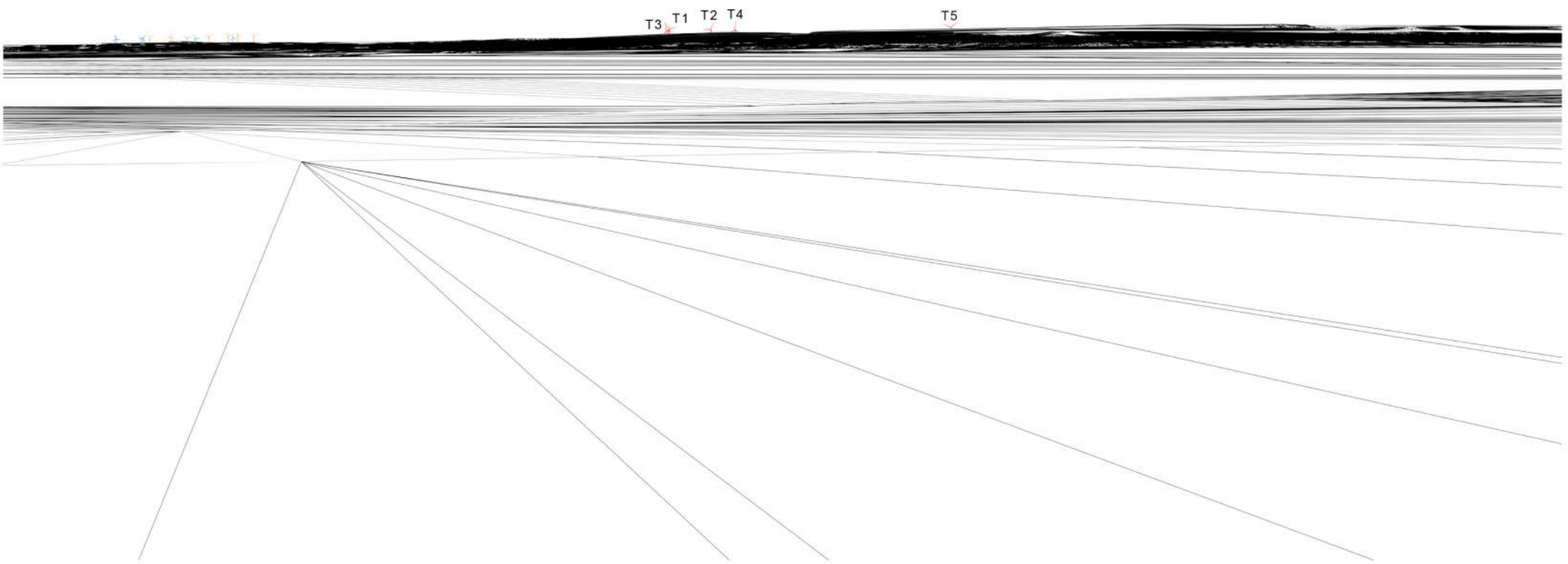
Proposed Moneypoint Wind Farm
Permitted Moanmore Wind Farm (Extention to Tullabrack Wind Farm)
Existing Tullabrack Wind Farm



Photomontage 13

View north towards Moneypoint from local road, west of Guiney's Cross Roads, Co. Kerry

Date photo taken:	04.08.2010	**Turbine blade tip height:**	152m
Time photo taken:	11:41 AM	**Number of turbines visible:**	5 of 5
Viewpoint location:	E01163 N37935	**Distance to nearest turbine:**	13,728m (T5)
Viewpoint elevation:	45m	**Arc of view:**	36.2 deg.
Height of camera above ground:	1.5m	**Recommended viewing distance:**	Approximately 30-50cm

PROPOSED WIND ENERGY PROJECT AT MONEYPOINT
COUNTY CLARE

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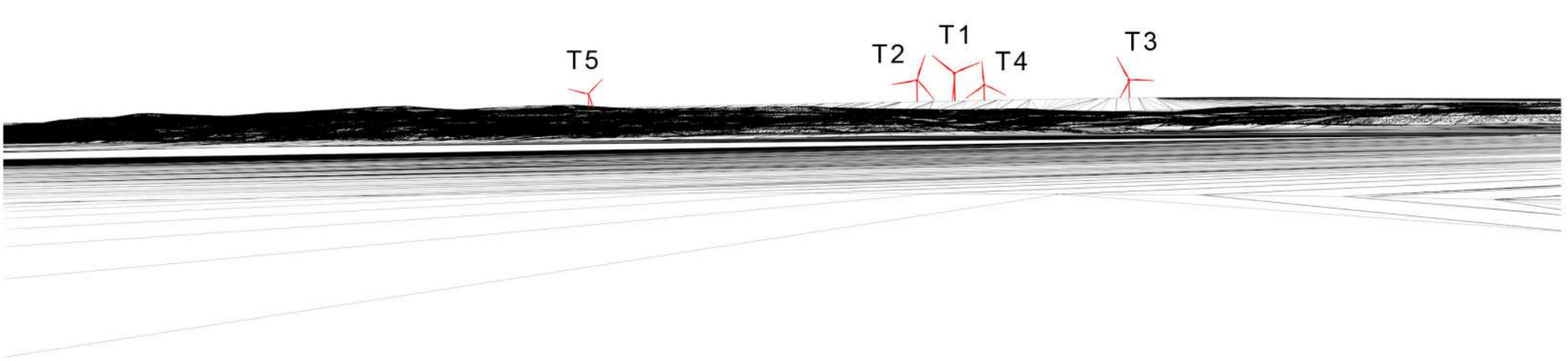

Photomontage 14

View southeast towards Moneypoint from N68, approximately 1km northeast of Kilrush

Date photo taken:	02.03.2011	**Turbine blade tip height:**	152m
Time photo taken:	12:50 PM	**Number of turbines visible:**	5 of 5
Viewpoint location:	E00763 N56035	**Distance to nearest turbine:**	4,363m (T1)
Viewpoint elevation:	22m	**Arc of view:**	36.2 deg.
Height of camera above ground:	1.5m	**Recommended viewing distance:**	Approximately 30-50cm

PROPOSED WIND ENERGY PROJECT AT MONEYPOINT
COUNTY CLARE

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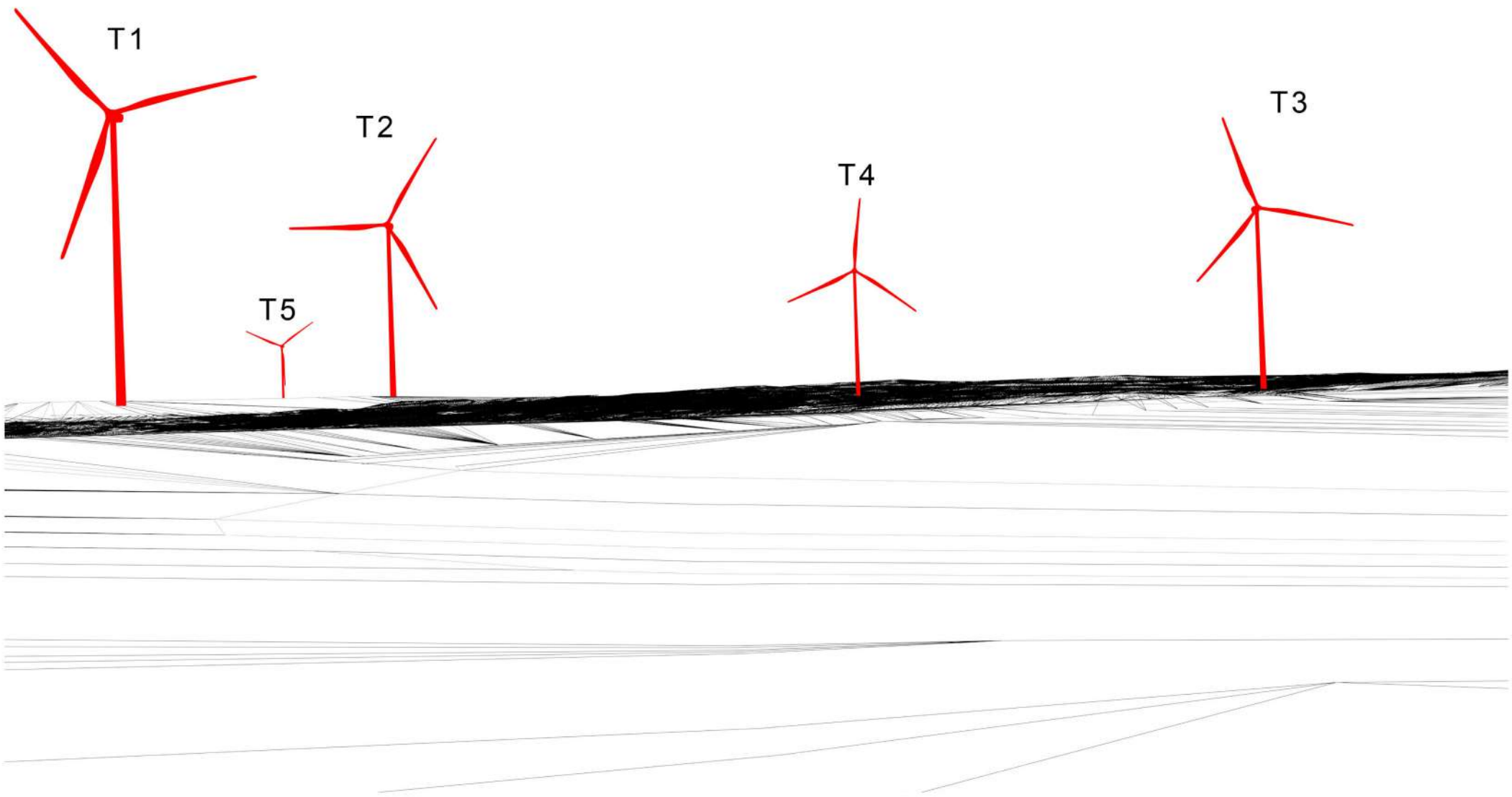

Photomontage 15 (panoramic)

View southeast towards Moneypoint from N67 (Scenic Route No. 19)

Date photo taken:	02.03.2011	**Turbine blade tip height:**	152m
Time photo taken:	14:35 PM	**Number of turbines visible:**	5 of 5
Viewpoint location:	E02230 N52469	**Distance to nearest turbine:**	647m (T1)
Viewpoint elevation:	2m	**Arc of view:**	45.8 deg.
Height of camera above ground:	1.5m	**Recommended viewing distance:**	Approximately 30-50cm

PROPOSED WIND ENERGY PROJECT AT MONEYPOINT
COUNTY CLARE

JUNE 2011 D129792

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11. AIR QUALITY AND CLIMATE

11.1 RECEIVING ENVIRONMENT

11.1.1 Atmospheric Emissions

Greenhouse Gases

There is now a general recognition that industrial air emissions can have serious impacts on health, ecology and climate. Without the earth's atmosphere, the average global temperature would be -19 °C approximately. However, due to the effect of this atmosphere, which selectively absorbs and re-radiates solar energy, the earth's temperature is 33 °C warmer. This natural "Greenhouse Effect", which is vital to life on earth, is determined by the concentration of the so-called greenhouse gases in the atmosphere.

Ireland is subject to several conventions and protocols that place limits on and force reductions in these emissions.

Ireland's commitment on greenhouse gases under the Kyoto Protocol, as determined by Decision 2005/166/EC, is to limit the increase in emissions in the 2008-2012 commitment period to 13% above base year emissions. The baseline emissions total for Ireland is calculated as the sum of CO_2, CH_4 and N_2O emissions in 1990 and the contribution from fluorinated gases in 1995.

The baseline value in CO_2 equivalent was established at 55.6 Mt and results in total allowable emissions of approximately 314.2 Mt over the commitment period, which equates to the average of 62.8 per annum. Compliance with the Kyoto Protocol limit is achieved by ensuring that Ireland's total emissions in the period 2008-2012, adjusted for any offsets from activities under Article 3.3 and the surrender of any purchased Kyoto Protocol credits, are below 314.2 Mt at the end of the five-year period

In 2009, total emissions of greenhouse gases (excluding the Land Use Land-Use Change and Forestry sector) in Ireland were 62.4 Mt, which is 13.8% higher than emissions in 1990. However, the total for 2009 is 10.5% lower than the level of 69.7 Mt in 2001 when emissions reached a maximum following a period of unprecedented economic growth.

There are major concerns on the mechanisms and cost of adhering to the above limit. Countries not fulfilling their obligations will be forced to purchase carbon credits on an open market from compliant countries.

Fuel combustion in the Energy sector is the principal source of emissions in Ireland, accounting for 66.5% of total emissions in 2009, and major increases in fuel use have driven the increase in emissions up to 2009 from a 57% contribution in 1990. The increase in emissions from electricity production has been 15.1%. The emissions from agriculture, the other main source category, increased during the 1990s but have decreased to below 1990 levels in 2009 as a result of falling livestock numbers since 1998 due to reform of the Common Agricultural Policy (CAP). See Figures 11.1 & 11.2.

Other Emissions

Long-range atmospheric transport of sulphur dioxide (SO_2) and nitrogen oxides (NOx) can contribute to regional problems of acidification and eutrophication of soils and waters and to air pollution over a wide area. SO_2 and NOx emissions are transported over long

distances and undergo chemical transformations in the atmosphere. The Government has entered into agreements at EU and international level to control national emissions of SO_2 and NOx. These agreements specify obligations to reduce total emissions of these gases.

Various industrial sectors, including power generation, have been assigned specific emissions targets for NOx and SO_2 by Government.

Moneypoint Generating Station's Environmental Retrofit Project included the following main elements:

- Installation of Flue Gas Desulphurisation (FGD) equipment on each boiler to reduce emissions of SO2.
- Installation of Selective Catalytic Reduction (SCR) equipment to reduce NOx emissions.

The approximate annual emissions reductions that have been achieved at Moneypoint with the completion of the station's Environmental Retrofit Project are shown in Table 11.1.

Table 11.1: Environmental Retrofit Project – Annual Emission Reductions

Sulphur Dioxide (SO_2)	Oxides of Nitrogen (NOx)	Particulates (t)
~ 20,000 t	~ 20,000 t	~ 300 t

11.1.2 Air Quality

Air quality in the environs of Moneypoint has been the focus of ongoing monitoring and assessment since the late-1970s. This has always indicated that air quality in the area is good and well within quality standards required by legislation. Operating in compliance with its IPPC Licence, Moneypoint's emissions to atmosphere are discharged via two 225 m high chimneys whose design was based on achieving adequate dispersion of emissions.

Modelling and monitoring data indicate that the station's emissions do not have any significant impact on ambient air quality in relation to SO_2 and NOx, which complies with national air quality standards by a large margin.

There are also three sites situated within the station grounds at Moneypoint to assess the localised impact of dust emissions arising from coal and ash handling operations. Airborne particulate sampling using ISO deposit gauges has been carried out on a monthly basis since 1989. For the most recent five-year period Table 11.2 presents average dust deposition rates based on results derived from dust monitors located in strategic points around the station.

Table 11.2: Dust Deposition 2006 – 2010 (mg/m²/day)

Year	2006	2007	2008	2009	2010
Average	50	70	86	75	69

In relation to possible nuisance impact on the surrounding community, the deposition rates recorded are well below the value of 100 - 150 mg/m²/day that is commonly used for

setting limit values at the boundary fence for licensing of quarrying and mining activities. Indeed, dust deposition rates of 25 - 50 mg/m²/day may be recorded in remote locations in Ireland due to the presence of windblown soil and peat and also from miscellaneous agricultural activities.

11.2 IMPACT OF THE DEVELOPMENT

11.2.1 Atmospheric Emissions

Electricity generation by wind turbines does not lead to environmental emissions. The wind farm will have no emissions to atmosphere and thus no adverse impact on general air quality or climate.

Moneypoint Wind Farm will generate up to approximately 45,000,000 kWh (units) of electricity per annum. Figures published by the Commission for Energy Regulation (CER)[2] indicate that the 2010 average CO_2 for the All-Ireland grid (average including all generating technologies such as coal, gas, oil, peat, CHP and wind) was 0.519 t/ MWhr.

The development of Moneypoint Wind Farm will lead typically to an annual reduction of 23,350 t of CO_2 annually.

In addition to its position regarding CO_2, Ireland also has binding international commitments to meet targets for emissions of air pollutants including SO_2 and NOx. The development of Moneypoint Wind Farm will also assist in achieving reductions in these emissions from the electricity generation sector.

11.2.2 Air Quality and Dust

Operation of the turbines will not lead to airborne dust being created from either the coal stockpiles in the coal yard, the ash deposited in the ash storage area or landfilled FGD by-product on station lands.

A wind turbine does not operate in the manner of a fan and create strong wind currents. On the contrary, the operation of a wind turbine extracts energy from the wind, leading to a reduced wind speed downwind of the turbines.

Operation of the turbines will not lead to any alteration in the pattern of dispersion of emissions from the station's chimneys at Moneypoint. Ambient conditions with respect to SO_2 and NOx will be unaffected.

11.3 MITIGATION

No mitigation of impacts is required.

11.4 CONCLUSION

The proposed development will not result in significant adverse environmental impacts.

[2] Fuel Mix Disclosure and CO2 Emissions 2010, CER (July 2011)

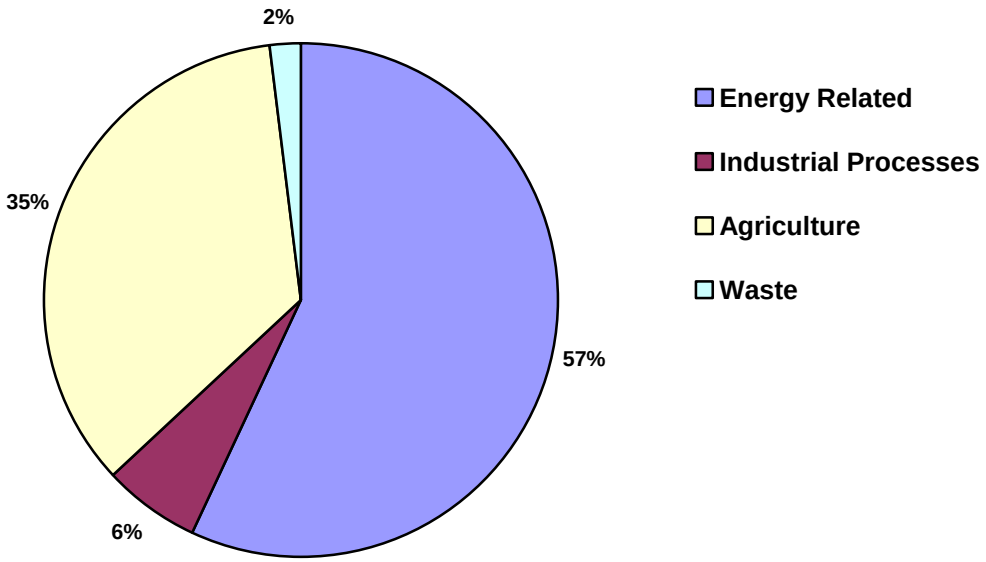

Figure 11.1:Greenhouse Gas Emissions by Sector - 1990

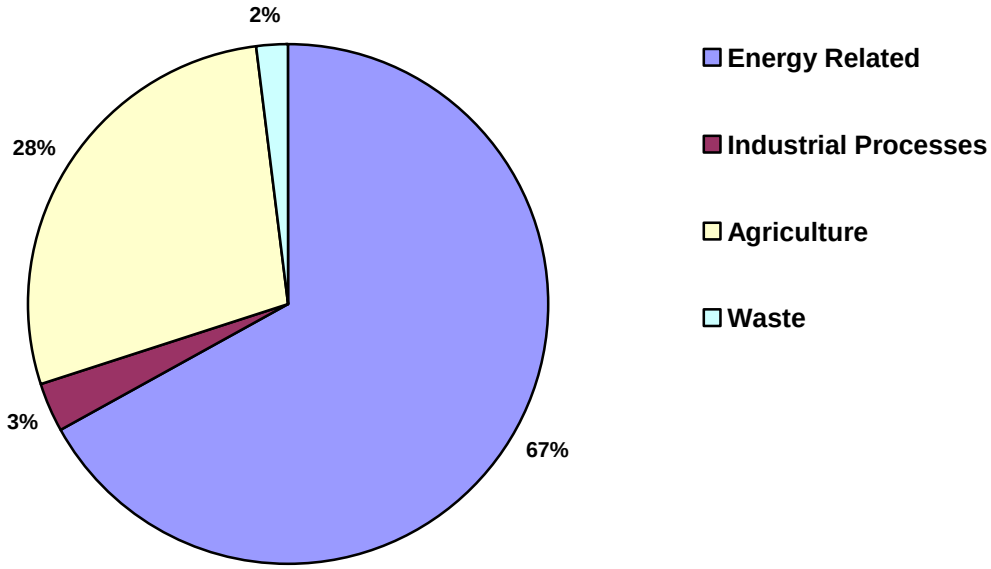

Figure 11.2: Greenhouse Gas Emissions by Sector - 2009

12. SOILS & WATERS

12.1 RECEIVING ENVIRONMENT

12.1.1 Geology & Hydrogeology

The Geological Survey of Ireland (GSI) Sheet No. 17, Geology of the Shannon Estuary, indicates the site to be underlain by Carboniferous Namurian Central Clare Group, which consists of cyclothermic sandstones, siltstones, mudstones and occasional coal seams.

The site was developed by extensive cut and fill operations. Significant volumes of rockfill were deposited to reclaim an area of approximately 30 ha from the Shannon Estuary, principally at the south-western part of the site. As a result of the cut and fill operations, the upper soil stratum consists of Made Ground of rockfill, overlying natural sediments and soils where these were not removed. There is variable depth to bedrock, with some areas having only very limited cover and other areas having significant thickness of Made Ground, some overlying natural overburden.

Where natural overburden is encountered, it comprises silts and sands, perhaps with gravel horizons, associated with fluvial, marine and littoral environments in the area of the original foreshore. These sediments may be underlain by glacial deposits, such as boulder clay, or rest directly on the bedrock.

There are no special geological or geomorphological features on the site.

Because of the rockfill nature of a significant part of the site and the saline nature of the water in the Shannon Estuary, it is possible that some saline waters have intruded beneath the site, notably at the locations of turbines T3 and T4. Tidal influence on the groundwater level is also expected, at least near the shoreline, due to the proximity of the Shannon.

The GSI has indicated the presence of wells in the general area. However, these are not of interest in light of their distance from the power station and the direction of groundwater flow. GSI data suggests that the site lies in a locally productive area, with regard to the groundwater resource. However, bored wells at the site that are up to 150 m deep provide no potential significant abstractions.

12.1.2 Surface Waters

The River Shannon is Ireland's major river. The main channel of the Shannon Estuary extends for approximately 105 km from the limit of the tidal rise at the Ardnacrusha power station to the mouth, which is bounded by Loop Head and Kerry Head. Measurements undertaken at Foynes have shown that sea water makes up some 88% of the water mix within the estuary at that point.

The Moneypoint site is located within the Shannon International River Basin District (SHIRBD) as defined under the European Communities (Water Policy) Regulations, 2003. This is the enabling legislation of the EC Water Framework Directive. The SHIRBD covers the natural drainage basin of the Shannon itself, stretching from the its source to the tip of the Dingle peninsula. A full description of the river basin and its characteristics as well as the WFD objectives can be found on www.wfdireland.ie and on www.shirbd.com.

An objective of SHIRBD Management Plan to maintain water status for High and Good

status waters and to restore all waters to at least Good status by 2015.

As described in Section 8 – Ecology, the Shannon Estuary is an SAC for the protection of a range of significant habitats and species listed for protection.

Under the terms of its IPPC Licence, ESB Moneypoint has ten licensed aqueous emission points, which include those listed in Table 12.1, discharging to the Shannon Estuary.

Table 12.1: Discharges to Surface Waters

Ref	Description	Ref	Description
SW1	Ash Disposal Area – Surface Drain	SW7	Surface Drain No. 6
SW2	Surface Drain No. 2	SW8	Cooling Water Outfall
SW3	Foul Drain No. 1	SW9	Coalyard Surface Drain
SW4	Surface Drain No. 3	SW10	Foul Drain No. 2
SW4A	Band Screen Wash Water	SW13	Surface Drain No. 8
SW5	Surface Drain No. 4	SW14	Lagoon Drain
SW6	Surface Drain No. 5		

Monitoring of the above emission points is carried out in accordance with Schedule 2(iii) of Moneypoint's IPPC licence.

The marine environment at Moneypoint has been the subject of multiple investigations over time that have established a wealth of knowledge concerning ecological aspects of the SAC in the vicinity of the site. These have included the following:

- Intertidal and Oceanographic Survey; AquaFact International Services (1992)
- An Assessment of the Intertidal Environment in the Vicinity of the ESB Generating Plant at Moneypoint Co. Clare; AquaFact International Services (1993)
- A Report to the ESB on Plankton Studies in the Vicinity of the Outfall, Moneypoint, Co. Clare; Aqua-Fact International Services (1999)

All of these have demonstrated the continuing healthy state of the marine environment in the vicinity of Moneypoint site.

12.2 IMPACT OF THE DEVELOPMENT

12.2.1 Geology & Hydrogeology

Turbines will be located as follows:

- Turbine T1 is in the ash storage area which was a naturally occurring valley into which significant quantities of ash have been placed since the initial development of the station. The top of the turbine foundation will correspond with the finished ground elevation in this area. The crane hard-standing of approximately 20 m x 40 m will be excavated to a depth of approximately 900 mm for replacement with a combination of coarse granular fill and fine gravel.
- Turbines T2 is in the area where the pre-development conditions of the Moneypoint site remain, with rock close to the surface. It is expected that excavations to a depth

of approximately 2.5 m will be involved to prepare the ground for construction of the turbine foundation. The crane hard-standing of approximately 20 m x 40 m will be excavated to a depth of approximately 900 mm for replacement with a combination of coarse granular fill and fine gravel.

- Turbines T3 and T4 are in the area of Made Ground of rockfill placed during reclamation of this part of the power station site during its the development. It is expected that foundations here will be piled. The crane hard-standings of approximately 20 m x 40 m will be constructed by excavating the coarse granular fill to a depth of approximately 300 mm and replacing it with fine gravel.
- Turbine T5 is at the lower part of the coal store where ground conditions represent the reduced formation level arising from the significant excavations that took place here in development of the power station site. Rock will be excavated to a finished depth of approximately 2.5 m below the existing surface. The existing surface is already suitable to act as a crane hard-standing.

The excavations involved in the wind farm will have no significant impact on the geology of these areas.

The hydrology of the site is already a highly modified one where the excavations for wind turbine foundations have no potential to impact on groundwaters.

12.2.2 Surface Waters

The nature and extent of the development will involve no redirection of surface water runoff at the site. The development does not result in any additional surface water run-off.

The wind farm development will not alter the nature, composition, volume or location of existing discharges from the site.

Turbines T3 and T4 are the turbines that will be located closest to the Estuary. There will be no alteration to the shoreline at these locations and no impacts on the SAC. In the development of Landfill B for the storage of FGD by-product, the main access road within the site will be located closer to the shoreline here. As illustrated in the typical cross-section shown in Figure 12.1, turbines T3 & T4 will be located on the landward side of the access road. This separation from the Estuary provides a suitable buffer zone to the SAC.

Additional rock protection in this area is already approved to provide protection to vehicles on the access from wind blown spray and water possibly breaking over the existing rock armouring during severe stormy weather conditions.

12.3 MITIGATION

Standard pollution control measures will be observed during construction.

No other mitigation of impacts is required.

12.4 CONCLUSIONS

The proposed development will not result in significant environmental impacts.

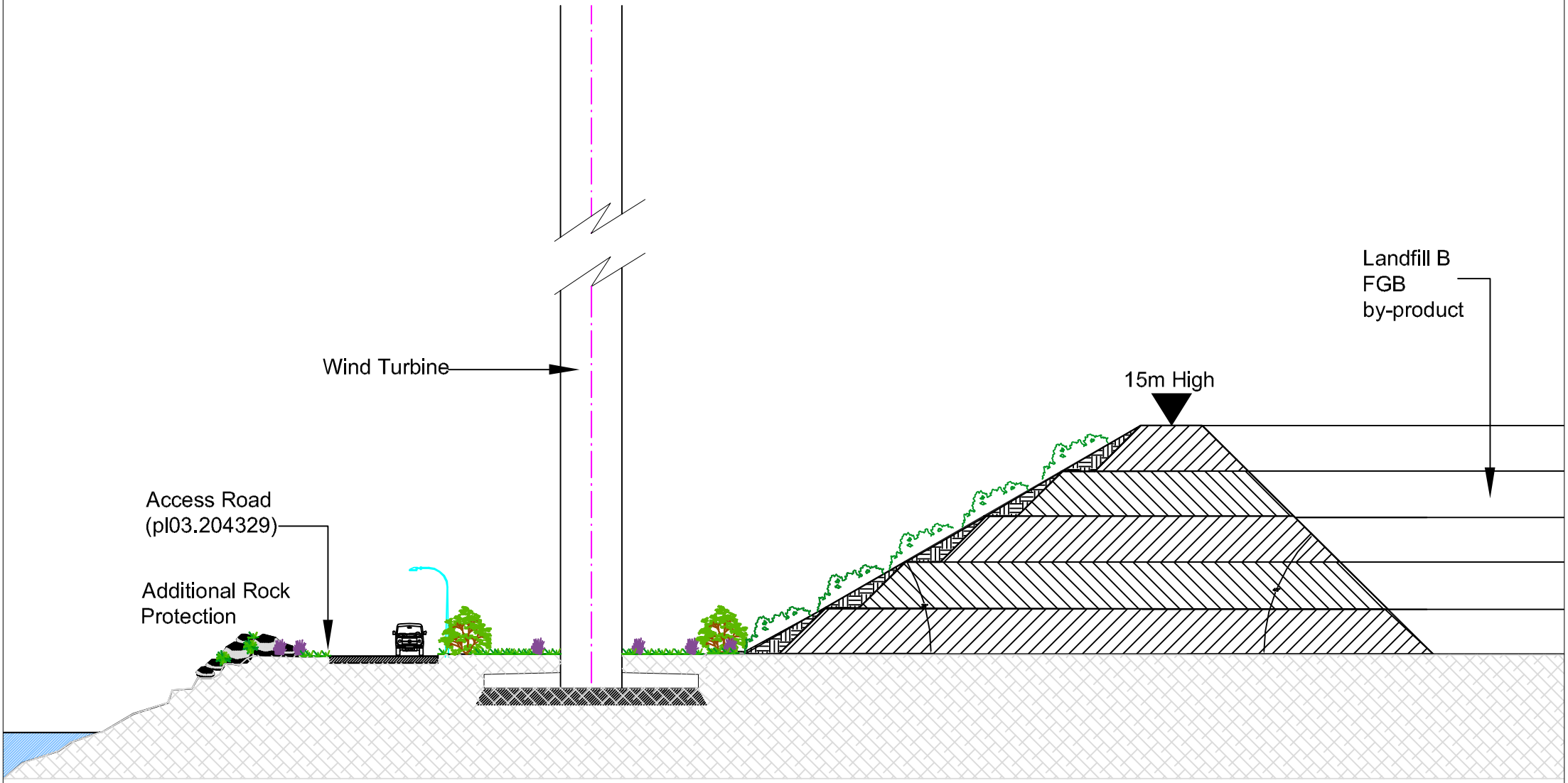

Figure 12.1 : Cross-Section at Turbines T3 & T4

13. ROADS & TRAFFIC

13.1 RECEIVING ENVIRONMENT

The receiving environment reflects the presence of Moneypoint Generating Station since its first unit was commissioned in 1985.

Access to the Moneypoint area is via the N67 Killimer - Kilrush and the N68 Kilrush – Ennis National Secondary Routes. Immediate access to the site is from the N67, which is an important route that links Co. Clare and Co. Kerry via the Killimer - Tarbert car ferry service. Beyond the National Secondary Routes the locality has a network of roads that serves a rural community that is reliant mainly on agriculture. The roads are thus used by this community for domestic and agricultural purposes.

The most recent traffic data (for the years 2000 – 2004) from the National Roads Authority (NRA) in terms of Annual Average Daily Traffic (AADT) for the N67 and N68 is shown in Table 13.1. This is an indicative traffic volume for a 24-hour period calculated on the basis of short-term traffic counts, using expansion factors (An Foras Forbartha RT201, 1978). It includes traffic in both directions and shows the amount of overall traffic that comprised Heavy Commercial Vehicles (HCV).

Table 13.1: NRA Traffic Data

Year	N67 Killimer - Kilrush		N68 Kilrush - Ennis	
	Total Vehicles	HCV	Total Vehicles	HCV
2000	2,541	280	3,957	396
2001	2,697	224	4,199	315
2002	2,802	231	-	-
2003	1,705	123	4,836	363
2004	1,794	149	5,090	382

The data indicates that traffic on the roads in the vicinity of the site is very much less than their design capacity. Due to the cyclical nature of the Killimer - Tarbert car ferry service, traffic on the N67 close to the power station tends to peak coinciding with ferry times.

Station Related Traffic

The principal sources of traffic arising from the presence of the station are the following:

- **Staff Transport**: It is estimated that about 300 cars are associated with staff transport during weekdays and 90 at weekends
- **Ash Transport**: Exports of ash from the site are not uniformly distributed throughout the year and they peak in the summer months. Up to 30 truckloads leave the site each day during this time.
- **Consumables:** Station operations have a requirement for various consumables whose delivery accounts for approximately 50 truckloads daily including six of lime and two of urea.

- **Other Activities**: Contractors may be engaged from time to time and there is a steady pattern of business visitors. These are estimated to account for 50 vehicles per day. An increase in the number of casual visitors at weekends is compensated by a reduction in the number of business visitors.

The combined effect of the above during weekdays is shown in Table 13.2 where peaks in all categories of station related traffic have been assumed to coincide.

Table 13.2: Traffic Associated with Generating Station

Source	Cars	Trucks	Vehicle-Movements
Staff Movement	235	-	470
Ash Transport	-	30	60
Consumables	-	50	100
Other Activities	35	15	100
TOTAL	270	95	730

The combined effect is approximately 750 vehicle-movement per day during weekdays, with this increasing marginally during periods of major plant overhauls.

13.2 IMPACT OF THE DEVELOPMENT

The existing site entrance will be used and creation of new access from the public road will not arise. Transport within the site will be via the approved road network.

Access requirements can be divided into three distinct phases, namely project construction comprising assembly and erection, project operation comprising routine inspection and maintenance, and project decommissioning.

13.2.1 Project Construction

The Moneypoint site has the advantage of an existing highly developed site infrastructure that significantly reduces the requirement for deliveries of materials in order to undertake the development.

Traffic associated with the construction phase essentially comprises three types, as follows:

- Construction staff: There will be a small increase in movements of private cars and vans at the beginning and end of each day as the workforce arrives at and departs from the site.
- Deliveries of concrete and other materials: The total was calculated to give the number of HCV movements to and from the site during the construction period.
- Exceptional loads: The total number was calculated on the basis of the installation of five turbines.

The vehicles requiring access during the civil engineering and earthworks phase will include tracked excavators, dump trucks, fixed or articulated haulage trucks and mobile cranes. Commercial traffic movements are likely to be spread throughout the working day and there will be a small increase in private car movements at the beginning and end of the day as the workforce arrives at and departs from the site.

Concrete & Reinforcement

The major requirement for ready mixed concrete will be for construction of the five turbine bases. This will be sourced from a local ready mixed concrete supplier and up to three concrete pumps will be employed in placing this concrete. Concrete will also be required for the minor works within the existing 110 kV Electrical Transformer Station and for the single-storey Control Building within it. Miscellaneous other requirements will also arise.

Concrete and associated steel reinforcement will entail up to approximately 250 deliveries. This includes an allowance of 25% over calculated deliveries for turbine foundation to cover miscellaneous uses within the site.

The general area is well served by suitable sources of these materials.

Stone Fill Material

In most wind farm developments crushed stone fill material is required for construction of access tracks within the site and a requirement also arises for the cranepad at each turbine.

At Moneypoint only a very limited requirement will arise, as the full extent of the site to the south of the public road already comprises a hardstand surface deriving from the historic site development works. Similar site development works didn't occur within the ash storage area to the north of the public road. While the surface here is well compacted and is expected to be adequate for access and craneage during construction of the single turbine located here, on a precautionary basis it is assumed that a total of up to 4,000 m^3 of stone fill and gravel material will be required here and elsewhere. It is noted that should a need for stone fill material occur, this will be likely be available from excess material at excavations for the other turbine foundations elsewhere within the site.

Electrical Equipment & Building Materials

Miscellaneous building materials will be required for the construction of the wind farm, notably blockwork, shuttering, etc. for the Control Building.

Miscellaneous electrical equipment such as transformers and switchgear will be needed in the Electrical Transformer Station and electrical cabling will be required for the underground connection of individual turbines to the substation.

Deliveries of miscellaneous other items will also arise and a total of about 100 deliveries is assumed.

Sand Backfilling

Power and control cabling within the site will be laid in cable trenches, which generally follow the edge of the site roads. Trenches will be backfilled with sand.

Total requirements for sand backfilling are expected to amount to approximately 300 m^3, being the equivalent of about 30 loads.

Cranes

It will be a matter for the contractor, selected on the basis of open competitive tendering, to determine the number and type of cranes that will be employed on the site for turbine erection. However, based on experience in the construction of other wind farm, it is envisaged that a heavy lifting capacity (approximately 1,000 t) main crane and a smaller capacity (approximately 350 t) crane will work in tandem. It is likely that two smaller

cranes will be engaged in assembly of the heavy lifting capacity main crane.

Summary of Construction Traffic Movements

The total number of heavy vehicle movements involved in the construction of the wind farm has been calculated and is as shown in Table 13.3.

Table 13.3: Construction Traffic

Material	Concrete & Steel	Sand	Cranes	Misc.	Stone	Total
Loads	250	30	10	100	300	690

Assessment of Impacts

On the basis of the above worst case scenario, the total number of heavy traffic movements on and off the site will be approximately 1,400, when account is taken of the return of empty delivery vehicles. For a 6-month construction period and activity limited to week-days, the additional average daily traffic is less than 12 HCVs.

Even if figures are doubled to reflect peak construction activity and peak construction employment, this level represents a temporary indiscernible increase on existing station related traffic. Furthermore, this peak will be for a short duration only and is within the capacity of the existing road network.

There will be no effects thereafter, but the following inevitable short-term effects, which will be temporary and short lived, will arise during construction:

- With the calculated level of additional traffic being so low, there will be a minimum of inconvenience to other road users.
- The increased vehicle movements will be so low that there will be no discernible increased traffic noise at residences situated on the delivery routes.

Averaging the total vehicle movements over the full construction period may not produce a realistic pattern of road usage. Rather than occurring uniformly throughout the construction period, traffic movements will peak on the five non-consecutive days on which concrete for turbine foundations will be delivered. Each foundation will involve 35-40 deliveries or up to 80 vehicle movements.

For most of the construction period the number of truck movements per day will be less than the maximum assessed above. The peak will occur on five occasions only during the construction period and no long-term impacts will be created.

There will be no impact on the network of local minor roads.

The impacts arising will be short-term effects that will be confined to the network of major routes. These impacts will be during the construction period and there will be no effects thereafter.

13.2.2 Wind Turbines

Moneypoint has its own barge landing facility, which was used extensively or delivery of heavy loads during construction of the power station. It was used similarly in the recently completed Environmental Retrofit Project.

It is expected that this facility will be used for delivery of turbine components. This will be

either by direct delivery to the site or by delivery to a convenient port with transhipment from there by barge.

However, on a precautionary basis, delivery of components by road is assumed in the assessment of impacts.

For delivery by road, each turbine would involve about 13 loads using articulated haulage trucks. Deliveries will likely comprise towers (5), blades (3), nacelle (2), hub (1) and small parts (2). It is envisaged that the likely approximate composition of the significant components will be as presented in Table 13.3. The total number of loads involved in turbine deliveries would thus be approximately 65.

Table 13.3: Summary of Turbine Component Details

Component	Weight (t)	Dimension (m)
Base tower	50 t	13.3 m x 4.2 - 3.8 m diameter
4th Section	45 t	20.3 m x 3.8 - 3.5 m diameter
3rd Section	30 t	20.5 m x 3.5 - 3.1 m diameter
2nd Section	27 t	20.5 m x 3.1 - 2.8 m diameter
Top Section	30 t	23.2 m x 2.8 - 2.5 m diameter
Nacelle	60-80 t	10 m x 3.0 m x 3.75 m
Blades (3)	6 t	50 m x 3.5 m at Root

A typical delivery of wind turbine tower components is shown in Figure 13.1.

Potential Traffic Routes

The assessment of a suitable delivery route for wind turbine components involves the following:

- Identification of suitable port facilities – principally the availability of off-loading equipment and sizeable laydown area.
- Assessment of the delivery route from port to site entrance in relation to vertical and horizontal road alignment.
- Assessment of the delivery route from port to site entrance in relation to road (and bridge / culvert) strength and running width.

The project is currently at a stage where the contract for the supply of turbines to the project is not yet in place. In accordance with EU procurement rules, the contract will be open to international competition and it will be a matter for the chosen contractor to determine the most suitable route to the site, if road haulage is proposed.

Although the turbine blades are relatively light it is the blade delivery that typically defines both vertical and horizontal alignment requirements. Blade trailers are extendable and invariably have rear wheel steer with the capability of being operated automatically during regular road use, or manually during slow walking pace manoeuvring.

While multiple blade load trailers may be preferred, this means that blades can have no overhang and the trailer unit must extend to the full length of the blade. In this instance, the possibility of tighter turning circles and avoidance of grounding indicate the use of a

trailer with shortened wheel base and blade overhang.

While definitive details cannot be provided at this time with regard the proposed haulage route if transportation by road is chosen, in reality there are few realistic options available. To that end, O'Neill Transport in conjunction with Wind Prospect Ireland Ltd were commissioned to review the transport requirements associated with delivery of turbines by road.

The aim of the review was to examine the existing road infrastructure, assess its suitability and identify a proposed delivery route to the site that would be suitable for abnormal loads associated with turbine component delivery vehicles.

For the purposes of the transport assessment, it was assumed that delivery is possible from the chosen port facility to the M18 at Ennis. Detailed analysis of the route was from N85 Skehanagh Roundabout in Ennis to the site entrance to Moneypoint Wind Farm.

The report identified necessary remedial works along a proposed delivery route and a drive over survey of the route was conducted. Topographical surveys followed to review potential constraints associated with access and to undertake Swept Path Analysis (SPA) of these constraints using Autotrack software to determine the actual extent of any widening / junction improvements that may be required. The potential route is shown in Figure 13.2.

An overall unrestricted minimum width of 4 m is required along the carriageway of the potential delivery route. Where this is not already available, in the main this can be achieved by trimming trees and hedges. Elsewhere, minor road widening will be required, but again this can be achieved in the main within the road margins without encroaching on private lands. The two locations where the most significant requirements for improvements arise due to restricted turning are as follows:

- Turn from the N68 onto local road at Ballymacurtaun
- Turn from local road onto the N67 at Moneypoint

Any local road improvements, albeit that they may be limited in extent, will ultimately benefit the local population through enhanced safety of the road network.

Traffic management measures that may be employed to mitigate the impacts of long loads during road transport have the potential to cause some inconvenience for other road users but this will be temporary and for a short period only.

13.2.3 Project Operation

Wind Farm Maintenance

Wind farms are designed to operate largely unattended and during the operational phase the wind farm will normally be unmanned. Each turbine will have its own in-built supervision and control system that will be capable of starting the turbine, monitoring its operation and shutting down the turbine in the case of fault conditions.

Supervisory operational and monitoring activities will be carried out remotely with the aid of computers connected via a telephone modem link.

Visits will be necessary to carry out routine inspection and preventive maintenance. A light vehicle will be required for routine access, occurring about once weekly, and in the event of any unscheduled fault conditions. In the unlikely event of a major component failure, a mobile crane will be required on site.

The additional traffic will be so low and so infrequent as to be indistinguishable from other station related traffic.

Road Safety

By their very nature wind turbines are significant features in the landscape and the turbines at Moneypoint will be visible intermittently from local roads. It is acknowledged that moving turbine blades may draw the eye of any motorists and any such distraction could be considered a potential safety hazard. However, there is no evidence from Ireland or elsewhere to indicate that wind turbine towers or moving wind turbine blades endanger public safety by reason of traffic hazard.

Fast moving objects in the field of view or on the horizon are much more likely to cause distraction to motorists than wind turbine blades. These move slowly and steadily, rotating at a speed of one revolution every 3 – 5 seconds. Instances of fast moving objects include views from the public road of aircraft take-offs and landings at airports; trains crossing roads at bridges or running on tracks parallel to roadways; traffic crossing road overbridges and on parallel, higher, lower or crossing roads at sophisticated motorway interchanges. Horses and other animals are also liable to move quickly in the field of view. There is no indication that such phenomena impact adversely on road safety.

There are many instances in Ireland and elsewhere of tall structures being located much closer to the public road than is proposed at Moneypoint, all with no apparent distraction to motorists. There is no recorded instance where the presence of a wind turbine in the field of vision was cited as a contributory factor in a road accident. Nor is there any recorded instance where the presence of a wind turbine in the field of vision was cited as having a negative impact on road safety.

The DoEHLG Wind Energy Planning Guidelines (Section 5.8) note as follows:

> *In general, turbines may distract motorists when they are being constructed or when they are new. Over time the turbines become part of the landscape and in general do not cause any significant distraction to motorists.*

The Guidelines also advise regarding safety aspects in developing the layout of the wind farm, as follows:

> *Although wind turbines erected in accordance with standard engineering practice are stable structures, best practice indicates that it is advisable to achieve a safety set back from National and Regional roads and railways of a distance equal to the height of the turbine and blade.*

The layout of the proposal at Moneypoint is based on fully meeting the above.

13.2.4 Project Decommissioning

Short-term effects will arise during decommissioning. The relatively low level of current use of the road accessing the site means that only a limited number of existing road users will be impacted. Any impact that does arise will be temporary and short lived.

Vehicle movements over the decommissioning period will be much less than those of the construction period, given that the major elements of traffic movements involving stone and concrete deliveries will not arise.

The dismantling of the wind turbines will involve the use of mobile cranes and their removal will entail a similar number of loads to turbine delivery during construction.

Alternatively, turbine blades, for example, may be cut into shorter sections before being loaded onto conventional flatbed trucks.

13.3 MITIGATION

If deliveries of turbine components involve road transport, the appropriate authorities will be notified of the movement of long and abnormal loads. Appropriate traffic management measures will be agreed in advance and it is expected that these would include the following.

- Placing warning notices to advise other road users of the presence of slow moving vehicles.
- Using lead warning vehicles and using police escorts where required.
- Undertaking deliveries at times that minimise the impact on other road users and resting in safe lay-bys to reduce any traffic congestion.
- Closing extendable transporter vehicles on return journeys.

Otherwise, no mitigation of impacts is foreseen.

13.4 CONCLUSIONS

A low-level impact will arise during the construction period but none thereafter.

Figure 13.1: Typical Delivery of Wind Turbine Tower Components

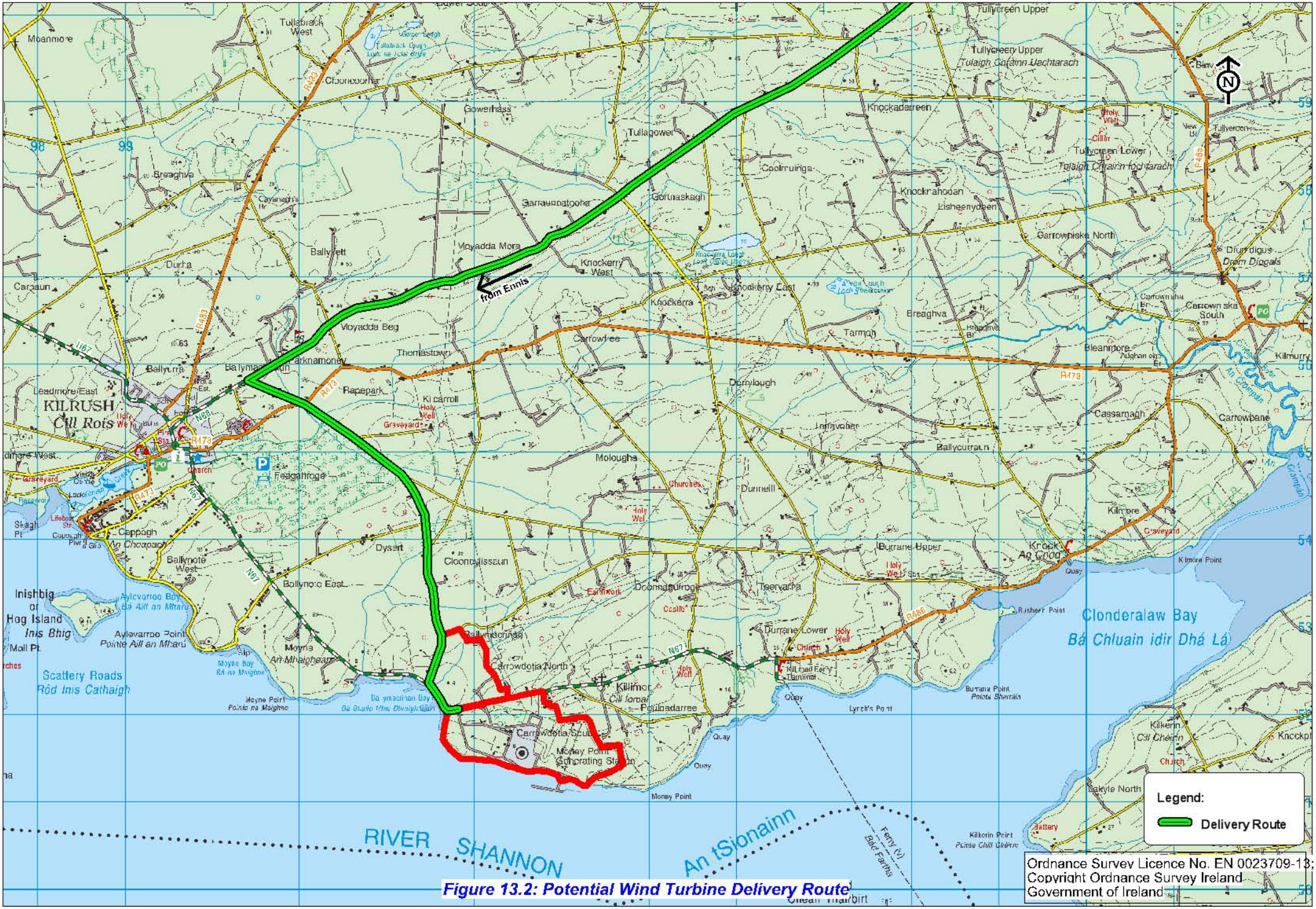

Figure 13.2: Potential Wind Turbine Delivery Route

14. MATERIAL ASSETS

14.1 TOURISM

14.1.1 Receiving Environment

Tourism is considered as being of vital importance to the national economy and is now regarded as one of the greatest potential wealth creators and employers at national level. Its importance is enhanced by the employment it can generate in areas that lack opportunity for other kinds of development. Tourism increased rapidly in Ireland in the past decade as indicated by the numbers of overseas visitors to Ireland, as shown in Table 14.1. A recent decline in numbers is mainly attributed to by the global economic downturn and an unfavourable exchange rates with the Euro.

Table 14.1: Overseas Visits (Thousands) to Ireland

Year	2002	2003	2004	2005	2006	2007	2008	2009
Number	6,065	6,369	6,574	6,977	7,709	8,012	7,839	6,927

In 2009, out-of-state tourist expenditure, including spending by visitors from Northern Ireland, amounted to €3.4 billion. With a further €0.5 billion spent by overseas visitors on fares to Irish carriers, total foreign exchange earnings were €3.9 billion. Domestic tourism expenditure amounted to €1.4 billion making tourism in total a €5.3 billion industry in 2009 and probably Ireland's most important indigenous industry.

The official count by the Central Statistics Office (CSO) of direct employment in 'Accommodation and food service activities', a category which includes hotels, restaurants, bars, canteens and catering, was 123,300 in 2009 (6.4% of total employment). Drawing on an alternative approach, an estimate of all jobs in the tourism and hospitality industry based on a Fáilte Ireland survey of businesses (full-time, part-time, seasonal / casual and not confined to 'main' job) indicates total employment in the sector at approximately 190,000. This estimate includes an additional category of tourism services and attractions which is not covered by the CSO.

Further potential is anticipated and tourism is a priority sector for development by the Government. Maximising the potential of the tourism section and economic diversification are recognised as critical in helping to achieve the critical mass of population in rural areas that have been suffering from population decline.

The majority of tourism growth has occurred in a number of the larger urban centres, being partly due to the emergence of convenient, frequent and affordable air access to these centres. This in turn has resulted in a fundamental shift in consumer preferences towards short city breaks at the expense of more long-stay rural-based holidays.

Co Clare has one of the best-developed tourism infrastructures among counties along the west coast. It has a significant resource in the form of Shannon Airport as it acts as a key gateway into the western region.

Historically, tourism has been a major industry in Co Clare and the county is well endowed in terms of the quality of its landscape, its physical cultural heritage and recreational resources. The quality of the open countryside is an important part of the attraction of the area to tourism.

The county has a diversity of visitor attractions and, in terms of visitor numbers, the main attraction is Bunratty Castle and Folk Park. Others include the Burren, the Atlantic Coast, Lough Derg, Lahinch, Kilkee, Doolin, Ballyvaughan, Lisdoonvarna, Killaloe, Mountcallan, Mountshannon, Ennis, the Cliffs of Moher, Craggaunowen, Ailwee Cave and various cultural festivals.

Local Interest

There are no major tourist attractions in the Moneypoint area and it has not been identified in the Clare County Development Plan 2011 – 2017 as being of particular importance for tourism. Moyne Bay caravan park is an established tourist development in the area, some 3 km west of the station.

Moneypoint lies on the N67 Killimer - Kilrush road, which is a significant access route for tourists travelling between major tourist destinations in Co. Clare and Co. Kerry. The coast road south east of Cappagh to Carrowdotia South is identified as Scenic Route No. 19 in Clare County Development Plan 2011-2017.

Moneypoint Generating Station is conscious of its position as one of the largest power stations within the ESB system and of the uniqueness of many of its facilities. The station has strong links with local schools and national universities, and site tours are a regular feature when organised in advance.

14.1.2 Impact of the Development

General

The issue of how wind farm affect tourism has long been an issue that has divided opinion and promoted debate. A poll carried out by MORI Scotland, an independent research agency, interviewed tourists visiting Argyll and Bute, the area in Scotland having the greatest concentration of wind farm. Responses by interviewees to various questions were as outlined in Tables 14.1 & 14.2.

When asked whether the presence of the wind farm had a positive or negative effect, less than one in ten (8%) felt it had a negative effect.

Table 14.1: Response to Question - What effect if any would you say the presence of that/these wind farm(s) has had on your impression of Argyll as a place to visit?

Completely Positive	Generally Positive	Equally Positive / Negative	Generally Negative	Completely Negative	Don't Know
15%	28%	43%	7%	1%	6%

Asked whether a presence of wind farm in Argyll, made any difference to the likelihood of them visiting the area, the majority (91%) maintained that it made no difference.

Table 14.2: Response to Question - Has the presence of wind farm in Argyll made you any more or less likely to visit the area in future, or has it made no difference?

More Likely	No difference	Less Likely	Don't Know
4%	91%	2%	3%

In general, it appeared that although the majority of tourists visited areas in which wind

farms are located, many were unaware of their existence. The research indicated that wind farms were not seen as having a detrimental effect on tourist visits.

This attitude was mirrored in Sustainable Energy Ireland's report Attitudes Towards Windfarm and Wind Energy in Ireland, which provided the results of an independent study of the Irish public's attitude towards the development of wind energy. One of the main findings was that those with direct experience of wind farm in their locality do not in general consider that they have had any adverse impact on the scenic beauty of the area or on tourism.

Various tourism strategies highlight the importance of showcasing Ireland as an environmentally clean country. Wind farms can contribute to this by indicating a commitment to renewable energy and a cleaner environment. Public attitude is that the presence of a wind farm adds interest to an area, associates the area with clean, green energy or presents the area as progressive and sustainable.

Local Interest

Because it is not a significant tourism area in its own right, the wind farm development will not have any significant adverse impacts on local tourism.

While it is used by tourists, this section of the N67 is of no special tourism merit in its own right. Visitors principally enjoy the attractions of Co Clare further west along the N68 at Kilrush, Kilkee and Milltown Malbay. While the wind turbines at Moneypoint will be visible to tourists, no tourist amenity will be affected.

Significant development is already a feature here along the N67 due to the presence of Moneypoint Generating Station. Furthermore, the area is one of two designated Working Landscapes in the Clare County Development Plan 2011-2017.

As part of ESB's public relations and environmental awareness education policy, Moneypoint Wind Farm development will provide a significant opportunity to present public information to visitors on the technology and economy of wind energy. The presence of a wind farm at a conventional fossil fuel thermal power station will provide a unique backdrop in this regard and will present an opportunity to view an integrated holistic approach to solving the nation's need for electrical energy.

14.1.3 Mitigation

There is no general mitigation of impacts for tourism.

14.1.4 Conclusions

The proposed development will not result in significant adverse impacts.

14.2 ENERGY SUPPLY

14.2.1 Existing Environment

Electricity Supplies and Economy

Demand for electricity is a key indicator of performance and growth in the national economy, with growth in demand for electricity actually surpassing national economic growth. Sustained economic growth requires that additional electricity generating capacity be installed on a continuing basis.

The development of Irish society and its economy has, as in the case of many other countries, relied heavily on the exploitation of apparently abundant, affordable and widely

available energy supplies and the services they provide. Such services are intrinsic to the operation of a modern economy with its needs for warmth and comfort, power and light, and mobility and communications.

The last two decades have seen significant growth in demand for electricity. Peak demand was 2,460 MW in 1990/91 and reached 5,035 MW in 2006. Further growth is expected in the long term.

While reliable high efficiency plant operating at base load is also required, some of this demand will be met from renewable and alternative forms of electricity production, such as wind, in line with Government strategy.

The production of electricity by conventional thermal power plants requires the use of fossil fuels and Ireland has a very high energy import dependency.

14.2.2 Impact of the Development

The proposal will contribute to ensuring that adequate electricity supplies are available to support economic activity and growth in a manner fully compatible with Government energy and environmental policies. It will ensure that local and regional economic development is not constrained by shortfalls in the availability of electric power.

The availability of wind energy coincides well with periods of peak electricity demand. Demand often peaks on cold windy winter days - just when wind turbines are at their most productive. Wind energy is low risk in that the small unit size of each individual wind turbine relative to the overall electricity system reduces the impact of technical failure compared with larger generating units. While energy output from a wind farm is variable, electricity demand itself is constantly fluctuating and supply and demand must be matched on a minute to minute basis, 24 hours of the day, every day of the year.

It is anticipated that the wind farm will generate about 45,000,000 kWh of electricity annually. While this is very modest in comparison with the output of Moneypoint Generating Station, based on estimates by the Sustainable Energy Authority of Ireland estimates that each additional MW of installed wind capacity generates in one year the equivalent electricity consumed by 525 average homes for the same period, the installed capacity will be capable of generating electricity that is the equivalent to the annual consumption of almost 8,000 homes in perpetuity.

The production of electricity by the wind farm will not involve fuel consumption. Each additional MW of installed wind capacity removes the need to import fossil fuels. Table 14.4 indicates the annual savings in fossil fuel imports in tonnes of oil or coal equivalent, which are universally used terms to compare different energy units, resulting from Moneypoint Wind Farm. (Average conventional power plant efficiencies of 40% are assumed.)

Table 14.4: Avoided Fuel Imports

Fuel	Avoided Consumption / MW	Annual Savings
Oil Equivalent	560 t	8,400 t
Coal Equivalent	797 t	12,000 t

A common assertion by opponents of wind power is that as much energy is consumed in manufacturing and installing wind turbines as they subsequently produce. Energy balance

is the comparison of energy used in manufacture with the energy produced by a wind turbine or power station. This can be expressed in terms of energy 'pay back' time, i.e. the time needed to generate the equivalent amount of energy used in manufacturing the wind turbine or power station. The average wind farm will pay back the energy used in its manufacture within 3-5 months of commencement of operation.[3]

This means that over an operating life of 20-25 years an onshore turbine is expected to recover multiples of the input energy required. This takes account of energy associated with maintenance of the wind farm, as well as the losses that are inherently part of electricity transmission and distribution systems.

14.2.3 Mitigation

No mitigation of impacts is required.

14.2.4 Conclusions

The proposed development will have positive effects and will not result in significant adverse environmental impacts.

14.3 AIR NAVIGATION

14.3.1 Existing Environment

Current tall structures at the site include the following:

- The station main building is approximately 64.5 m high (top 70 m OD).
- Two ship unloaders on the station's jetty are approximately 90 m high in the upright position (top 96 m OD).
- The station's two reinforced concrete chimneys are 225 m high (top 230 m OD).

14.3.2 Impact of the Development

The land profile is such that the turbine at the highest elevation is turbine T1 located within the ash storage area. The ground elevation here is 15.6 m OD. All wind turbines will be founded at existing ground level and at a maximum of 100 m tall the top of the most elevated stationary turbine tower will be at 115.6 m OD. Taking into account the maximum overall turbine dimension of 152 m from ground level to tip of blade in the fully upright position, the highest point will be 167.6 m OD.

Thus, the turbines will be very low relative to the chimneys, which are already provided with obstacle lighting to ensure that they do not pose a danger to air navigation.

All requirements of the Irish Aviation Authority and the Department of Defence will be implemented in full. The wind farm will have no implications for air navigation nor impact on the safety of air traffic

14.3.3 Mitigation

The proposed development will not result in significant adverse impacts.

[3] Milborrow, Dispelling the Myths of Energy Payback Time, as published in Windstats, Vol. 11, No 2 (Spring 1998).

14.4 TELEVISION AND COMMUNICATIONS SIGNALS

14.4.1 Receiving Environment

Some evidence exists that in certain circumstances, wind turbines, more particularly the rotation of the blades, can adversely affect communication systems that use electromagnetic waves as the transmission medium, e.g. television, radio and microwave links.

14.4.2 Impact of the Development

Scattering effects have been associated with television reception in the vicinity of some wind turbines, causing double imaging on the television screen. The most significant effect, at a domestic level, is straightforward involving a possible flicker effect caused by the moving rotor, particularly on television signals. In practice, the majority of these difficulties arise where structures such as wind turbines are located in a region where there is a relatively weak signal.

The most significant potential effect, in terms of numbers of households affected, is where the wind farm is directly in line with the transmitter radio path. In practice, the majority of these difficulties arise where structures such as wind turbines are located in a region where there is a relatively weak signal.

There are two potential and different effects depending on the location of the receiver to the wind farm:

- Shadowed houses: The majority of the issues are related to receivers 'shadowed' directly behind the wind farm where the main signal passes through the wind farm. In these locations the turbine rotor can create a degree of signal scattering which causes loss of picture detail, loss of colour and buzz on sound.
- Viewers to the side: The effects are likely to be periodic reflections from the blades, giving rise to a delayed image or ghost image on the screen which is liable to flicker as the blades rotate.

These problems are predominantly associated with turbines having metal or carbon-fibre blades. Modern turbines, such as the type proposed, have blades manufactured from fibreglass composite materials and the problem of scattering are much less likely to arise. There are already large structures within the power station at Moneypoint that do not impact on TV or radio reception.

It is believed that the presence of the wind farm will not create any loss of broadcast amenity to local residences.

14.4.3 Mitigation

In the event that the wind farm development leads to interference with television reception, in collaboration with the appropriate bodies, all necessary measures will be undertaken to fully eliminate the impact. There are two potential methods of mitigation, as follows:

- ESB Wind Development will enter a protocol agreement with RTÉ concerning Moneypoint Wind Farm. The standard protocol agreement includes a remedial mechanism for any loss of broadcast amenity that might be suffered by residents as a result of the wind farm development.

- ESB Wind Development will commission an independent survey of television reception in the locality prior to erection of the wind turbines. This will establish the baseline position against which any apparent subsequent impacts will be evaluated.

ESB Wind Development undertakes to fully remedy any interference with broadcast reception that is attributable to the wind farm development.

14.4.4 Conclusions

The proposed development will not result in significant adverse environmental impacts.

15. CULTURAL HERITAGE

15.1 RECEIVING ENVIRONMENT

The current land profile of the site is a man-made one that was created at the time of construction of the power station by site development works, which involved in excess of 3,5000,000 m³ of earth moving leading to remodelling of the site's topography. The coal yard was formed by excavating rock from the hill at its northern and eastern boundaries and the excavated rock was used to reclaim and level the site towards the estuary, where an additional 24 ha of land were created.

In addition, the ash storage area has been transformed by the deposition of significant volumes of ash there since the station was commissioned and its subsequent restoration to grassland as sections within it have reached their final level.

Archaeology

There are no protected structures within the meaning of the Planning and Development Act, 2000 (as amended) within the power station lands. A number of recorded archaeological sites in the townland of Carrowdotia South, as listed in Table 15.1 and shown in Figure 15.1,have been identified. These are classified as Enclosures.

Table 15.1: Surrounding Archaeological Sites

Site Reference	CH1	CH2	CH3	CH4	CH5
Site & Monuments Record (SMR)	CL067:041	CL067:042	CL067:043	CL067:050	CL067:051

History

The place-name Carrowdotia comes from the Gaelic "Ceathrú Dóite" or "Burnt Quarter". There are no historical events associated with the site that have the ability to be impacted upon.

Architectural Heritage

There are no protected structures within the meaning of the Planning and Development Act, 2000 situated on the station site. The power station buildings at Moneypoint are not considered to be of interest from an architectural heritage perspective. However, there are a number of structures located in the general area, as listed in Table 15.2 and shown in Figure 15.1.

Table 15.2: Surrounding Architectural Heritage Sites

Site Reference	Description
CH6	Two modern agricultural barns, with steel and concrete walls and corrugated roofs.
CH7	Two-storey cottage with chimneys at each gable.
CH8	Modern (1980.s) two-storey dwelling orientated east-west with front facing north; single-storey extension to east.

Site Reference	Description
CH9	Two-storey dwelling orientated with single storey extension to east.
CH10	Single-storey bungalow; three bay with off-centre recessed entrance; garage incorporated into western end.
CH11	Two-storey cottage with rear extension.
CH12:	Single-storey gable-ended cottage with attic-room

15.2 IMPACT OF THE DEVELOPMENT

With the exception of turbine T2, all of the works associated with the wind farm development will take place in the remodelled / filled areas of the power station lands. Turbine T2 itself will be located in an area now having a substantial depth of fill.

The nature of the site is such that the excavation of buried or hidden features in these areas cannot arise during construction. There is no potential for disturbance of sites that are as yet undiscovered. Areas of archaeological interest in the vicinity of the site will be unaffected and undisturbed by the wind farm.

There are no historic events associated within the development areas.

The wind farm has no potential to impact on Architectural heritage sites that are outside of the station lands.

15.3 MITIGATION

No mitigation of impacts is proposed.

15.4 CONCLUSIONS

The proposed development will not result in significant environmental impacts.

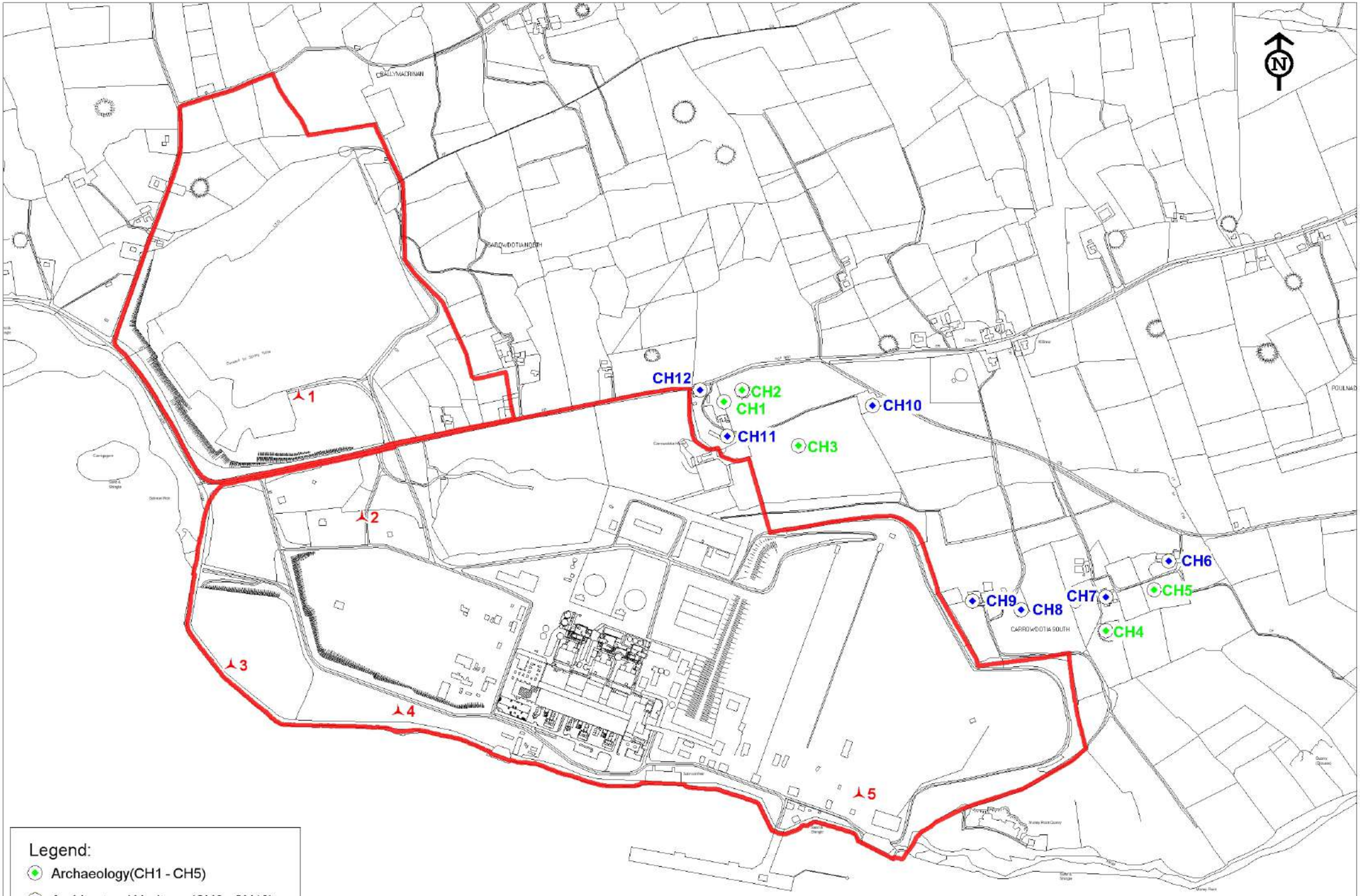

Figure 15.1 : Location of Cultural Heritage Sites

16. INTERACTION OF IMPACTS

16.1 INTRODUCTION

In addition to the requirement to describe the likely significant effects of the proposed development on the different elements of the environment, it is also required to consider the interaction of those effects. Interactions are considered by a means of the matrix presented in Table 16.1. Each aspect of the environment which is considered in detail in the appropriate sections of the EIS is cross tabulated against all other aspects that have also been considered.

Where an interaction is considered to be both likely and significant, it is given a reference number in the matrix and detail of the interaction is discussed herein.

Mitigation measures in relation to primary impacts are outlined in the relevant Section of the EIS. Mitigation measures are not repeated herein and only mitigation that is additional to the primary impacts is described.

16.2 INTERACTION

1: Human Beings / Noise

In terms of the construction noise, any impacts arising will be short-term in nature and a perceptible increase in noise sufficient to cause harm to residential amenity will not result given the distance from the site to the existing properties in the area.

With the closest occupied residence being located in excess 500 m from the nearest proposed turbine, noise predictions indicated that noise from Moneypoint Wind Farm in combination with noise associated with operation of the power station will not exceed fixed limit values suggested by the EPA.

No further mitigation measures are proposed.

2: Human Beings / Shadow Flicker

When the wind farm is operational there is potential for shadow flicker to arise, depending on the simultaneous occurrence of a number of unrelated conditions.

Potential occurrence was assessed for all properties surrounding the site at Moneypoint, Regardless of their actual susceptibility to actual occurrence. Results indicated shadow flicker was possible but calculations showed a predicted maximum occurrence of only about 50% of the recommended limit value of 30 hours.

No further mitigation measures are proposed.

3: Human Beings / Landscape

Impacts on the landscape are commonly recognised as being the most significant impacts of this type of development. Photomontages were generated for 15 viewshed reference points and a detailed analysis of each was presented. In addition to impacts on visual character and landscape character, impacts on human beings were considered in the context of built-up areas, recreational areas and roads (scenic routes, national primary roads, regional roads and country roads).

The main near-distance views of the wind farm occur mostly within a 7 km radius around the site. Its visual impact is considered to range from slight to moderate adverse with

higher potential visual impact on views from locations close to the development. The wind farm will not be visible from all locations within this area, as some screening is provided by existing vegetation and the undulating land profile.

No further mitigation measures are proposed.

4: Human Beings / Roads & Traffic

The development will generate traffic during the construction phase and but the number of heavy traffic movements on and off the site has been calculated as being the equivalent of 9 traffic movements daily over a 6-month period. Rather than occurring uniformly throughout the construction period, traffic movements will likely peak on the five non-consecutive days on which concrete for turbine foundations will be delivered. Each foundation will involve up to 35-40 deliveries or 80 vehicle movements.

For existing road users on the N67 National Secondary Route there will be an indiscernible impact. The network of local minor roads and its users will be unaffected by the development.

Traffic management measures that may be employed to mitigate the impacts of long loads, in the event that road haulage rather than the station's barge landing facility is used for the delivery of wind turbine components, have the potential to cause temporary inconvenience for other road users.

Any local road improvements that may be necessary for delivery of wind turbine components, albeit they would be of limited extent, would improve overall road safety in the long term.

No further mitigation measures are proposed.

5: Human Beings / Material Assets

No impacts were predicted in relation to electromagnetic interference. In the very unlikely event of interference with television reception, all necessary measures will be undertaken by the developer in accordance with standard mitigation measures to fully eliminate any negative impact.

No further mitigation measures are proposed.

5: Ecology (Flora & Mammals – Avifauna) / Landscape

The main ecologically designated area in the vicinity of the site is the Lower River Shannon Special Areas of Conservation (SAC). There will be a combination of long-distance, mid-distance and short-distance views of the wind farm from the SAC. However, this site and others that in the broader area are designated for their nature conservation value, which is not impacted upon by the visibility of the wind farm.

No further mitigation measures are proposed.

6: Landscape / Material Assets

The landscape assessment concluded that the overall image presented by the wind farm development is not a negative one. In that context it is not considered that the visual impact of the proposed development will negatively impact on existing or future tourism facilities in the area.

One of the main findings of the Irish public's attitude to wind energy was that those with direct experience of wind farms in their locality do not in general consider that they have

had any adverse impact on the scenic beauty of the area or on tourism. Independent research elsewhere has confirmed that the presence of wind farms makes no difference to tourists' enjoyment of their holiday.

No further mitigation measures are proposed.

7: Landscape / Cultural Heritage

While there are no recorded archaeological, historical or architectural features within the site of the proposed development, the nature of the development is such that indirect impacts associated with visual intrusion will result at cultural heritage sites in the broader landscape. The extent of visibility is determined by local topography, vegetative screening and the effects of distance. Although there are no mitigation measures available to reduce impact arising, it was considered that any impacts arising would not be significant.

No further mitigation measures are proposed.

8: Air & Climate / Roads & Traffic

The primary air quality issue relates to dust potentially arising from a number of activities that include construction transport within and off the site. Traffic associated with the development will also give rise to exhaust emissions during the construction phase. The potential impact is not considered significant in the context of the extent of traffic movements arising.

No further mitigation measures are proposed.

9: Soils & Waters / Cultural Heritage

There are no Recorded Monuments located within the site. Excavations of soils during construction doesn't have the possibility of uncovering previously unrecorded features and material of archaeological interest and potential.

No further mitigation measures are proposed.

16.3 EPA GUIDANCE

The Environmental Protection Agency (EPA) published its Advice Notes on Current Practice (in the preparation of Environmental Impact Statements), which are designed to accompany the Guidelines on the information to be contained in Environmental Impact Statements, also published by the EPA.

The Advice Notes contain greater detail on many of the topics covered by the Guidelines and offer guidance on current practice for the structure and content of Environmental Impact Statements. They are divided into five sections, each providing detailed guidance on specific aspects to be considered in the preparation of an EIS.

Section 3 provides guidance on the topics which would usually be addressed when preparing an EIS for a particular class of development, highlighting typical issues which arise. The projects are grouped into 33 generic types, which have similar development or operational characteristics.

Project Type 33 addresses installations for the harnessing of wind power for energy production and the guidance on interaction of impacts for this project type notes as follows:

> *The interaction of noise, visual impacts, access to underdeveloped areas and effects on ecology can combine to affect perceptions of the integrity of natural areas.*

At Moneypoint the magnitude of separate impacts on the listed environmental factors is not such as to combine to affect the perception of integrity of a natural area.

16.4 CONCLUSIONS

In summary, the consideration of Interaction of Impacts has concluded that no additional potentially unacceptable environmental impacts arising as a result of the construction and operation of the wind farm at Moneypoint, provided that the recommended mitigation measures are implemented.

Table 16.1: Potential Interaction of Significant Environmental Impacts

Interactions	Human Beings	Noise	Shadow Flicker	Flora & Mammals	Avifauna	Landscape	Air & Climate	Soils & Waters	Roads & Traffic	Material Assets	Cultural Heritage
Human Beings		1	2			3			4	5	
Noise	1										
Shadow Flicker	2										
Flora & Mammals						5					
Avifauna						5					
Landscape	3			5	5					6	7
Air & Climate									8		
Soils & Waters											9
Roads & Traffic	4						8				
Material Assets	5					6					
Cultural Heritage						7		9			

APPENDIX A: BIBLIOGRAPHY

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APPENDIX B: PREDICTED NOISE LEVELS

RESULTS OF WINDPRO ANALYSIS AT MONEYPOINT

Project:
Moneypoint Wind Farm_May 2011

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DECIBEL - Main Result

Calculation: Moneypoint Noise Calc_5 x Vestas V112_11th Jan 2012

Noise calculation model:
ISO 9613-2 General
Wind speed:
3.0 m/s - 12.0 m/s, step 1.0 m/s
Ground attenuation:
General, Ground factor: 0.5
Meteorological coefficient, C0:
0.0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are 90% exeedance values (L90)
Pure tones:
Pure and Impulse tone penalty are added to WTG source noise
Height above ground level, when no value in NSA object:
4.0 m Don't allow override of model height with height from NSA object
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0.0 dB(A)

Scale 1:50,000

New WTG Noise sensitive area

WTGs

	IG				WTG type							Noise data							
	East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Creator	Name	First wind speed	LwaRef	Last wind speed	LwaRef	Pure tones	Octave data	
	IG		[m]					[kW]	[m]	[m]			[m/s]	[dB(A)]	[m/s]	[dB(A)]			
1	102,890	152,233	15.6	VESTAS V112 3000 112.0 !O! hub...	Yes	VESTAS	V112-3,000	3,000	112.0	94.0	USER	User Input Values_Level 0 - Mode 0_May 2011	3.0	94.7	12.0	106.5	0 dB	Generic	*)
2	103,035	151,939	10.2	VESTAS V112 3000 112.0 !O! hub...	Yes	VESTAS	V112-3,000	3,000	112.0	94.0	USER	User Input Values_Level 0 - Mode 0_May 2011	3.0	94.7	12.0	106.5	0 dB	Generic	*)
3	102,735	151,617	5.3	VESTAS V112 3000 112.0 !O! hub...	Yes	VESTAS	V112-3,000	3,000	112.0	94.0	USER	User Input Values_Level 0 - Mode 0_May 2011	3.0	94.7	12.0	106.5	0 dB	Generic	*)
4	103,118	151,511	5.2	VESTAS V112 3000 112.0 !O! hub...	Yes	VESTAS	V112-3,000	3,000	112.0	94.0	USER	User Input Values_Level 0 - Mode 0_May 2011	3.0	94.7	12.0	106.5	0 dB	Generic	*)
5	104,176	151,320	12.7	VESTAS V112 3000 112.0 !O! hub...	Yes	VESTAS	V112-3,000	3,000	112.0	94.0	USER	User Input Values_Level 0 - Mode 0_May 2011	3.0	94.7	12.0	106.5	0 dB	Generic	*)

*)Notice: One or more noise data for this WTG is generic or input by user

Calculation Results

Sound Level

Noise sensitive area No.	Name	IG East	IG North	IG Z [m]	Imission height [m]	Demands Max Noise [dB(A)]	Sound Level Max From WTGs [dB(A)]	Demands fulfilled ? Noise
A	Noise sensitive point: User defined (1)	102,285	152,580	16.1	4.0	45.0	38.6	Yes
B	Noise sensitive point: User defined (2)	102,477	152,614	15.8	4.0	45.0	40.2	Yes
C	Noise sensitive point: User defined (3)	102,534	152,764	20.0	4.0	45.0	39.0	Yes
D	Noise sensitive point: User defined (4)	102,556	152,864	20.0	4.0	45.0	38.0	Yes
E	Noise sensitive point: User defined (5)	103,042	153,015	22.4	4.0	45.0	37.2	Yes
F	Noise sensitive point: User defined (6)	103,397	152,329	23.6	4.0	45.0	42.7	Yes
G	Noise sensitive point: User defined (7)	103,375	152,362	20.3	4.0	45.0	42.7	Yes
H	Noise sensitive point: User defined (8)	103,563	152,332	30.0	4.0	45.0	40.8	Yes
I	Noise sensitive point: User defined (9)	103,813	152,191	34.5	4.0	45.0	39.3	Yes
J	Noise sensitive point: User defined (10)	104,174	152,262	40.0	4.0	45.0	36.8	Yes
K	Noise sensitive point: User defined (11)	104,405	151,895	27.2	4.0	45.0	38.5	Yes
L	Noise sensitive point: User defined (12)	104,513	151,790	30.0	4.0	45.0	38.7	Yes
M	Noise sensitive point: User defined (13)	104,646	151,878	30.0	4.0	45.0	36.8	Yes
N	Noise sensitive point: User defined (14)	105,002	151,975	30.0	4.0	45.0	33.4	Yes
O	Noise sensitive point: User defined (15)	105,435	151,701	30.0	4.0	45.0	31.0	Yes
P	Noise sensitive point: User defined (16)	105,534	151,892	23.0	4.0	45.0	30.1	Yes

Distances (m)

	WTG				
NSA	1	2	3	4	5
A	698	987	1063	1355	2272
B	562	876	1030	1276	2136
C	639	965	1165	1383	2187
D	714	1042	1260	1465	2238
E	797	1076	1431	1506	2039
F	516	532	972	864	1275

To be continued on next page...

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DECIBEL - Main Result

Calculation: Moneypoint Noise Calc_5 x Vestas V112_11th Jan 2012

...continued from previous page

	WTG				
NSA	1	2	3	4	5
G	502	543	982	889	1314
H	680	658	1094	934	1183
I	924	818	1221	972	944
J	1284	1184	1577	1296	942
K	1552	1371	1693	1343	619
L	1682	1485	1786	1423	578
M	1792	1612	1929	1571	730
N	2128	1967	2295	1940	1054
O	2600	2412	2701	2325	1315
P	2666	2499	2812	2446	1474

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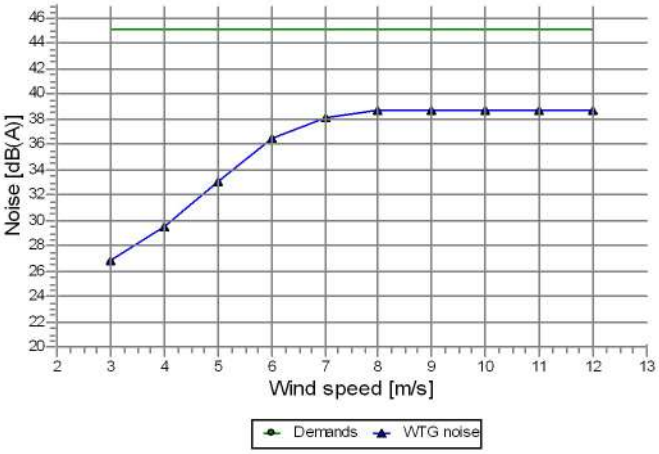
DECIBEL - Detailed results

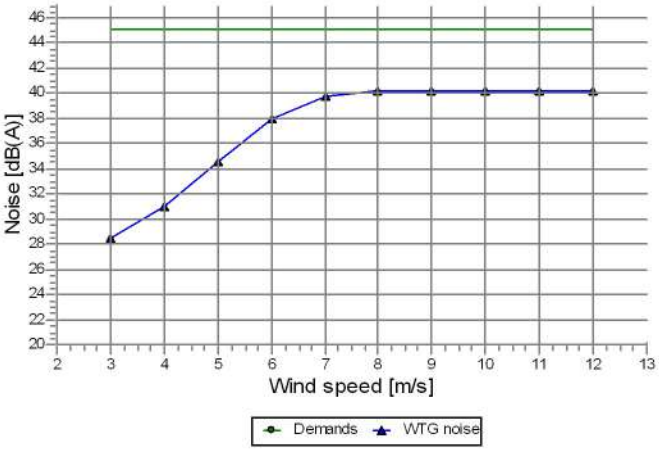
Calculation: Moneypoint Noise Calc_5 x Vestas V112_11th Jan 2012 **Noise calculation model:** ISO 9613-2 General

Noise sensitive point: User defined (1) (A)



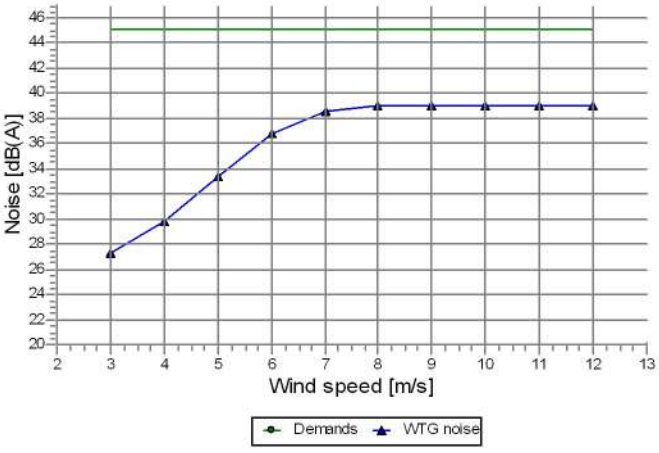
Wind speed [m/s]	Sound Level Demands [dB(A)]	WTG noise [dB(A)]	Demands fulfilled ?
3.0	45.0	26.8	Yes
4.0	45.0	29.4	Yes
5.0	45.0	33.0	Yes
6.0	45.0	36.4	Yes
7.0	45.0	38.1	Yes
8.0	45.0	38.6	Yes
9.0	45.0	38.6	Yes
10.0	45.0	38.6	Yes
11.0	45.0	38.6	Yes
12.0	45.0	38.6	Yes

Noise sensitive point: User defined (2) (B)



Wind speed [m/s]	Sound Level Demands [dB(A)]	WTG noise [dB(A)]	Demands fulfilled ?
3.0	45.0	28.4	Yes
4.0	45.0	31.0	Yes
5.0	45.0	34.6	Yes
6.0	45.0	38.0	Yes
7.0	45.0	39.7	Yes
8.0	45.0	40.2	Yes
9.0	45.0	40.2	Yes
10.0	45.0	40.2	Yes
11.0	45.0	40.2	Yes
12.0	45.0	40.2	Yes

Noise sensitive point: User defined (3) (C)



Wind speed [m/s]	Sound Level Demands [dB(A)]	WTG noise [dB(A)]	Demands fulfilled ?
3.0	45.0	27.2	Yes
4.0	45.0	29.8	Yes
5.0	45.0	33.4	Yes
6.0	45.0	36.8	Yes
7.0	45.0	38.5	Yes
8.0	45.0	39.0	Yes
9.0	45.0	39.0	Yes
10.0	45.0	39.0	Yes
11.0	45.0	39.0	Yes
12.0	45.0	39.0	Yes

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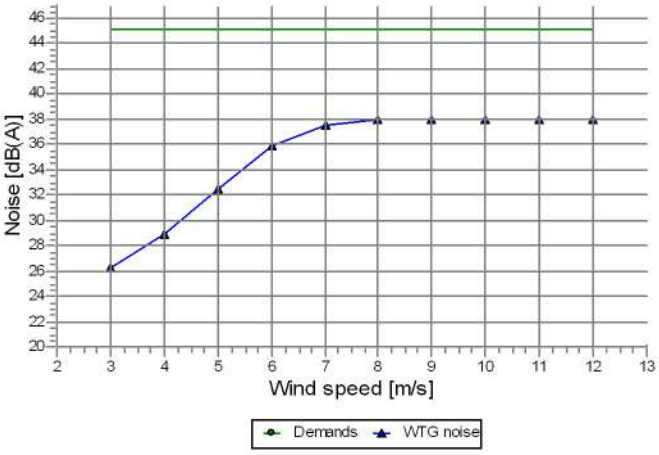
DECIBEL - Detailed results

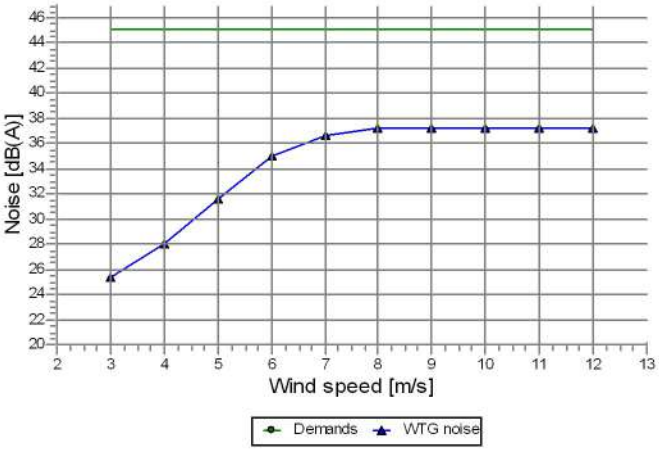
Calculation: Moneypoint Noise Calc_5 x Vestas V112_11th Jan 2012 **Noise calculation model:** ISO 9613-2 General

Noise sensitive point: User defined (4) (D)



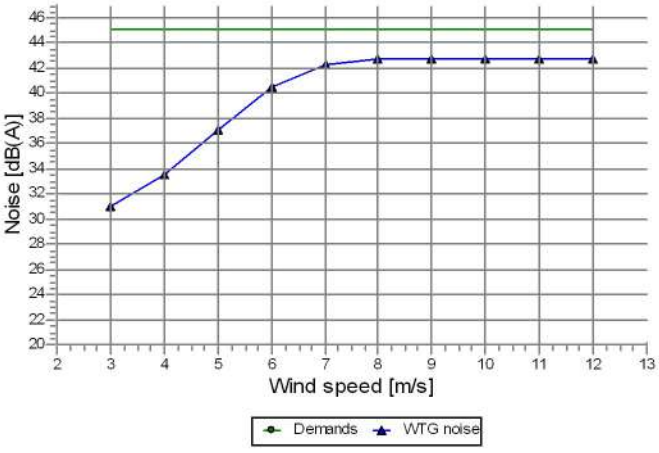
	Sound Level		
Wind speed [m/s]	Demands [dB(A)]	WTG noise [dB(A)]	Demands fulfilled ?
3.0	45.0	26.2	Yes
4.0	45.0	28.8	Yes
5.0	45.0	32.4	Yes
6.0	45.0	35.8	Yes
7.0	45.0	37.5	Yes
8.0	45.0	38.0	Yes
9.0	45.0	38.0	Yes
10.0	45.0	38.0	Yes
11.0	45.0	38.0	Yes
12.0	45.0	38.0	Yes

Noise sensitive point: User defined (5) (E)



	Sound Level		
Wind speed [m/s]	Demands [dB(A)]	WTG noise [dB(A)]	Demands fulfilled ?
3.0	45.0	25.4	Yes
4.0	45.0	28.0	Yes
5.0	45.0	31.6	Yes
6.0	45.0	35.0	Yes
7.0	45.0	36.7	Yes
8.0	45.0	37.2	Yes
9.0	45.0	37.2	Yes
10.0	45.0	37.2	Yes
11.0	45.0	37.2	Yes
12.0	45.0	37.2	Yes

Noise sensitive point: User defined (6) (F)



	Sound Level		
Wind speed [m/s]	Demands [dB(A)]	WTG noise [dB(A)]	Demands fulfilled ?
3.0	45.0	30.9	Yes
4.0	45.0	33.5	Yes
5.0	45.0	37.1	Yes
6.0	45.0	40.5	Yes
7.0	45.0	42.2	Yes
8.0	45.0	42.7	Yes
9.0	45.0	42.7	Yes
10.0	45.0	42.7	Yes
11.0	45.0	42.7	Yes
12.0	45.0	42.7	Yes

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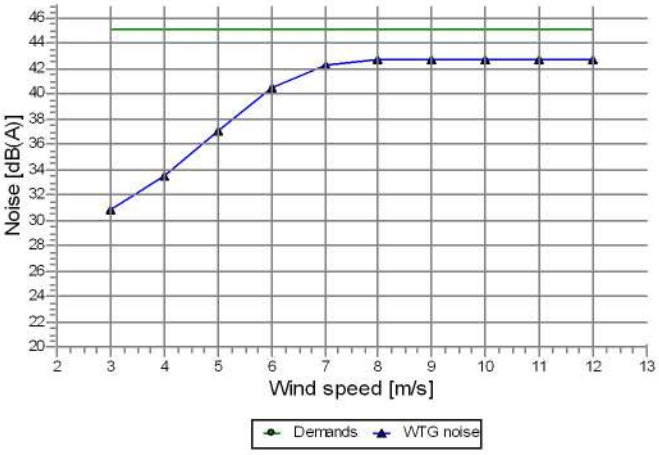
DECIBEL - Detailed results

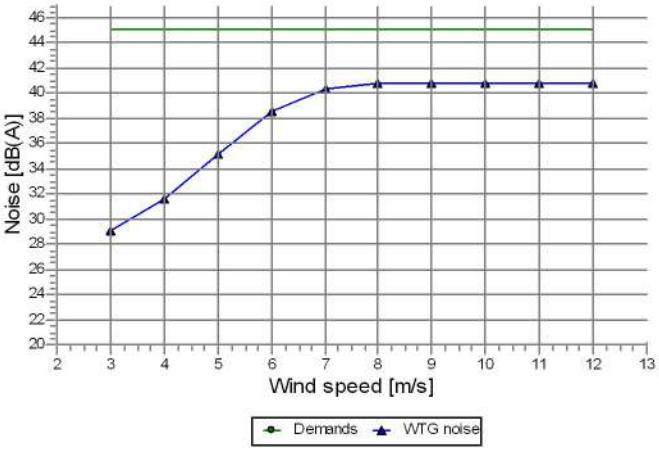
Calculation: Moneypoint Noise Calc_5 x Vestas V112_11th Jan 2012 **Noise calculation model:** ISO 9613-2 General

Noise sensitive point: User defined (7) (G)



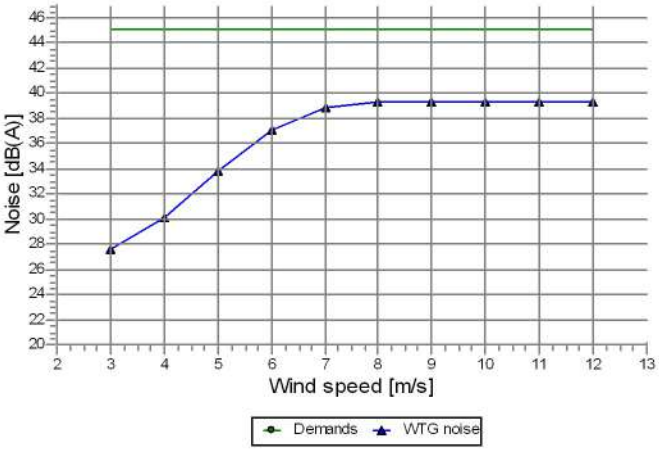
Wind speed [m/s]	Sound Level Demands [dB(A)]	WTG noise [dB(A)]	Demands fulfilled ?
3.0	45.0	30.9	Yes
4.0	45.0	33.5	Yes
5.0	45.0	37.1	Yes
6.0	45.0	40.5	Yes
7.0	45.0	42.2	Yes
8.0	45.0	42.7	Yes
9.0	45.0	42.7	Yes
10.0	45.0	42.7	Yes
11.0	45.0	42.7	Yes
12.0	45.0	42.7	Yes

Noise sensitive point: User defined (8) (H)



Wind speed [m/s]	Sound Level Demands [dB(A)]	WTG noise [dB(A)]	Demands fulfilled ?
3.0	45.0	29.0	Yes
4.0	45.0	31.6	Yes
5.0	45.0	35.2	Yes
6.0	45.0	38.6	Yes
7.0	45.0	40.3	Yes
8.0	45.0	40.8	Yes
9.0	45.0	40.8	Yes
10.0	45.0	40.8	Yes
11.0	45.0	40.8	Yes
12.0	45.0	40.8	Yes

Noise sensitive point: User defined (9) (I)



Wind speed [m/s]	Sound Level Demands [dB(A)]	WTG noise [dB(A)]	Demands fulfilled ?
3.0	45.0	27.5	Yes
4.0	45.0	30.1	Yes
5.0	45.0	33.7	Yes
6.0	45.0	37.1	Yes
7.0	45.0	38.8	Yes
8.0	45.0	39.3	Yes
9.0	45.0	39.3	Yes
10.0	45.0	39.3	Yes
11.0	45.0	39.3	Yes
12.0	45.0	39.3	Yes

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11/01/2012 16:17/2.7.490

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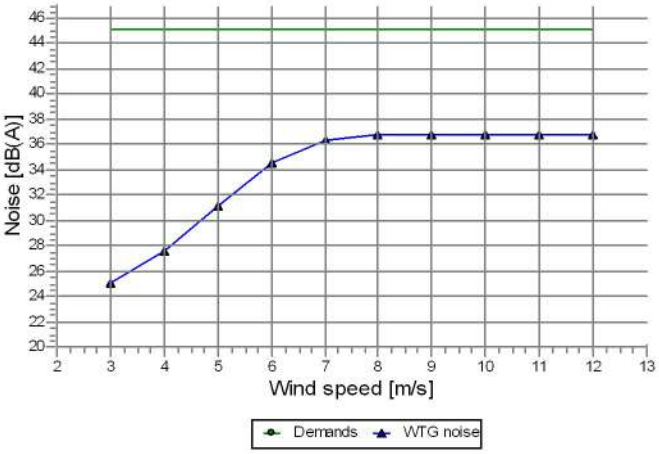
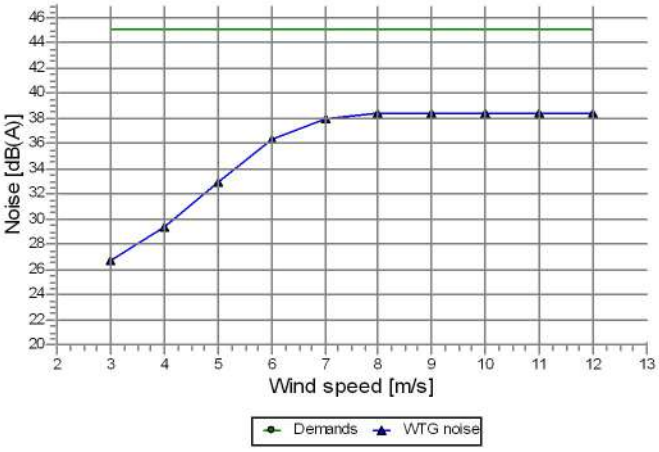
Calculation: Moneypoint Noise Calc_5 x Vestas V112_11th Jan 2012 **Noise calculation model:** ISO 9613-2 General

Noise sensitive point: User defined (10) (J)



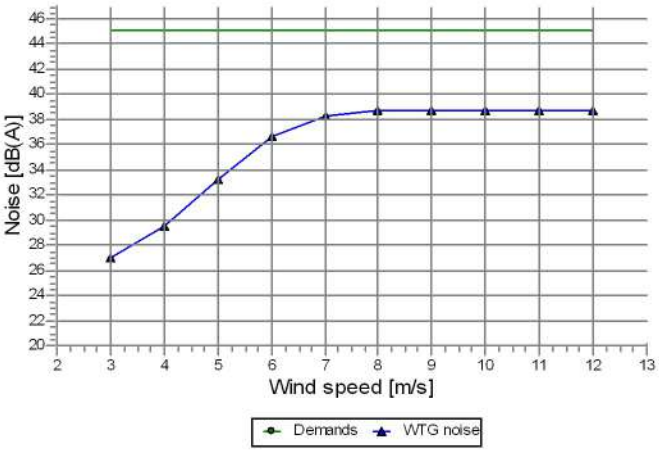
	Sound Level		
Wind speed [m/s]	Demands [dB(A)]	WTG noise [dB(A)]	Demands fulfilled ?
3.0	45.0	25.0	Yes
4.0	45.0	27.6	Yes
5.0	45.0	31.2	Yes
6.0	45.0	34.6	Yes
7.0	45.0	36.3	Yes
8.0	45.0	36.8	Yes
9.0	45.0	36.8	Yes
10.0	45.0	36.8	Yes
11.0	45.0	36.8	Yes
12.0	45.0	36.8	Yes

Noise sensitive point: User defined (11) (K)



	Sound Level		
Wind speed [m/s]	Demands [dB(A)]	WTG noise [dB(A)]	Demands fulfilled ?
3.0	45.0	26.7	Yes
4.0	45.0	29.3	Yes
5.0	45.0	32.9	Yes
6.0	45.0	36.3	Yes
7.0	45.0	38.0	Yes
8.0	45.0	38.5	Yes
9.0	45.0	38.5	Yes
10.0	45.0	38.5	Yes
11.0	45.0	38.5	Yes
12.0	45.0	38.5	Yes

Noise sensitive point: User defined (12) (L)



	Sound Level		
Wind speed [m/s]	Demands [dB(A)]	WTG noise [dB(A)]	Demands fulfilled ?
3.0	45.0	27.0	Yes
4.0	45.0	29.6	Yes
5.0	45.0	33.2	Yes
6.0	45.0	36.5	Yes
7.0	45.0	38.2	Yes
8.0	45.0	38.7	Yes
9.0	45.0	38.7	Yes
10.0	45.0	38.7	Yes
11.0	45.0	38.7	Yes
12.0	45.0	38.7	Yes

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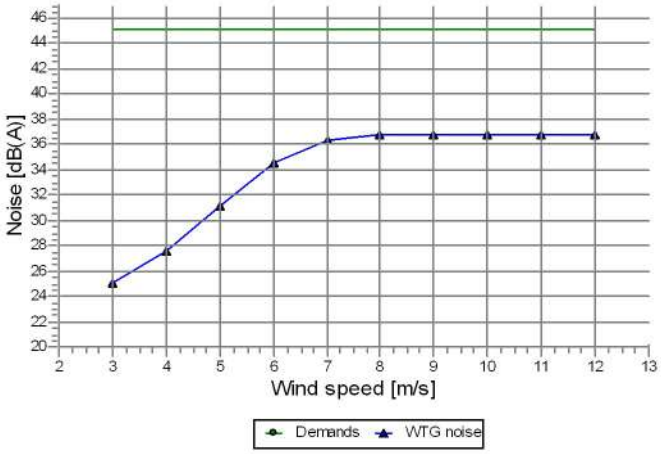
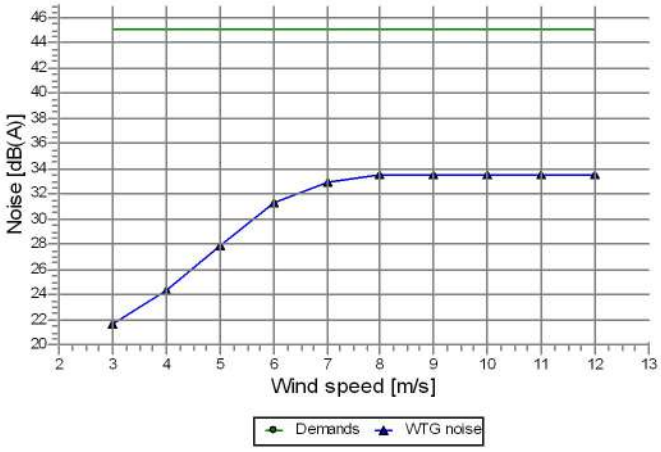
Calculation: Moneypoint Noise Calc_5 x Vestas V112_11th Jan 2012 **Noise calculation model:** ISO 9613-2 General

Noise sensitive point: User defined (13) (M)



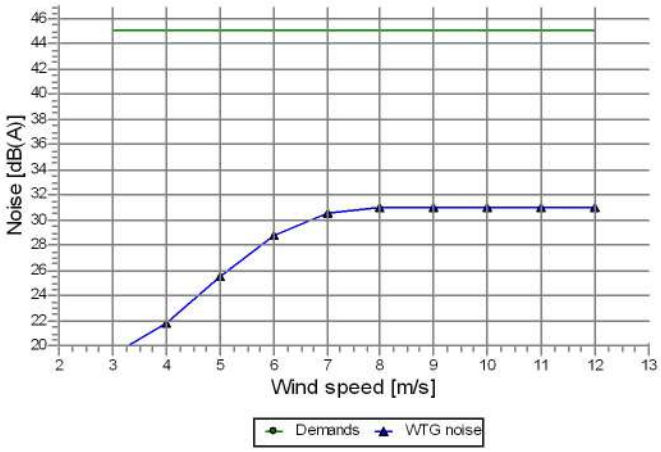
Wind speed [m/s]	Sound Level Demands [dB(A)]	WTG noise [dB(A)]	Demands fulfilled ?
3.0	45.0	25.0	Yes
4.0	45.0	27.6	Yes
5.0	45.0	31.2	Yes
6.0	45.0	34.6	Yes
7.0	45.0	36.3	Yes
8.0	45.0	36.8	Yes
9.0	45.0	36.8	Yes
10.0	45.0	36.8	Yes
11.0	45.0	36.8	Yes
12.0	45.0	36.8	Yes

Noise sensitive point: User defined (14) (N)



Wind speed [m/s]	Sound Level Demands [dB(A)]	WTG noise [dB(A)]	Demands fulfilled ?
3.0	45.0	21.6	Yes
4.0	45.0	24.2	Yes
5.0	45.0	27.8	Yes
6.0	45.0	31.2	Yes
7.0	45.0	32.9	Yes
8.0	45.0	33.4	Yes
9.0	45.0	33.4	Yes
10.0	45.0	33.4	Yes
11.0	45.0	33.4	Yes
12.0	45.0	33.4	Yes

Noise sensitive point: User defined (15) (O)



Wind speed [m/s]	Sound Level Demands [dB(A)]	WTG noise [dB(A)]	Demands fulfilled ?
3.0	45.0	19.2	Yes
4.0	45.0	21.8	Yes
5.0	45.0	25.4	Yes
6.0	45.0	28.8	Yes
7.0	45.0	30.5	Yes
8.0	45.0	31.0	Yes
9.0	45.0	31.0	Yes
10.0	45.0	31.0	Yes
11.0	45.0	31.0	Yes
12.0	45.0	31.0	Yes

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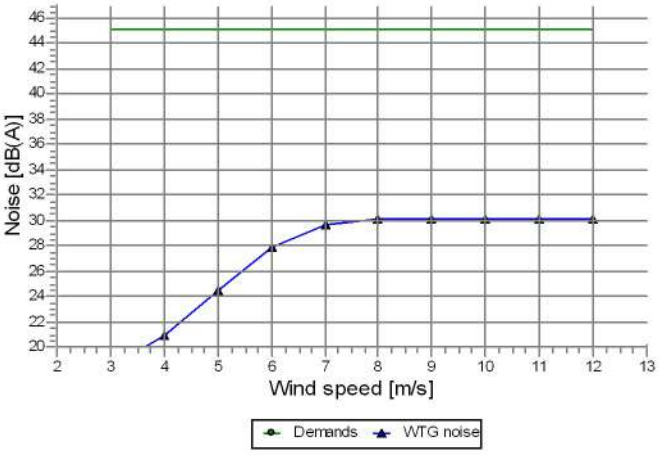
Calculation: Moneypoint Noise Calc_5 x Vestas V112_11th Jan 2012 **Noise calculation model:** ISO 9613-2 General

Noise sensitive point: User defined (16) (P)



	Sound Level		
Wind speed [m/s]	Demands [dB(A)]	WTG noise [dB(A)]	Demands fulfilled ?
3.0	45.0	18.3	Yes
4.0	45.0	20.9	Yes
5.0	45.0	24.5	Yes
6.0	45.0	27.9	Yes
7.0	45.0	29.6	Yes
8.0	45.0	30.1	Yes
9.0	45.0	30.1	Yes
10.0	45.0	30.1	Yes
11.0	45.0	30.1	Yes
12.0	45.0	30.1	Yes

APPENDIX C: FLORA & MAMMALS

LEGISLATION AND STATUTORY CONTEXT

TABLE C.1: SITES DESIGNATED FOR ECOLOGICAL REASONS

TABLE C.2: CRITERIA FOR ASSESSING TERRESTRIAL SITES (NRA, 2004)

TABLE C.3: CRITERIA FOR ASSESSING THE IMPORTANCE OF ECOLOGICAL FEATURES (NRA, 2004)

Legislative and Statutory Context

Birds Directive: Article 4 of the Birds Directive requires that, in SPAs, it is incumbent on the developer to provide empirical evidence that the qualifying interest of that SPA will not be adversely impacted upon by the proposed development and outside SPAs the State must strive to 'avoid pollution or deterioration of habitats' of all wild birds, including species listed in Annex I of the Directive. Annex I refers to a list of species that require strict protection due to their populations declining seriously throughout their respective ranges.

Habitats Directive: The Habitats Directive 92/43/EEC was transposed into national law through the European Communities (Natural Habitats) Regulations, 1997. These regulations require local governments to ensure that an appropriate assessment of the implications of the proposals on sites, in view of the sites conservation objectives, is undertaken. This applies to all development proposals, irrespective of their location, or likely impact on these sites.

Wildlife Act, 1976: The Wildlife Act, 1976 is the principal national legislation providing for the protection of wildlife and the control of some activities which may adversely affect wildlife. Its aims are to provide for the protection and conservation of wild fauna and flora, to conserve a representative sample of important ecosystems, to provide for the development and protection of game resources and to regulate their exploitation, and to provide the services necessary to accomplish such aims. As a consequence of the Act all wild birds are protected throughout the state and careful assessment of their habitats must take place before any development is allowed. The Third Schedule to the Act was amended by the European Communities (Wildlife Act, 1976) (Amendment) Regulations, 1985, which removed the remaining 12 unprotected species from that schedule.

Wildlife (Amendment) Act, 2000: This Act broadened the scope of the wildlife protection to include most species, including the majority of fish and aquatic invertebrate species. It strengthened the provisions relating to the cutting of hedgerows during the critical bird-nesting period and the protective regime for SACs by removing any doubt that protection will in all cases apply from the time of notification of proposed sites. The Act also addresses promoting the conservation of biological diversity, in light of Ireland's commitment to the UN Convention on Biological Diversity.

Table C.1: Sites Designated for Ecological Reasons

Name Site code	Designation	Notes	Distance and Direction
Lower River Shannon 002165	SAC	This very large site stretches along the Shannon valley from Killaloe to Loop Head/Kerry Head, a distance of 120 km. The site is a candidate SAC selected for lagoons, alluvial wet woodlands, floating river vegetation, Molina meadows, estuaries, tidal mudflats, Atlantic salt meadows, Mediterranean salt meadows, sea cliffs, reefs and large inlets and bays, amongst others, all Annex I habitats of the EU Habitats Directives. The site is also selected for species listed on Annex II of the same directive such as bottlenose dolphin, sea lamprey, river lamprey, brook lamprey, freshwater pearl mussel, Atlantic salmon and otter.	Adjacent southern and western site boundaries.
Scattery Island 001911	pNHA	Scattery Island lies c. 2km offshore from Kilrush, 7km west of Moneypoint. It is composed of glacial till, with soft cliffs on the western side. There is a tidal lagoon, and some areas of salt marsh. Most of the island is grassland in light agricultural use.	~3 km south-west
Derrygeeha Lough 000050	pNHA	Derrygeeha Lough is a small freshwater lake c. 2km inland from Clonderalaw Bay, with lake, wet woodland and cutover bog habitats. Its main interest is as one of only two known stations for the caddis fly Cyrnus insolutus in Ireland.	~3 km west-south-west
St. Senan's Lough 0001025	pNHA	St. Senan's Lough is located 3 km north of Moneypoint. It is an acidic lake with adjoining marsh habitats, with moss rich marsh including areas of peat forming Sphagnum mosses, and areas of cut over bog. The area of interest is 11ha in extent. Acidic wetlands of this type support small numbers of waterfowl in comparison with calcareous systems.	~3 km north
Ballylongford Bay 001332	pNHA	No site synopsis available.	~3 km south-west
Clonderalaw Bay 0013860	pNHA	No site synopsis available.	~3 km east
Tarbert Bay 00027	pNHA	No site synopsis available.	~3 km south

Table C.2: Criteria for Assessing Terrestrial Sites (NRA, 2004)

Impact Level	A Sites: Internationally Important	B Sites: Nationally Important	C Sites: High Value, Locally Important	D Sites: Moderate Value Locally Important	E Sites: Low Value, Locally Important
Severe Negative	Any permanent impacts	Permanent impacts on a large part of a site			
Major Negative	Temporary impacts on a large part of a site	Permanent impacts on a small part of a site	Permanent impacts on a large part of a site		
Moderate Negative	Temporary impacts on a small part of a site	Temporary impacts on a large part of a site	Permanent impacts on a small part of a site	Permanent impacts on a large part of a site	
Minor Negative		Temporary impacts on a small part of a site	Temporary impacts on a large part of a site	Permanent impacts on a small part of a site	Permanent impacts on a large part of a site
Neutral	No impacts	No impacts	No impacts	No impacts	Permanent impacts on a small part of a site
Minor Positive				Permanent beneficial impacts on a small part of a site	Permanent beneficial impacts on a large part of a site
Moderate Positive			Permanent beneficial impacts on a small part of a site	Permanent beneficial impacts on a large part of a site	
Major Positive		Permanent beneficial impacts on a small part of a site	Permanent beneficial impacts on a large part of a site		

Table C.3: Criteria for Assessing the Importance of Ecological Features (NRA, 2004)

Importance	Criteria
International	An internationally designated site or candidate site (SPA, pSPA, SAC, pSAC, Ramsar Site, Biogenetic Reserve). Also Sites which qualify for designation as SACs or SPAs – this includes sites on the NGO shadow list of SACs.
National[1]	A nationally designated site or candidate site (NHA, pNHA') (unfortunately there is no published criteria used in selecting these areas).
	Sites holding Red Data Book (Curtis and McGough, 1988) plant species.
County	Sites holding nationally scarce plant species (recorded from less than 65 10 km squares[2]), unless they are locally abundant.
	Sites holding semi-natural habitats likely to be of rare occurrence within the county.
	Sites holding the best examples of a semi-natural habitat type within the county.
High Local Importance	Sites holding semi-natural habitats and/or species likely to be of rare occurrence within the local area.
	Sites holding the best examples of a high quality semi-natural habitat type within the local area.
Local Importance	Sites holding high quality semi-natural habitats
Local Value	Any semi-natural habitat

APPENDIX D: AVIFAUNA

Table D.1: Waterfowl Numbers at Moneypoint – November / December 2001

Species	1% National level	< 500m Peak count	Height (m) over water	On Site	Height (m) over ground
Bar-tailed Godwit	175	1	40	0	-
Blackheaded Gull	N/A	26	0-150	26	30-150
Cormorant	105	8-10	1-100	15	3-150
Common Gull	NA	20	1-30	6-10	-
Curlew	1,000	150	1-50	40	<3
Dunlin	1,200	5	N/A	0	-
Great Black-backed Gull	N/A	3	1-200	3	-
Great Crested Grebe	35	3	N/A	0	-
Greenshank	20	1	N/A	0	-
Grey Heron	105	2	1	2	0-3
Herring Gull	N/A	1	3m	0	-
Grey Plover	50	2	150	0	-
Lapwing	2,000	200	N/A	0	3 above road
Lesser Black-backed Gull	N/A	1	N/A	1	2
Mallard	500	2	N/A	0	-
Moorhen	N/A	0	-	3	N/A
Oystercatcher	700	32	<1	2	-
Pochard	350	0	-	1	N/A
Red-breasted Merganser	25	1	Low	0	-
Red Throated Diver	N/A	5	1	0	-
Ringed Plover	100	6	N/A	0	-
Ring-billed Gull	N/A	1	N/A	0	-
Shag	N/A	1	3	1	14
Shelduck	125	5	3	0	-
Snipe	N/A	N/A	N/A	40	< 20
Redshank	250	5	<1	1	-
Teal	500	2	N/A	0	-
Turnstone	100	11	N/A	0	-
Wigeon	1,000	4	Low	0	-

N/A: These species not observed in flight.

Table D.2: Results from the Spring 2010 breeding bird survey at Moneypoint. Birds recorded within 100 m of the observer are shown along with maximum counts, % frequency occurrence and conservation status.

Common Name	Scientific Name	Transect 1	Transect 2	Transect 3	Transect 4	Max. Count	% Frequency Occurrence	Conservation Status*
Blackbird	*Turdus merula*	11	11	0	8	11	75	Green
Blackcap	*Sylvia atricapilla*	2	1	0	2	2	75	Green
Blue Tit	*Parus caeruleus*	2	0	0	1	2	50	Green
Bullfinch	*Pyrrhula pyrrhula*	0	2	0	2	2	50	Green
Chaffinch	*Fringilla coelebs*	4	3	0	1	4	75	Green
Chiffchaff	*Phylloscopus collybita*	6	0	0	2	6	50	Green
Coal Tit	*Parus ater*	0	0	0	2	2	25	Green
Dunnock	*Prunella modularis*	0	2	0	2	2	50	Green
Hooded Crow	*Corvus cornix*	0	4	2	0	4	50	Green
House Sparrow	*Passer domesticus*	0	0	0	1	1	25	Amber
Jackdaw	*Corvus monedula*	3	8	0	12	12	75	Green
Lesser Black-backed Gull	*Larus fuscus*	0	0	1	0	1	25	Amber
Linnet	*Carduelis cannabina*	0	1	3	0	3	50	Amber
Magpie	*Pica pica*	1	1	0	5	5	75	Green
Meadow Pipit	*Anthus pratensis*	0	1	2	0	2	50	Green
Pheasant	*Phasianus colchicus*	0	1	0	0	1	25	N/A**
Raven	*Corvus corax*	0	3	0	0	3	25	Green

Common Name	Scientific Name	Transect 1	Transect 2	Transect 3	Transect 4	Max. Count	% Frequency Occurrence	Conservation Status*
Robin	*Erithacus rubecula*	3	5	3	8	8	100	Green
Rook	*Corvus frugilegus*	1	37	0	0	37	50	Green
Skylark	*Alauda arvensis*	0	0	1	1	1	50	Amber
Song Thrush	*Turdus philomelos*	6	1	0	2	6	75	Green
Starling	*Sturnus vulgaris*	14	11	1	9	14	100	Amber
Swallow	*Hirundo rustica*	1	13	0	2	13	75	Amber
Whimbrel	*Numenius phaeopus*	0	0	40	1	40	50	Green
Whitethroat	*Sylvia communis*	0	3	0	0	3	25	Green
Willow Warbler	*Phylloscopus trochilus*	2	2	1	1	2	100	Green
Woodpigeon	*Columba palumbus*	1	0	0	3	3	50	Green
Wren	*Troglodytes troglodytes*	5	8	0	7	8	75	Green
No. of Species	**28**	**15**	**20**	**9**	**20**			

***** BoCCI, Birds of Concern in Ireland: Species highlighted in amber are of Medium Conservation Concern (*Amber-listed*) and birds highlighted in red are of High Conservation Concern (*Red-listed*) according to the Birds of Conservation Concern in Ireland list (BOCCI, Lynas *et al.,* 2007). All other species are not currently of special conservation concern in Ireland (*Green-listed*).

** N/A, non applicable as Pheasant is a stocked species

Table D.3: Vantage Point Survey Watch Data - Spring 2010

Date	VP	Start - Finish	Sighting	Flight	Species	No.	Time	On/Off	Height (m)	Weather
12/05/2010	1	10.15-13.15	1	1	Jackdaw	2	10.26	on	20	Bright/Dry/Wind0/Vis ex.
12/05/2010	1	10.15-13.15	2	2	Hooded Crow	1	10.34	on	10	Bright/Dry/Wind0/Vis ex.
12/05/2010	1	10.15-13.15	3	3	Raven	1	10.36	off	20	Bright/Dry/Wind0/Vis ex.
12/05/2010	1	10.15-13.15	4	4	Sparrowhawk	1	11.09	on	5	Bright/Dry/Wind0/Vis ex.
12/05/2010	1	10.15-13.15	5	5	Rook	1	11.17	on	10	Bright/Dry/Wind0/Vis ex.
12/05/2010	1	10.15-13.15	6	6	Kestrel	1	11.36	on	60	Bright/Dry/Wind0/Vis ex.
12/05/2010	1	10.15-13.15	7	7	Cormorant	1	11.56	off	10	Bright/Dry/Wind0/Vis ex.
12/05/2010	1	10.15-13.15	8	8	Cormorant	1	11.56	off	10	Bright/Dry/Wind0/Vis ex.
12/05/2010	1	10.15-13.15	9	9	Kestrel	1	12.26	on	40	Bright/Dry/Wind0/Vis ex.
12/05/2010	1	10.15-13.15	10	10	Raven	1	12.45	on	20	Bright/Dry/Wind0/Vis ex.
12/05/2010	2	14.30-17.30	1	11	Woodpigeon	1	14.57	on	10	Bright/Dry/Wind0/Vis ex.
12/05/2010	2	14.30-17.30	2	12	Raven	1	15.01	on	30	Bright/Dry/Wind0/Vis ex.
12/05/2010	2	14.30-17.30	3	13	Raven	1	15.12	on	10	Bright/Dry/Wind0/Vis ex.
12/05/2010	2	14.30-17.30	4	14	Sparrowhawk	1	15.29	on	120	Bright/Dry/Wind0/Vis ex.
12/05/2010	2	14.30-17.30	5	15	Lesser Black Backed Gull	1	15.41	on	40	Bright/Dry/Wind0/Vis ex.
12/05/2010	2	14.30-17.30	6	16	Whimbrel	16	16.15	on	15	Bright/Dry/Wind0/Vis ex.
12/05/2010	2	14.30-17.30	7	17	Raven	1	16.2	on	40	Bright/Dry/Wind0/Vis ex.
12/05/2010	2	14.30-17.30	8	18	Whimbrel	1	16.39	on	20	Bright/Dry/Wind0/Vis ex.
12/05/2010	2	14.30-17.30	9	19	Whimbrel	5	17.05	on	20	Bright/Dry/Wind0/Vis ex.

Date	VP	Start - Finish	Sighting	Flight	Species	No.	Time	On/Off	Height (m)	Weather
13/05/2010	3	09.30-12.30	1	20	Lesser Black Backed Gull	3	9.55	on	30	Bright/Showers/Wind0/Vis.good
13/05/2010	3	09.30-12.30	2	21	Raven	1	10.27	on	30	Bright/Showers/Wind0/Vis.good
13/05/2010	3	09.30-12.30	3	22	Whimbrel	20	10.44	on	10	Bright/Showers/Wind0/Vis.good
13/05/2010	3	09.30-12.30	4	23	Whimbrel	11	11.45	on	15	Bright/Showers/Wind0/Vis.good
13/05/2010	1	13.00-16.00	1	24	Lesser Black Backed Gull	1	13.40	on	30	Bright/Showers/Wind0/Vis.good
13/05/2010	1	13.00-16.00	2	25	Grey Heron	1	14.12	on	5	Bright/Showers/Wind0/Vis.good
14/05/2010	2	09.00-12.00	1	26	Kestrel	1	9.36	ON	10	Bright/Dry/Cloud 60%/Vis. Ex.
14/05/2010	2	09.00-12.00	2	27	Whimbrel	4	10.29	ON	5	Bright/Dry/Cloud 60%/Vis. Ex.
14/05/2010	3	12.30-15.30	1	28	Lesser Black Backed Gull	1	12.39	on	10	Bright/Dry/Cloud 60%/Vis. Ex.
14/05/2010	3	12.30-15.30	2	29	Whimbrel	2	12.41	on	20	Bright/Dry/Cloud 60%/Vis. Ex.

All habiats are Improved Agricultural Grassand (IAG)

Table D.4: Moneypoint Monitoring - Autumn 2010 Watch Information

VP	Grid Reference	Date	Start-Finish	Visibility	Cloud Cover	Wind Speed/Direction	Precipitation	Temperature
3	01280 52802	31/08/2010	11.50 - 14.50	Excellent	50%	E F1	None	Warm
1	04542 52317	31/08/2010	15.10 - 18.10	Excellent	50%	E F1	None	Warm
3	01280 52802	01/09/2010	06.45 - 09.45	Good	70%	E F1	None	Warm
2	02507 53477	01/09/2010	10.10 - 13.10	Good	70%	E F1	None	Warm
1	04542 52317	01/09/2010	14.20 - 17.20	Good	70%	E F1	None	Warm
2	02507 53477	02/09/2010	07.30 - 10.30	Excellent	10%	SE F1	None	Warm

Table D.5: Moneypoint Winter 2010 / 2011 Vantage Point Watch Information

Date	Start-Finish	Visibility	Cloud Cover	Wind Direction / Speed	Precipitation	Temperature
11/11/2010	07.30 – 09.30	Good	75%	SW F3 + Gusts	Showers	Mild
11/11/2010	09.30 – 11.30	Good	75%	SW F3 + Gusts	Showers	Mild
11/11/2010	11.45 – 13.45	Good	75%	SW F3 + Gusts	Showers	Mild
15/12/2010	08.15 – 10.15	Good	80%	Wind 0	Dry	Cool
15/12/2010	10.20 – 12.20	Good	80%	Wind 0	Dry	Cool
15/12/2010	12.20 – 14.20	Good	80%	Wind 0	Dry	Cool
27/01/2011	08.30 – 10.30	Excellent	10%	Wind 0	Dry	Cool
27/01/2011	11.15 – 13.15	Excellent	10%	Wind 0	Dry	Cool
27/01/2011	13.20 – 15.20	Excellent	10%	Wind 0	Dry	Cool
22/02/2011	09.45 – 11.45	Excellent	80%	S F1	Showers	Mild
22/02/2011	11.51 – 13.51	Excellent	80%	S F1	Showers	Mild
22/02/2011	14.00 – 16.00	Excellent	80%	S F1	Showers	Mild

Table D.6: Moneypoint Flight Activity Autumn 2010

Bout	Date	VP	Flightline	Period	Species	Start	Time	<10	10-100	>100	Notes
AUGUST											
1	31/08/2010	3	1	11.50-14.50	Curlew	11.50	30s		30		
2	31/08/2010	3	2	11.50-14.50	Curlew	12.03	30s		30		
3	31/08/2010	3	3	11.50-14.50	Black Headed Gull	12.12	10s	10			
4	31/08/2010	3	4	11.50-14.50	Grey Heron	12.13	25s		25		
5	31/08/2010	3	5	11.50-14.50	Herring Gull	12.19	30s		30		
6	31/08/2010	3	6	11.50-14.50	Herring Gull	12.21	36s		36		
7	31/08/2010	3	7	11.50-14.50	Common Gull	12.24	43s		43		
8	31/08/2010	3	8	11.50-14.50	Common Gull	12.29	40s	40			
9	31/08/2010	3	9	11.50-14.50	Common Gull	12.31	34s	34			
10	31/08/2010	3	10	11.50-14.50	Curlew	12.36	25s		25		
11	31/08/2010	3	11	11.50-14.50	Common Gull	12.51	32s		32		70 birds
12	31/08/2010	3	12	11.50-14.50	Curlew	12.51	10s	10			
13	31/08/2010	3	13	11.50-14.50	Common Gull	13.01	17s		17		
14	31/08/2010	3	14	11.50-14.50	Raven	13.02	81s	81			
15	31/08/2010	3	15	11.50-14.50	Sparrowhawk	14.28	137s		137s		
16	31/08/2010	3	16	11.50-14.50	Curlew	14.33	16s	16			
17	31/08/2010	3	17	11.50-14.50	Curlew	14.33	18s		18		
18	31/08/2010	1	18	15.10-18.10	Starling	15.41	107s		107		120 birds

Bout	Date	VP	Flightline	Period	Species	Start	Time	<10	10-100	>100	Notes
19	31/08/2010	1	19	15.10-18.10	Kestrel	16.02	40s		40		
20	31/08/2010	1	20	15.10-18.10	Common Gull	16.5	114s		114		
21	31/08/2010	1	21	15.10-18.10	Common Gull	17.51	33s		33		
22	31/08/2010	1	22	15.10-18.10	Cormorant	17.58	120s		120		14 birds
SEPTEMBER											
23	01/09/2010	3	23	06.45-09.45	Common Gull	6.56	162s		162		50 birds
24	01/09/2010	3	24	06.45-09.45	Common Gull	7.02	30s		30		
25	01/09/2010	3	25	06.45-09.45	Black Headed Gull	7.06	64s		64		
26	01/09/2010	3	26	06.45-09.45	Rook	7.06	30s	30			
27	01/09/2010	3	27	06.45-09.45	Curlew	7.22	40s		40		
28	01/09/2010	3	28	06.45-09.45	Curlew	7.25	25s	25			
29	01/09/2010	3	29	06.45-09.45	Curlew	7.37	20s		20		
30	01/09/2010	3	30	06.45-09.45	Black Headed Gull	7.39	49s		49		10 birds
31	01/09/2010	3	31	06.45-09.45	Black Headed Gull	7.41	92s		92		30 birds
32	01/09/2010	3	32	06.45-09.45	Cormorant	7.46	34s	34			
33	01/09/2010	3	33	06.45-09.45	Common Gull	8.43	80s		80		
34	01/09/2010	3	34	06.45-09.45	Common Gull	9.14	40s		40		
35	01/09/2010	2	35	10.10-13.10	Sparrowhawk	10.19	40s	40			
36	01/09/2010	2	36	10.10-13.10	Common Gull	10.44	142s		142		
37	01/09/2010	2	37	10.10-13.10	Rook	10.55	20s	20			

Bout	Date	VP	Flightline	Period	Species	Start	Time	<10	10-100	>100	Notes
38	01/09/2010	1	38	10.10-13.10	Black Headed Gull	11.01	120s		120		
39	01/09/2010	1	39	10.10-13.10	Common Gull	11.59	108s		108		
40	01/09/2010	1	40	14.20-17.20	Starling	14.2	120s		120		100 birds
41	01/09/2010	1	41	14.20-17.20	Black Headed Gull	14.37	20s		20		
42	01/09/2010	1	42	14.20-17.20	Kestrel	14.51	42s		42		
43	01/09/2010	1	43	14.20-17.20	Lesser Black Backed Gull	14.53	10s	10			
44	01/09/2010	1	44	14.20-17.20	Glaucous Gull	15.03	97s		97		
45	01/09/2010	1	45	14.20-17.20	Starling	15.16	45s		45		
46	01/09/2010	1	46	14.20-17.20	Starling	15.29	25s		25		120 birds
47	01/09/2010	1	47	14.20-17.20	Kestrel	15.29	179s		179		
48	01/09/2010	1	48	14.20-17.20	Grey Heron	15.35	42s		42		
49	01/09/2010	1	49	14.20-17.20	Kestrel	15.4	12s	12			
50	01/09/2010	1	50	14.20-17.20	Kestrel	15.5	98s		98		
51	01/09/2010	1	51	14.20-17.20	Black Headed Gull	16.04	26s		26		
52	02/09/2010	2	52	07.30-10.30	Curlew	7.41	31s	31			
53	02/09/2010	2	53	07.30-10.30	Black Headed Gull	7.47	246s		246		17 Birds
54	02/09/2010	2	54	07.30-10.30	Common Gull	8.15	32s	32			
55	02/09/2010	2	55	07.30-10.30	Raven	8.42	50s		50		
56	02/09/2010	2	56	07.30-10.30	Curlew	8.49	50s	10	40		
57	02/09/2010	2	57	07.30-10.30	Common Gull	9.16	29s		29		10 Birds

Bout	Date	VP	Flightline	Period	Species	Start	Time	<10	10-100	>100	Notes
58	02/09/2010	2	58	07.30-10.30	Lesser Black Backed Gull	9.31	17s		17		
59	02/09/2010	2	59	07.30-10.30	Common Gull	9.36	120s		120		
60	02/09/2010	2	60	07.30-10.30	Lesser Black Backed Gull	9.54	32s		32		
61	02/09/2010	2	61	07.30-10.30	Lesser Black Backed Gull	10.25	16s		16		

Table D.7: Moneypoint Flight Activity Winter 2010 / 2011

Bout	Date	VP	Flightline	Period	Species	Start	Time	<10	10-100	>100	Notes
NOVEMBER											
1	11/11/2010	1	1	07.30-09.30	Jackdaw	07.43	20s		20		
2	11/11/2010	1	2	07.30-09.30	Hooded Crow	07.44	20s	20			
3	11/11/2010	1	3	07.30-09.30	Hooded Crow	07.46	20s		20		
4	11/11/2010	1	4	07.30-09.30	Rook	07.49	20s	20			
5	11/11/2010	1	5	07.30-09.30	Rook	07.54	60s		20		10 birds
6	11/11/2010	1	6	07.30-09.30	Common Gull	08.23	30s	30			
7	11/11/2010	1	7	07.30-09.30	Starling	08.24	10s		10		
8	11/11/2010	1	8	07.30-09.30	Common Gull	08.26	60s		60		
9	11/11/2010	1	9	07.30-09.30	Cormorant	08.38	20s		20		
10	11/11/2010	1	10	07.30-09.30	Black Headed Gull	08.41	37s		37		
11	11/11/2010	1	11	07.30-09.30	Cormorant	08.53	5s		10		
12	11/11/2010	1	12	07.30-09.30	Rook	09.02	10s		10		
13	11/11/2010	1	13	09.30-11.30	Cormorant	09.12	30s		30		
14	11/11/2010	2	14	09.30-11.30	Lesser Black Backed Gull	09.44	40s		40		
15	11/11/2010	2	15	09.30-11.30	Hooded Crow	09.48	15s	15			
16	11/11/2010	2	16	09.30-11.30	Starling	09.59	10s	10			100
17	11/11/2010	2	17	09.30-11.30	Common Gull	10.06	60s		60		10
18	11/11/2010	2	18	09.30-11.30	Starling	10.12	10s	10			100

Bout	Date	VP	Flightline	Period	Species	Start	Time	<10	10-100	>100	Notes
19	11/11/2010	2	19	09.30-11.30	Common Gull	10.17	10s	10			
20	11/11/2010	2	20	09.30-11.30	Lapwing	10.41	15s		15		40
21	11/11/2010	2	21	09.30-11.30	Lapwing	10.48	10s		10		
22	11/11/2010	2	22	09.30-11.30	Starling	10.55	10s	10			
23	11/11/2010	2	23	09.30-11.30	Black Headed Gull	10.57	30s	30			
24	11/11/2010	3	24	11.45-13.45	Starling	11.47	30s		30		
25	11/11/2010	3	25	11.45-13.45	Lapwing	11.49	15s		15		
26	11/11/2010	3	26	11.45-13.45	Lapwing	12.15	15s		15		20
27	11/11/2010	3	27	11.45-13.45	Common Gull	12.28	20s		20		85
DECEMBER											
28	15/12/2010	1	1	08.15-10.15	Cormorant	08.33	10s	10			6 birds
29	15/12/2010	1	2	08.15-10.15	Jackdaw	08.36	10s	10			Flock of 30
30	15/12/2010	1	3	08.15-10.15	Hooded Crow	08.44	15s		15		
31	15/12/2010	1	4	08.15-10.15	Lesser Black Backed Gull	08.46	5s		5		
32	15/12/2010	1	5	08.15-10.15	Rook	08.48	101s		101		2 birds
33	15/12/2010	1	6	08.15-10.15	Black Headed Gull	08.51	54s	54			
34	15/12/2010	1	7	08.15-10.15	Jackdaw	08.58	47s	47			
35	15/12/2010	1	8	08.15-10.15	Common Gull	09.08	10		10		
36	15/12/2010	1	9	08.15-10.15	Lesser Black Backed Gull	09.10	11s		11		
37	15/12/2010	1	10	08.15-10.15	Common Gull	09.17	86s		86		

Bout	Date	VP	Flightline	Period	Species	Start	Time	<10	10-100	>100	Notes
38	15/12/2010	1	11	08.15-10.15	Lesser Black Backed Gull	09.43	80s		80		
39	15/12/2010	1	12	08.15-10.15	Starling	09.47	10s	10			
40	15/12/2010	1	13	08.15-10.15	Grey Heron	09.48	41s	41			
41	15/12/2010	1	14	08.15-10.15	Black Headed Gull	09.49	45s		45		
42	15/12/2010	2	15	10.20-12.20	Jackdaw	10.29	20s		20		14 birds
43	15/12/2010	2	16	10.20-12.20	Jackdaw	10.33	10s	10			
44	15/12/2010	2	17	10.20-12.20	Lapwing	10.35	20s	20			10 birds
45	15/12/2010	2	18	10.20-12.20	Black Headed Gull	10.45	35s		35		
46	15/12/2010	2	19	10.20-12.20	Hooded Crow	10.53	28s	28			
47	15/12/2010	2	20	10.20-12.20	Raven	10.57	5s		5		2 birds
48	15/12/2010	2	21	10.20-12.20	Curlew	11.06	16s	16			
49	15/12/2010	2	22	10.20-12.20	Curlew	11.09	31s		31		22 birds
50	15/12/2010	2	23	10.20-12.20	Lapwing	11.21	10s	10			15 birds
51	15/12/2010	2	24	10.20-12.20	Lapwing	11.25	20s	20			25 birds
52	15/12/2010	2	25	10.20-12.20	Lapwing	12.05	38s		38		7 birds
53	15/12/2010	3	26	12.20-14.20	Lapwing	12.33	14s		14		
54	15/12/2010	3	27	12.20-14.20	Black Headed Gull	12.36	10s	10			
55	15/12/2010	3	28	12.20-14.20	Curlew	12.41	31s	31			5 birds
56	15/12/2010	3	29	12.20-14.20	Curlew	13.14	27s	27			
57	15/12/2010	3	30	12.20-14.20	Lapwing	13.22	27s		27		30 birds

Bout	Date	VP	Flightline	Period	Species	Start	Time	<10	10-100	>100	Notes
58	15/12/2010	3	31	12.20-14.20	Curlew	13.29	55s		55		30 birds
59	15/12/2010	3	32	12.20-14.20	Lapwing	13.29	55s		55		40 birds
60	15/12/2010	3	33	12.20-14.20	Black Headed Gull	14.04	78s		78		
JANUARY											
61	27/01/2011	1	1	08.30-10.30	Lesser Black Backed Gull	08.39	47s		47		
62	27/01/2011	1	2	08.30-10.30	Hooded Crow	08.41	31s	31			
63	27/01/2011	1	3	08.30-10.30	Raven	09.07	77s		77		
64	27/01/2011	2	4	11.15-13.15	Lapwing	11.26	75s		75		
65	27/01/2011	2	5	11.15-13.15	Curlew	11.31	20s	20			51 birds
66	27/01/2011	2	6	11.15-13.15	Merlin	11.43	30s	30			
67	27/01/2011	2	7	11.15-13.15	Lapwing	11.48	30s		30		150 flock
68	27/01/2011	2	8	11.15-13.15	Sparrowhawk	12.30	30s	30			
69	27/01/2011	2	9	11.15-13.15	Curlew	12.59	43s		43		80 birds
70	27/01/2011	2	10	11.15-13.15	Grey Heron	13.06	26s		26		
71	27/01/2011	3	11	13.20-15.20	Curlew	13.24	34s		34		30 birds
72	27/01/2011	3	12	13.20-15.20	Cormorant	13.43	11s		11		
73	27/01/2011	3	13	13.20-15.20	Sparrowhawk	14.03	15s	15			
74	27/01/2011	3	14	13.20-15.20	Sparrowhawk	14.20	20s		20		Female
FEBRUARY											
75	22/02/2011	1	1	09.45-11.45	Hooded Crow	10.15	33s		33		

Bout	Date	VP	Flightline	Period	Species	Start	Time	<10	10-100	>100	Notes
76	22/02/2011	1	2	09.45-11.45	Black Headed Gull	10.27	72s		72		
77	22/02/2011	1	3	09.45-11.45	Peregrine	10.31	10s		10		
78	22/02/2011	1	4	09.45-11.45	Great Black Backed Gull	10.54	77s		77		
79	22/02/2011	1	5	09.45-11.45	Raven	10.55	20s		20		
80	22/02/2011	1	6	09.45-11.45	Herring Gull	11.20	20s		20		
81	22/02/2011	1	7	09.45-11.45	Sparrowhawk	11.24	20s	20			
82	22/02/2011	1	8	09.45-11.45	Raven	11.36	10s		10		
83	22/02/2011	2	9	11.51-13.51	Hooded Crow	11.51	30s		30		
84	22/02/2011	2	10	11.51-13.51	Redwing	12.12	24s		24		23 birds
85	22/02/2011	2	11	11.51-13.51	Snipe	12.23	30s		30		2 birds
86	22/02/2011	2	12	11.51-13.51	Sparrowhawk	12.55	10s	10			
87	22/02/2011	3	13	14.00-16.00	Starling	14.25	20s	20			100 birds
88	22/02/2011	3	14	14.00-16.00	Rook	14.34	25s		25		
89	22/02/2011	3	15	14.00-16.00	Curlew	14.40	20s		20		
90	22/02/2011	3	16	14.00-16.00	Rook	15.10	10s		10		60-70 birds
91	22/02/2011	3	17	14.00-16.00	Great Black Backed Gull	15.20	24s	24			
92	22/02/2011	3	18	14.00-16.00	Black Headed Gull	15.22	31s		31		3 birds

Table D.8: Moneypoint I-WeBS Surveys Autumn 2010 & November 2010 - February 2011

Species	Scientific Name	Autumn 2010				Winter 2010 / 2011			
		Section A	Section B	Section C	Totals	November	December	January	February
Black Guillemot	*Cepphus grylle*	-	-	-	-	0	0	0	1
Black Headed Gull	*Larus ridibundus*	48	0	1	**49**	49	0	20	8
Common Gull	*Larus canus*	3	0	15	**18**	18	2	2	2
Common Sandpiper	*Actitis hypoleucos*	0	0	1	**1**	1	0	0	0
Cormorant	*Phalacrocorax carbo*	2	14	0	**16**	16	0	2	2
Curlew	*Numenius arquata*	7	1	3	**11**	11	4	85	11
Dunlin	*Calidris alpina*	0	0	10	**10**	10	0	2	0
Glaucous Gull	*Larus hyperboreus*	0	0	1	**1**	1	0	0	0
Great Crested Grebe	*Podiceps cristatus*	-	-	-	-	0	4	6	3
Great Northern Diver	*Gavia immer*	-	-	-	-	0	0	1	1
Greenshank	*Tringa nebularia*	2	0	0	**2**	2	0	2	0
Grey Heron	*Ardea cinerea*	1	0	2	**3**	3	1	0	0
Lesser Black Backed Gull	*Larus fuscus*	2	0	1	**3**	3	0	0	0
Lapwing	*Vanellus vanellus*	0	0	2	**2**	2	48	31	0
Little Egret	*Egretta garzetta*	3	1	0	**4**	4	0	0	0
Mallard	*Anas platyrhynchos*	-	-	-	-	0	0	1	2
Mediterranean Gull	*Larus melanocephalus*	2	0	0	**2**	2	0	0	0

Species	Scientific Name	Autumn 2010				Winter 2010 / 2011			
		Section A	Section B	Section C	Totals	November	December	January	February
Mute Swan	*Cygnus olor*	2	0	0	**2**	2	0	0	0
Oystercatcher	*Haematopus ostralegus*	1	3	2	**6**	6	13	26	15
Razorbill	*Alca torda*	-	-	-	-	0	0	0	1
Red Breasted Merganser	*Mergus serrator*	-	-	-	-	0	1	0	0
Redshank	*Tringa totanus*	9	0	0	**9**	9	2	2	9
Ringed Plover	*Charadrius hiaticula*	0	0	31	**31**	31	0	14	0
Shelduck	*Tadorna tadorna*	-	-	-	-	0	0	1	0
Teal	*Anas crecca*	5	0	0	**5**	5	0	35	0
Turnstone	*Arenaria interpres*	0	0	20	**20**	20	3	11	21
Wigeon	*Anas penelope*	-	-	-	-	0	0	24	0

Table D.9: Total Species Recorded at Moneypoint in Autumn 2010

Common Name *(Scientific Name)*	Common Name *(Scientific Name)*
Black Headed Gull (*Larus ridibundus)*	Lesser Black Backed Gull (*Larus fuscus)*
Blackbird (*Turdus merula)*	Linnet (*Carduelis cannabina)*
Blue Tit (*Parus caeruleus)*	Little Egret (*Egretta garzetta)*
Chiffchaff (*Fringilla coelebs)*	Magpie (*Pica pica)*
Collared Dove (*Streptopelia decaocto)*	Mediterranean Gull (*Larus melanocephalus)*
Common Gull (*Larus canus)*	Mute Swan (*Cygnus olor)*
Common Sandpiper (*Actitis hypoleucos)*	Oystercatcher (*Haematopus ostralegus)*
Cormorant (*Phalacrocorax carbo)*	Pied Wagtail (*Motacilla alba)*
Curlew (*Numenius arquata)*	Raven (*Corvus corax)*
Dunlin (*Calidris alpina)*	Ringed Plover (*Charadrius hiaticula)*
Glaucous Gull (*Larus hyperboreus)*	Robin (*Erithacus rubecula)*
Goldfinch (*Carduelis carduelis)*	Rook (*Corvus frugilegus0*
Greenshank (*Tringa nebularia)*	Sparrowhawk (*Accipiter nisus)*
Grey Heron (*Ardea cinerea)*	Starling (*Sturnus vulgaris)*
Grey Wagtail (*Motacilla cinerea)*	Swallow (*Hirundo rustica)*
Hooded Crow (*Corvus cornix)*	Teal (*Anas crecca)*
House Martin (*Delichon urbica)*	Turnstone (*Arenaria interpres)*
House Sparrow 9*Passer domesticus)*	Willow Warbler (*Phylloscopus trochilus)*
Jackdaw (*Corvus monedula)*	Woodpigeon (*Columba palumbus)*
Kestrel (*Falco tinnunculus)*	Wren (*Troglodytes troglodytes)*
Lapwing (*Vanellus vanellus)*	

Table D.10: Moneypoint Total Species List for Winter 2010/2011 Survey

Common Name *(Latin Name)*	Common Name *(Latin Name)*
Bullfinch (*Pyrrhula pyrrhula)*	Magpie (*Pica pica)*
Blackbird (*Turdus merula)*	Mallard (*Anas platyrhynchos)*
Black Guillemot (*Cepphus grylle)*	Meadow Pipit (*Anthus pratensis)*
Black Headed Gull (*Larus ridibundus)*	Mediterranean Gull (*Larus melanocephalus)*
Collared Dove (*Streptopelia decaocto)*	Merlin (*Falco columbarius)*
Common Gull (*Larus canus)*	Mute Swan (*Cygnus olor)*
Common Sandpiper (*Actitis hypoleucos)*	Oystercatcher (*Haematopus ostralegus)*
Cormorant (*Phalacrocorax carbo)*	Peregrine (*Falco peregrinus)*
Chaffinch (*Fringilla coelebs)*	Pied Wagtail (*Motacilla alba)*
Glaucous Gull (*Larus hyperboreus)*	Raven (*Corvus corax)*
Curlew (*Numenius arquata)*	Razorbill (*Alca torda)*
Dunlin (*Calidris alpina0*	Ringed Plover (*Charadrius hiaticula)*
Dunnock (*Prunella modularis)*	Reed Bunting (*Emberiza schoeniclus)*
Fieldfare (*Turdus pilaris)*	Redshank(*Tringa totanus)*
Goldcrest (*Regulus regulus)*	Red Breasted Merganser (*Mergus serrator)*
Goldfinch (*Carduelis carduelis)*	Redwing (*Turdus iliacus)*
Great Northern Diver (*Gavia immer)*	Robin (*Erithacus rubecula)*
Great Crested Grebe (*Podiceps cristatus)*	Rook (*Corvus frugilegus)*
Great Tit (*Parus Major)*	Shelduck (*Tadorna tadorna)*
Greenshank (*Tringa nebularia)*	Snipe (*Gallinago gallinago)*
Grey Heron (*Ardea cinerea)*	Starling (*Sturnus vulgaris)*
House Sparrow (*Passer domesticus)*	Stonechat (*Saxicola torquata)*
Hooded Crow (*Corvus cornix)*	Sparrowhawk (*Accipiter nisus)*
Jackdaw (*Corvus monedula)*	Teal (*Anas crecca)*
Lapwing (*Vanellus vanellus)*	Turnstone (*Arenaria interpres)*
Lesser Black Backed Gull (*Larus fuscus)*	Wigeon (*Anas penelope)*
Little Egret (*Egretta garzetta)*	Woodpigeon (*Columba palumbus)*
Long Tailed Tit (*Aegithalos caudatus)*	