer plantation and bogs, travelling, travelling in n direction towards Trusk More	suitable nesting habitat; possible breeder	DM
BZ147	BR2	19/07/2022	12:19	Buzzard	1	conifer plantation, circling, male circling	suitable nesting habitat; possible breeder	DM
BZ148	BR4	22/07/2022	12:10	Buzzard	1	bogs and conifer plantation, soaring, soaring over bog and forest	suitable nesting habitat; possible breeder	MM
SH034	BR4	22/07/2022	14:03	Sparrowhawk	1	conifer plantation, carrying prey, carrying prey to forest probably nest with young	adult carrying food/faecal sac; confirmed breeding	MM
BZ149	BR4	22/07/2022	14:20	Buzzard	1	conifer plantation, soaring, soaring on thermals	suitable nesting habitat; possible breeder	MM
K.038	BR4	22/07/2022	16:10	Kestrel	1	bogs and conifer plantation, hunting, hunting, hovering at intervals	suitable nesting habitat; possible breeder	MM
BZ150	BR5	26/07/2022	09:42	Buzzard	1	conifer plantation and bogs, circling, male mobbed by mc	suitable nesting habitat; possible breeder	DM
K.039	BR5	26/07/2022	10:11	Kestrel	1	bogs, hunting, adult male	suitable nesting habitat; possible breeder	DM

Ref.	BR	Date	Time	Species	Number	Habitat and activity	Breeding status	Surveyor
SH035	BR5	26/07/2022	14:26	Sparrowhawk	1	bogs and conifer plantation, travelling with prey, adult female with blackbird prey	adult carrying food/faecal sac; confirmed breeding	DM
PE009	BR1	27/07/2022	12:45	Peregrine Falcon	1	bogs, perched, male adult sitting on a fence post near lake. preened and turned around at times	suitable nesting habitat; possible breeder	MM
BZ151	BR1	27/07/2022	13:50	Buzzard	1	bogs, travelling, flew over hill and landed on ESB pole.	suitable nesting habitat; possible breeder	MM
PE010	BR1	27/07/2022	14:16	Peregrine Falcon	1	bogs, hunting, the male at map ref 1 flew across the lake and stooped at small flock of pigeons	suitable nesting habitat; possible breeder	MM
WE014	BR1	27/07/2022	16:10	White-tailed Eagle	1	conifer plantation, perched, sitting preening on tree at edge of forest.	migrating; non-breeding	MM

Map Legend

- Wind Farm Site
- Turbine Layout
- 500m Turbine Buffer
- Flightline

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Project Title
 Glenard Wind Farm
 Project No.
 190114
 Drawing No.
 31
 Date
 05/04/2023

Client
 S. Duff
 Project No.
 190114
 Drawing No.
 31
 Date
 05/04/2023

Project Title
 Glenard Wind Farm
 Project No.
 190114
 Drawing No.
 31
 Date
 05/04/2023



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HH-010



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Osprey Observation Breeding
Raptor Surveys

Project Title
Glenard Wind Farm

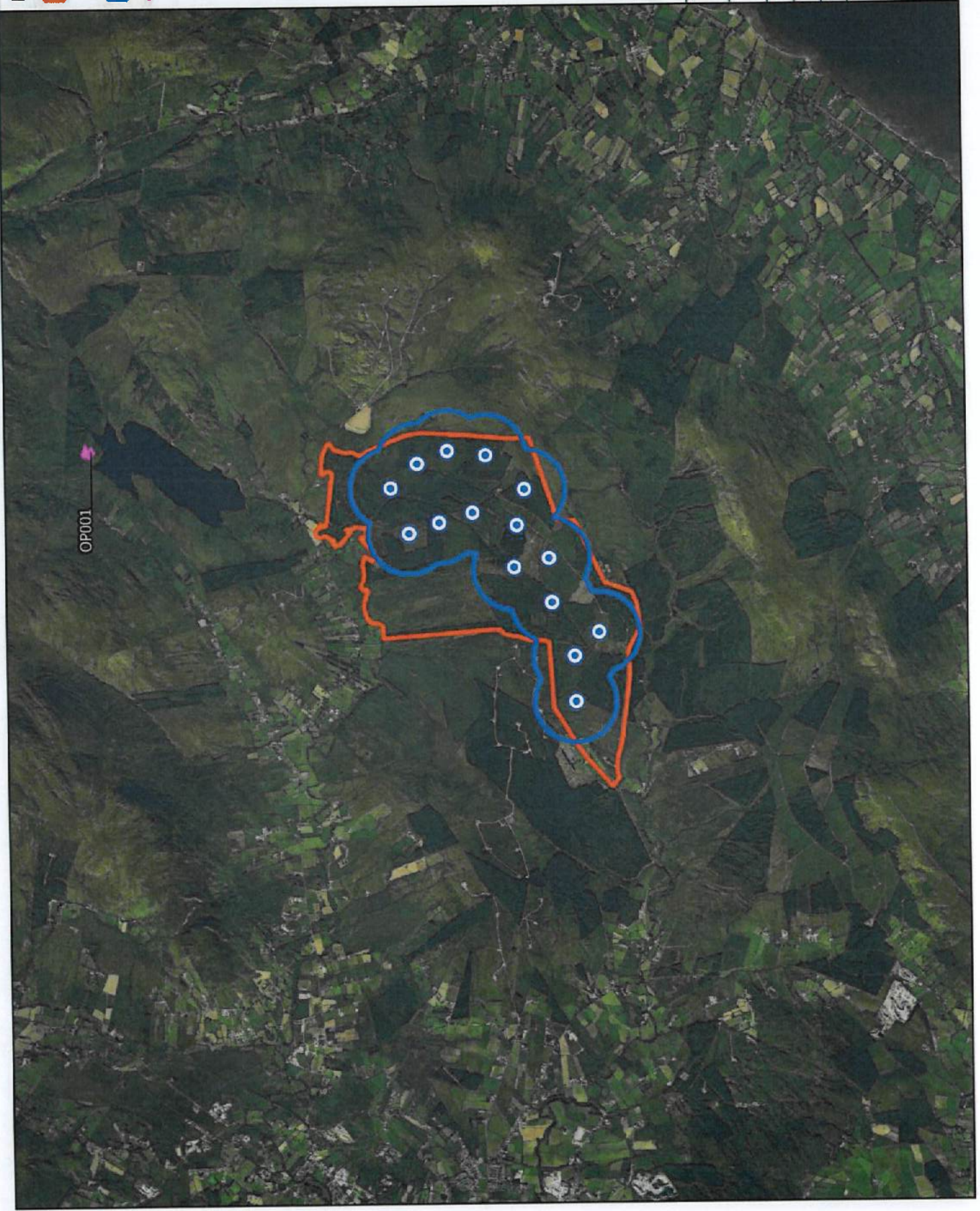
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P. Manley

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Date
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OP001



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Peregrine Observations
Breeding Raptor Surveys

Project 186

Glenard Wind Farm

Drawn by

S. Duff

Checked by

P. Manley

Project No.

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Drawing No.

34

Date

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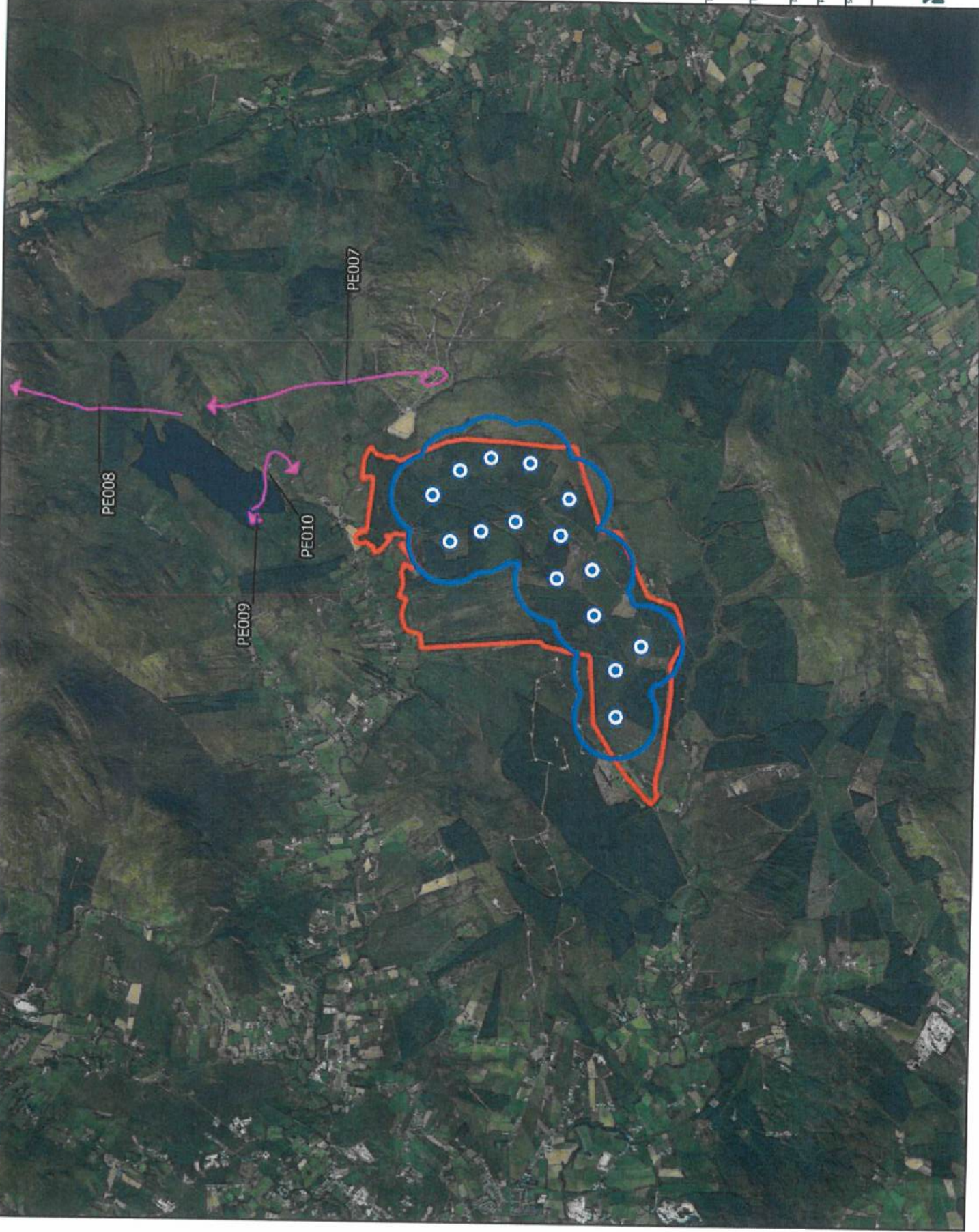
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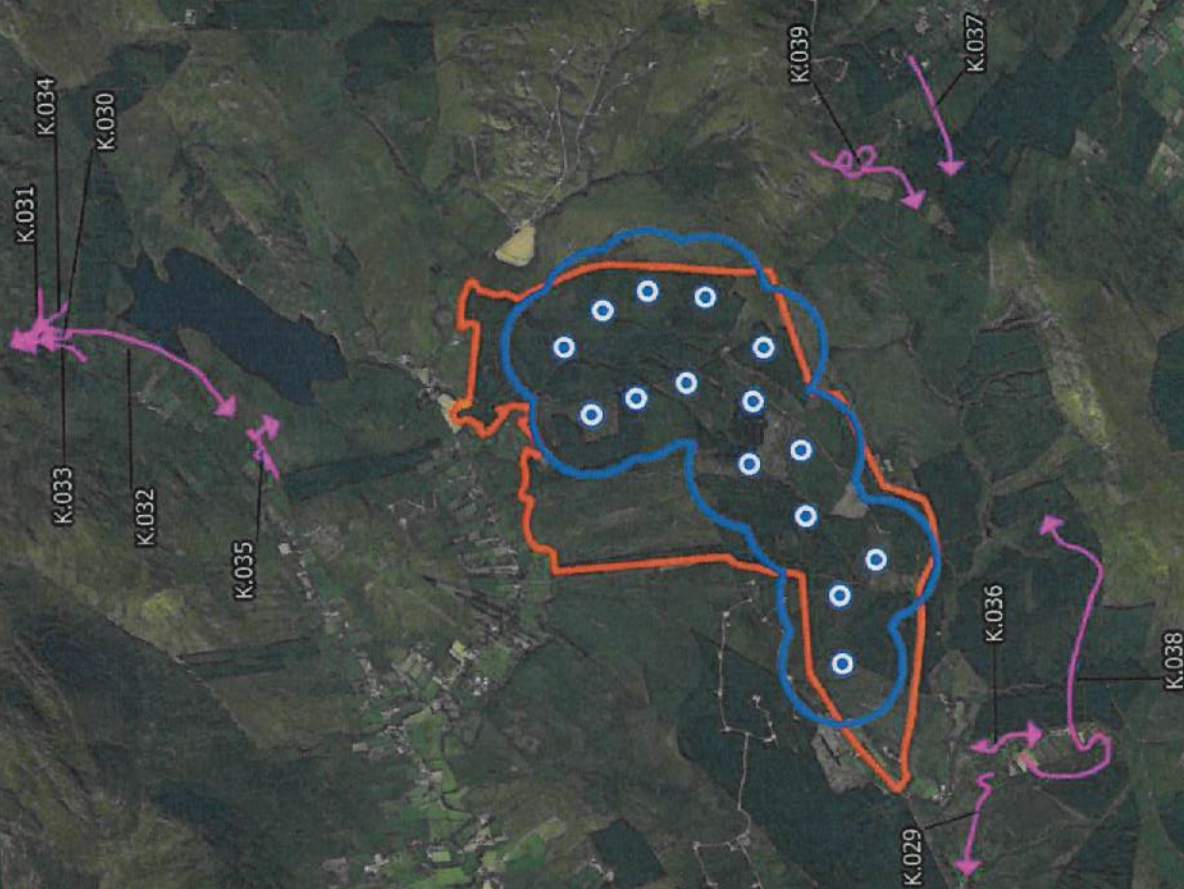
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Kestrel Observations Breeding Raptor Surveys	
Project ID	Glenard Wind Farm
Client	MRB
Project Manager	S. Duff
Project No.	190114
Scale	1:60,000
Date	05/04/2023
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Drawing Title
**White-tailed Eagle Observations
Breeding Raptor Surveys**

Project No

Glenard Wind Farm

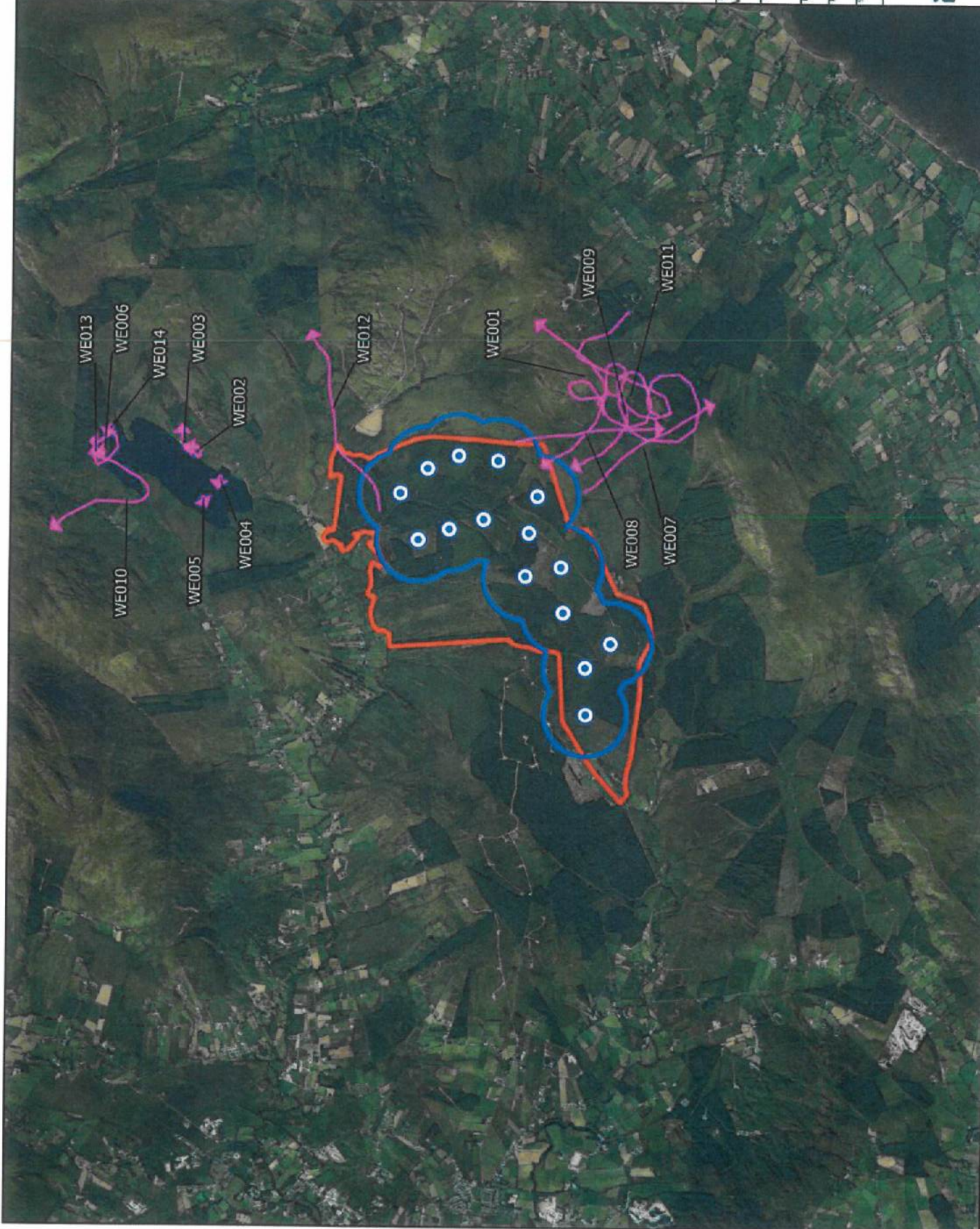
Drawn By
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190114

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Appendix 1 Table 5 Hen Harrier Roost Surveys

Ref.	HHVP	Date	Time	Species	Number	Habitat and activity	Surveyor
HH028	C43016 33793	27/10/2021	14:15	Hen Harrier	1	bogs, in flight, male, flew along forest.	MM
HH029	C42290 33630	28/10/2021	18:05	Hen Harrier	1	bogs, in flight, male flew over the roost site	MM
HH030	C42290 33630	28/10/2021	18:10	Hen Harrier	1	bogs, in flight, landed at roost, a second/separate male flew over the roost and went down into the heather near a sapling sika spruce tree	MM
HH031	C42294 33632	16/11/2021	15:28	Hen Harrier	1	bogs, seen sitting on a fence post near forest at 15:28, he sat there for over an hour before flying out to roost at 16:36, sub ad male	MM
HH032	C42294 33632	16/11/2021	16:39	Hen Harrier	1	bogs, flew over the roost site with the sub adult. the sub adult had risen from its roost spot and both birds went down and rose again 5-6 times before eventually settling at 16:39, ad male	MM
HH033	C41992 33878	17/11/2021	15:25	Hen Harrier	1	bogs, flew low along forest at 15:25, landed on fence post, ad male	MM
HH034	C41992 33878	17/11/2021	15:27	Hen Harrier	1	bogs, flew in almost exactly same flight path as 1st bird at 15:27, ad male	MM
HH035	C41992 33878	17/11/2021	16:28	Hen Harrier	1	bogs, at 16:28 saw bird flying out over roost, probably one of the birds seen earlier, ad male	MM

Appendix 1 Table 6 Incidental Observations

Ref.	Location	Date	Time	Species	Number	Habitat and activity	Surveyor
ML002	Hen Harrier Roost Survey; C 40739 29342	29/10/2021	08:08	Merlin	1	bogs; flight & preening, male sitting on a fence post preening, it flew off a few times but returned to the fence again. remained for the whole 3 hrs.	MM
ML003	Hen Harrier Roost Survey; C 40739 29342	29/10/2021	08:39	Merlin	1	bogs; flight, female flew over as the male sat on a fence post	MM
BZ071	Hen Harrier Roost Survey; C 42294 33632	16/11/2021	16:42	Buzzard	1		MM
KT003	Hen Harrier Roost Survey; C 42365 33593	10/12/2021	15:10	Red Kite	1	bogs; in flight	MM
BZ072	Hen Harrier Roost Survey; C 43023 33783	16/12/2021	14:50	Buzzard	1	bogs; flew over, BZ flew quite low over the site. landed on a tree at forest edge	MM
KT004	Hen Harrier Roost Survey; C 43023 33783	16/12/2021	15:50	Red Kite	1	bogs and conifer plantation; went to roost, kt flew over road and went down into Glenard Forest to roost. roost grid ref: c43508 33251	MM
BZ073	Hen Harrier Roost Survey; C 43023 33783	16/12/2021	15:56	Buzzard	1	bogs; flew over, BZ flew over site	MM
BZ074	Hen Harrier Roost Survey; C 42370 33586	17/01/2022	14:35	Buzzard	1	bogs; flying, flew along river calling	MM
BZ075	Hen Harrier Roost Survey; C 42370 33586	17/01/2022	14:56	Buzzard	1	bogs; flying, flew over roost area	MM
BZ076	Hen Harrier Roost Survey; C 40743 29334	24/01/2022	14:10	Buzzard	1	conifer plantation; perched, perched on tree at edge of forest	MM
BZ077	Hen Harrier Roost Survey; C 43021 33796	04/02/2022	15:26	Buzzard	1	bogs, conifer plantation and improved agricultural grassland; flying, flew over site and went down towards forest. it rose again and circled over forest (c 42820 33447)	MM
BZ078	Hen Harrier Roost Survey; C 42366 33591	10/02/2022	14:10	Buzzard	1	improved agricultural grassland; feeding, female feeding in field beside sheep feeder and then flew off to the west	MM

Ref.	Location	Date	Time	Species	Number	Habitat and activity	Surveyor
BZ079	Hen Harrier Roost Survey; C 42366 33591	10/02/2022	16:25	Buzzard	1	improved agricultural grassland; flying / feeding, BZ flew across field and went down to feed. same bird as before	MM
BZ080	Hen Harrier Roost Survey; C 42366 33591	10/02/2022	17:08	Buzzard	1	improved agricultural grassland; flying, flew parallel to the river as it flew	MM
BZ081	Hen Harrier Roost Survey; C 43016 33765	08/03/2022	17:23	Buzzard	1	bogs; flying, flew low along the river (c 42626 33226)	MM
ML004	Hen Harrier Roost Survey; C 40751 29302	10/03/2022	17:50	Merlin	1	bogs; hunting, male flew fast over bog and appeared to be hunting	MM
CU026	Breeding Raptor Survey; BR1	04/04/2022	13:20	Curlew	1	bogs; travelling, bird flew over lake and landed on bog.	MM
CU027	Breeding Raptor Survey; BR2	08/04/2022	16:55	Curlew	2	bogs; displaying, both birds displaying over hill, calling loudly.	MM
CU028	Breeding Raptor Survey; VP1	11/05/2022	09:25	Curlew	1	lakes and ponds and semi-natural grassland; travelling, flew along lake and landed in rushy field. Began to forage	MM
CU029	Breeding Raptor Survey; VP1	11/05/2022	09:37	Curlew	1	semi-natural grassland; travelling, landed in the same rushy field where the male had been and foraged.	MM
CU030	Breeding Raptor Survey; VP2	15/05/2022	09:52	Curlew	2	bogs; changeover of adults on nest., changeover of adults on nest which has been fenced by BW1 and NPWS nest containing 4 eggs (NE)	DM
CU031	Breeding Raptor Survey; C 44388 73257	13/06/2022	11:01	Curlew	6	bogs; adult pair and 4 chicks	DM



Map Legend

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- Flightline

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Drawing Title		Merlin Incidental Observations	
PROJECT		Glenard Wind Farm	
Drawn By	S. Duff	Checked By	P. Manley
Project No	190114	Drawing No.	51
Scale	1:35,000	Date	05/04/2023
MKO Planning and Environment Consultants Tasman Road, Glenard Aberdeen, PA, PA 15204 +1 412 601 7300 www.mkocorp.com			

Map Legend

- Wind Farm Site
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- Flightline

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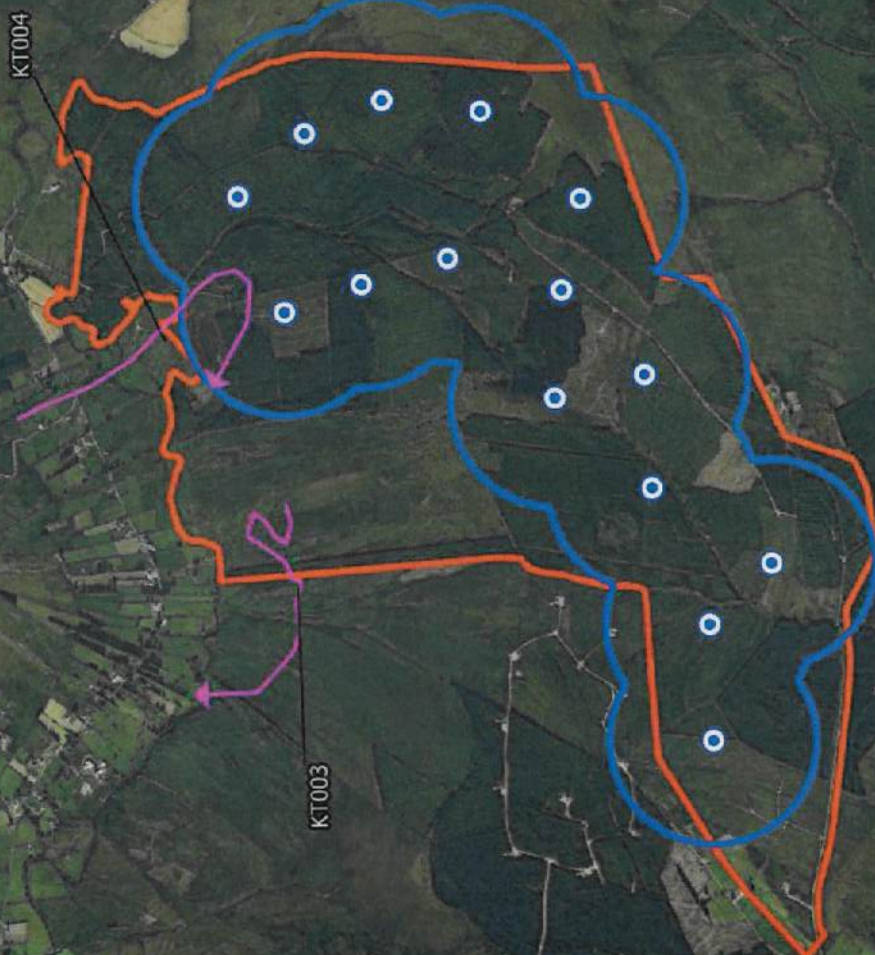


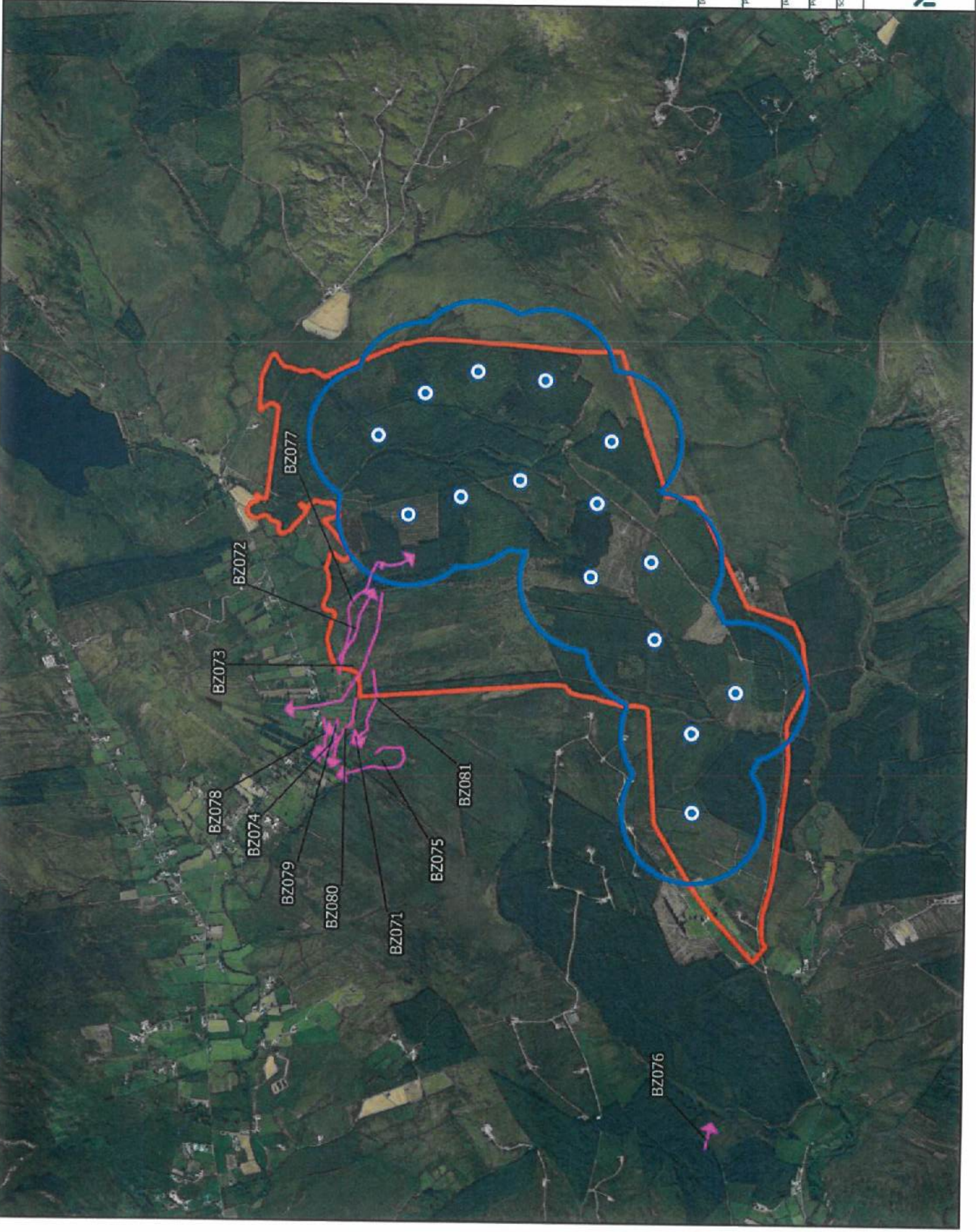
Red Kite Incidental Observations

Glenard Wind Farm

Project Lead	S. Duff
Client	P. Manley
Project No.	190114
Scale	1:35,000
Date	05/04/2023

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Map Legend

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Drawing Title		Buzzard Incidental Observations	
Project Ref		Glenard Wind Farm	
Drawn By	S. Duff	Checked By	P. Manley
Project No	190114	Drawing No.	54
Scale	1:35,000	Date	05/04/2023



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Appendix 1 Table 7 Non-target Species Observations

Date	Survey	Species	Notes	Surveyor
15/08/2022	Vantage Point Survey, VP5	Lesser Black-backed Gull		PW
13/09/2022	Vantage Point Survey, VP1	Hooded Crow		LD
13/09/2022	Vantage Point Survey, VP1	Woodpigeon		LD
13/09/2022	Vantage Point Survey, VP1	Wren		LD
13/09/2022	Vantage Point Survey, VP1	Robin		LD
13/09/2022	Vantage Point Survey, VP1	Coal Tit		LD
13/09/2022	Vantage Point Survey, VP1	Raven		LD
13/09/2022	Vantage Point Survey, VP1	Magpie		LD
13/09/2022	Vantage Point Survey, VP1	Jay		LD
13/09/2022	Vantage Point Survey, VP1	Song Thrush		LD
14/09/2022	Vantage Point Survey, VP2	Wren		LD
14/09/2022	Vantage Point Survey, VP2	Hooded Crow		LD
14/09/2022	Vantage Point Survey, VP2	Robin		LD
14/09/2022	Vantage Point Survey, VP2	Raven		LD
14/09/2022	Vantage Point Survey, VP2	Blackbird		LD
14/09/2022	Vantage Point Survey, VP2	Woodpigeon		LD
14/09/2022	Vantage Point Survey, VP2	Reed Bunting		LD
14/09/2022	Vantage Point Survey, VP2	Coal Tit		LD
14/09/2022	Vantage Point Survey, VP2	Mistle Thrush		LD
14/09/2022	Vantage Point Survey, VP2	Blue Tit		LD
14/09/2022	Vantage Point Survey, VP2	Jackdaw		LD
20/09/2022	Vantage Point Survey, VP5	Wren		LD
20/09/2022	Vantage Point Survey, VP5	Hooded Crow		LD
20/09/2022	Vantage Point Survey, VP5	Chaffinch		LD
20/09/2022	Vantage Point Survey, VP5	Raven		LD
20/09/2022	Vantage Point Survey, VP5	Starling		LD
20/09/2022	Vantage Point Survey, VP5	Coal Tit		LD
20/09/2022	Vantage Point Survey, VP5	Blackbird		LD
20/09/2022	Vantage Point Survey, VP5	Woodpigeon		LD
20/09/2022	Vantage Point Survey, VP5	Robin		LD
20/09/2022	Vantage Point Survey, VP5	Jackdaw		LD
20/09/2022	Vantage Point Survey, VP5	Golden Pheasant		LD
20/09/2022	Vantage Point Survey, VP5	Song Thrush		LD
20/09/2022	Vantage Point Survey, VP5	Linnet		LD
21/09/2022	Vantage Point Survey, VP6	Hooded Crow		LD
21/09/2022	Vantage Point Survey, VP6	Blackbird		LD
21/09/2022	Vantage Point Survey, VP6	Robin		LD
21/09/2022	Vantage Point Survey, VP6	Coal Tit		LD
21/09/2022	Vantage Point Survey, VP6	Raven		LD
21/09/2022	Vantage Point Survey, VP6	Mistle Thrush		LD
21/09/2022	Vantage Point Survey, VP6	Woodpigeon		LD
21/09/2022	Vantage Point Survey, VP6	Linnet		LD
21/09/2022	Vantage Point Survey, VP6	Jackdaw		LD
21/09/2022	Vantage Point Survey, VP6	Golden Pheasant		LD
21/09/2022	Vantage Point Survey, VP6	Chaffinch		LD
21/09/2022	Vantage Point Survey, VP6	Song Thrush		LD
22/09/2022	Vantage Point Survey, VP7	Wren		LD
22/09/2022	Vantage Point Survey, VP7	Woodpigeon		LD
22/09/2022	Vantage Point Survey, VP7	Raven		LD
22/09/2022	Vantage Point Survey, VP7	Hooded Crow		LD

Date	Survey	Species	Notes	Surveyor
22/09/2022	Vantage Point Survey, VP7	Jackdaw		LD
22/09/2022	Vantage Point Survey, VP7	Coal Tit		LD
22/09/2022	Vantage Point Survey, VP7	Robin		LD
22/09/2022	Vantage Point Survey, VP7	Linnet	25+	LD
22/09/2022	Vantage Point Survey, VP7	Mistle Thrush		LD
22/09/2022	Vantage Point Survey, VP7	Dunnock		LD
22/09/2022	Vantage Point Survey, VP7	Blackbird		LD
22/09/2022	Vantage Point Survey, VP7	Song Thrush		LD
26/09/2022	Vantage Point Survey, VP4	Hooded Crow		LD
26/09/2022	Vantage Point Survey, VP4	Wren		LD
26/09/2022	Vantage Point Survey, VP4	Coal Tit		LD
26/09/2022	Vantage Point Survey, VP4	Mistle Thrush		LD
26/09/2022	Vantage Point Survey, VP4	Robin		LD
26/09/2022	Vantage Point Survey, VP4	Raven		LD
26/09/2022	Vantage Point Survey, VP4	House Martin		LD
26/09/2022	Vantage Point Survey, VP4	Sedge Warbler		LD
26/09/2022	Vantage Point Survey, VP4	Woodpigeon		LD
26/09/2022	Vantage Point Survey, VP4	Linnet		LD
26/09/2022	Vantage Point Survey, VP4	Great Tit		LD
26/09/2022	Vantage Point Survey, VP4	Golden Pheasant		LD
26/09/2022	Vantage Point Survey, VP4	Jackdaw		LD
26/09/2022	Vantage Point Survey, VP4	Song Thrush		LD
27/09/2022	Vantage Point Survey, VP3	Jackdaw		LD
27/09/2022	Vantage Point Survey, VP3	Wren		LD
27/09/2022	Vantage Point Survey, VP3	Golden Pheasant		LD
27/09/2022	Vantage Point Survey, VP3	Magpie		LD
27/09/2022	Vantage Point Survey, VP3	Raven		LD
27/09/2022	Vantage Point Survey, VP3	Robin		LD
27/09/2022	Vantage Point Survey, VP3	Dunnock		LD
27/09/2022	Vantage Point Survey, VP3	Pied Wagtail		LD
27/09/2022	Vantage Point Survey, VP3	Hooded Crow		LD
27/09/2022	Vantage Point Survey, VP3	Blue Tit		LD
27/09/2022	Vantage Point Survey, VP3	Chaffinch		LD
27/09/2022	Vantage Point Survey, VP3	Blackbird		LD
27/09/2022	Vantage Point Survey, VP3	Barn Swallow		LD
27/09/2022	Vantage Point Survey, VP3	Song Thrush		LD



APPENDIX 2

Appendix 2
FIGURES



APPENDIX 3

COLLISION RISK ASSESSMENT

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INTRODUCTION

This response document has been prepared by McCarthy Keville O'Sullivan Ltd. (MKO) to update the collision risk for white-tailed eagle, merlin and goshawk at the proposed Glenard Wind Farm Site, Co. Donegal. The collision risk assessment, prepared by Mr Patrick Manley (BSc), is based on vantage point watch surveys undertaken at the development site from September 2016 to September 2019, January 2021 to September 2022, and is supplemented by data collected between October 2019 and September 2020. This represents a 61-month survey period, consisting of five breeding seasons and four and a half non-breeding seasons, in full compliance with NatureScot (SNH 2017)¹. Surveys were undertaken from six fixed Vantage Point (VP) Locations, (i.e. VP1a, VP2a, VP3, VP4, VP5a & VP6) between September 2016 and September 2019 and seven fixed Vantage Point (VP) locations, (i.e. VP1a, VP2a, VP3a, VP4, VP5a, VP6 & VP7) between January 2021 and September 2022. Note that VP3 was repositioned to VP3a in April 2021. Please refer to Figure 7.1 of the EIAR as lodged for location details. Supplementary data from two additional VP locations are also included in this assessment. Canavan Associates LTD undertook these surveys between October 2019 and September 2020 LTD. This data consists of one breeding and one non-breeding season. Details on the surveyor involved are provided in Section 7.1.3 of the EIAR as lodged.

Collision risk is calculated using a mathematical model to predict the number of individual birds, of a particular species, that may be killed by collision with moving wind turbine rotor blades. The modelling method used in this collision risk calculation follows NatureScot (formerly Scottish Natural Heritage (SNH)) guidance which is sometimes referred to as the Band Model (Band *et al.* 2007). The Band model has been the subject of academic assessment (e.g. Chamberlain *et al.*, (2005 & 2006), Madders & Whitfield (2006), Drewitt & Langston (2006), Fernley, Lowther & Whitfield (2006)) and its results must be interpreted with a degree of caution.

¹ SNH (2017). *Recommended bird survey methods to inform impact assessment of onshore wind farms*. Scottish Natural Heritage.

METHODOLOGY

Collision risk is calculated using the Band Model to predict the number of individual birds, of a particular species, that may be killed by collision with moving wind turbine rotor blades. Two stages are involved in the model:

- Stage 1: Estimation of the number of birds or flights passing through the air space swept by the rotor blades of the wind turbines. Transits are calculated using either the “**Regular** or **Random Flight**” model, depending on flight distribution and behaviour.
- Stage 2: Calculation of the probability of a bird strike occurring. Calculated using a statistical spreadsheet that considers avian biometrics and turbine parameters. This spreadsheet is publicly available on the SNH website. <https://www.nature.scot/wind-farm-impacts-birds-calculating-probability-collision>

The product of Stage 1 and Stage 2 gives a theoretical annual collision mortality rate and is based on the assumption that birds do not attempt to avoid colliding with turbines.

An informal third stage is then applied to the generated outcome of Stage 1 and Stage 2. This third stage is to account for a “real life” scenario, i.e., to account for the avoidance measures taken by each bird species, worked out as a percentage applied to the product of stage 1 and 2. This third “informal” stage is often the most important factor of collision risk modelling. For several years, NatureScot advocated a highly precautionary approach, recommending a value of 95% as an avoidance rate (Band *et al.*, 2007). However, based on empirical evidence and literature reviews, precautionary rates have now been increased to 98-99% or higher in most cases and are regularly evolving with further examination of bird behaviour and mortality rates at wind farm sites. The most recently recommended species’ avoidance rates can be found on the NatureScot website at <https://www.nature.scot/wind-farm-impacts-birds-guidance-avoidance-rates-guidance>.

For full details on the methodology used for the collision risk model, please refer to Appendix 7-7 of the EIAR as lodged. The turbine and wind farm characteristics for the purposes of this assessment at the proposed Glenard Wind Farm are presented in Table 1.

Table 1 Wind Farm Parameters at Glenard Wind Farm

Wind Farm Component	Scenario Modelled
Number of turbines	15
Blades per turbine rotor (3d model used)	3
Rotor diameter (m)	140
Rotor radius (m)	70
Hub height (m)	96
Swept height range(m) (i.e. above top of foundation)	26-166
Mean pitch of blade (degrees)	6
Maximum chord (m) (i.e. depth of blade) ²	4

² The assumed turbine model was GE 137 Turbine for the following parameters: maximum chord and rotational period.

Wind Farm Component	Scenario Modelled
Max Tip Speed (m/s)	82
Circumference of Blade Tip ($\pi \times \text{Rotor Diameter}$)	439.8
Rotational period (s) $[439.8/82]$	5.36
*Turbine operational time (%)	85%

*This operational period of 85% is referenced from a report by the British Wind Energy Association (BWEA) (2007) which identifies the standard operational period of the wind turbines in the UK to be roughly 85%.

It was necessary to run a second collision risk model to assess the largest swept path of the range of turbine dimensions (i.e. max. tip height 173m) considered in this application. The second model assesses the swept path between 41-173m. Appendix 1 shows the collision risk assessment based on the minimum rotor diameter and the maximum hub height. These two collision risk assessments allow for the full range of possible turbine dimensions to be assessed (26-173m). Taking a precautionary approach, the highest predicted collision risk for each species was then presented in the overarching response document.

RESULTS

3.

The predicted number of transits per year and the collision risk is presented in Table 2 and Table 3, along with the final predicted number of collisions per year. Note that for birds that both flap and glide, the average collision risk percentage between flapping and gliding is taken.

Table 2 Results of CRM for Combined Method

Species	Survey Period	Model	Transits	Collision Risk			Collision Rate			One Bird Collision
				flapping	gliding	overall	without avoidance	avoidance factor	with avoidance	
White-tailed Eagle	All Seasons	Random	148.15	7.29%	6.86%	7.18%	10.48	95%	0.524	1.91 years
Merlin	All Seasons	Random	5.33	4.76%	4.69%	4.73%	0.25	98%	0.008	198.5 years
Goshawk	All Seasons	Random	15.13	5.51%	5.30%	5.40%	0.82	98%	0.02	61.1 years

Table 3 Results of CRM for Averaging Method

Species	Survey Period	Model	Transits	Collision Risk			Collision Rate			One Bird Collision
				flapping	gliding	overall	without avoidance	avoidance factor	with avoidance	
White-tailed Eagle	All Seasons	Random	148.15	7.29%	6.86%	7.18%	8.12	95%	0.406	2.46 years
Merlin	All Seasons	Random	5.33	4.76%	4.69%	4.73%	0.19	98%	0.004	259 years
Goshawk	All Seasons	Random	15.13	5.51%	5.30%	5.40%	1.20	98%	0.02	41.82 years

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- British Trust of Ornithology (BTO) online BirdFacts. Available at <https://www.bto.org/about-birds/birdfacts>
- <https://www.timeanddate.com/sun/>



APPENDIX 1

**COLLISION RISK ASSESSMENT –
MINIMUM BLADE DIAMETER
AND MAXIMUM HUB HEIGHT**

Table 4 Windfarm Parameters at Glenard Wind Farm for minimum blade length and maximum hub height

Wind Farm Component	Scenario Modelled
Number of turbines	15
Blades per turbine rotor (3d model used)	3
Rotor diameter (m)	132
Rotor radius (m)	66
Hub height (m)	107
Swept height range(m) (i.e. above top of foundation)	41-173
Mean pitch of blade (degrees)	6
Maximum chord (m) (i.e. depth of blade) ³	4
Max Tip Speed (m/s)	82
Circumference of Blade Tip (π *Rotor Diameter)	414.69
Rotational period (s) $[414.69/82]$	5.06
*Turbine operational time (%)	85%

*This operational period of 85% is referenced from a report by the British Wind Energy Association (BWEA) (2007) which identifies the standard operational period of the wind turbines in the UK to be roughly 85%.

³ The assumed turbine model was GE 137 Turbine for the following parameters: maximum chord and rotational period.

ALTERNATIVE TURBINE DIMENSIONS RESULTS

1.

The predicted number of transits per year and the collision risk is presented in Table 5 and Table 6, along with the final predicted number of collisions per year. Note that for birds that both flap and glide, the average collision risk percentage between flapping and gliding is taken.

Table 5 Results of CRM for Combined Method (41-173m)

Species	Survey Period	Model	Transits	Collision Risk			Collision Rate			One Bird Collision
				flapping	gliding	overall	without avoidance	avoidance factor	with avoidance	
White-tailed Eagle	All Seasons	Random	119.95	7.73%	7.26%	7.49%	8.99	95%	0.45	2.22 years
Merlin	All Seasons	Random	4.32	5.05%	4.97%	5.01%	0.22	98%	0.004	231.2 years
Goshawk	All Seasons	Random	12.25	5.84%	5.62%	5.73%	0.70	98%	0.01	71.2 years

Table 6 Results of CRM for Averaging Method (41-173m)

Species	Survey Period	Model	Transits	Collision Risk			Collision Rate			One Bird Collision
				flapping	gliding	overall	without avoidance	avoidance factor	with avoidance	
White-tailed Eagle	All Seasons	Random	104.86	7.73%	7.26%	7.49%	7.86	95%	0.39	2.5 years
Merlin	All Seasons	Random	2.81	5.05%	4.97%	5.01%	0.14	98%	0.003	355.3 years
Goshawk	All Seasons	Random	15.17	5.84%	5.62%	5.73%	0.87	98%	0.02	57.5 years

1.1

Comparison

Table 7 Comparison of collisions per year for VP averaging method and the Combined VP Method

Species	Max Blade and Min Hub (26m minimum swept height)	Min Blade and Max Hub (41m minimum swept height)		
	Collisions per Year VP Averaging Method	Collisions per Year Combined VP Method	Collisions per Year VP Averaging Method	Collisions per Year Combined VP Method
White-tailed Eagle	0.406	0.524	0.39	0.45
Merlin	0.004	0.008	0.003	0.004
Goshawk	0.02	0.02	0.02	0.01



APPENDIX 3

**CORRESPONDENCE BETWEEN
THE APPLICANT & DONEGAL
COUNTY COUNCIL ROADS
ENGINEER**

Meabhann Crowe

From: Emmet McLaughlin <emmet.mclaughlin@coillte.ie>
Sent: 07 July 2020 13:34
To: BRENDAN O'DONNELL
Cc: SEAMUS HOPKINS
Subject: RE: Glenard Wind Farm, Illies, Inishowen, Co Donegal
Attachments: Letter for DCC Roads Dept. - LTR- 002.pdf

Importance: High

Dear Brendan,

Thank you for coming back to me in relation our letter of 26 April, seeking a letter of consent for the inclusion of lands along the public roads corridor within a planning application for a wind farm development which includes the development of a grid connection connecting the site to the 110kV Trillick Substation.

I have taken your feedback on-board and respond accordingly in the attached letter. I am seeking that the Council reconsider its position on providing a letter of consent for the reasons set out in the letter. I would welcome the opportunity to discuss this matter with you and your colleagues in person, if this would be of benefit.

Should you have any queries please do not hesitate to call

Kind Regards

Emmet McLaughlin

Project Manager | Coillte

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IF YOU PRINT THIS EMAIL, PLEASE RECYCLE IT. PAPER IS RENEWABLE AND RECYCLABLE

From: BRENDAN O'DONNELL [mailto:BRENDAN.ODONNELL@Donegalcoco.ie]

Sent: 29 April 2020 17:47

To: Emmet McLaughlin <Emmet.McLaughlin@coillte.ie>

Cc: SEAMUS HOPKINS <SHOPKINS@Donegalcoco.ie>

Subject: Glenard Wind Farm, Illies, Inishowen, Co Donegal

Emmet,

I refer to your letter issued by e-mail to Seamus Hopkins on 26th April seeking a letter of consent for the inclusion of lands along the public roads corridor within a planning application for a wind farm development which includes the development of a grid connection connecting the site to the 110kV Trillick Substation.

I note from the drawing submitted with your correspondence that approx. 6km of grid connection cabling is intended to be laid in public roads.

Donegal County Council consider that the presence of long lengths of HV cabling within public roads would have significant unacceptable impacts on the road network and road users, both during and after construction.

The presence of HV cabling would represent a major constraint in the context of future road maintenance. Relatively straight forward works such as culvert replacement (many culverts are legacy stone culverts), installation or maintenance of road drainage, installation of road signage and maintenance of bridges would all become much more complex and costly. The presence of the HV cabling could become a significant factor limiting the Roads Authority's ability to undertake essential maintenance and would likely require road closures. The presence of HV cabling would also introduce a significant H&S risk.

It is also considered that the scale of construction works required to install the HV cabling has significant potential to interfere with and destabilise existing roads infrastructure, including road drainage/culverts, bridge structures, road embankments & bog ramparts. Such construction works could not be undertaken without the use of extensive road closures resulting in large scale disruption to road users. Damage to existing local roads arising from the passage of large volumes of heavy construction traffic and from construction activities would also be likely.

The local road network is essential infrastructure for use of residents of rural areas and the presence of HV cabling within the road will introduce a significant obstacle to local development accessing existing underground services (water, telecommunications). Future upgrades to such services will also be limited by the presence of the HV cabling.

In the circumstances Donegal County Council are not in a position to provide the letter of consent requested,

Regards,

Brendan

Brendan O'Donnell

A/ Senior Engineer | Roads Areas Division | Roads and Transportation Directorate

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Donegal County Council will be implementing EIRCODES in our communications. These are the codes for the Public Services Buildings: Lifford HQ F93 Y622, Letterkenny F92 TNY3, Milford F92 TD0P, Carndonagh F93 YV1N, Dungloe F94 H4CF & Donegal Town F94 DK6C.

Beidh an córas EIRCODE á chur i bhfeidhm ag Comhairle Contae Dhún na nGall inár gcuid cumarsáidí. Seo iad a leanas na cóid do na hIonaid Seirbhíse Poiblí: Leifear F93 Y622, Leitir Ceanainn F92 TNY3, Baile na nGallóglach F92 TD0P, Carn Domhnach F93 YV1N, An Clochán Liath F94 H4CF agus Baile Dhún na nGall F94 DK6C.

Brendan O'Donnell,
Donegal County Council,
The Diamond,
Lifford,
Co. Donegal,
F93Y622

By email to.:
BRENDAN.ODONNELL@Donegalcoco.ie
Our Ref:
ENGL_DCC_LTR_002

Date: 07 July 2020

Re: Proposed Wind Farm Development at Illies, Inishowen, Co Donegal

Dear Mr. O'Donnell,

In response your email received on the 29th of April 2020 with regards to the proposed Glenard Wind Farm development and in particular its underground grid connection to the national grid we wish to provide the following information/clarifications with regards to the issues you raised..

Within the issued correspondence it is stated that *'Donegal County Council consider that the presence of long lengths of HV cabling within public roads would have significant unacceptable impacts on the road network and road users'*. In this regard we wish to highlight and reiterate that it is the policy of Donegal County Council to support the further development and strengthening of the electricity grid to enable the harnessing and distribution of renewable energy. This is clearly outlined under the following provisions of the County Development Plan¹:

- **E-O-1:** To facilitate the strengthening of the electricity grid to enable the harnessing and distribution of energy. The Council will support transboundary and trans-national interconnectors to enable the exporting of energy outside of the County.
- **E-P-1:** It is policy of the Council to facilitate the development of grid reinforcements including grid connections and transboundary energy network (Electricity and gas) into and through the

¹ Donegal County Development Plan 2018-2024

(<http://www.donegalcoco.ie/media/donegalcountyc/planning/pdfs/viewdevelopmentplans/countydonegaldevelopmentplan2018-2024/partaandb/Part%20A%20The%20Strategic%20Plan%20and%20Part%20B%20Objectives%20and%20Policies.pdf>)

County and between all adjacent counties and to support the development of cross border grid connections, subject to other objectives and policies of this Plan.

Donegal County Council within the Donegal County Development Plan 2018-2022 under policy E-P-9 note that *'where practicable power lines be routed underground' in an effort to preserve scenic amenity and the receiving landscape*". As such it is the stated preference that the undergrounding of electrical cables is optimal. The full wording of E-P-9 reads as follows:

- **E-P-9:** It is a policy of the Council to seek to ensure that, where practicable, power lines be routed underground, having particular regard to the scenic amenity of the receiving landscape.

Furthermore, Part B, Appendix 3 under Section 6.4 of the Donegal County Development Plan 2018-2022 points towards the facilitation of grid cable connections, associated with wind energy development, to be located underground.

- **6.4-** All grid cable connections within the site should be undergrounded.

Undergrounding cable connections is also the stated preferred approach within the Draft Wind Energy Guidelines² (December 2019) issued by the Department of Housing Planning and Local Government (DHPLG), provided that there is no technical reason on the basis of ground conditions that would not allow for the provision of underground cables.

As you will be aware in preparing a planning application for a wind farm development of in excess of 5MW it is necessary to complete an Environmental Impact Assessment Report (EIAR) and the consenting authority must carry out an Environmental Impact Assessment as part of the decision making process. The EIAR and EIA must consider alternatives and must present environmental reasons setting out how the alternative chosen is optimal. In considering alternatives for the cable route, the undergrounding of cables is generally considered optimal due to the reduction in visual impact when compared with overhead lines (despite the additional construction required in providing the underground ducts for the cable). It is also considered optimal from an environmental impact assessment viewpoint for underground cables to follow established (or proposed) linear infrastructure such as roads which already present elements of the manmade built environment running through the landscape. The existing road network is readily accessible and presents an environmentally robust platform which can and frequently does accommodate a broad range of services (watermains, electricity and telecommunications networks). The provision of underground cabling along the road network effectively represents brownfield construction in lieu of greenfield construction through farmland and other habitats.

² Draft Revised Wind Energy Development Guidelines, December 2019
(https://www.housing.gov.ie/sites/default/files/public-consultation/files/draft_revised_wind_energy_development_guidelines_december_2019.pdf)

In terms of construction activities along the road these would be co-ordinated and scheduled to minimise disruption (and would of course be subject to a road opening licence in the event of favourable consideration). Coillte as the proposers of this project have significant landholdings in the vicinity and are committed to consulting with local neighbors and phasing of the works to reduce the potential for impact on residents/road users accessibility along the route during construction. Coillte therefore wish to engage with all stakeholders (including Donegal County Council) actively in the interests of facilitating a positive outcome from the planning process and order to ensure delivery of the proposed renewable energy development (in the event of favourable consideration) with minimal impacts and to deliver a project which will have benefits both locally and in contributing to the decarbonisation of the economy.

In the event of favourable consideration, following the construction of the underground cabling the road infrastructure within which the cable will be laid, could be improved from its current condition through resurfacing and upgrading where it is necessary. Any application for permission including the grid connection will be subject to conditions and it is standard practice for items such as roads bonds to be put in place (to ensure public roads are not left damaged) and, carrying out of works to the satisfaction of the relevant roads/planning authority as conditions are standard.

It should be noted that, the Roads Authority would have two opportunities to scrutinise the proposed cabling works both at planning application stage and Road Opening Licence stages, and should Donegal County Council require, a bond can be put in place, as part of either or both processes, to ensure that the contractor, when carrying out the relevant cabling works, restore and/or upgrade the road to the required specification.

With regards to any future maintenance which may be required along the road network, please note that the roads along the cable route are local county roads and no regional or national roads are included, please see Figure A- 'Glenard WF Grid Connection Option attached. There are minimal residential properties served by these roads and therefore we do not expect significant amounts of passing or through traffic, and the design team are not aware of any proposed significant future upgrades of the affected network. Coillte, as the applicants, are also open to engaging with the Roads Authority to investigate how the Council can be given sufficient confidence to ensure that they are not exposed to any significant additional costs for any proposed, additional future maintenance works which could potentially arise as a direct result of the associated cabling works, whether this could require additional bonds in favour of the Council or some form of similar agreement.

In relation to concerns regarding impacts to road users, appropriate traffic management would be put in place ensure that the impact on the local community will be kept to a minimum during construction. We do not anticipate that any impacts will arise during the operational phase, save for in the case of a cable fault repair, which, could require specific traffic management for a short period. The underground cabling works will only require very short-term closures of short sections (c.150m-300m per day) of the local road network and construction activities can be managed and co-ordinated to ensure local access is facilitated and that impacts on residents/landowners will be kept to a minimum. Furthermore, Coillte have identified the properties/locals which may be impacted by the works and will liaise with them to ensure that nobody is significantly adversely affected during the cabling works.

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Cláráithe in Éirinn No. 138108. Oifig Chláraithe: Coillte CGA, Baile an Chinnéidigh, Co. Cill Mhantáin, A63 DN25, Éire.
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It should also be noted that Coillte has engaged with landowners to seek consent for placing cabling works within their field boundary along and or close to the existing road network where possible. Some landowners have been more agreeable to the principle of a cable than other, however, all landowners are generally against the principle of a 3m road construction through their lands to provide vehicular access to the cable as required by EirGrid specifications where required. As set out above while it is generally considered that the construction of cabling within greenfield conditions is not considered the most environmentally optimal, we have made efforts to investigate this option with private landowners, however it has not been possible to-date to secure the relevant third party consents.

As is evident and outlined in the above the cable in road approach is preferred and the noted concerns are manageable.

Based on the above we again request a letter of consent for the inclusion of lands in the charge of Donegal County Council within the areas outlined in Figure A- 'Glenard WF Grid Connection Option A' (attached).

Should you have any further queries please do not hesitate to contact me.

Yours sincerely,

[e-version, no signature]

Emmet Mc Laughlin,
Project Manager, Renewable Energy
Coillte

Coillte, Dublin Road, Newtownmountkennedy, Co. Wicklow, A63 DN25, Ireland.

T 1890 367 378 F +353 1 201 1199 E info@coillte.ie W www.coillte.ie

Stiúrthóirí / Directors: Bernie Gray (Cathaoirleach / Chair), Gerard Gray, Jerry Houlihan,
Patrick Eamon King, Kevin McCarthy, Gerard Murphy, Julie Murphy-O'Connor, Eleanor O'Neill.
Cláráithe in Éirinn No. 138108. Oifig Chláraithe: Coillte CGA, Baile an Chinnéidigh, Co. Cill Mhantáin, A63 DN25, Éire.
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APPENDIX 4

**CITY OF DERRY AIRPORT – NO
OBJECTION**



Date: 09 Dec 2021

CoDA Operations Limited,
City of Derry Airport,
Airport Road,
Eglinton,
Co. Derry,
BT47 3GY.

An Bord Pleanála
64 Marlborough Street
Dublin 1
D01V902.

Re: Proposed application by Futureenergy Glenard DAC for Planning Permission in respect of a Wind Farm development at Glenard County, Donegal City of Derry Airport, Airport Road, Eglinton, Co. Derry (referred to herein as "the Airport")

Letter of Consent to Application for Planning Permission

Dear Sirs,

I refer to the above and confirm that I have authority to provide this letter for and on behalf of the Airport.

I refer to the proposed development of a wind farm by Futureenergy Glenard DAC at Glenard, County Donegal ("the Development"), the proposed layout of which is identified on the draft map attached hereto.

I understand that Futureenergy Glenard DAC (or an associated company) intends to make an application for planning permission in respect of the Development and I hereby confirm that the Airport consents to such an application and raises no objection to same.

Should you have any queries in relation to the above, please do not hesitate to contact me.

Yours faithfully,

Steve Frazer
Managing Director
For and on behalf of CoDA Operations Limited, City of Derry Airport

Turbine No.	X	Y	Elevation
1	644783	931991	481
2	644840	932467	410
3	644684	932840	353
4	644384	933164	322
5	643824	932948	324
6	643953	932577	347
7	644075	932161	378
8	643927	931653	428.5
9	644357	931517	361.5
10	643370	931654	413
11	643505	931222	409
12	641736	930911	376.5
13	642298	930922	360
14	642958	931192	385.5
15	642589	930617	361.5

Map Legend

- EMA8 Site Boundary
- Proposed Turbine Layout

Ordnance Survey Ireland Licence No. AR 00218205, Ordnance Survey



Ordnance Survey Ireland Licence No. AR 00218205, Ordnance Survey

190114 - Glendard Windfarm
 Eoin McCarthy
 190114
 1:35000
 30.11.2021

