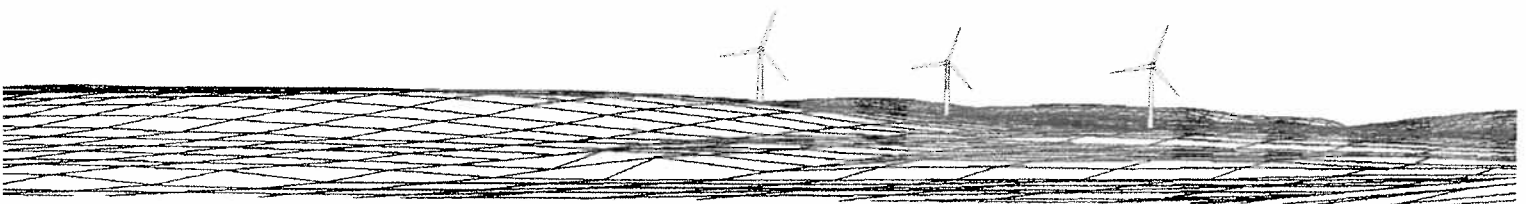


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Supplemental Project Information



Ballymartin

Wind Farm



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Non-technical summary

Wind turbines are modern windmills designed to generate electricity and a wind farm is an array of wind turbines in one location. Modern wind turbines consist of a tubular steel tower 60m-70m high on which a housing is placed containing the generator and gearbox. Three fibreglass blades, each of which can be up to 40m in length and propelled by the prevailing wind, drive the generator. The power from each wind turbine is fed into a central transformer from which it is exported to the National Grid.

The Ballymartin Wind Farm project involves the construction of a wind farm of 3 turbines, which will have the potential to produce up to 4.5MW - 4.9MW of electrical power. The turbines will have 60m hubs and 40m long blades.

The proposed 43.5Ha site is located in the townland of Ballymartin, 4.6km northeast of Mullinavat, Co. Kilkenny and 3.2km southwest of Brabstown, Co. Kilkenny.

The application does not require an Environmental Impact Study to be undertaken as set out in the following statutory instrument: S.I No. 93 of 1999, EC (EIS) (Amendment Regulations, 1999) in Part 2 of the First Schedule, item (i) lists:

"Installations for the harnessing of wind power for energy production (wind farms) with more than 5 turbines or having a total output greater than 5MW".

However, to facilitate Kilkenny County Council and in recognising the substantive environmental issues the developers have assessed and submit assessments of the major environmental impacts of this development:

- ⊕ Visual influence – Zone of Visual Influence (ZVI) map & 6 photomontages
- ⊕ Proximity to dwellings and sound level impact map
- ⊕ Shadow flicker effect
- ⊕ Site archaeology

The application is made on the basis of turbines with a maximum hub height of 60m and a maximum blade length of 40m. The final choice of make and model of turbine will be made on commercial grounds after a tendering process and will be agreed with the Planning Authority before construction.

The final specific site turbine co-ordinates will be agreed with the planning authority prior to construction.

Site selection criteria

After evaluation of a number of limited locations in Co. Kilkenny, pre-consultation with Kilkenny County Council, and considering the Kilkenny Wind Energy Policy, the site at Ballymartin was considered suitable for the following reasons:

1. By having regard to the following national and EU policies:
 - a) the objective of the National Development Plan in relation to the development of renewable energy,
 - b) National Strategy on Sustainable Energy,
 - c) the Guidelines for Wind Farm Development published by the Department of the Environment and Local Government (DoELG), September, 1996,
 - d) the provisions of the current County Kilkenny Development Plan for the area
 - e) the terms of the European Communities (Conservation of Wild Birds)(Amendment) Regulations, 1986, the (Amendment) (No.3) Regulations, 1996 and the European Communities (Natural Habitats) Regulations, 1997.

2. The majority of land in Co. Kilkenny is dominated by lowlands and therefore the upland site is relatively unique in the county. It presents Kilkenny with an relatively rare opportunity to viably harness the county's wind resource without contravening any national or county development regulations.
3. By using the screening effects of the surrounding hills, the visual impact will be low and localised to the immediate upland region. There is no significant visibility from regional primary routes or large urban centres.
4. The landscape can be classified as rolling farmland with boundaries and field patterns and the turbine layout has been designed with a more regulated, 'equal spacing between turbines.'
5. All exclusion zone requirements are met:

Exclusion Zones		
Exclusion Area	Distance (m)	Policy guidelines satisfied
Towns, villages	1500	Yes
National Primary	N.R.A.	Yes
National Secondary	N.R.A.	Yes
High voltage cables	200	Yes
Airport Protection zone	6000	Yes
Lakes >6Ha	2000	Yes
Prime Special Amenity Areas	No-go areas	Yes

6. A detailed site assessment concluded that:
 - 1) the site is not designated as a National Heritage Area (NHA) or Special Area of Conservation (SAC). The site is not designated as an amenity area by Kilkenny County Council in the county development plan.
 - 2) no known archaeological artefacts will be impacted by the wind farm
7. The upland site has an average altitude of 195m and the surrounding region is relatively sparsely populated.
8. The effects of the sound of the turbines on dwellings will satisfy all published and accepted 40dB guidelines. Computer modelling has shown that the maximum predicted sound levels at nearby occupied dwelling is within nationally recommended and internationally accepted limits. Therefore, noise impact will not be an issue.
9. There is a suitable and available grid connection close-by at the ESB's 38kV sub-station near New Ross town. The proximity of the grid connection is critical so that the electricity can be exported efficiently with a minimum of environmental effect. It is envisaged that the power from the project will be exported via a 20kV, single pole. The planning, engineering and construction of the export line will be the sole and exclusive responsibility of the ESB EirGrid. All 20kV connections under Class27 Planning Regulations Act 2001 do not require planning permission.
10. The potential of interference with local TV broadcast and mobile phone signals is not considered to be applicable. Nevertheless, the developer will ensure that, in the event of such issues arising, immediate remedies will be put in place to address to problem.

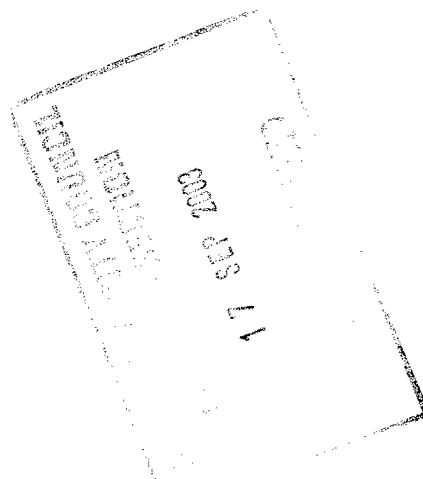
11. The shists and gneisses are abundant rock types in the area and therefore its minor excavation is not an unacceptable environmental effect.
12. There are no rivers or streams on site or nearby. The potential impacts on the current high water quality in the region will be minimised by ensuring that no sediment-bearing water reaches any nearby watercourses. Appropriate sediment trapping techniques during construction will be used.

Conclusion

The latest climate models, from the UKCIP (www.ukcip.org.uk), suggest global mean surface temperatures will rise by between 1.4 and 5.8°C by 2100. These projected global average temperature rises are too high to be natural fluctuations in climate, are very likely to be without precedent in the last 10,000 years and are expected to modify rainfall patterns and cause sea levels to rise. The fact that Ireland has already dramatically exceeded the Kyoto limits on GHG emissions, which should not have been reached until 2013, means that there is a most urgent need for the state to generate emission-less power.

The Ballymartin Wind Farm project of 3 turbines would contribute approximately 1% to the national target of approximately 500MW for renewable energy deployment over the next five years.

In summary, the major negative effects of the wind farm at this site will be the limited and subjective visual effect, and the traffic during construction. To offset these, it has the advantages of being a clean source of electricity, reducing dependence on imported fuels, increasing local, sustainable development and employment, improving site access and supplying a tourism potential. No effects of a severe nature (e.g. contamination of an aquifer, destruction of a unique habitat) are possible through the construction and operation of this project.



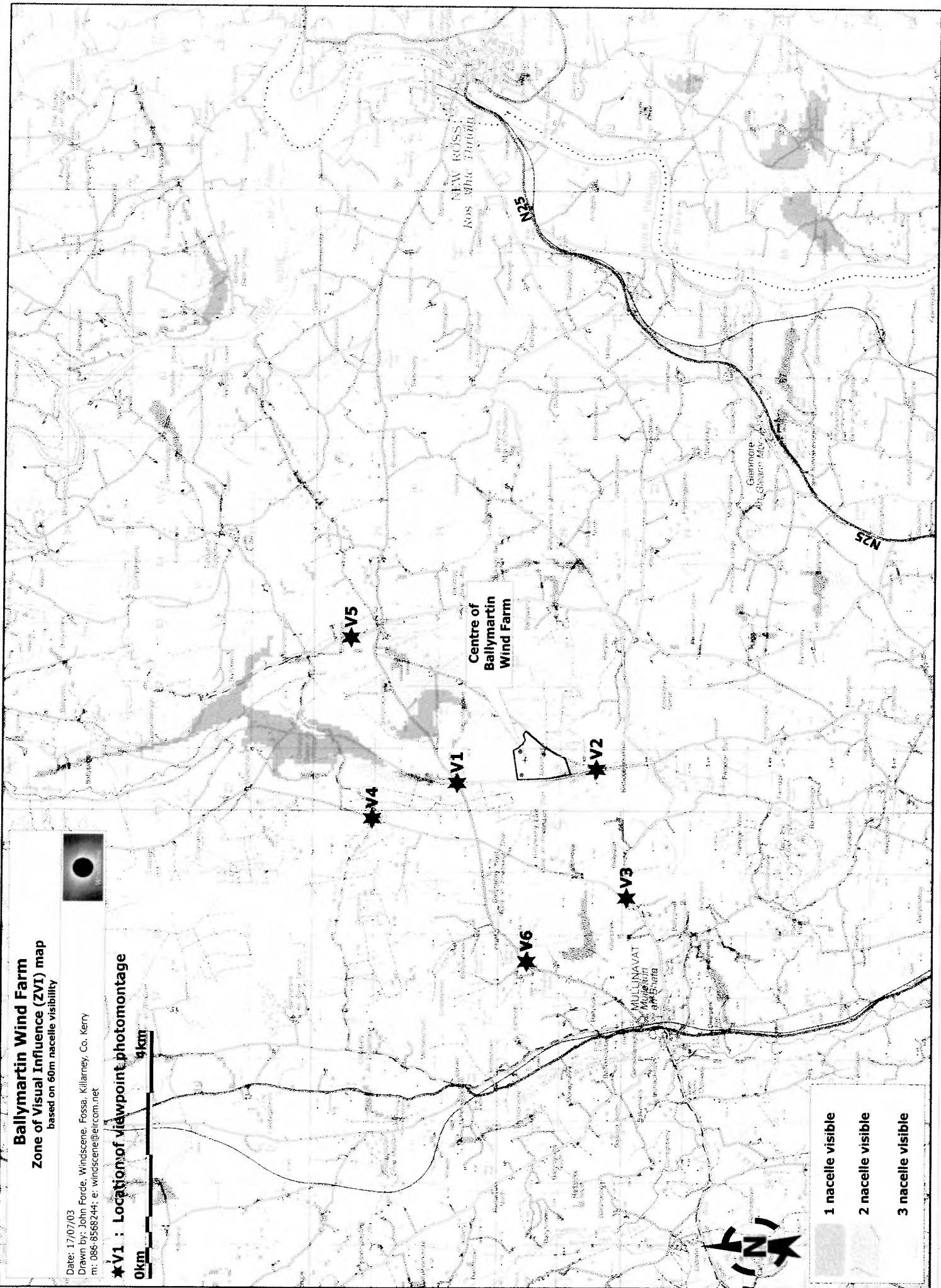
Ballymartin Wind Farm **Zone of Visual Influence (ZVI) map** based on 60m nacelle visibility

Date: 17/07/03
 Drawn by: John Forde, Windscone, Fossa, Kilarney, Co. Kerry
 m: 086-8568244; e: windscone@eircom.net

★V1 : Location of viewpoint photomontage

0km 4km

- 1 nacelle visible
- 2 nacelle visible
- 3 nacelle visible

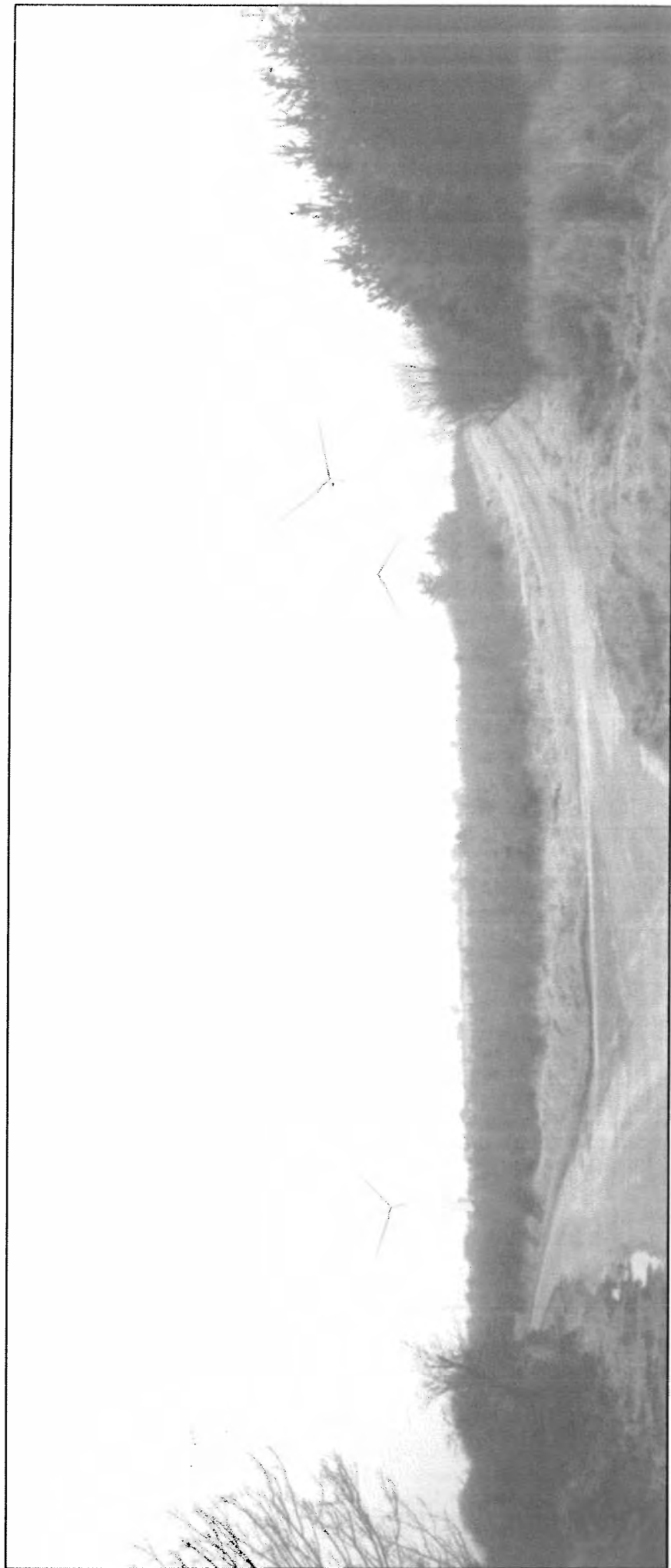


Ballymartin Wind Farm



Viewpoint 1 The proposed Smithstown Wind Farm superimposed on the landscape 1.2km southeast of 'Three Friars' crossroads.
Grid co-ordinates: 260430E, 127670N

Ballymartin Wind Farm



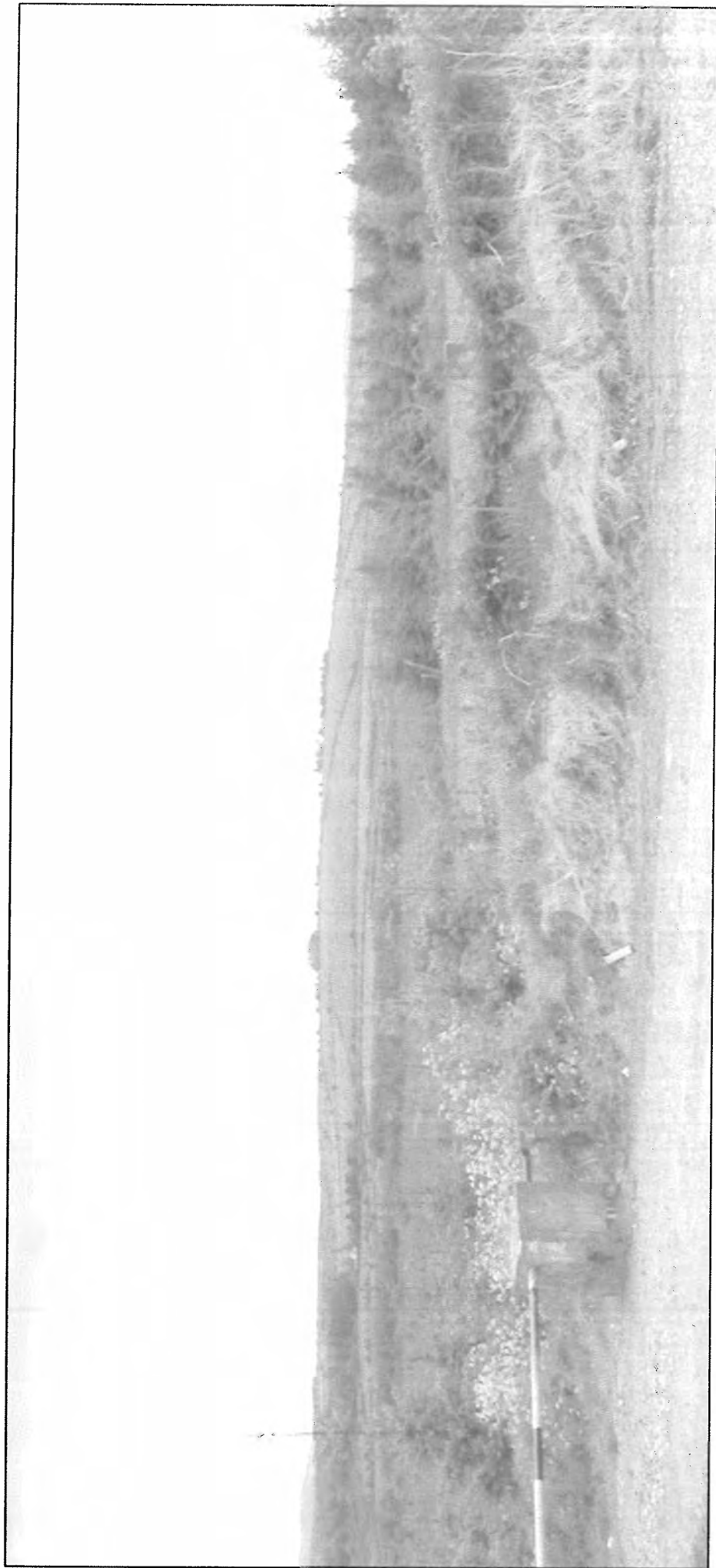
Viewpoint 2 The proposed Smithstown Wind Farm superimposed on the landscape 1km northeast of Ballymartin road fork.
Grid co-ordinates: 260660E, 125440N

Ballymartin Wind Farm



Viewpoint 3 The proposed Smithstown Wind Farm superimposed on the landscape 2.7km northeast of Ballyquin road fork.
Grid co-ordinates: 258620E, 124950N

Ballymartin Wind Farm



Viewpoint 4 The proposed Smithstown Wind Farm superimposed on the landscape 2.7km southeast of Derrylacky townland.
Grid co-ordinates: 259870E, 128950N

Ballymartin Wind Farm



Viewpoint 5 The proposed Smithstown Wind Farm superimposed on the landscape 3.5km southwest of Brabstown townland.
Grid co-ordinates: 262810E, 129480N

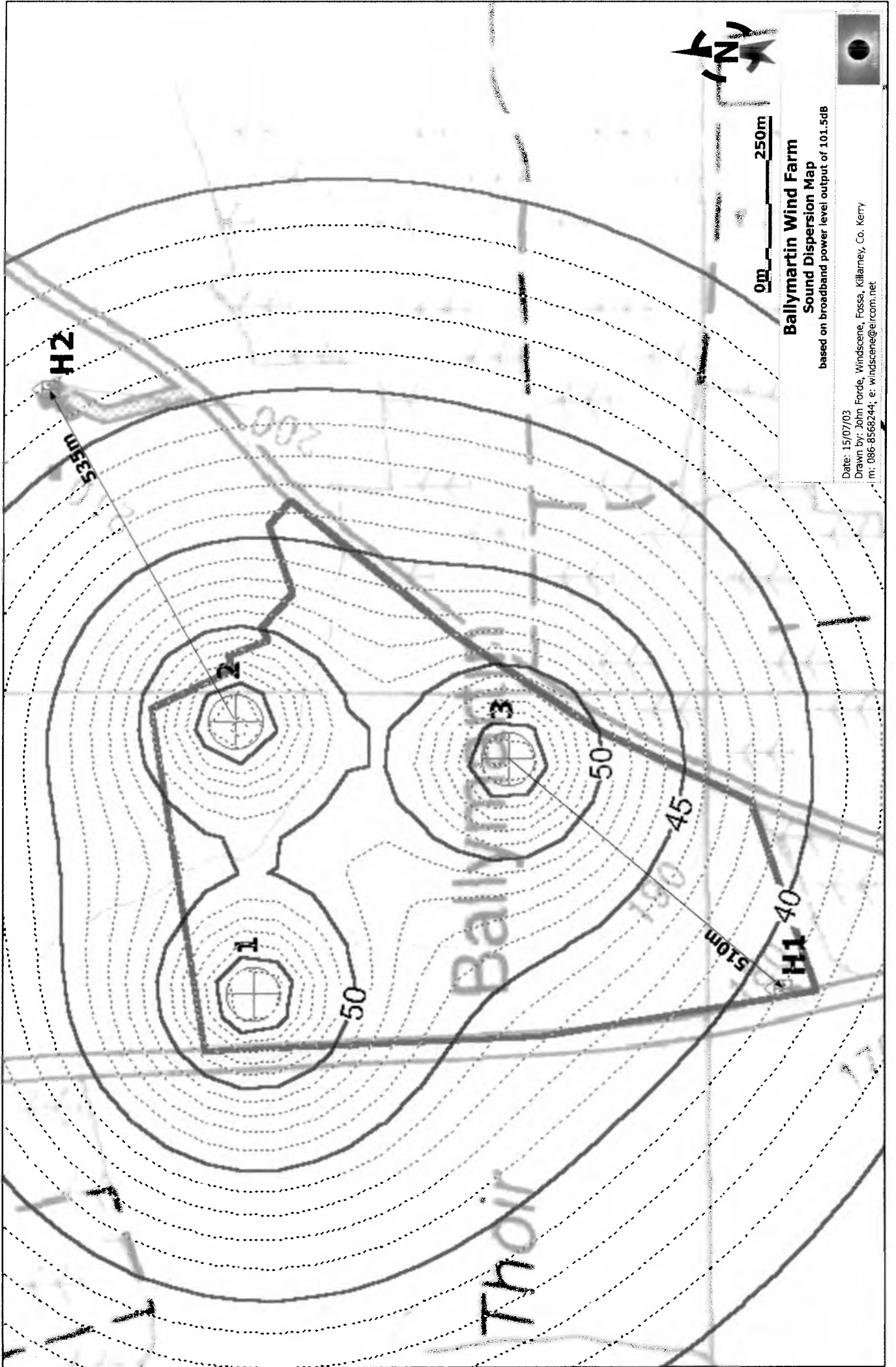
Produced by: Windscene, Fossa, Kiltarney, Co. Kerry; windscene.ie/eng/eng.html

Ballymartin Wind Farm



Viewpoint 6 The proposed Smithstown Wind Farm superimposed on the landscape 3km northeast of the R704 at Ballyvatheen townland.
Grid co-ordinates: 257470E, 126465N

Produced by: Windscene, Fossa, Kildare, Co. Kerry, windscene@eircom.net



Date: 15/07/03
Drawn by: John Forde, Windscene, Fossa, Kilarney, Co. Kerry
m: 086-8568244; e: windscene@eircom.net

Date: 16th July 2003
Ballymartin Wind Farm –
Supplemental Project Information



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Noise

Ballymartin townland is a quiet place with few human-induced noise generating activities, except normal farm traffic noise from near-by minor roads. Similarly, the surrounding areas within one kilometre can be classified as "quiet rural".

There are two types of noise associated with the operation of wind turbines:

1. The first is the sound made by the turbine blades as they move through the air. However, the wind in your ears, in the trees and around buildings causes similar noise and this substantially masks the aerodynamic noise from the turbine blades. For this reason, at more than two or three hundred metres away, this noise is indistinguishable by the human ear from other wind noises. If the wind speed is below 4 m/s (approx. 10 mph), the turbines do not operate and are therefore completely silent.
2. The second type of noise is made by the machinery in the turbine, including the generator and gearbox. Well designed and maintained modern turbines do not create any noise nuisance from the above source. A survey on research and development priorities of Danish wind turbine manufacturers conducted in 1995, however, showed that no manufacturer considered mechanical noise as a problem any longer, and therefore no further research in the area was considered necessary. The reason was that within three years noise emissions had dropped to half their previous level due to better engineering practices (Krohn 2000).

Noise is measured in decibels (dB). The decibel is a measure of the *sound pressure level*, i.e. the magnitude of the pressure variations in the air. An increase of 10 dB sounds roughly like a doubling of loudness. Measurements of environmental noise are usually made in dB(A) which includes a correction for the sensitivity of the human ear. The noise a wind turbine creates is normally expressed in terms of its sound *power* level. Although this is measured in dB(A), it is not a measurement of the noise level which we hear but of the noise power emitted by the machine. The sound *power* level from a single wind turbine is usually between 90 and 100 dB(A). This creates a sound *pressure* level of 50-60 dB(A) at a distance of 40 metres from the turbine, i.e. about the same level as conversational speech. At a house 500 metres away, the equivalent sound *pressure* level would be 25-35 dB(A) when the wind is blowing from the turbine towards the house. Ten such wind turbines, all at a distance of 500 metres would create a noise level of 35-45 dB(A) under the same conditions. With the wind blowing in the opposite direction the noise level would be about 10 dB lower.



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The developer has carried out a projection of noise levels for the proposed development of 3 turbines using the Nordex N60, 60m hub-height. A maximum sound output of 101.5dB(A) was used.

This is shown as a map of sound intensity contours for the Ballymartin site (see accompanying Sound Dispersion map).

The contour map shows that at a wind speed of 8 m/s (the noisiest wind speed situation) no currently occupied dwellings will fall within the predicted 40dB level.

Table 2 Noise levels from common sources

Source	Noise Level dB(A)
Threshold of pain	140
Jet aircraft at 250m	105
Pneumatic drill at 7m	95
Truck at 30mph at 100m	65
Busy general office	60
Car at 40mph at 100m	55
Quiet room	30-35
Rural night time background	25-40

source: Scottish Office, Environment Office

The specific turbine chosen after commercial tendering will have a similar sound output and this will be agreed with the Planning Authority prior to construction.

There are no specific regulations from the planning authorities or other agencies in Ireland about the amount of noise that can come from wind farms (source - F. Clinton, Environmental Protection Agency). The law governing noise as a nuisance is contained in two legal instruments, namely:

The Environmental Protection Agency Act, 1992, (sections 107 and 108) and The Environmental Protection Agency Act, 1992 (Noise) Regulations, 1994 (S.I. No. 179 of 1994). However, these do not specify permitted sound levels around wind farms and advice from other authorities needs to be sought.

The Irish Planning Institute Wind Energy Guidelines (1995) recommends that wind farms should be located a minimum distance of 500m from existing dwellings although it is stated that this distance may vary from site to site.

The Department of Environment (DOE) guidelines on wind farm development (1995) states:

The DOE guidelines state that *"Generally, noise levels measured externally at any dwelling house should not exceed 40 dB and tonal noise should be avoided"*.

By using high quality turbines from well-respected manufacturers tonal noise contributions will be eliminated. The developer undertakes to use only turbines that have passed examination by international certification agencies such as Germanischer Lloyd and possess a Class 1 certification. The developer further undertakes to eliminate any noise that occurs due to malfunctions as quickly as possible and, if persistent nuisance is caused, to shut down the offending turbine until the problem is rectified.



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Date: 16th July 2003
Ballymartin Wind Farm –
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Shadow flicker

Shadow flicker is a periodic phenomenon where the blades of a wind turbine cast a shadow over a window in a nearby house. The intermittent shadowing which results from the rotation of the blades causes a flashing-light effect in the room whose window is effected. In order to calculate the sun's location relative to the windows throughout the year the latitude, longitude and time zone have to be set for a specific location in close proximity to the wind farm.

It is important to note that shadow flicker is only possible if no object obscures the sun from the relevant house. Common climatic conditions, e.g. cloudy weather, will also regularly block the sun from while local trees and hedging will further reduce any potential effect.

The following formula has been produced to demonstrate the combination of specific simultaneous criteria that need to occur for the effect to be experienced:

$$S + C_0 + F_0 + Px + Ob + T + WoS + DoW = SF$$

Where:

S = direct sunlight, i.e. no local screening obstruction e.g. hedging, trees, buildings etc.

C₀ = zero cloud => blue skies

F₀ = zero local mist or fog => blue skies

Px = <500m proximity to specific window (based on most recent Kerry Co. Co. guidelines)

Ob = presence of conscious observer to experience the effect

T = total number of hours of the day that the effect is possible; the effect is not possible for approx. 50% of the time, on average per annum, because the sun is not present in the sky.

WoS = window of site: the specific window has to be exactly in-line and perpendicular to the direction of the casting shadow

DoW = the direction of the prevailing wind is southwest for approx. 70% of the time; therefore a window facing perpendicularly to this direction would not be effected

SF = shadow flicker effect experienced by a conscious observer

All other things being equal, the potential time window for the flicker effect to occur is between approximately 6.40am and 7.20am in the Kilkenny region (Dunsink Observatory) from 1st March to the first week in August. This is the only time when the rising sun is predicted to fall in line with the turbines. Also, it has been found that on average, for 60% of the time between 4am and 7am for the last 5 years that no direct sunlight in the morning is available in the Kilkenny region (Met Éireann).

A shadow flicker model (WindFarm3.1) was run based on the 3 turbine layout and a minor theoretical effect was predicted on House2 (see accompanying Sound Dispersion map). However, taking into consideration the above limited time window, the very low probability of the combination of the other specific criteria occurring simultaneously and the fact that the dwelling in question is surrounded by mature tress and vegetation the potential for shadow flicker is considered to be an insignificant at this site.



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**ECOLOGICAL IMPACT ASSESSMENT OF A PROPOSED
WINDFARM AT BALLYMARTIN, MULLINAVAT, CO.
KILKENNY.**

1. INTRODUCTION

The proposed windfarm site is situated 5 km north-west of Mullinavat, Co. Kilkenny. The site is at an elevation of between 300 - 500 m. Minor roads run along the western and eastern boundaries.

The site was visited on 1st August, 2003 with regard to a botanical and ecological assessment. The habitat is a mixture of heath, scrub and rough grassland. It is grazed by cattle. There is coniferous forestry adjacent to the southern and eastern boundaries.

This report deals with the flora and fauna separately. In each case the existing environment i.e. what is currently actually present, is firstly detailed. Potential impacts then indicate any possible effects the windfarm may have on the site and the scale of such effects. Finally, mitigation measures deals with steps that can be taken to minimise any potential impacts.

The information supplied has been sourced from a site visit, personal contact with Dúchas staff i.e. the local Conservation Ranger (Mr. Jimi Conroy), as well as from up-to-date literature on plants, birds, mammals and the impacts of windfarms on flora and fauna (most notably birds). These references are listed at the back of this report and, where relevant, detailed in brackets (i.e. surname and date) in the main body of the text after the information.

2. FLORA and habitats present

2.1 Existing environment

The proposed windfarm site is a mixture of heath, scrub and rough grassland. There are also earthen banks where hedgerow exists. The terrain is relatively flat to slightly undulating.

Heath is common. It is mostly dry heath, although a little standing water occurs in places. Ling Heather (*Calluna vulgaris*) is dominant. Other species in this habitat include Autumn Gorse (*Ulex gallii*), Bell Heather (*Erica cinerea*), Purple Moorgrass (*Molinia caerulea*), Bilberry (*Vaccinium myrtillus*), Carnation Sedge (*Carex panicea*), Heath Rush (*Juncus squarrosus*), Tormentil (*Potentilla erecta*) and *Cladonia* lichens. In wetter areas, the habitat is more marshy, and species such as Marsh Thistle (*Cirsium palustre*) and Creeping Cinquefoil (*Potentilla reptans*) occur. Although the vegetation cover is good, it is not very species diverse. Heath mostly occurs in the southern and eastern parts of the site, where it dominates. However, it is also interspersed with rough grassland to the north-west.

The heath is interspersed with scrub mostly of Common Gorse (*Ulex europaeus*) with Willow (*Salix cinerea*, *S. aurita*) and occasional Birch (*Betula pubescens*).

Rough / wet grassland is common throughout the western and northern sides of the site. Some are semi-improved with Perennial Rye Grass (*Lolium perenne*). In drier areas, there is Bent Grass (*Agrostis* spp.), White Clover (*Trifolium repens*), Chickweed (*Stellaria media*), Ragwort (*Senecia* sp.), Plantain (*Plantago lanceolata*), Dandelion (*Taraxacum officinale* agg.), Daisy (*Bellis perennis*), Common Dock (*Rumex* sp.) and occasional Red Fescue (*Festuca rubra*). In wetter areas, Soft Rush (*Juncus effusus*), Sorrel (*Rumex acetosa*), Creeping Buttercup (*Ranunculus repens*) and Yorkshire Fog (*Holcus lanatus*) occur. On banks, patchy hedgerow of Hawthorn (*Crataegus monogyna*), Birch and Willow occurs. Here, Willowherb (*Epilobium montanum*), Bird's-foot Trefoil (*Lotus corniculatus*), Knapweed (*Centaurea nigra*), Vetch (*Vicia sativa*), Bilberry and Bramble (*Rubus fruticosus*) grow in the ground flora.

2.2 Potential impact on the flora present

Road construction and turbine installation will destroy the flora, where located and have an impact in the direct vicinity of these works. The area affected will represent approximately 1 - 2 % of the total area of the windfarm site.

The construction phase will have the most floristically impact. However, much of the site is grassland and is of little botanical interest. The heath present, although not appreciably overgrazed is not very species diverse. Destruction of some grassland and heath habitats will have little ecological significance.

On a longer term, increased drainage resulting from construction works (particularly roads and tracks), will have little impact on the habitats present, as there is little wetland habitats present.

Because the land is mostly not very soft, heavy machinery traversing the area would do little long-term damage the vegetation.

Construction of turbine bases consists essentially of excavating a hole of approximately 15x15m down to bedrock and constructing the turbine base within this. The base is made of steel-reinforced concrete with or without a fill of hardcore beneath to raise the level of the base sufficiently. The process does not result in long-term drainage of the surrounding land.

The disposal of rock spoil from turbine excavation by dumping on adjoining vegetation would result in destruction of the underlying vegetation. The dumping of large amounts of soil for periods of months would have a similar effect.

Excavation and construction of the proposed windfarm could result in additional silt entering watercourses on site. This could cause excessive siltation of watercourses downstream. However, on this site, although a tributary of the Blackwater River is 0.5 km from the west of the site and the Arrigle River is 0.5 km to the east of the site, there are no outflowing streams / main drainage channels running from the site.

2.3 Mitigation measures (flora)

Relatively, the area of habitat lost due to the construction of the windfarm and associated infrastructure is relatively small (1 - 2% of site). Some habitat destruction does occur due to construction of turbines and associated infrastructure. On a longer term and over a larger area, the roadways and associated drainage ditches can cause some deterioration of the habitats present. However, the grassland and other habitats present are not of major ecological significance.

Construction work could result in excessive siltation of drains / watercourses on site.

- Where possible, roadways will utilise existing tracks or previously disturbed ground.
- Roads and heavy machinery will avoid areas of wetter ground.
- The small amount of rock spoil from turbine excavations will be consumed in road making. The soil excavated from sites of turbine foundations will be stored temporarily on site, to be removed later.
- Where excavation or construction works occur within 20 m of watercourses, steps will be taken to ensure excessive silt does not enter such watercourse. If necessary, silt traps will be installed during the excavation / construction phase and left in place until the surrounding vegetation stabilises.

3. FAUNA

3.1 Bird species

Hen Harrier (*Circus cyaneus*) nest c. 2.5 km north of the site in the Glenpipe area. However, there are no Hen Harriers nesting on site. Peregrine Falcon (*Falco peregrinus*) nest on the River Barrow some 10 km from the proposed windfarm site, while Barn Owl (*Tyto alba*) and Long-eared Owl (*Asio otus*) are quite possibly present in the locality. Osprey (*Pandion haliaetus*) have been recorded on the River Nore. (J.Conroy, pers. comm., 2003).

Kestrel (*Falco tinnunculus*), along with Sparrowhawk (*Accipiter nisus*), could utilise the area for hunting. Bird species which may frequent the site could include Snipe (*Gallinago gallinago*), Raven (*Corvus corax*), Woodcock (*Scopopax rusticola*) and Pheasant (*Phasianus colchicus*). Small birds such as Meadow Pipit (*Anthus pratensis*), Skylark (*Alauda arvensis*) and Stonechat (*Saxicola torquata*) may also occur.

In Ireland, Hen Harrier nest predominantly in second rotation coniferous plantations, pre-thicket plantation of less than 10 years and heather moorland. They favour upland areas (200 - 400 m) where there is a mosaic of semi-natural vegetation and, in particular, heath, bog and hill farmland. Most birds vacate breeding sites and move to lowland areas in winter. Hen Harriers were widely distributed in Ireland in previous centuries. By the 1950s, numbers had declined dramatically. However, with an increase in coniferous afforestation there has been some recent recovery in their numbers. Now, there is a healthy population at 102 - 129 breeding pairs, limited by the carrying capacity of the breeding range (Irish Birds, 2002).

Peregrine Falcon are widespread and relatively common in Ireland with c. 500 breeding pairs (Cabot, 1995). Long-eared Owl are seldom seen, spending the day roosting close to the trunk of a tree, only emerging at night to feed. They are more frequent in the east than the west with about 2,300 pairs, mostly in coniferous woodland (Cabot, 1995). Barn Owl are thinly scattered (600 - 900 pairs), generally south of a line from Galway to Dundalk and mostly in the east of the country (Cabot, 1995). Osprey is a migrant, leaving its nesting grounds in August or September for winter quarters in tropical and southern Africa.

Kestrel and Raven are relatively common in mountain, moor and farmland habitats, while Sparrowhawk is our commonest bird of prey. Meadow Pipit, Skylark, Stonechat, Snipe and to a lesser degree Woodcock and Pheasant are common on fields, wetlands and bogs.

Hen Harrier is listed for protection under Annex I of the EU Birds Directive.

3.2 Mammal fauna

The mammal fauna present could include Fox (*Vulpes vulpes*), Mountain Hare (*Lepus timidus hibernicus*) and Irish Stoat (*Mustela erminea hibernica*). Badger (*Meles meles*) may venture into the site. None of these species are uncommon in Ireland.

3.3 Potential impact on avifauna present

3.3.1 General

Windpower has drawbacks for biodiversity, including habitat loss, disturbance and bird mortality. Habitat loss can occur as a result of opening up an area to development that had not previously been accessible. Disturbance includes human presence and the noise of the turbines themselves during construction, operation and maintenance of the wind farm. Bird mortality can result from collision with the turbines, their support towers and any power lines in the development. These impacts can be minimised by sensitive siting and design, and in many situations wind turbines will have minimal effects on biodiversity (RSPB, 1996).

Deaths of raptors at windfarms in California and south-west Spain have occurred through collision with turbines, transmission lines and electrocution. In Holland, it was found that small songbirds and Black-headed Gulls were more susceptible to collisions than other birds, these being particularly vulnerable at dusk and at night. However, from limited work carried out in the UK, the scale of birds strike does not appear to be of serious concern. Unless windfarms are sited on bird migration routes or in areas of high bird concentration, bird strike has not been found to be a major problem. Relevant cases in the U.K. support this, including the following:

- A study at Bryn Tytli showed no significant adverse effects on upland breeding bird communities (Philips, 1994). Peregrine Falcon were subsequently found to be nesting within 250m of one turbine (Lloyd, 1996).
- Dulas Engineering Ltd (1995), in the windfarm impact study for the Cemmaes Wind Farm in Wales showed similar results.
- A study at Carno, a large hilltop wind farm of 56 turbines in Wales, also showed no adverse effects on birds using the site (Williams and Young, 1997).
- Hawker (1997) found that the turbines at an upland Scottish site had no effects on birds using the site.
- Scottish Power (2003) at a windfarm at Inverliew, where Hen harriers widely use the site, found that the probability of Hen Harrier mortality from a strike with a turbine was one in every 100 years.
- Crockford (1992) and Benner *et al.* (1993) indicated that bird collisions are rare and occur mainly at sites of unusual concentrations of birds and turbines.

Also, limited evidence from the UK suggests that many breeding birds are unaffected by operational wind farms, becoming habituated to the noise and movements of turbines (RSPB, 1996). In general, noise is not considered a major disturbance factor to fauna.

The RSPB (1996) recommends not siting wind farms in certain locations:

- within Special Areas of Conservation,
- near high concentrations of migrant feeding or roosting birds.
- near known migration routes or regular flights paths, particularly of waterfowl.

Mike Madder (1997), states that the impact of a wind farm will very much depend on how close the turbines are to nesting sites. Also, a loss of habitat may result because

the birds may avoid the windfarm location. The turbine structures can facilitate the predation of small birds' nests by Ravens and crows, by supplying perching vantage sites (Carruthers, 1997). Also, birds perching on the turbines can suffer mortality by collision with the windmills.

3.3.2 Hen Harrier

- Bird strike

Hen Harriers fly to a small area in which it spends the day hunting and resting. In hunting, Hen Harriers quarter the area very slowly within a few feet of the ground. On such occasions, they would certainly avoid the windmills (King, 1994).

In April and early May spectacular displays are performed. These range from wide circles, rising so high as at times to be lost from sight, to the wild undulating displays which have been described as "sky dancing". These displays serve both to attract a mate and to advertise occupancy of a territory (Picozzi). The soaring displays of the Hen Harrier normally take place high above its proposed breeding site, which would be within coniferous forestry (King, 1994). However, they can take place up to a kilometre from the nest site (Madder, 1997), preferably displaying in valleys (O'Donghue, 2000). The proposed wind turbines will not be amid the forestry, nor is it within a valley and is over 2.5 km distant from the nearest nesting site. Therefore, the risk of bird strike is substantially reduced.

There is also a risk of bird strike with the newly flying fledglings. For their first 2 - 3 weeks out of the nest, their flight is unsure and they would be prone to collision (Madder, 1997). However, Scottish Power (2003) concluded that at their windfarm at Inverliever, where Hen Harriers widely used the site, that the risk of birdstrike was one in every 100 years.

- Habitat loss

The RSPB (1996) has voiced concerns over siting windfarms within enclaves of open hill within large forest blocks. This may impact on species like Hen Harrier which require large open spaces to hunt in. Obviously, some potential hunting habitat loss will result where the windfarm is sited. However, taking account of low flying hunting technique of the Harrier, it could still hunt in the vicinity of the turbines. At Tursillagh, Co. Kerry Hen Harriers have been found foraging within 200 m of the turbines. If the raptor abandons the windfarm site, hunting areas can be 4 km or more from the roost and as small as 250 ha (Picozzi). Therefore, unless tracts of adjacent open spaces are lost, the Hen Harrier can easily utilise suitable territory nearby. This matter could become an issue if a number of windfarms were sited in the area, utilising the remaining open spaces amid the forestry.

- Disturbance

From late March, the Harriers move to their nesting grounds on the heather moors. Eggs are laid in large open nests on the ground from the end of April at one to three

day intervals. (Picozzi). This is when disturbance from the windfarm construction could be most critical. When in place, the Harriers will most likely accustomise to the turbines. The major impact of human disturbance would be in the vicinity of the nests. Hen Harrier are known to aggressively attack intruders encroaching near a nest site (Watson, 1977). However, Hen Harrier have been recorded nesting in areas close to human activity e.g. intensive turf cutting (O' Donoghue, 2000). Breeding Hen Harriers have been found to be particularly resilient to human activity, with the national Hen Harrier survey (Irish Birds, 2002) estimating that 61% of all nest sites lie within 300m of a forestry track or a tarred road, some of which were surprisingly busy during the breeding season. At Tursillagh windfarm, Co. Kerry, Hen Harriers have bred successfully within 1 km of the turbines (D. Norriss, pers. comm.). Therefore, disturbance, even during the construction phase, should not be a major factor.

3.3.3 Peregrine Falcon

- Bird strike

Peregrine Falcon have a fast, pigeon-like, dashing flight (Cabot, 1995). They capture their prey by plummeting downwards at speeds of up to 280 km/hr., suddenly slowing its flight before striking upwards to sink its talons into the victims flesh (Felix, 1986). The wind farm could pose some threat of collision here. However, being a very agile flyer, the risk category would be low.

There is also a risk of bird strike with the newly flying fledglings. For their first few weeks out of the nest, their flight is unsure and they would be prone to collision. However, the proposed windfarm is over 10 km distant from the nearest nesting site. Taking account of this, and that the agility of the newly flying fledglings is only unsure for a very short period, the risk of collision here is again low.

- Habitat loss

Obviously, some potential hunting habitat loss will result where the windfarm is sited. However, the area covered by the windfarm is relatively small at 1-2% of the total area. Also, if the raptor abandons the windfarm site, it can easily hunt in suitable territory nearby. In any case, Peregrine Falcon is quite adaptable in the type of territory it will utilise. This matter could become an issue if windfarms and coniferous forestry dominated the landscape. However, there are no other windfarms in the direct locality, and afforestation, although present nearby, does not dominate the landscape. Also, there is open moorland still present in the locality.

- Disturbance

Peregrine Falcon nest in open country in rocky, wooded spots which command a wide view, as well as on coastal cliffs and sometimes on city towers (Felix, 1986). There are no suitable nesting sites in the direct vicinity of the proposed windfarm site. Although 1 pair nest on the Barrow, this is over 10 km distant. Therefore, disturbance, even during the construction phase, will not be a factor.

3.3.4 Long-eared Owl and Barn Owl

- Bird strike

Owls are very low-level flyers and are, therefore, unlikely to collide with the windmills. They mostly hunt at night, but the owl's well developed night senses would minimise the likelihood of collision with the windmills.

- Habitat loss

Long-eared Owl frequent small conifer and mixed woods, as well as field groves, large parks and overgrown gardens (Felix, 1986). Barn Owl are mostly found in agricultural landscape. The habitat loss of the proposed windfarm would minimally impact on the population of owls, as there is ample similar habitat nearby, notably farmland and young coniferous woodland.

- Disturbance

Long-eared Owl lay eggs at the end of March or April, incubating for 27 to 28 days (Felix, 1986). Barn Owl are not particularly discriminating as to the time of nesting, and its clutch of 4 - 6 eggs may be found any time from March to November (Felix, 1986). Construction will obviously cause short-term disturbance if any owls are nesting nearby. However, there are no definite records of either species nesting in the locality. The normal operation of the turbines would minimally impact on both owl species.

3.3.5 Other Bird species present

Osprey favourite haunts are large, freshwater lakes and ponds, feeding mainly on fish, flying above the water's surface at a height of about 25 metres, often hovering for a while. On sighting prey, it plunges into the water with force. (Felix, 1986). This species occurs on the River Nore and is unlikely to venture near the windfarm site.

- Bird strike

Skylarks and Meadow Pipits display in the breeding season by flying high to advertise their presence in song. Skylark sing on the ascent, Meadow Pipit on the descent. In their song flight, the Skylark will invariably, and the Meadow Pipit will often, reach the height of the rotor blades. Also, Meadow Pipits indulge in aerial chases with erratic flight paths (EM Consultants, 1995). Again wind turbines would pose a threat.

Snipe have aerial song-flight which involves steep dives at elevations which could bring them near rotor blades. This takes place at night and is, therefore, a potential hazard (EM Consultants, 1995). Similarly, the territorial display of Woodcock from mid February to July, which occurs at dusk could bring this species near the turbine rotor blades. Pheasant fly low and would be in the low risk category.

Kestrels hunt ground prey by hovering, or perching, on look-outs. They would be in a low-risk category. Ravens and other crows are quite intelligent and will assess carefully any new phenomenon in their territories. It would be expected that they would avoid contact with the rotor blades (EM Consultants, 1995). Sparrowhawk hunt mostly along hedges and woodland with a dashing, low, almost jinking flight. Its low, alert flight would put it in the very low risk category. It is also our commonest bird of prey at 11,000 pairs (Cabot, 1995).

- Habitat loss

The loss of habitat caused by the turbines and roadway is unlikely to be significant for any of the species above. Meadow Pipits and Skylarks will probably nest in the vicinity of the turbines, if the habitat is maintained. Ravens and Kestrels are quite adaptable at utilising different habitat types, while Sparrowhawk would preferably hunt in the farm field systems at lower altitudes.

- Disturbance

Construction would cause disturbance to breeding birds in the vicinity. This would mostly impact on Kestrel, Meadow Pipits and Skylarks. Kestrels are quite adaptable, though, and will move if necessary. The day-to-day operation of the wind farm and associated low level human activity would minimally impact on most bird species mentioned.

3.3.6 Mammal fauna

The day to day operation of the wind farm is unlikely to have a major impact on the mammal fauna present. It would be expected that they would accustomise to the movement and noise of the blades. As long as human activity is not intensive and confined to the turbines and roadway, disturbance to the mammal population should be minimal. Obviously, the construction phase will cause disturbance, notably during the breeding season of the Mountain Hare, although few would be expected to be breeding on site. Habitat loss would minimally impact on the fauna present.

3.4 Mitigation measures (fauna)

3.4.1 Bird strike

Peregrine Falcon, Long-eared Owl, Hen Harrier, Merlin, Kestrel and Sparrowhawk would not be expected to come in contact with the rotor blades. Skylark, Meadow Pipit, Snipe and Woodcock all may suffer bird strike. However, since these are common species, and the risk of collision low, the potential loss to their population would not be significant.

- The possibility of bird strike can be mitigated by building the turbines of solid structure, rather than the alternative lattice design. This serves to restrict perching sites for raptors. This also means that vantage points for potential plunder of small birds' nests are not available for crows and ravens.
- The placement of turbines will be such so as not to present a "wind wall" effect, where birds will have room to avoid turbines and thus reduce the potential for bird strike.
- Turbines shall have low intensity navigation illumination, thereby reducing the potential for night-time, or low visibility bird strike.

3.4.2 Habitat loss

Some of the windfarm site could be lost as a habitat to some species because they choose to avoid the area. At this site, there is still other areas of similar habitat in the vicinity, which could be utilised by these species. The amount of habitat lost as a result of the wind turbines and associated roads is relatively low.

- Mitigation measures for this potential impact are detailed under flora mitigation measures.

3.4.3 Disturbance

Most disturbance will occur during construction. This could impact on Hen Harrier as they nest c. 2.5 km distant. Disturbance during construction would not be a major ecological factor for other bird species. Kestrel will move nesting site quite easily. Construction could result in the failure of some smaller birds' nests such as Skylark and Meadow Pipit. These species, though, are relatively common. Any potential loss of the smaller bird species can hardly be regarded as significant.

- Construction could be deferred until after the nesting season of Hen Harrier (April, May), ideally when bird fledglings have matured somewhat (June, July). However, at this site, although Hen Harrier nest nearby, it is over 2.5 km distant and it is expected that disturbance will not be a major factor.

Once constructed, the daily operation of the windfarm will cause disturbance, by noise from the turbines and blades, the movement of the blades, and human activity. The

noise disturbance factor is not regarded as serious, both being at low audible levels. Similarly, the movement of turbine blades is not considered a major disturbance factor to the fauna present. The RSPB (1996) suggest that breeding birds habituate to the noise and movements of turbines.

- After construction, human activity will be confined to roadways and occasional visits to the wind turbines, to minimise the human disturbance factor.

3.4.4 General

- The risk of pollution arising from construction of the windfarm can be reduced by adopting the following preventative measures :
 - off-site washing of concrete and cement carrying vehicles.
 - off-site disposal of excess concrete, used oils and other chemicals (temporary on-site storage to be restricted to bunded areas).
- With sensitive siting and design, windfarms will minimally effect biodiversity (RSPB, 1996). However, the impact of windfarms on native fauna has been relatively little studied. Therefore, on-going monitoring of the windfarm's impact on the fauna present will be carried out.

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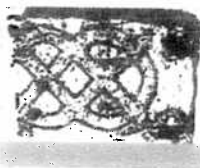
Archaeological Assessment:
Proposed Wind Farm at
Ballymartin, Mullinavat,
Co. Kilkenny



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Archaeological Assessment: Proposed Wind Farm at Ballymartin, Mullinavat, Co. Kilkenny

1.0 INTRODUCTION

This report was commissioned as part of a pre-planning submission for the proposed construction of a wind farm at Ballymartin, Co. Kilkenny (NGC 261269 126609, 200m OD; Fig.1). The report is divided into six sections. Section 2.0 outlines the methodology employed for the assessment. Section 3.0 details the recorded evidence for cultural heritage in the development area and surrounds. Section 4.0 contains the results of the field inspections. Section 5.0 gives the Archaeological Impact Statement and Section 6.0 offers mitigatory measures. Section 7.0 contains the bibliography.

1.1 Proposed development

It is proposed to construct a three-turbine wind farm. The development footprint includes the construction of access routes, pads for the wind turbines, below-ground electrical piping, pads for electricity poles and a pad for a 20kv sub-station..

2.0 ASSESMENT METHODOLOGY

The assessment conforms to the methodologies recommended in 'Framework and Principles for the Protection of the Archaeological Heritage' issued by the Dept. of Arts, Heritage, Gaeltacht and the Islands (1999) and the Environmental Impact Statement Guidelines published by the Environmental Protection Agency (1995, 39-40).

2.1 Documentary research

The following documentary sources were examined:

2.1.1 Primary sources:

- a. Sites and Monuments Record (SMR) files held by the Archaeological Survey of Ireland, Duchas, The Heritage Service
- b. National Museum of Ireland Topographical files and Registers
- c. Griffiths Valuation (1849)
- d. Census of County Kilkenny (1801, 1841, 1871, 1911)
- e. Low level Aerial Photograph of area (Ordnance Survey)
- f. Irish Schools Folklore Collections Microfiche Manuscripts Listerlin N.S.

2.1.2 Secondary sources:

Secondary sources employed are noted in the bibliography.

2.1.3 Cartographic Sources:

- a. 1st edition OS 1:10560 maps Sheets 36, 40 (1839) (Fig.4)
- b. 2nd edition OS 1:10560 maps Sheets 36, 40 (1902) (Fig.2)
- c. Discovery Series 1:50000 Sheet 76 (Fig.1)
- d. Wm Petty's Down Survey maps of Baronies of Knocktopher and Ida (1685)
- e. The civil Parishes and Baronies of Kilkenny in the mid 19th century (Smyth 1990)
- f. Records of Monuments and Places (RMP) constraints maps, Co. Kilkenny (Fig.5)

2.2 Field Inspection

Each field within the proposed development area was inspected and photographed. Recorded archaeological sites within close proximity of the proposed development area were visited. *Pro forma* record sheets were employed to record information on local topography, landuse, areas of archaeological and/or architectural significance/potential and any folklore connected with the locale. A hand held GPS was used to plot locations of new possible sites encountered during inspection of the study area fields as well as to check the coordinates of those sites already known nearby.

2.3 Aerial Photograph

An Ordnance Survey aerial photograph (ref.29/00R97) flown at 5000ft on 27th June 2000 was utilised (Plate 1). It was of moderate quality, making the identification of cropmarks difficult. No such features were visible within the development area.

3.0 DESK-TOP STUDY RESULTS

3.1 Archaeological and Historical Context

3.1.1 Introduction

The development area lies within the townland of Ballymartin and the parish of Listerlin in the barony of Knocktopher, South County Kilkenny (Fig.1). The region is one of uplands; the granite massifs of Mt Brandon and Cullentragh hill to the Walsh Mountains and the foothills of Slievenamon at the west border with Tipperary. Land is predominantly poor farmland and bog. Unlike the rich farmlands of the north of the county this area is one with a far more rural feel and a much wider dispersed and smaller population.

The parish of Listerlin or Listerling as it was sometimes spelt is an ancient one and was so called in local folklore in reference to "a Danish fort or moat of considerable dimensions, surrounded by a ditch and fosse from which the Parish is supposed to have derived its name Lis-Easterling, the Fort of the Easterlings or Danes" (Tighe 1800, 631). O'Donovan however believes this to be an incorrect interpretation: "I am sure it is the place called Lis-ar-Glind in the Annals of the Four Masters at the year 1118" and therefore being simply translated as the Fort

on the Valley (O'Donovan 1839, 170).

Prehistoric Context

Recent research carried out by the Ballylough Project in Waterford and Stout in Wexford has shown that during the Mesolithic period hunter-gatherers were present in the south-east of Ireland (Gibbons 1990). There is also partial confirmation of the presence of hunter-gatherers exploiting the resources of the rivers Suir, Nore and Barrow through the presence of materials associated with the later Mesolithic period such as Bann flakes from the Barrow valley in south-east Kildare. To date however, no unequivocal evidence of a mesolithic presence in county Kilkenny has been documented.

The Neolithic period sees the first concrete evidence of human settlement in County Kilkenny. All of the major megalithic tombs are represented and south Kilkenny in particular has a notable concentration of the sites with examples at Kilmogue, Farnoge, Ballynearla, Ballyvatheen and indeed a wedge-tomb is located 1km from the proposed development area in Ballymartin townland (Gibbons 1990). A fine example of a three stone alignment, known locally as the "three friars" (Site 2) lies 900m north of the proposed development area (Plate 3). Such sites are generally datable to the late neolithic-early bronze age and are rare in Kilkenny. Single standing stones are also quite common with examples recorded from Ballylusky, near Mullinavat and a possible new example (Site 1) 200m north of the proposed development area (Gibbons 1990). At Coolmore, south of Knocktopher, a flat cemetery was found with four short rectangular cists and at Ballynooney West, 2.5km west of the proposed development area, a cemetery cairn containing at least three cists was identified.

Early Historic Context

There are some 1200 Early Christian ringforts in County Kilkenny (Gibbons 1990). Of these twelve are located within 5km of the proposed development site including Site 6 in Smithstown townland. Local folklore stories of fairy forts are be found in the Irish Folklore Commission's Schools Manuscripts: "Fairy forts are plentiful around the district. There is one in Darbystown in Nicolas Wood's field" (Listerlin National School 1838), and "there is a rath in a field belonging to Jack Harte of Darbystown" (Listerlin National School 1838). The National Museum of Ireland topographical registers record the discovery of iron slag fragments from a ringfort at Knockmoylan townland (reg. no. 1987:115). What may have been a souterrain is recorded by O'Kelly: "Ballymartin, Baile Mhairtin, Martins field... area of 322 acres..... In the Kilkenny Archaeological Journal of 1849, it is recorded that a sepulchral vault to the south-west of Listerlin is locally called the Pooka's Grave..... In Carrigan's notes he also records it as Toomapooka i.e. Tumba an Phuca, also Moonashoga, i.e. Moin na Sidheog, moor of the fairies" (O'Kelly 1969, 173). Early ecclesiastical sites are found at some two-hundred locations in County Kilkenny (Gibbons 1990). St. Moling has left connections with the locality in placenames such as Mullenakill and there are possible early Christian ecclesiastical foundations at Mullinavat and Davidstown.

3.1.4 *Medieval Context*

The south Kilkenny uplands were peripheral to, though not entirely unaffected by the great economic and social transformations brought about by the Anglo-Normans conquest in the late 12th-13th century. The proposed development area was contained in the medieval cantred of Iverk, part of the Marshall lordship of Leinster. Attesting to settlement in the 13th-14th century are the moated sites at Smithstown (Site 4; Plate 3), Earlsrath and Ballytarsna and the boroughs established at Mullinavat and Knocktopher.

3.1.5 *Modern Context*

The 1st ed OS map (1839) of the townland shows a total of nine possible dwellings, only two of these appear to lie within the development area (Fig.4). By the revision of the 1st ed map in 1902 a new road had been built, bounding the east side of the development area running NE-SW and dividing the townland almost in half (Fig.2). Areas of the townland to the south and west were subdivided into fields not previously farmed, perhaps in an attempt to cultivate them. At around the same time perhaps, a trackway was built running E-W, which now divides the development area in half N-S. It does not appear as if this road and trackway nor the field divisions gave rise to new houses in the area as the total number shown had shrunk to one for the entire townland by the 2nd ed map (Fig.2). Visible as a large homestead surrounded by trees this dwelling lies NE of the current development area. In 1801, the number of houses recorded in the census at Mullinavat was 35, with 158 inhabitants. The erection of a church here in 1805 led to an increase in population with 110 inhabited houses noted in the 1841 census. In 1871, the population of Mullinavat was 531. The 1911 census notes only three houses in Ballymartin townland with one family living in each. All the houses were listed as stone built with two being slated and a third (for the servants and labourers of the Woods family) being thatched. Today only one early 20th century house stands within the development area.

3.2 **Archaeological sites in vicinity of proposed development area**

No previously recorded archaeological sites lie within the proposed development area. Field inspection and aerial photography failed to identify any previously unrecorded sites within the site. Two recorded archaeological sites lie within 1km and a further three within 2km. One new potential archaeological site was identified during the field-inspection outside the development area. Each site has been classified on the basis of the TOWNLAND in which it lies, its Record of Monuments and Places (RMP) number its National Grid Reference (NGC) and its means of IDENTIFICATION. This is followed by a determination of the site TYPE and a brief DESCRIPTION. The description employed is composed of data from the ASI field-notes and the authors inspection. An examination of the sites PROXIMITY to the development area is noted as is any potential impact the development might have on the site. MITIGATORY MEASURES are then outlined.

SITE 1 (Fig 5; Plate 2)

COUNTY

Kilkenny

TOWNLAND

Ballymartin

RMP

Previously Unrecorded

NGC

261109 126525

IDENTIFICATION

Field Inspection

TYPE

Standing Stone (possible)

DESCRIPTION

In flat field on gentle west-facing slope.
Stone with a rectangular cross-section 1.05m x 0.80m. Stone-type possibly shale.

PROXIMITY

210m

POTENTIAL
IMPACT

Site is outside the proposed development area and will not be directly impacted upon physically. It is possible that the proposed wind turbines would be visible from site though any impact would be minimal.

MITIGATORY
MEASURES

See 5.2-5.4.

SITE 2 (Fig 5; Plate 3)

COUNTY

Kilkenny

TOWNLAND

Smithstown

RMP

KK036:35

NGC

260560 127680

IDENTIFICATION

SMR files, RMP, OS

TYPE

Stone Alignment

DESCRIPTION

Inspected 6th August 2003. Site appears on the 1st ed. OS map (1839). The stones are aligned N-S with size decreasing in the same direction. Three granite stones set 1.2-1.7m apart. The stones appear to have been whitewashed a number of years ago. They are situated about half way up a prominent ridge which runs N-S parallel to the alignment and the N-S facing valley in which they are located. About 10m below the alignment and respecting the curve of the ridge is a ditch of unknown date which partially encircles them. It is shown on the 1st ed. OS map. There has been a marker erected in honour of "the three friars" (as they are known locally) at the crossroads at the base of the hill to the NW (Plate 4). This is a reference to local folklore which equates the stones with three friars who were reputedly murdered by Cromwell's arm. A lime-kiln is also located in the NE corner of the field with a corresponding quarry at the NW side (Plate 5). They are both marked on the 1st ed OS map sheet 36, 1:10560.

PROXIMITY

900m

POTENTIAL
IMPACT

Site is outside the proposed development area and is not directly impacted upon physically. It is possible that the proposed wind turbine would be visible from site though any impact would be minimal.

MITIGATORY
MEASURES

See 5.2-5.4.

SITE 3 (Fig.5)
COUNTY
TOWNLAND
SMR
NGC
IDENTIFICATION
TYPE

Kilkenny
Ballymartin
KK040:37
262290 126790
SMR files, RMP
Wedge tomb

DESCRIPTION

Site could not be found during field inspection. Possibly destroyed by quarrying. Described by ASI: 'gallery aligned east-west incorporated in a low mound approximately parallel-sided in present condition. Overall dimensions 7.80m east-west, 4.60m north-south. Internal diameter 3.80m x 1.10m. Orthostats stand 0.30m high. Height of mound 0.90m a.g.l. Set on dry raised area in a boggy zone on west side of Arrigle river nearby at bottom of steep ravine. All grazing land or forestry.

PROXIMITY

1 km

POTENTIAL
IMPACT

No potential archaeological impact envisaged.

SUGGESTED
MITIGATION

See 5.2-5.4.

SITE 4 (Fig.5; Plate 4)
COUNTY
TOWNLAND
SMR
NGR
IDENTIFICATION
TYPE

Kilkenny
Smithstown
KK036:36
261730 127980
RMP, SMR files, OS
Moated Site

DESCRIPTION

Large rectangular moated site with a raised inner area and an outer enclosure to the south. Extant and in good condition. Heavily overgrown in parts so visibility was poor. Stream appears to be amalgamated with the enclosure all along the south side forming a wet ditch on the south side before it runs away again from the SE corner as a culvert and rejoins the stream. The area inside the trapezoidal shape made by the stream and culverts appears very

flat and may be an enclosed area associated with the site. The site is situated 178m OD at the centre and a clear view of the surrounding landscape would have been possible when it was in use. Tory Hill is clearly seen to the SE. It consists of a raised central area of 30m square approx with internal low-lying banks visible in places. The enclosing ditch was 5m wide by 1.5m deep at west. Outside the ditch is a rectangular bank of stone (and some earth) of coarse boulders and large angular rocks. It lies along a gently sloping surface declining N-S.

PROXIMITY

1.5 KM

POTENTIAL IMPACT

No potential archaeological impact is envisaged.

MITIGATORY
MEASURES

See 5.2-5.4.

3.2.5

SITE 5 (Fig. 6; Plate 7)

COUNTY

Kilkenny

TOWNLAND

Smithstown

SMR

KK036:3602

NGR

261880 127930

IDENTIFICATION

RMP, SMR files, OS.

TYPE

Dwelling

DESCRIPTION

Possible 17th century building shown on 1st ed. OS maps and associated with the Moated Site 36:36. The building consists of a rectangular stone built structure lying at the south side of the roadside and orientated E-W. The building materials were of large coarse boulders and some cut stone. It measures some 25m approx long E-W by 10m N-S the roofed is pitched and slated. Stone is well dressed. It appears to have comprised originally of a stables and two adjacent rooms as well as an attached outhouse. Construction materials were a mix of limestone and granite typical of the local bedrock types. The 1st ed OS map shows a second building running N-S which may have been the original dwelling with the remaining standing structure being the outhouses. There is no sign of this part of the structure and a newly built 4 span haybarn lies at this location shielding it from the development area.

PROXIMITY

1.5km

POTENTIAL IMPACT

No archaeological impact is envisaged.

MITIGATORY
MEASURES

See 5.2-5.4.

3.2.6	SITE 6 (Fig 5)	
	COUNTY	Kilkenny
	TOWNLAND	Smithstown
	SMR	KK036:37
	NGC	261880 127930
	IDENTIFICATION	RMP, SMR files, OS
	TYPE	Ringfort
	DESCRIPTION	Site levelled and barely visible. In 1989 when the ASI visited: the "outline traceable in places. Ditch at south side is 5.3m wide (dark green grass) and is 0.2m deep. Ditch is visible for most of the eastern half of site". Field inspection proved further truncation had occurred to monument.
	PROXIMITY	1.6km
	POTENTIAL IMPACT	No potential impact envisaged.
	MITIGATORY MEASURES	See 5.2-5.4.

4.0 FIELD INSPECTION RESULTS

The field inspection was carried out 12th-14th August 2003 in good dry and sunny conditions. The methodology employed is described in Section 1.2 above. Field numbers are marked on Figure 3.

4.1 Field Notes

4.1.1 Field # 1

Field of raised bog. Drains cut it to the west and south of the field. Visibility moderate to poor. Slopes gently E-W. No archaeological features visible at the time of the inspection. A wall stands as the boundary to the east.

4.1.2 Field #2

Small rectangular field, moderate to poor pasture. Sloped E-W and slightly N-S. Bounded by a wall on the north and ditches elsewhere. The field had been grazed recently making visibility good. It is located atop a prominent ridge running down the centre of the proposed development area and commanding clear views of the surrounding area in all directions – this should be considered an area of moderate archaeological potential. No features of archaeological potential noted.

4.1.3 Field # 3

Moderate pasture field. Declines east-west. Field lies atop a prominent ridge with clear views of Tory Hill to the south and the rest of the surrounding landscape. Bounded by a hedge growing on top of a stone earthen bank. This field should be considered an area of moderate archaeological potential. No features of archaeological potential noted.

4.1.4 Field #4

Small field of poor pasture. Slightly boggy underfoot despite the three week dry spell. Gentle decline N-S. No features of archaeological potential noted.

- 4.1.5 *Field # 5*
A small boggy field. Visibility was moderate with the field ungrazed and heather and furze plentiful. House and garden marked on first edition OS map (Fig.4). No features of archaeological potential noted.
- 4.1.6 *Field #6*
Pasture. Good clear visibility. Gentle decline NW-SE. Used as a grazing field. No features of archaeological potential noted.
- 4.1.7 *Field #7*
Large field of pasture. Good visibility. Declines NW-SE. Bounded by a wall on all sides, which is overgrown with hedgeline and small trees and brambles. No features of archaeological potential noted.
- 4.1.8 *Field #8*
Poor marshy land occupying a prominent location, with good clear views of the surrounding area. Gentle slope runs N-S. No features of archaeological potential noted.
- 4.1.9 *Field #9*
Heath and heather growing on this undeveloped field lying on the high ground of the prominent ridge running N-S along the development area. Bounded by walls on the west and north sides and gorse hedge line on the others. Prominent ridge should be considered an area of moderate archaeological potential.
- 4.1.10 *Field #10*
Completely overgrown with furze and gorse making inspection difficult. Lies close to the high ridge running N-S across the development area – should be considered an area of archaeological potential. House and garden marked on first edition OS map (Fig.4). No features of archaeological potential noted.
- 4.1.11 *Field # 11*
Poor marshy pasture. Declines E-W. Visibility moderate to good in places with maram grass and heather growing. A drain flows into the ditch at the SW corner of the field. No features of archaeological potential noted.
- 4.1.12 *Field #12*
A large marshy and boggy field being used for open grazing but no grass only heather, furze, and other heath-typical plants growing. Visibility was poor. The field slopes very gently N-S and is on the upslope, which runs along the middle of the development area. No features of archaeological potential noted.
- 4.1.13 *Field #12A*
Originally a part of field 12 as shown on 2nd ed OS map sheet 40 (Fig.2). The field is being used for open grazing but is very poor pasture. A land reclamation scheme has been initiated by the local farmer in an attempt to reclaim this rather poor land for farming purposes. The visibility in this field was poor. The NE appears to have a now redundant avenue bounded by stone walls which run for approximately the entire east side of the field. It is interrupted and may have been partially dismantled in order to restructure the field shape. A trackway which crosses the development area E-W is completely overgrown with trees and briars. No features of archaeological potential noted.
- 4.1.14 *Field #13*
Field is poor boggy land used as open grazing by the local landowner. Large trapezoidal field with moderate to poor visibility. There are a number of linear features in the field, which are probably field walls but they are very overgrown. A large boulder lay at the south side of the field. A

trackway crosses the development area E-W. It is completely overgrown with trees and briars. No features of archaeological potential noted.

4.1.15 *Field #14*

This field lies to the east side of the proposed development area and is a long triangular field of poor marsh and scrub. It is bounded to the east by the road running NE-SW. The land slopes gently N-S towards Tory Hill. Access to the field was gained through a gate with two stone built pillars on either side. This once formed the entrance to a road/avenue shown on the 2nd ed. OS maps of the area and is now mostly overgrown along its length and used as an access route by local land users to farm fields within the inspection area (Fig.2). The avenue, which is bounded by a stone wall on either side is over 10m wide and runs NE-SW across the area dividing it in half N-S. No features of archaeological potential noted.

4.1.16 *Field #15*

Long narrow field of poor pasture and peat. This is a trackway which crosses the development area E-W. It is completely overgrown with trees and briars. The field slopes gently N-S. Visibility was moderate due to the scrub and furze growing. No features of archaeological potential were noted.

4.1.17 *Fields #16, 25*

Field of marsh and bog with heather covering the ground surface of the field. Gentle decline N-S. Field is not in use for any agricultural or other purpose. Some areas of the field were inaccessible due to the overgrowth. Visibility was poor. Boundary to east is a ditch, the south and west a wall and hedge. No features of archaeological potential noted.

4.1.18 *Fields #17, 18*

Pasture field. Poor grazing land. This field sits prominently in the landscape with clear views of surrounds and should be considered an area of archaeological potential (No.2). Good visibility. No features of archaeological potential noted.

4.1.19 *Field #19*

Moderate to poor pasture land in use for grazing. Good visibility. Cattle grazing. Ditch boundary to the west and a wall overgrown with hedge east and south. Decline E-W. No features of archaeological potential noted.

4.1.20 *Field #20*

Shown on 2nd edition maps as a small rectangular enclosed area, possible a house-plot (Fig.2). The area is now very overgrown and visibility was poor. Dead trees and brambles are scattered within the field. South defined by a trackway. It is completely overgrown with trees and briars. No features of archaeological potential noted.

4.1.21 *Field #21*

Moderate pasture, declines west to the road. A dried up pond is located at the west end of the field between it and the ditch before the road. The pond is fenced off, horseshoe shaped and measures approximately 12m diameter by 1.8m deep from ground level to the base of the pond. An arc of trees encircles it. The field is bounded by the overgrown trackway on the south and stone walls on the north and east with a ditch between it and the road on the west. No features of archaeological potential noted.

4.1.22 *Field #22*

Poor pasture. Declined E-W. Moderate visibility. Bounded by a drainage ditch on the north side. Ditch on the west side. A trackway defines the south of the field. No features of archaeological potential noted.

4.1.23 *Field #23*

Poor pasture. Good visibility. Decline E-W. South of field defined by a trackway on first edition OS map (Fig.4). No features of archaeological potential noted.

4.1.24 *Field #24*

Pasture field. Bounded by a hedge and stone wall on all sides. South of field defined by a trackway on first edition OS map (Fig.4). Slightly uneven surface and a very gentle decline N-S. Visibility was moderate to good in places. No features of archaeological potential noted.

4.1.25 *Field #26*

Marsh and bog. Visibility was poor. Union Boundary to the south. This was a trackway built on boulders 4m wide flanked by a ditch on either side. Field declined gently N-S to the Union Boundary. Boundary to the north and east is a wall, hedge and electric fence. Boundary to the west is a hedge. Field not in use for any agricultural or other purpose. No features of archaeological potential noted.

4.1.26 *Field #27*

Moderate to poor pasture. Good visibility. Declines E-W. Ditch and wall boundary to the west, overgrown wall elsewhere. North of field defined by a trackway on first edition OS map (Fig.4). No features of archaeological potential noted.

4.1.27 *Field #28*

Plot of a now derelict house and field. Built post 1902 as not shown on 2nd ed OS map (Fig.2). Building stands two storeys high and is roofed. Occupied by four caravans. North of field defined by trackway on first edition OS map (Fig.4). No features of archaeological potential noted.

4.1.28 *Field # 29*

Marsh and bog. Overgrown with gorse and heather. A stream at the SW corner of the field running E-W divides the Union Boundary to the south. The stream is outside the development area. Union Boundary and R.D. boundary defines the south of the field. This was a trackway built on boulders 4m wide flanked by a ditch on either side. A ditch lies to the east of the field between it and the road. Visibility poor. No features of archaeological potential noted.

4.1.29 *Field #30*

Marsh and bog. Furze and heather. There is a very gentle decline from E-W. Bounded by Coile forest to the south beyond a trackway adjacent the Union boundary. This was a trackway built on boulders 4m wide flanked by a ditch on either side. Bounded by a wall, overgrown with hedge on all sides. No features of archaeological potential noted.

4.2 **Table of summary results from field inspection**

<i>Type</i>	<i>Field Numbers</i>	<i>Description</i>	<i>Plate</i>	<i>Figure</i>
Area of Archaeological Potential 1	2, 3, 9, 10	Prominent ridge-top	Pl. 1	Fig.3
Area of Archaeological Potential 2	17, 18	Prominent ridge-top	Pl.1	Fig.3
Union and R.D. boundary	26, 29, 30	Ditched trackway		Fig.3

5.0 ARCHAEOLOGICAL IMPACT STATEMENT

- 5.1 The development area lies within a landscape rich in archaeological sites of late prehistoric and medieval date (Fig.5).
- 5.2 No previously recorded sites of archaeological or architectural significance lie within the development area.
- 5.3 Field inspection and aerial photography analysis failed to discover any previously unidentified sites of archaeological or architectural significance within the development area.
- 5.4 Two areas of moderate archaeological potential were identified – AAP 1 and 2 (Fig.3). It is proposed that AAP 1 will be impacted upon by an access road between wind-turbines 1 and 2.

6.0 SUGGESTED MITIGATION

- 6.1 It is recommended that a programme of archaeological test excavation be undertaken of the proposed development footprint prior to the construction phase of works as a planning condition. The development footprint includes the construction of access routes, pads for the wind turbines, below-ground electrical piping, pads for electricity poles and a pad for a 20kv sub-station (Fig.2). Archaeological test excavation is defined as: *'that form of archaeological excavation where the purpose is to establish the nature and extent of archaeological deposits and features present in a location which it is proposed to develop (though not normally to fully investigate those deposits or features) and allow an assessment to be made of the archaeological impact of the proposed development'* (Framework and Principles for the Protection of the Archaeological Heritage 1999, 27). An archaeological testing methodology will be agreed prior to commencement with the archaeological licensing section of the Dept. of the Environment and the National Museum of Ireland.
- 6.2 No site offices, depots, storage facilities should be placed on or within 30m of any of the recorded monuments.
- 6.3 Construction traffic must not be allowed on or within 30m of any of the recorded monuments, unless on an existing road.
- 6.4 Spoil should not be dumped on or within 30m of any of the recorded monuments.

7.0 BIBLIOGRAPHY

- | | | |
|--------------------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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Note: All recommendations are based on information supplied by the developer and are subject to the approval of Kilkenny County Council and the Department of the Environment, Heritage and Local Government.

Cóilín Ó Drisceoil MA, MIAI
Archaeologist
22.8.2003

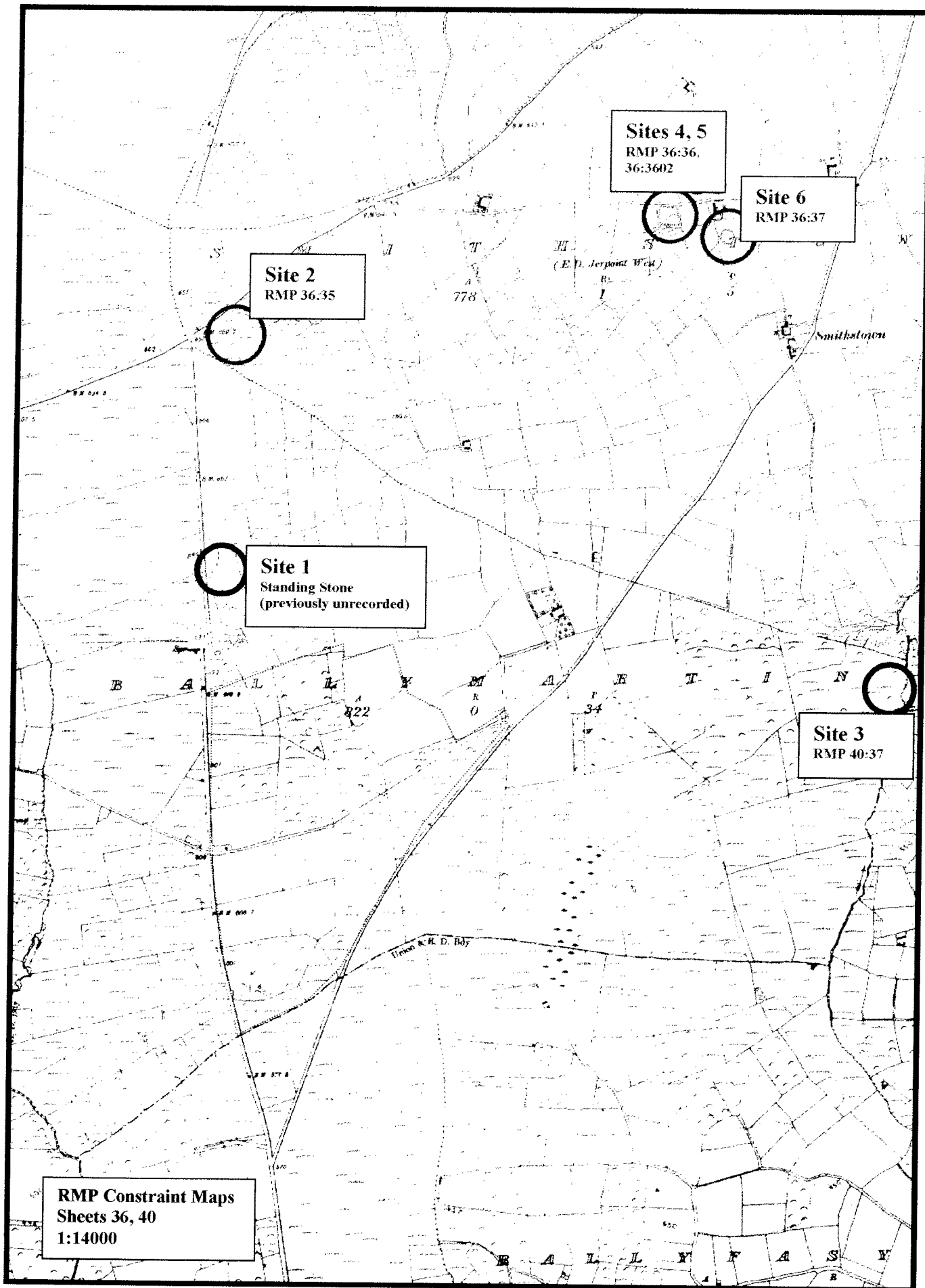


FIGURE 5: Ballymartin, Co. Kilkenny proposed development area and position of RMP sites



FIGURE 4: Site location on 1st edition OS map 1839

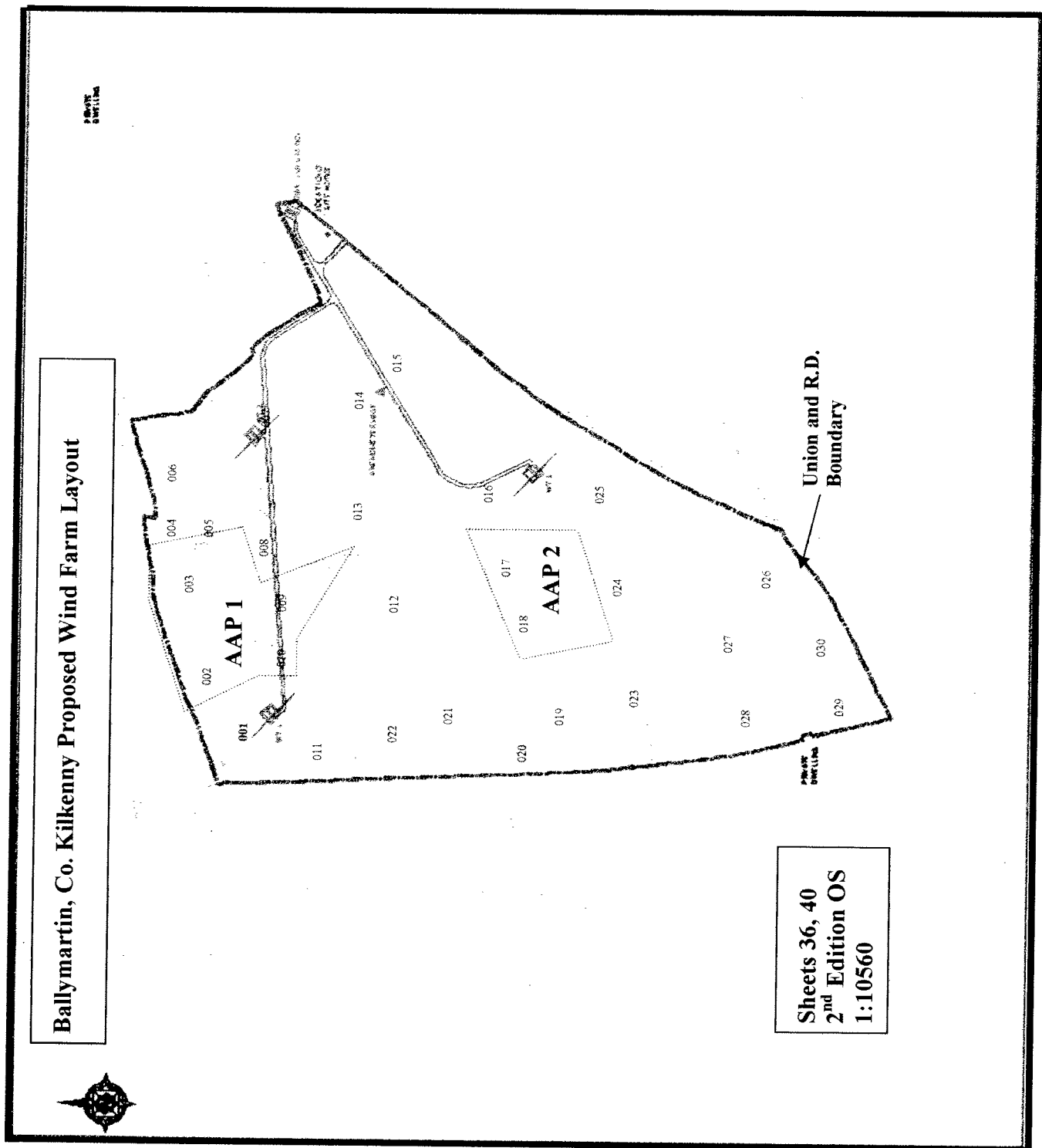


FIGURE 3: Ballymartin, Co. Kilkenny proposed wind farm layout and field inspection data

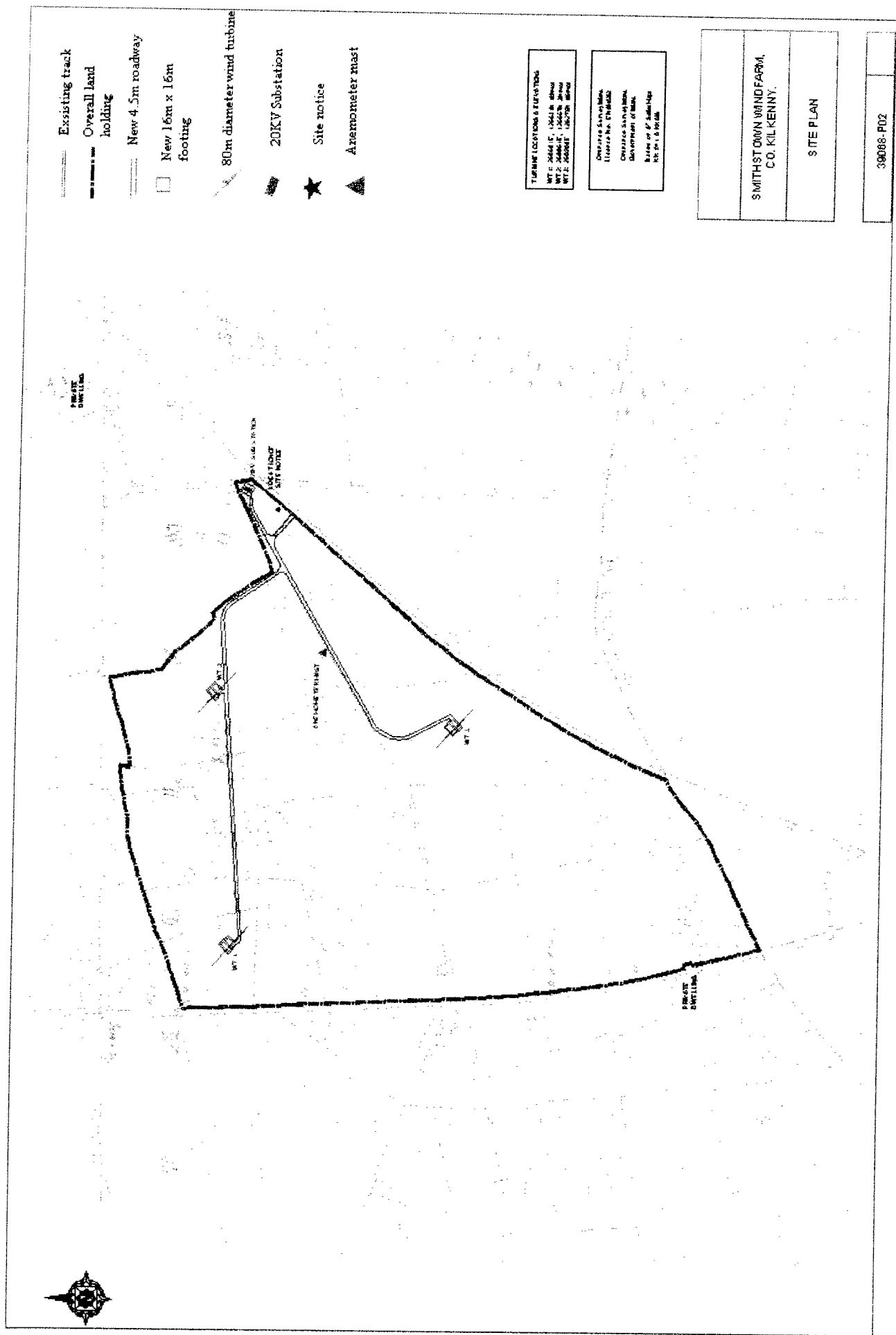


Figure 2: Proposed site location and layout

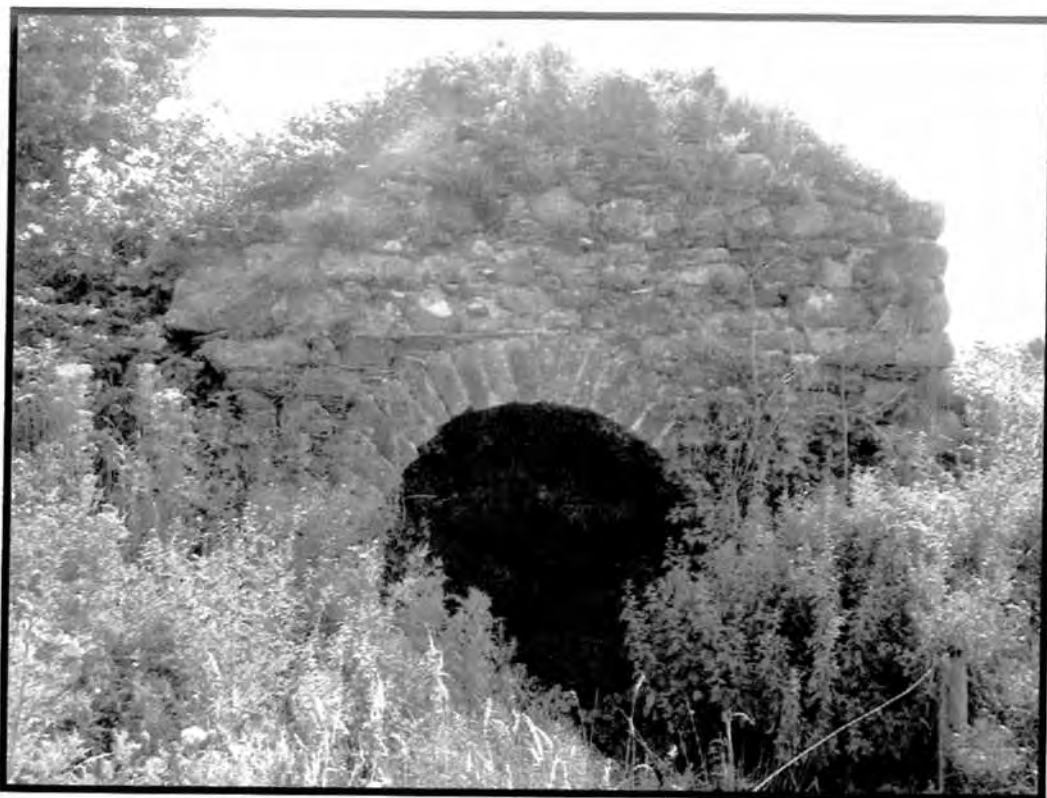


PLATE 6: Lime-kiln adjacent Site 2 RMP36:35



PLATE 7: Site 5 Dwelling RMP36:3602



PLATE 4: Site 4, moated site RMP36:36



PLATE 5: Memorial beside stone alignment Site 2 RMP36:35

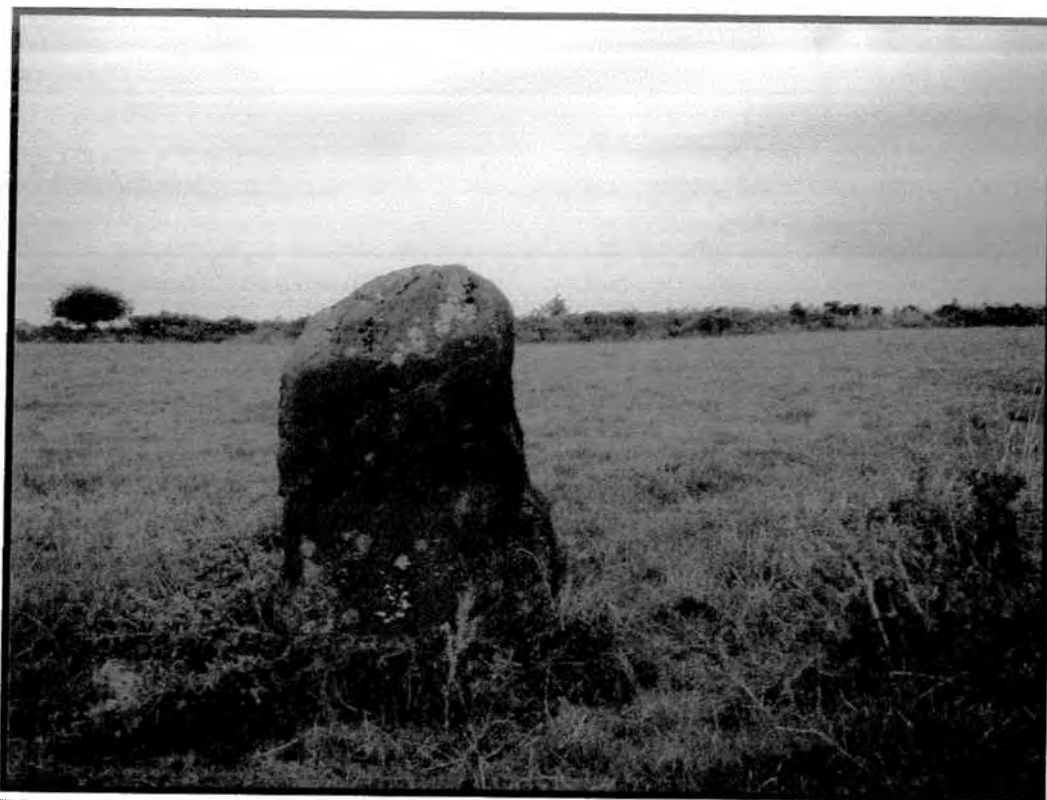


PLATE 2: Site 1, possible standing-stone (previously unrecorded)



PLATE 3: Site 2 'the three friars' stone alignment RMP36:35



PLATE 1: Ordnance Survey aerial photograph 29/00R97 from 5000ft.

Mr. Paul Martin,
Powerstown,
Clonmel,
Co. Tipperary.

Administrative Officer,
Kilkenny County Council,
County Hall,
John Street,
Kilkenny.

13 October 2003

RE: Schedule of submitted information –Application for Permission to
build at Ballymartin, Smithstown, Co. Kilkenny, 3 wind turbines of 60m hub height,
service roadways, electrical transformer compound, control housing and 50m
permanent anemometer.

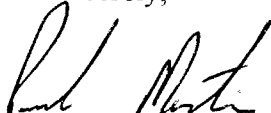
Dear Sir or Madam:

With reference to the above application I hereby submit the following information in
support of this application.

- 1) Application Form
- 2) Application Fee
- 3) Site Notice
- 4) Newspaper Notice
- 5) Drawing showing the location of the site notice.
- 6) 6 copies of
 - (i) Schedule of drawings
 - (ii) Site location map at a scale of 1:2500 showing the site
boundary in red and overall land holding in blue.
 - (iii) Site layout plans.
 - (iv) Plans of development.
 - (v) Elevations and sections.
- 7) 10 copies of supplemental project information

I trust this is to your satisfaction.

Yours Sincerely,



Mr. Paul Martin.