



## ANGUS COUNCIL

TOWN AND COUNTRY PLANNING (SCOTLAND) ACT 1997  
(AS AMENDED)  
TOWN AND COUNTRY PLANNING (DEVELOPMENT MANAGEMENT PROCEDURE)  
(SCOTLAND)  
REGULATIONS 2013

PLANNING PERMISSION REFUSAL  
REFERENCE 13/00865/FULL

To Mr William Shaw  
c/o Locogen  
Per Ian Mclean  
Mitchell House  
5 Mitchell Street  
Edinburgh  
EH6 7BD

With reference to your application dated 23 September 2013 for planning permission under the above mentioned Acts and Regulations for the following development, viz:-

LIST OF DWELLINGErection Of Wind Turbine Of 50 Metres To Hub Height And 77 Metres To Blade Tip And Ancillary Development at Field 1500M South East Of Ingliston Farm Eassie for Mr William Shaw

The Angus Council in exercise of their powers under the above mentioned Acts and Regulations hereby Refuse Planning Permission (Delegated Decision) for the said development in accordance with the particulars given in the application and plans docqueted as relative hereto in paper or identified as refused on the Public Access portal.

The reasons for the Council's decision are:-

- 1 That the proposed turbine by virtue of its height and skyline location would have an unacceptable landscape and visual impact and accordingly the siting and appearance of the turbine has not been chosen to minimise impact on amenity. As such the proposal is contrary to policies ER5, ER34 and S6 of the Angus Local Plan Review 2009.
- 2 That the proposed turbine would have an unacceptable cumulative impact on the landscape and visual amenity of this part of the Sidlaw Hills and would give rise to unacceptable impacts on the visual amenity of occupants of nearby residential property and this is contrary to Policy ER35 of the Angus Local Plan Review, 2009.
- 3 That the proposed turbine by virtue of its height and skyline location, and proximity to the existing Castleward and Denoon Law burial sites would have an unacceptable impact on the setting of these Scheduled Ancient Monuments. As such, the proposal is contrary to Scottish Planning Policy, 2014 and Policies ER18 and ER34 of the Angus Local Plan Review, 2009.

The application has not been subject of variation.

Dated this 4 August 2014

Iain Mitchell - Service Manager  
Angus Council  
Communities  
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County Buildings  
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**Supporting Environmental Document  
for  
Ingliston Farm Wind Turbine**

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<b>Version</b>	<b>Date</b>	<b>Purpose of amendment</b>
0422RRev1	18/09/2013	Final planning submission to LPA

## Table of Contents

1.	Introduction.....	4
2.	The Wind Turbine Proposal .....	9
3.	Planning & Environmental Policy .....	18
4.	Work to Date .....	32
5.	Landscape & Visual .....	35
6.	Soils & Hydrology .....	87
7.	Socioeconomic .....	95
8.	Cultural Heritage .....	102
9.	Ecology .....	108
10.	Shadow Flicker.....	109
11.	Noise .....	113
12.	Telecommunications .....	122
13.	Aviation.....	124
14.	Public Safety.....	127
15.	Summary & Mitigation.....	129
	Appendix A – Landscape & Visual Assessment Methodology .....	133
	Appendix B – Ecology & Ornithology Report .....	134
	Appendix C – Manufacturer's Noise Data and ReSoft Windfarm Report Exports.....	135

## Abbreviations

AGL	Above Ground Level
AOD	Above Ordnance Datum
ALS	Area of Landscape Significance
ASL	Above Sea Level
ATC	Air Traffic Control
BAA	British Airports Authority
CAA	Civil Aviation Authority
CO <sub>2</sub>	Carbon dioxide
EIA	Environmental Impact Assessment
GHG	Greenhouse Gas
GRP	Glassfibre Reinforced Plastic
GDL	Gardens and Designed Landscapes
HGV	Heavy Goods Vehicle
HBT	Height to Blade Tip
IPCC	Inter-governmental Panel on Climate Change
kW	Kilowatt (a unit of power)
kWh	Kilowatt-hour (a unit of energy generation)
LCA	Landscape Character Assessment
LCT	Landscape Character Type
LPA	Local Planning Authority
LVIA	Landscape and Visual impact Assessment
MOD	Ministry of Defence
MW	Megawatt
NATS	National Air Traffic Services
NSA	National Scenic Areas
Ofcom	Office of Communications
RSPB	Royal Society for the Protection of Birds
SINC	Site of Importance for Nature Conservation
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
ZTV	Zone of Theoretical visibility

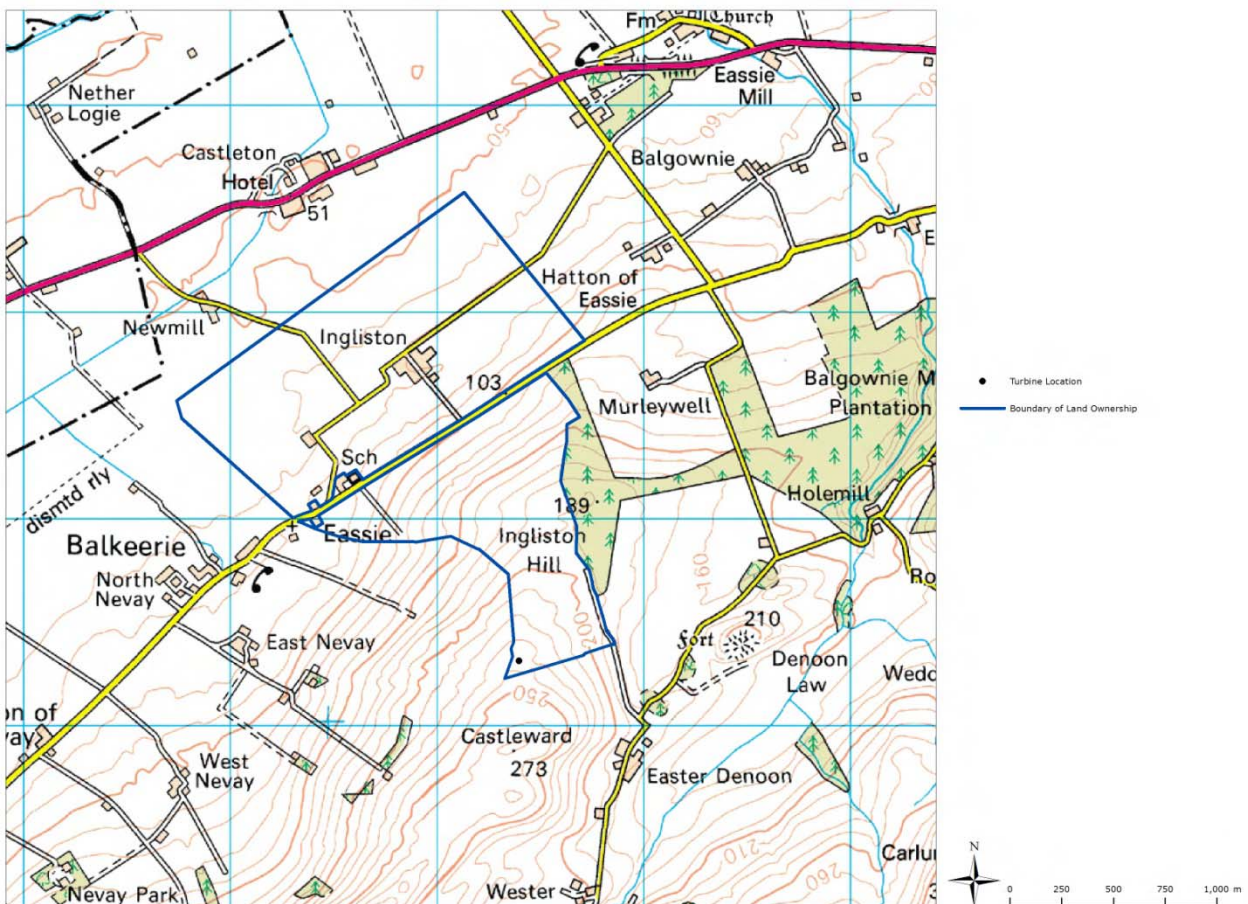
# 1. Introduction

This Supporting Environmental Document describes and quantifies the potential environmental and social impacts associated with the construction, operation and decommissioning of a medium scale wind turbine at Ingliston Farm, near Balkeerie. It also provides further information on the proposed development, its compliance with planning policy and the reasons for development. It is to be read alongside the formal planning application submitted to Angus Council.

The remainder of this chapter provides background information on the Ingliston Farm site and the drivers that led to the proposed development being put forward. Information of the alternative sites that were also examined are provided later in this Supporting Environmental Document.

## 1.1. Turbine site

The proposed turbine will be situated within an upland grassland field, approximately 1.6km east south east of Balkeerie, and 4.5km west south west of Glamis. The area that comprises the Ingliston Farm site is illustrated in Figure 1 below with the boundary of the agricultural land owned by the applicant shown in blue. The proposed turbine location is highlighted by the black circle.



**Figure 1: Map showing the land comprising the Ingliston Farm site**

## **1.2. Project Benefits**

There are three core drivers for the applicant to develop wind energy on the farm:

1. Diversification of farming business;
2. Improve environmental performance; and
3. Combating climate change.

These drivers are discussed further in the chapters below.

### **1.2.1. Diversification**

The development of a wind turbine at Ingliston Farm would lead to an additional sustainable source of income for the farmer, Mr William Shaw. Concerns have been raised over the poor weather conditions experienced in recent years and the significant impact this has had on the farming business. This has prompted the applicant to explore alternative areas of income to help support his farming business. Mr Shaw's farming business currently employs 4 full time staff and a number of seasonal staff. Ingliston Farm has been in Mr Shaw's family's ownership for over 70 years.

The proposed wind turbine will provide a source of additional income over the 25 years of expected operation. Agriculture incomes can be very variable year to year due to variations in weather conditions, crop quality and yield, market prices, exchange rates and operational costs for fertiliser, fuel etc. The operation of the wind turbine will provide an income stream that is separate from these factors and the project therefore demonstrates best practice diversification. The development will also have a minimal footprint and allow for the continuation of the current farming operation on the vast majority of the land.

The main objectives of the proposed income diversification are as follows:

- To increase direct business revenue and thus support the continued viability of the existing farming business;
- To improve attractiveness of food produce to suppliers through improved sustainability credentials;
- To support existing employment;
- To create new employment;
- To provide renewable energy to meet demand;
- To reduce the overall carbon footprint of the farm through offsetting energy usage;
- To promote the use of renewable energy generation in the area and contribute towards achieving national and regional renewable energy targets; and
- To spread the farmer's risk into a non-agricultural sector.

The development of wind energy at the site by the applicant will also maximise the local benefits from renewable development as the revenue from the project will stay in the local economy. The additional benefits of locally developed renewable energy projects are described in further detail in the socioeconomic chapter of this document but will lead to a more significant opportunity for local job creation.

### **1.2.2. Improve Environmental Performance**

Ingliston Farm is a mixed arable and livestock farm comprising approximately 150 acres of permanent grassland and 400 acres of arable farm land. Mr Shaw also farms Huntly Farm in Invergowrie (650 acres), and is a tenant farmer at Newton of Ballunie in Kettins (280 acres). In total Mr Shaw farms an area totalling approximately 1,480 acres.

Arable cropping across the farming estate includes winter wheat, winter barley, spring barley, oil seed rape, cattle feed beans and potatoes.

1,000 cattle per annum are finished for the beef trade on the permanent grassland and in the farm buildings at Ingliston Farm.

Ingliston Farm itself comprises a number of farm buildings, some of which are about to be replaced after a major fire in September 2012. The buildings will include:

- A new 1,000m<sup>2</sup> grain store and associated grain drier, capable of storing 2,000t of grain and drying 40t of grain per hour;
- A new 1,000m<sup>2</sup> refrigerated cold store;
- An existing 5,000m<sup>2</sup> of cattle buildings (housing up to 500 head of cattle at any one time); and
- An existing 1,000m<sup>2</sup> of general purpose buildings.

Huntly Farm also includes approximately 5,500m<sup>2</sup> of grain storage and general purpose buildings.

All of Mr Shaw's spring barley, wheat and oil seed rape are sold through local merchants. The grassland is used for silage and grazing, and the winter barley and beans are used as cattle feed. The 1,000 cattle per year finished at Ingliston Farm are sold to 4 Scottish abattoirs.

Given the above operations the farm has a significant carbon footprint from normal operations and this is primarily linked to the energy consumption required to run the farming business. For example, it is estimated that Mr Shaw's farm business annually consumes ~100,000 litres of red diesel and this is considered to directly lead to 267 tonnes of CO<sub>2</sub><sup>1</sup> emitted per annum. This carbon footprint will increase significantly with the addition of the new buildings at Ingliston Farm.

The current electricity use of the farming operations is also high, and with the erection of the new buildings this is expected to double. Electricity is therefore a significant cost to the business and a source of associated carbon emissions, and this will only increase as the farm business continues to grow and energy prices increase.

As a high energy user, a supplier to local and national food companies, and a supplier of British produce, the farm is seeking to improve its sustainability credentials and reduce its carbon footprint. The requirement to demonstrate a tangible commitment to sustainability is increasing, with markets demanding higher environmental standards from their supply chain, and buyers requesting support from suppliers to help meet their environmental commitments. In a competitive market the ability to demonstrate that the farm business is working hard to support buyers' environmental strategies is becoming increasingly important to maintain business. Energy prices are also increasing and to ensure farming remains viable, both environmentally and financially, a sustainable energy supply is essential.

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<sup>1</sup> Using current figures from DECC and the Carbon Trust each litre of diesel used emits 2.6676 kg of CO<sub>2</sub>.



Given the strong expected wind resource at the proposed location the operation of 1 No. 500kW wind turbine is expected to generate in the region of 1,660MWh per annum<sup>2</sup>. This would directly offset the emission of approximately 871 tonnes of CO<sub>2</sub> for every year of operation<sup>3</sup>.

This would be a significant step towards reducing the carbon footprint of the farming business and meeting Mr Shaw's desire to achieve environmentally friendly farming practices.

### 1.2.3. Combating Climate Change

In addition to the above local drivers the development will also be a small step towards combating climate change. It is now generally accepted that there is an important requirement to reduce the emission of harmful Greenhouse Gases (GHG's) – specifically carbon dioxide (CO<sub>2</sub>) – in order to mitigate the worst impacts of human-induced global climate change. To this end there are global and national targets in place that address this requirement for a move to a low carbon way of life.

The UK has signed up to targets to reduce total CO<sub>2</sub> emissions. Over and above the terms laid out in the UK, Scotland has set further ambitious targets. Around 20% of the UK's CO<sub>2</sub> emissions are caused by the production of electricity from conventional burning of fossil fuels (coal, oil and gas). Therefore the increased development of renewable energy technologies – such as wind energy – is a key part of the strategy to meet the UK's legal requirements. To this end a number of national and regional targets have been set out for the increased provision of electricity from renewable sources and these are summarised for Scotland and the UK in Table 1 below.

	<b>Scotland</b>	<b>UK</b>
CO <sub>2</sub> emissions reduction targets by 2020 <sup>4</sup>	42%	34%
Proportion of electricity demand to be met by renewable technologies by 2020	100%	15%
Estimated renewable electricity generation required to meet target	45TWh	>100TWh
Expected proportion of the above to be met by onshore wind	50%	40%
Equivalent GW capacity required from onshore wind to meet this target	~9.5GW	~15-19GW
Actual onshore installed capacity as of October 2012	3.4GW	5.0GW

**Table 1: Overview of energy related CO<sub>2</sub> emission reduction targets**

From the above table it can be seen that Scotland and the UK are a considerable way from achieving the scale of on-shore wind development considered necessary to meet their targets. This proposed development is therefore a small but positive step towards meeting the Scottish and UK goals regarding wind energy.

This locally owned development will also contribute to the target of 500MW community and locally-owned renewable energy schemes by 2020, as laid out in the 2011 document, the '2020 Routemap for Renewable Energy in Scotland'. This target was put forward with the aim of generating local revenue and sustaining local economies and it is considered that the applicant is well placed to support these aims through his farming business.

<sup>2</sup> This figure is based on a turbine capacity factor of 38%.

<sup>3</sup> Using current figures from DECC and the Carbon Trust each kWh of electricity generated offsets 0.5246kg of CO<sub>2</sub>.

<sup>4</sup> From 1990 levels

### 1.3. Remainder of the Document

This Environmental Supporting Document is divided into separate chapters. The environmental assessment chapters describe the subject being addressed, summarise relevant background and guidance documentation, state the relevance to the Ingliston Farm project and discuss the methodologies used in the assessment. The results of each impact assessment are then presented and, where appropriate, mitigation measures are suggested. A brief overview of the contents of each chapter is provided below:

2. **The Wind Turbine Proposal** – A description of the proposed development, including turbine description, site layout, access, grid connection, delivery routes etc.
3. **Planning & Environmental Policy** – An introduction and overview of the national, regional and local planning legislation relevant to the project.
4. **Work to Date** – An outline of the development works completed prior to this planning submission.
5. **Landscape & Visual** – This chapter uses ZTVs, photomontages and wireframe analysis to demonstrate and assess the landscape and visual impacts associated with the proposed development.
6. **Soils & Hydrology** – Provides a description of the hydrological and the hydrogeological features surrounding the site and the expected impact of the development.
7. **Socioeconomic** – Provides a description of the activity of the local economy and tourism and the expected impacts of the development on these areas.
8. **Cultural Heritage** – Provides an assessment of the effects of the wind development on the setting of cultural sites in the area such as Listed Buildings and Scheduled Ancient Monuments.
9. **Ecology** – Provides a description of the flora and fauna within the surrounding region of the turbine and the expected impact of development.
10. **Shadow Flicker** – Industry software has been used to identify dwellings which may be subject to the effect of shadow flicker. The exact times and durations are calculated and, should any shadow flicker impact be expected, mitigation measures are suggested.
11. **Noise** – A noise assessment was carried out to assess the effect of background noise on the nearby residential areas.
12. **Telecommunications** – Relevant industry bodies have been contacted to assess any potential impact on communication signals and infrastructure.
13. **Aviation** – Considers any potential impacts on civil and military aviation operations in the area.
14. **Public Safety** – Based on national planning guidelines, this chapter outlines the public safety issues associated with the proposed development. The proximity of the turbine locations to pipeline consultation zones is also discussed in this chapter.
15. **Summary & Mitigation** – Summarises the main conclusions of the Supporting Environmental Document and provides justification as necessary for the proposal.

## 2. The Wind Turbine Proposal

This chapter provides an overview of the proposed location of the medium scale turbine at the site, given the existing constraints and the available space within the surrounding area. A single medium scale turbine was deemed suitable for this site to ensure maximum utilisation of the available wind resource, whilst ensuring a minimal impact on the local environment.

### 2.1. Site Selection

The primary criteria to consider for the feasible installation of a medium scale wind turbine are as follows:

- **Distance from residential buildings** – It is important to maximise the distance between the turbine and nearby residential dwellings to mitigate potential issues such as noise, shadow flicker and a loss of visual amenity. Satisfactory residential exclusion zones were applied to mitigate these key issues from those properties not in the ownership of the applicant;
- **Avoidance of key environmental areas** – In choosing the most suitable location, efforts were made to avoid environmentally sensitive areas. Ecological studies undertaken at the site identified it as being a low sensitivity site in terms of the habitats and species noted within or adjacent to the development area;
- **Available wind resource** – The best available wind resource for the turbine was sought through maximising the height of the location without significantly impacting upon visual concerns. The wind resource for the area was assessed through desk based models and the suitable areas (to maximise generation) were considered to be on the higher areas of land to the south of the land ownership area;
- **Access to site** – Efforts should be made to minimise the need for additional civil works. The preferred access utilises as much of the existing road network as possible and this in turn will minimise the footprint and associated environmental impact of the development. Direct access to the turbine location will be provided via approximately 2.1km of access track. Approximately 730m of this will be an upgraded existing farm track which is regularly used to provide access to the cattle corral at the top of the track. The remaining 1,370m will be a new access track which will provide direct access to the turbine location. This track will also provide the farmer with permanent improved access to the field in which the turbine will be located;
- **Avoidance of culturally sensitive areas** – The disturbance of archaeological or historical sites, including stone walls and ruins of interest was avoided through the sympathetic selection of the site; and
- **Clearance from public roads** – The required clearance distance for a turbine from public roads is dependent on the Local Planning Authority (LPA) but a conservative distance of 84.7 m (equal to fall-over distance plus 10%) was used as a minimum to ensure public health and safety.

When examining the above criteria, the key concerns were to maximise the distance from residential properties, minimise visual impact whilst still ensuring sufficient wind resource and avoid areas of higher ecological sensitivity.

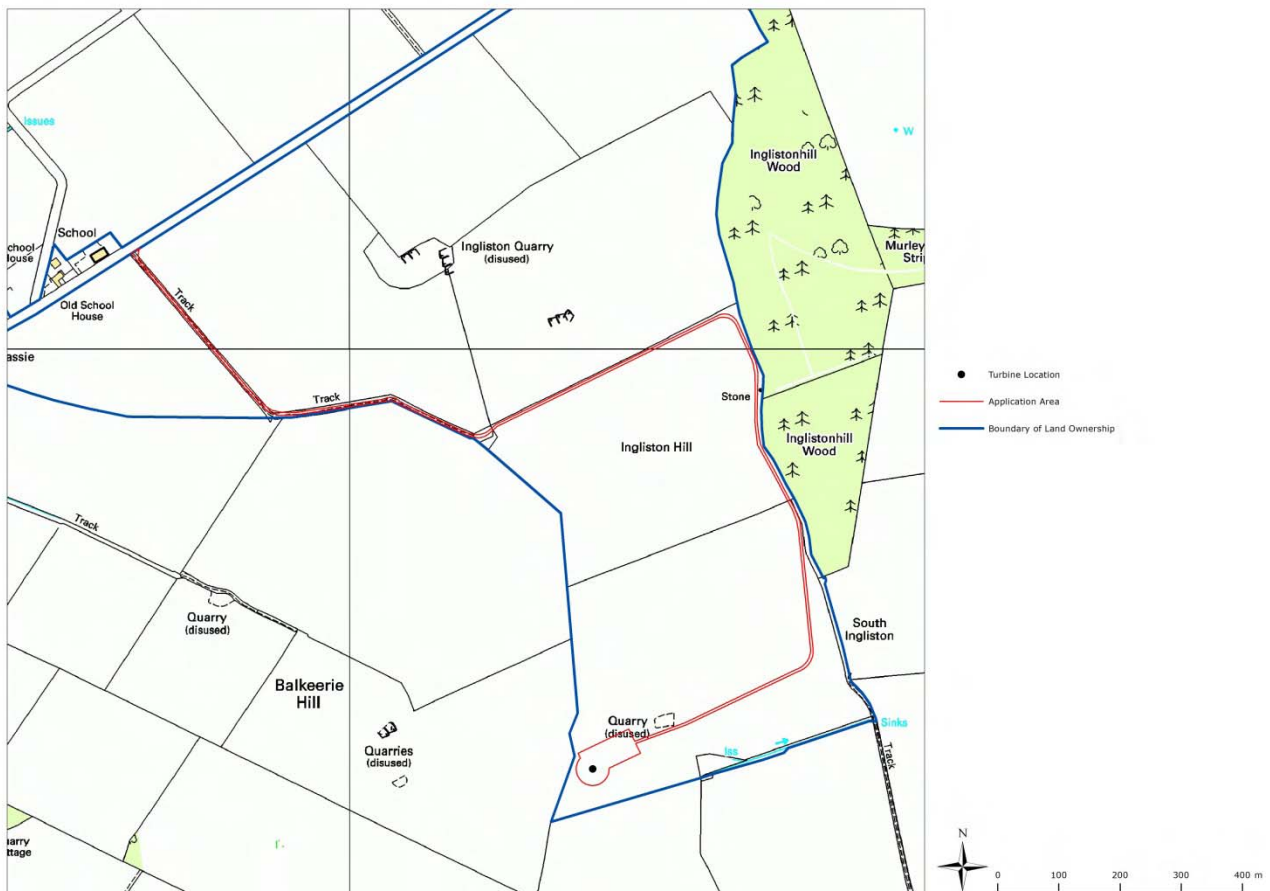
The next section discusses the development components in further detail.

## 2.2. Site Layout

The proposed position of the turbine is in a grass upland field. The proposed installation will include the following components:

- **Wind turbine** – The candidate turbine is discussed in further detail in Chapter 2.3 below;
- **Foundation** – For the chosen turbine the foundation will be a square structure with expected dimensions of 13m x 13m. Once constructed this structure will be backfilled so that only the tower base pedestal will be visible;
- **Electrical substation kiosk** – It is proposed that the required turbine transformer be located in a GRP building located next to the base of the tower along with the necessary switchgear and protection equipment. In addition this building would have space for the Distribution Network Operator's (DNO's) electrical equipment. This building will have maximum dimensions of 10.3m x 3m, and will have an elevation of 3.15m;
- **Access road** – Direct access to the turbine location will be provided via approximately 2.1km of access track. Approximately 730m of this will be an upgraded existing farm track which is regularly used to provide access to the cattle corral at the top of the track. The remaining 1,370m will be a new access track which will provide direct access to the turbine location. This track will also provide the farmer with permanent access to the field in which the turbine will be located;
- **Construction compound** – There will be a requirement for the construction of a hardstanding area for the assembly of the crane and rotor. This would measure an estimated 20m x 35m with an adjacent temporary compacted area for lay down of turbine components during construction; and
- **Underground cable** – The 11kV cable connecting the turbine to the proposed grid connection point will be buried to minimise visual impacts.
- **Borrow pit** – As highlighted in Drawing ING003, the development will also include the utilisation of a small borrow pit. The borrow pit will measure 92m x 44m, and will involve a limited amount of excavation to 700mm depth below the current bedrock level. The extracted bedrock material will form the crushed rock layer of the new access track (see Figure 6 below). The foundation, electrical substation kiosk and construction compound will lie within the limits of the borrow pit. As such, the required borrow pit excavation area is in reality smaller than that outlined above, as it will include excavated material from the construction of features that would be present regardless of the inclusion of the borrow pit.

The proposed layout of the construction components is illustrated in Figure 2 and Figure 5 below, with further information provided in Drawings ING002 and ING003 which are attached to this Supporting Environmental Document.



**Figure 2: Proposed layout of application site**

From the above information it can be seen that all works for this application will take place on the applicant's land. The requirement for ancillary structures will be minimal with limited additional permanent structures required alongside the turbine. The only visible aspects of the development once construction is complete will be the retained access road, crane pad, turbine and substation kiosk. The next chapters discuss the various components of the development in further detail.

### **2.3. Turbine Specification**

The proposed choice of turbine for development is a medium scale turbine with a capacity of up to 500kW. At this time the preferred choice of turbine is the EWT Directwind 54 model. The final choice of turbine may differ but would not increase in size from what is proposed or vary significantly in design (e.g. all considered turbine options would be 3 bladed upwind designs as used in commercial wind farms).

The outline technical specifications for the Directwind 54 are provided in Figure 3 below alongside a photograph of an operational turbine.

	<b>Directwind 54</b>
Rated Capacity	500kW
Status	New
IEC Wind Class	IIIa
Proposed Hub Height	50m
Rotor diameter	54m
Distance from ground to blade tip	77m
IEC Maximum Rotational Speed	12 – 28rpm
Rated wind speed	10m/s
Operational turbine life	25 years



**Figure 3: Technical specifications and photograph of the proposed turbine option**

## 2.4. Transport to Site

It is intended that the wind turbine components will be delivered to site from a suitable port on the east coast from where they will be loaded onto road vehicles. The access road requirement for a turbine of the scale proposed is provided in Table 2 below. The longest single load will be the blades themselves which are each approximately 26m in total length, while the tower will be delivered in two sections of approximately 23m.

<b>Consideration</b>	<b>Requirement</b>
Useful width of carriageway	4m
Clearance width	5.7m
Clearance height	4.6m
Radius of curve, external	20m
Maximum longitudinal slope	8°
Maximum lateral slope	0 - 2°
Maximum axle load	16.5t

**Table 2: Minimum access considerations for the proposed scale of wind turbine**

At this time it is proposed that the turbine components are transported to site from Dundee Port. The delivery vehicles will utilise the A90 and A94 roads leading to Glamis. From here, the delivery vehicles will utilise the minor road network to access the site. Direct access to the turbine location will be provided via approximately 2.1km of access track. Approximately 730m of this will be an upgraded existing farm track which is regularly used to provide access to the cattle corral at the top of the track. The remaining 1,370m will be a new access track which will provide direct access to the turbine location. This track will also provide the farmer with permanent access to the field in which the turbine will be located. The proposed access route from Dundee Port is shown in Figure 4 below.





**Figure 4: Proposed transport route (shown orange). Radii are at 5km intervals.**

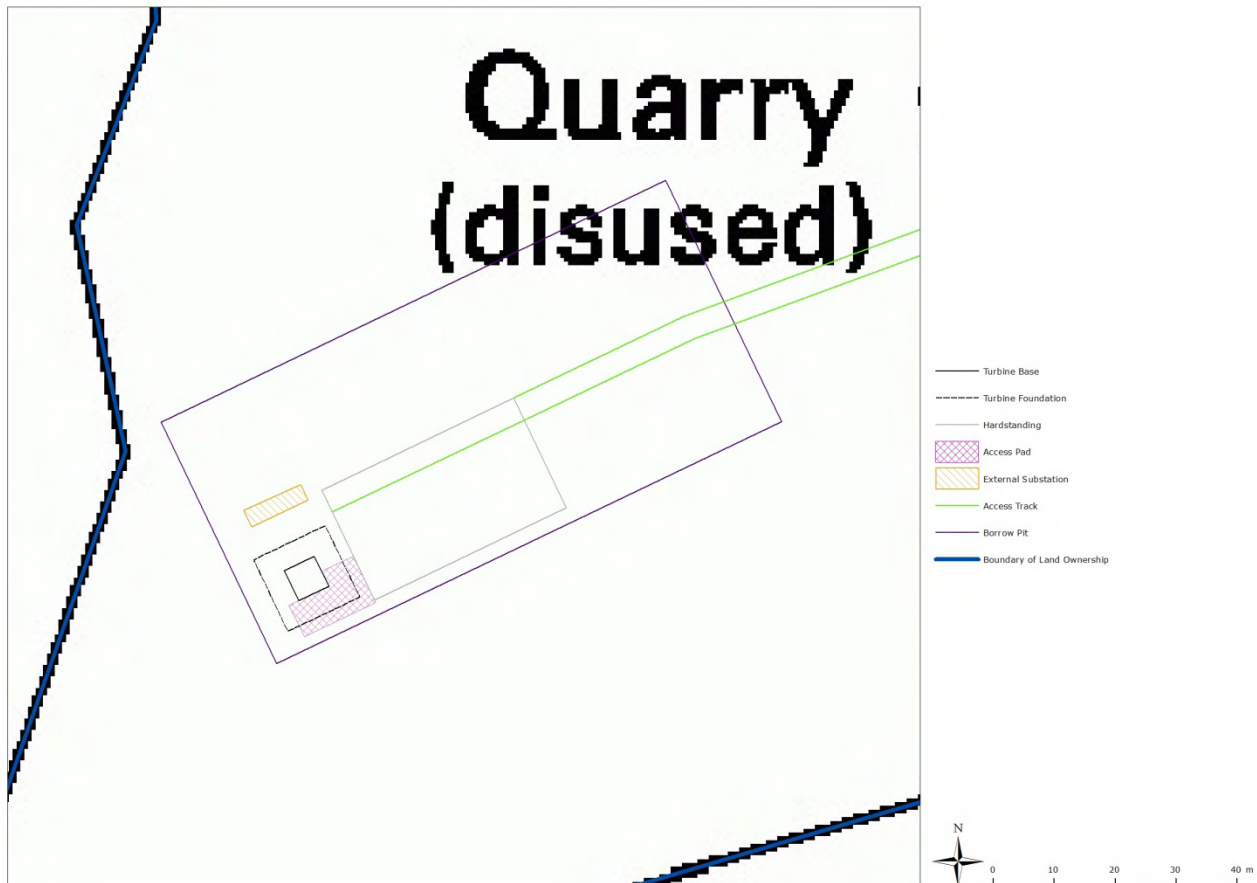
From an initial assessment of the route, the junctions can generally be considered to be suitable to allow for the safe movement of the turbine delivery vehicles. This assumes that front and rear axle steered vehicles would be used to allow for increased manoeuvrability. If consented a full transport assessment can be provided to Angus Council's Roads Department for discussion and approval.

## 2.5. Construction Traffic

The turbine components will be delivered in approximately 8 individual loads. Extendable trailers will be employed to transport the larger turbine components. All vehicles carrying abnormally long loads will have rear wheel steering to facilitate delivery down minor roads. The axle loading of the heaviest delivery vehicle is 16.5 tonnes. Two cranes are required for the offloading and construction of the turbine, the main crane is expected to be a 250 – 400 tonne mobile crane. The tailing crane is likely to be a 90 tonne, rear wheel steering crane. Additional construction traffic would be necessary for the construction of the hardstanding area. There will also be small vehicle access for site workers/individual contractors throughout the construction program.

## 2.6. Construction Compound

The construction hardstanding area will comprise an area of suitably firm footing for the cranes to operate. There will also be levelled lay down and assembly area to allow for the set down of components, rotor blade assembly and for general installation works. The proposed construction area is shown in Figure 5 below (this is also provided in Drawing ING003).



**Figure 5: Overview of construction area**

An area of hardstanding at a size of 20m x 35m (area of approximately 700m<sup>2</sup>) will be required for the safe operation of the main mobile crane and the tailing crane. This area will be filled with crushed stone and/or aggregate of a maximum depth of approximately 750mm.

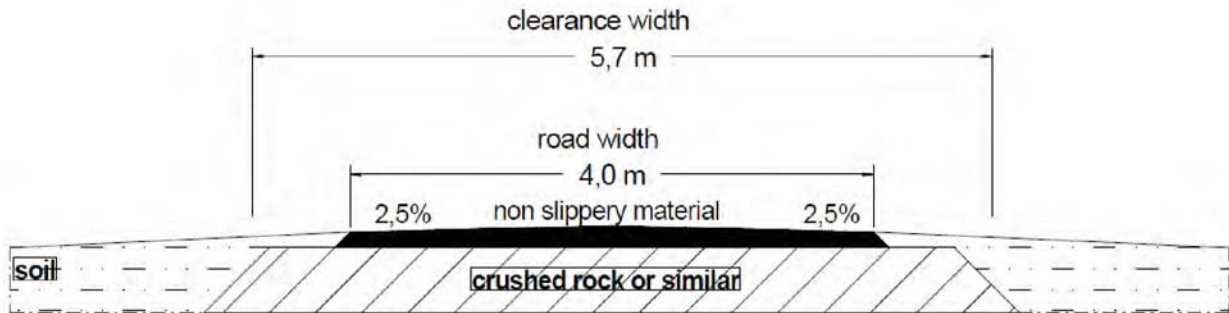
## 2.7. Access Road

The new access track will be constructed to resemble existing farm tracks, where possible, to minimise the visual impact of the development. The turbine delivery route will spur off the minor road, which links Glamis with Newtyle and intersects the applicant's land ownership, as shown in Figure 2 and Drawing ING002. Direct access to the turbine location will be provided via approximately 2.1km of access track. Approximately 730m of this will be an upgraded existing farm track which is regularly used to provide access to the cattle corral at the top of the track. The remaining 1,370m will be a new access track which will provide direct access to the turbine location. This track will also provide the farmer with permanent access to the field in which the turbine will be located.



The new access track will have a constant useable width of 4m and a load bearing capacity capable of handling the abnormal load vehicles required for delivering the turbine components and installation equipment.

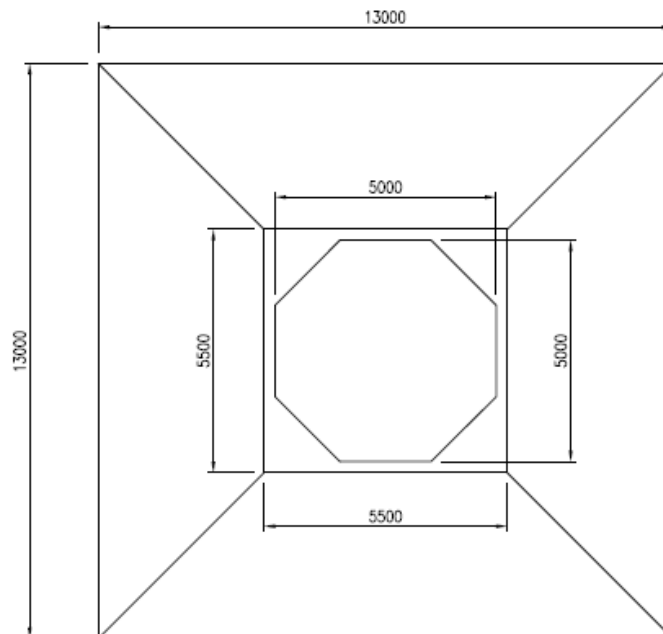
The new dedicated access track will be constructed, where possible, along the field border of the permanent grassland so there will be no significant loss of habitat associated with this additional construction requirement and minimal loss of useable farming land. An example of the access road specification is provided in Figure 6 below.



**Figure 6: Access track cross-section**

## 2.8. Turbine Foundations

The turbine foundation will consist of a square reinforced concrete base footing and a pedestal. This is illustrated in Figure 7 below, although the exact layout of the foundation may be subject to minor change. The majority of the foundation will be below ground level with only the pedestal being visible post-construction. The standard raft foundation will comprise of a reinforced concrete plinth with approximate dimensions of 13m x 13m. The total depth of the foundation is expected to be approximately 2.5m, however in some cases, following ground investigations, there may be a requirement for a deeper foundation.



**Figure 7: Plan drawing of standard turbine foundation**

## 2.9. Borrow Pit

As highlighted in Drawing ING003, the development will also include the utilisation of a small borrow pit. The borrow pit will measure 92m x 44m, and will involve a limited amount of excavation to 700mm depth below the current bedrock level (assumed to be approximately 300mm below current ground level). The extracted bedrock material will form the crushed rock layer of the new access track (see Figure 6). The foundation, electrical substation kiosk and construction compound will lie within the limits of the borrow pit. As such, the required borrow pit excavation area is in reality smaller than that outlined above, as it will include excavated material from the construction of features that would be present regardless of the inclusion of the borrow pit. The turf and topsoil removed during the excavation process will be used post-construction to re-instate the borrow pit to permanent grassland, up to the edge of the permanent features included within the construction area (see Figure 5). Therefore during the operational period cattle will be able to continue to graze up to the edge of the permanent construction area.

## 2.10. Ancillary Works

### 2.10.1. Grid Connection

It is proposed that the electricity generated by the turbine will be fed directly into the National Grid via 11kV cabling, for subsequent sale as part of a long term power purchase contract. The electricity exported to the National Grid will offset electricity used on site. Scottish and Southern Energy are currently undertaking an assessment of preferred grid connection options for the development, however it is currently proposed to connect to the National Grid at a point approximately 290m North North West of the hamlet of Eassie. It is currently envisaged that 11kV cabling will run underground from the proposed turbine to the point of grid connection.

### 2.10.2. Substation Kiosk

There is a requirement for the transformer, switchgear, communications and further protection equipment to be located in a glass reinforced plastic (GRP) kiosk close to the turbine. As the nature of the final grid connection infrastructure is still being agreed, this building may also be required to have space for the Distribution Network Operator's (DNO's) electrical equipment. The maximum dimensions of the substation kiosk are outlined in Table 3 below.

<b>Length</b>	10.3m
<b>Breadth</b>	3.0m
<b>Height</b>	3.15m

**Table 3: Likely substation kiosk dimensions**

The substation kiosk can be painted to the most unobtrusive colour that conforms to the surroundings. Typical colours are grey, green or brown. A suitable structure will be confirmed with the DNO (Scottish and Southern Energy) prior to construction.

## 2.11. Construction Programme

The construction work will be carried out in three phases. During the first phase a soil study will be conducted to determine the foundation design. During the second phase, the civil works will be carried out. This includes the laying of electrical cable and construction of the construction compound. The foundations will also be completed and left to cure for a period of at least 28 days. During the third phase, the turbine will be delivered, erected and

commissioned prior to the necessary reinstatement works being completed. The phased construction process is shown in more detail in Table 4 below.

<b>Construction</b>	<b>Works carried out</b>	<b>Approximate duration</b>
Phase 1	Soil investigation survey Turbine foundation design	2 days on site (36 days for survey results and foundation design)
Phase 2	Borrow pit excavation works Construct access track Cable trenching and laying Prepare turbine base Prepare transformer kiosk base Install turbine insert & re bars Concrete pour to base Lay turbine external earth mat Install transformer HV jointing at TX and Gen sw/gear	28 days on site (28 days for concrete curing)
Phase 3	Cranes on site Delivery of turbine components Lay out and fit blades to cone Delivery of tower sections Erect Turbine tower/nacelle/blades Internal tower wiring External LV wiring and connecting Site (including borrow pit) reinstatement Commission turbine and handover	12 days

**Table 4: Phased construction program**

## 2.12. Decommissioning

On reaching the end of its operational life (25 years), and if no agreed turbine replacement is consented, the proposed turbine will be decommissioned, dismantled and removed, leaving no visible trace of the development. The site will be completely restored to pasture land and there will be no lasting implications on the land usage/character. The turbine components will be dismantled and removed from site. The foundation will be broken down and removed to a licensed off-site facility. A decommissioning programme will be agreed with Angus Council prior to the commencement of decommissioning works.

### **3. Planning & Environmental Policy**

This chapter provides an introduction and overview of the global, European, national and local planning policy documentation which is relevant to a wind energy development of this scale.

Scientific evidence is clear that most of the observed global rises in temperature since the mid-20<sup>th</sup> century is linked to the emissions of anthropogenic greenhouse gases. This is expected to continue if present emissions levels are maintained or expand without suitable controls. Climate change policy and renewable energy policy are vital tools in controlling and minimising the future impacts of man-made climate change.

EU and individual Government policies have placed the development of renewable energy, including wind energy, as a primary target in their strategic energy policies. These targets have then been translated into planning policy.

In Scotland, national planning policy is principally provided in the National Planning Framework for Scotland 2 (NPF2) and in Scottish Planning Policy (SPP). These documents are produced by the Scottish Government to provide overarching planning policy and are currently subject to review. Regional and local planning policy is formulated by local planning authorities in the form of Structure and Local Plans (which are being phased out) and Strategic and Local Development Plans.

The following is a review of the policies and legislation, at international, European and national level, which relate to the proposed development at Ingliston Farm.

#### **3.1. Global Context**

The burning of fossil fuels results in the release of greenhouse gases such as carbon dioxide (CO<sub>2</sub>). These gases contribute to the process of climate change. The following policies provide a summary of global policy relating to the current effects of climate change and the policies which aim to avoid and reduce it.

##### **3.1.1. Intergovernmental Panel on Climate Change**

The Intergovernmental Panel on Climate Change (IPCC) is the leading body for the assessment of climate change, established by the United Nations Environment Programme and the World Meteorological Organisation to provide the world with a clear scientific view on the current state of climate change and its potential environmental and socio-economic consequences. The IPCC is a scientific body. It reviews and assesses the most recent scientific, technical and socio-economic information produced worldwide, relevant to the understanding of climate change.

The main activity of the IPCC is to provide regular Assessment Reports of the state of knowledge on climate change. The Fourth Assessment Report was released in 2007. The IPCC is now beginning the process towards preparing the Fifth Assessment Report which is due to be finalised in 2014. Some of the findings of the Fourth Assessment Report included the following:

- Unmitigated climate change would, in the long term, be likely to exceed the capacity of natural, managed and human systems to adapt;
- A wide range of mitigation options are currently available or projected to be available by 2030 in all sectors;
- Some planning adaptation of human activities is occurring now but more extensive adaptation is required to reduce vulnerability to climate change;

- Many impacts can be reduced, delayed or avoided by mitigation. Delayed emissions reductions significantly constrain the opportunities to achieve lower stabilisation levels and increase the risk of more severe climate change impacts; and
- Decisions about macro-economic and other policies that seem unrelated to climate change can significantly affect emissions.

In the past sixteen years a number of international conferences have been held in relation to the issue of climate change, in particular Kyoto (1997) and subsequent UN conferences.

### **Kyoto Protocol**

Following the World Summit Conference held in Kyoto, Japan, in 1997, nations which signed the Protocol agreed to take actions to control, reduce or limit their emissions of the six main greenhouse gases (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride).

The Kyoto Protocol (1997) to the United Nations Framework Convention on Climate Change, 1992 (UNFCCC) imposes legally binding targets to be achieved in the period 2008 – 2012:

- 5% overall reduction in the emission of greenhouse gases in developed countries;
- 8% reduction below 1990 levels within the EU;
- The United Kingdom's contribution is a limit of 12.5% above 1990 levels by 2008-2012. This implies an 8% reduction in CO<sub>2</sub> emissions over this time period; and
- Countries not fulfilling their obligations will be forced to purchase carbon credits on an open market from compliant countries.

## **3.2. European Context**

### **3.2.1. EU Directive on the Promotion of the Use of Energy from Renewable Sources**

An EU Directive (2009/28/EC) on the Use of Energy from Renewable Sources came into force on 23 April 2009 – 'The Renewables Directive'. It establishes the rules for achieving 20% of EU energy consumption from renewable sources by 2020<sup>5</sup>. Other measures introduced at the same time aim to ensure a 20% cut in greenhouse gas emissions by 2020, and a 20% reduction in energy consumption through energy efficiency and demand reduction – the EU's 20:20:20 Plan.

The Renewables Directive recognises the need to promote renewable energy sources and technologies which will have a positive impact on:

- Security of energy supply;
- Regional and local development opportunities;
- Rural development;
- Export prospects;

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<sup>5</sup> Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directive 2001/77/EC and 2003/30/EC.

- Social cohesion; and
- Employment opportunities.

Under an EU 'burden sharing' arrangement, the UK's overall national target for the share of energy from renewable sources in gross final consumption of energy in 2020 is 15% (increased from 1.3% in 2005)<sup>6</sup>. The promotion of electricity produced from renewable energy sources is therefore an extremely important component in the UK achieving its mandatory target.

On 6<sup>th</sup> June 2012 the European Commission presented a Communication on its renewable energy policy, outlining options for the period beyond 2020. It confirms the market integration of renewables and the need for their growth in the decades after 2020. The Communication also calls for a more coordinated European approach in the establishment and reform of support schemes and an increased use of renewable energy trading among Member States.

It recognises that renewable energy development increases our security of supply and improves European competitiveness creating new industries, jobs, and economic growth and export opportunities, whilst also reducing our greenhouse gas emissions. It states that "*strong renewables growth to 2030 could generate over 3 million jobs, including in small and medium sized enterprises*"<sup>7</sup>.

The associated Staff Working Document, also published on 6<sup>th</sup> June 2012, states that wind energy will provide at least 12% of European electricity by 2012, therefore significantly contributing to the 20:20:20 goal outlined above. Beyond 2020, the integration of 50% wind power into an electricity system is seen as technically possible.

### 3.3. National Context

The UK Government has set a target to cut the UK's carbon dioxide emissions by 60% by 2050. The UK Government's Energy White Paper, published in May 2007, concludes that if the UK is to achieve a reduction in carbon emissions of that order, then by 2050 renewables will need to contribute at least 30 – 40% of our electricity generation and possibly more.

The Scottish Government's Draft Electricity Generation Policy Statement, published in March 2012, takes full account of the amended target of delivering the equivalent of at least 100% of gross electricity consumption from renewables by 2020. It advises that "*wind power, alongside other forms of onshore and offshore renewables, provides an electricity supply which is largely emissions-free and, because of its decentralised nature, contributes significantly to greater security of supply*".

With regard to the scale of the overall challenge, one of the key findings of the Scottish Government commissioned modelling study is that "*achieving the 100% target will require Scottish installed generation capacity to almost double over the 10 year period to 2020 – with wind (offshore and onshore) accounting for around 13GW of capacity*".

As noted in the 2020 Routemap for Renewable Energy in Scotland, the benefits are not only in terms of energy generation, security of supply and reduced carbon emissions, but also in

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<sup>6</sup> Directive of the European Parliament and of the Council on the Promotion of the Use of Energy from Renewable Sources, 2008/0016 (COD), Council of the European Union, Brussels, December 2008;

[http://www.ewea.org/fileadmin/ewea\\_documents/documents/00\\_POLICY\\_document/RES-directive\\_consolidated.pdf](http://www.ewea.org/fileadmin/ewea_documents/documents/00_POLICY_document/RES-directive_consolidated.pdf).

<sup>7</sup> "Renewable energy: a major player in the European energy market", June 2012.

terms of economic recovery. During the period to 2020, renewables in Scotland could provide *"up to 40,000 jobs and £30bn investment to the Scottish economy"*.

With specific regard to onshore wind, the Routemap notes that *"it is a mature and relatively low cost renewable technology with a large supply chain already established"*. Furthermore, *"onshore wind turbines can make a very large contribution to the progress to Scotland's renewable electricity target..."*.

In addition to the 100% renewable electricity generation target, the Routemap also outlines a new objective of 500MW of community and locally-owned renewable energy schemes by 2020. This target seeks to allow communities and rural businesses to take advantage of the revenue streams that can accrue from onshore wind within the Feed in Tariff, thereby generating local revenue and sustaining local economies.

As explained elsewhere within this Document, the proposals at Ingliston Farm fully comply with these community objectives.

### **3.4. National Planning Policy**

#### **3.4.1. National Planning Framework for Scotland 2 (NPF2) 2009**

Published in June 2009, National Planning Framework for Scotland 2 (NPF2) guides Scotland's future development and establishes strategic priorities to support the Scottish Government's central purpose of sustainable economic growth.

The spatial strategy to 2030 therefore seeks to *"promote development which helps to reduce Scotland's carbon footprint and facilitates adaptation to climate change"*, and *"realise the potential of Scotland's renewable energy resources and facilitate the generation of power and heat from all clean, low carbon sources"*.

With regard to renewable energy in general, the Scottish Government is *"committed to establishing Scotland as a leading location for the development of renewable energy technology and an energy exporter over the long term"*. The aim of national planning policy is therefore to develop the country's renewable energy potential whilst safeguarding the environment and communities.

With specific regard to onshore wind, the Scottish Government is *"assisting planning authorities with the preparation of supplementary planning guidance on the location of wind farms"*, and *"participating in a UK-wide project to identify technical solutions to potential conflicts between wind farm developments and radar systems"*.

NPF2 will eventually be replaced by NPF3. In this respect, the Scottish Government has recently published the NPF3 Main Issues Report (MIR). The consultation window on the MIR closed at the end of July 2013.

To help make Scotland a 'low carbon place', the MIR recommends that NPF3 builds on NPF2 by: *"supporting the further deployment of onshore wind farms, whilst addressing concerns raised about the impacts of some wind energy development"*; *"reflecting the objective of greater community and local ownership of renewable energy"*; and *"identifying further necessary enhancements to the electricity transmission and distribution grid"*.

The MIR reiterates the Scottish Government's ambitious target of generating the equivalent of at least 100% of gross electricity consumption from renewable sources by 2020, with an interim target of 50% by 2015. To put this into context, Scotland met the equivalent of 39% of its gross electricity demand from renewable sources in 2012. If the 100% target is to be met, around 14 – 16 GW of capacity needs to be deployed over the next seven years, with onshore wind playing a significant role.



The Scottish Government supports onshore wind energy development in appropriate locations. Within this context, accompanying the continuing priority to ensure green forms of electricity is to ensure that wind farms are appropriately sited and well designed. The proposed adjustments to national planning policy (in which greater protection is to be given to nationally important designations such as National Parks and 'wild land') are outlined in draft Scottish Planning Policy (SPP) and summarised in Chapter 3.4.2 below.

### **3.4.2. Scottish Planning Policy (SPP) 2010**

Scottish Planning Policy (SPP) outlines the Scottish Government's policy on land use planning and reaffirms its commitment to increasing sustainable economic growth.

The need to tackle climate change, and in particular reduce emissions of the greenhouse gases that contribute to it, is a principal challenge of sustainable economic growth. Within this context, *"the need to help mitigate the causes of climate change and the need to adapt to its short and long term impacts should be taken into account in all decisions throughout the planning system"*.

The commitment to increase the amount of electricity generated from renewable sources is a vital part of the response to climate change. In this respect, *"renewable energy generation will contribute to more secure and diverse energy supplies and support sustainable economic growth"*.

Planning authorities should therefore *"support the development of a diverse range of renewable energy technologies, guide development to appropriate locations and provide clarity on the issues that will be taken into account when specific proposals are assessed"*. Development plans and supplementary guidance should support all scales of renewable energy generation development, while ensuring that issues in relation to landscape, natural heritage, residential amenity and any cumulative impacts are properly considered.

With specific regard to onshore wind energy, planning authorities should *"support the development of wind farms in locations where the technology can operate efficiently and environmental and cumulative impacts can be satisfactorily addressed"*. Development plans should establish criteria for the assessment of wind farm proposals, including extensions. *"The criteria will vary depending on the scale for development and its relationship to the characteristics of the surrounding area, but are likely to include:*

- *Landscape and visual impact;*
- *Effects on the natural heritage and historic environment;*
- *Contribution of the development to renewable energy generation targets;*
- *Effect on the local and national economy and tourism and recreation interests;*
- *Benefits and disbenefits for communities;*
- *Aviation and telecommunications;*
- *Noise and shadow flicker; and*
- *Cumulative impact"*.

The design and location of any wind farm should reflect the scale and character of the landscape. Specifically, *"the location of turbines should be considered carefully to ensure that the landscape and visual impact is minimised"*.

When considering cumulative impact, planning authorities should take account of existing wind farms, those which have permission, and valid applications for wind farms which have not



been determined. *"The weight that planning authorities attach to undetermined applications should reflect their position in the application process."* Cumulative impact will largely relate to the *"scale and proximity of further development"* and the criteria for its assessment should be set out in the development plan or supplementary guidance.

SPP is currently in the process of being updated. In this respect, the consultation window for the SPP Consultation Draft ended at the end of July 2013.

Fundamentally, the Consultation Draft states that the planning system should help to address climate change by supporting the expansion of renewable energy generating capacity and heat networks. Development plans should therefore *"support all scales of development associated with the generation of electricity and heat from renewable sources with a view to realising the renewable energy potential of the areas they cover"*.

The Consultation Draft provides revised guidance to Local Planning Authorities in the preparation of spatial frameworks to inform the location of wind energy developments, regardless of their scale. In this respect, proposals for wind farms in National Parks and National Scenic Areas *"will not be acceptable"*.

Within 'areas of significant protection', wind farms will only be appropriate where it can be demonstrated that any significant effects on the qualities for which an area is identified can be satisfactorily overcome. For the first time, it is proposed to include areas of 'wild land' as defined by SNH under this tier. It is also intended to increase the suggested separation distance between wind farms and cities, towns and villages from 2km to 2.5km. This is to reduce visual impact but *"decisions on individual developments should take into account specific local circumstances and geography"*.

More generally, in determining applications for wind turbine development, account should be taken of:

- Community benefits, where they are 'material considerations';
- Landscape and visual effects, including wild land character;
- Natural heritage effects, including birds;
- Impacts on carbon rich soils;
- Historic environment effects;
- Impacts on tourism and recreation;
- Impacts on communities, including residential amenity;
- Noise and shadow flicker effects;
- Impacts on aviation and defence interests, including radar and seismological recording;
- Impacts on telecommunications and broadcasting installations;
- Impacts on road traffic;
- Contribution towards renewable energy generation targets; and
- Cumulative impacts.

The Consultation Draft states that *"proposals for onshore wind turbine development should continue to be determined while spatial frameworks and local policies are being updated"*, and *"moratoria on onshore wind development are not appropriate"*.

### 3.4.3. Specific Advice Sheet – Onshore Wind Turbines (Updated October 2012)

Last updated in October 2012, this Sheet replaces PAN 45 and provides advice in relation to the determination of onshore wind turbines. The key areas for consideration are summarised in Table 5 below.

Subject	Comments
Impact on Landscape	<p>The ability of the landscape to absorb development often depends on features of landscape character such as landform and vegetation. Different layouts of turbines may be more or less suited to particular landscape types and the physical form and/or colour of turbines may also be relevant.</p> <p>In considering wind farm visibility, it is important to note that visibility and distance do not follow a linear relationship. Factors including the backcloth/skyline against which turbines are seen, turbine colour and typical weather conditions require careful consideration.</p> <p><i>"As more areas of search are taken up and as more sites are proposed within or near sensitive landscapes, landscape protection and designing appropriate mitigation through conditions and/or legal agreements, will become a more routine consideration alongside maximising the potential of wind energy".</i></p>
Impact on Wildlife & Habitat, Ecosystems & Biodiversity	<p><i>"Wind turbine developments have the capacity to have both positive and negative effects on the wildlife, habitats, ecosystems and biodiversity of an area".</i></p> <p>With regard to the former, renewable energy generation counteracts climate change while wind farm developments offer opportunities to introduce environmental enhancement through land management, land restoration and habitat creation.</p> <p>Conversely, there is also potential for negative environmental effects, including: loss of or damage to valuable habitat; risk of collision, displacement or disturbance to bird and bat species; and impacts on designated sites and protected species, even from a distance. Notwithstanding, <i>"there is scope for mitigation in the location of wind turbines, construction techniques, design measures and management".</i></p>
Impact on Communities	<p>As a general rule, turbines should be sited ten rotor diameters from the nearest properties so as to avoid shadow flicker.</p> <p>With regard to noise, the Sheet refers the reader to other documents that provide a framework for the measurement of wind farm noise, including acceptable indicative noise levels. One of the cited reports concludes that <i>"there is no evidence of health effects arising from infrasound or low frequency noise generated by wind turbines".</i></p>
Separation Distances	<p>SPP currently refers to a guideline separation of up to 2km (current proposals are to increase this to 2.5km) between wind farm areas of search and the edge of settlements, to reduce visual impact. However, <i>"this 2km separation distance is a guide not a rule and decisions on individual developments should take into account specific local circumstances and geography".</i> Furthermore, there is no recommended distance between established and proposed groups of turbines.</p>
Aviation Matters	<p>It is essential that the safety of UK aerodromes, aircraft and airspace is not adversely affected by new wind energy infrastructure. Developers and planning authorities are therefore required to consult with the relevant aviation and communication authorities.</p>
Military Aviation & Other Defence Matters	<p>It is important that new wind energy infrastructure does not significantly impede or compromise the safe and effective use of any defence assets. Developers and planning authorities are therefore</p>

Subject	Comments
	required to engage with the Ministry of Defence in relation to wind farm proposals.
Impact on the Historic Environment	The Sheet notes that Scottish Ministers policies for the protection of the historic environment are outlined in SPP, SHEP and PAN 2/2011. Historic Scotland's guidance on setting explains how the impact of change can be assessed and mitigated. <i>"Wind farm developments have the potential for direct and/or indirect impacts by virtue of the location of turbines and ancillary development, or changes to groundwater levels or surface water patterns, which may affect archaeological deposits. Developments can be designed to avoid or minimise such impacts"</i> .
Impact on Road Traffic	In siting turbines close to main roads, pre-application discussions with Transport Scotland are recommended. This is particularly important for the movement of large components (abnormal load routing) during construction, periodic maintenance and decommissioning. Driver distraction may also be a consideration during the operational phase.
Cumulative Impact	In assessing cumulative landscape and visual impacts, the scale and pattern of the turbines as well as access tracks, power lines and ancillary development will be relevant considerations. Consistent with advice published by Scottish Natural Heritage, <i>"it will also be necessary to consider the significance of the landscape and the views, proximity and inter-visibility and the sensitivity of visual receptors"</i> . The issue of cumulative impact on Ministry of Defence operations and facilities also needs to be considered. In this respect, it cannot be assumed that the MoD can continue to meet its current operational requirements in cases where there is a further proliferation of turbines.
Good Practice During Construction	Developers are encouraged to appoint Ecological Clerks of Works to ensure that agreed methodologies are followed after planning approval.
Decommissioning	Planning authorities are instructed to <i>"ensure via conditions and/or legal agreement that site restoration takes place either on the expiry of the consent or in the event of the project ceasing to operate for a specified period"</i> .

**Table 5: Summary of Specific Advice Sheet**

### 3.5. Regional and Local Planning Policy

Planning legislation clearly states that development proposals are to be determined in accordance with the 'development plan' unless 'material considerations' indicate otherwise. With regard to this site, the current 'development plan' comprises the approved TAYplan Strategic Development Plan 2012-2032 and the Angus Local Plan 2009.

#### 3.5.1. TAYplan Strategic Development Plan 2012-2032

The TAYplan Strategic Development Plan has replaced the Dundee and Angus Structure Plan (2009). The plan provides a broad-brush direction for the next 20 years about where new development and infrastructure should take place. The current Strategic Development Plan was approved in June 2012 and the Plan is constantly reviewed. The four Local Authorities in the TAYplan area (including Angus) have their own Local Development Plan which identifies the detail of what development should take place for the next ten years and they must reflect the TAYplan strategy.

The plan recognises *"opportunities to grow the renewable energy sector as a whole within the TAYplan region. The issue is no longer about whether such facilities are needed but instead about helping to ensure they are delivered in the most appropriate locations"*.

TAYplan is underpinned by three principles:

- Supporting sustainable economic development and improving regional image and distinctiveness;
- Enhancing the quality of place through better development outcomes; and
- Ensuring effective resource management and promoting an accessible, connected and networked region.

The main strategic policy relating to wind energy is Policy 6: Energy & Waste/Resource Management Infrastructure. The key elements of this policy, insofar as they relate to small to medium scale wind energy proposals, are summarised in Table 6 below:

<b>Policy 6: Energy &amp; Waste/Resource Management Infrastructure</b>
<p><i>"Local Development Plans should identify areas that are suitable for different forms of renewable heat and electricity infrastructure and for waste/resource management infrastructure or criteria to support this; including, where appropriate, land for process industries (e.g. the co-location/proximity of surplus heat producers with heat users)."</i></p> <p><i>"Local Development Plans and development proposals should ensure that all areas of search, allocated sites, routes and decisions on development proposals for energy and waste/resource management infrastructure have been justified, at a minimum, on the basis of these considerations (inter alia):</i></p> <ul style="list-style-type: none"> <li>• <i>The specific land take requirements associated with the infrastructure technology and associated statutory safety exclusion zones where appropriate;</i></li> <li>• <i>Proximity of resources (e.g. woodland, wind or waste material); and to users/customers, grid connections and distribution networks for the heat, power or physical materials and waste products, where appropriate;</i></li> <li>• <i>Anticipated effects of construction and operation on air quality, emissions, noise, odour, surface and ground water pollution, drainage, waste disposal, radar installations and flight paths, and, of nuisance impacts on off-site properties;</i></li> <li>• <i>Sensitivity of landscapes (informed by landscape character assessments and other work), the water environment, biodiversity, geo-diversity, habitats, tourism, recreational access and listed/scheduled buildings and structures;</i></li> <li>• <i>Cumulative impacts of the scale and massing of multiple developments, including existing infrastructure; and</i></li> <li>• <i>Consistency with the National Planning Framework and its Action Programme."</i></li> </ul>

**Table 6: TAYplan Policy 6**

Other relevant policies include:

- Policy 2: Shaping Better Quality Places;
- Policy 3: Managing TAYplan's Assets; and
- Policy 8: Delivering the Strategic Development Plan.

### **3.5.2. Angus Local Plan (2009)**

This document sets out the detailed guidance for new development in Angus from 2009. It conforms to the Dundee and Angus Structure Plan (now superseded by TAYplan), which sets out the broader guidance for new development in both Angus and Dundee up to the end of 2015.

The development strategy of the Local Plan sets the background within which the various policies and proposals of the plan provide for the sustainable development of Angus. Relevant points within this strategy are:

- *"Provide opportunities for diversification of the rural economy;*
- *Maintain and protect the diversity and quality of the rural area and encourage local development which supports the population and services of local communities;*
- *Support the protection and enhancement of the countryside; and*
- *Maintain the quality of valued landscapes; the natural, built and historic environment, and biodiversity".*

With regard to planning policy that is relevant to this development, Local Plan Policy **ER34** relates to renewable energy developments and is provided below:

*"Proposals for all forms of renewable energy development will be supported in principle and will be assessed against the following criteria:*

- a) *The siting and appearance of apparatus have been chosen to minimise the impact on amenity, while respecting operational efficiency;*
- b) *There will be no unacceptable adverse landscape and visual impacts having regard to landscape character, setting within the immediate and wider landscape, and sensitive viewpoints;*
- c) *The development will have no unacceptable detrimental effect on any sites designated for natural heritage, scientific, historic or archaeological reasons;*
- d) *No unacceptable environmental effects of transmission lines, within and beyond the site; and*
- e) *Access for construction and maintenance traffic can be achieved without compromising road safety or causing unacceptable permanent and significant change to the environment and landscape."*

Policy **ER35** deals directly with wind energy development:

*"Wind energy developments must meet the requirements of Policy ER34 and also demonstrate:*

- a) *The reasons for site selection;*
- b) *That no wind turbines will cause unacceptable interference to birds, especially those that have statutory protection and are susceptible to disturbance, displacement or collision;*
- c) *There is no unacceptable detrimental effect on residential amenity, existing land uses or road safety by reason of shadow flicker, noise or reflected light;*
- d) *That no wind turbines will interfere with authorised aircraft activity;*
- e) *That no electromagnetic disturbance is likely to be caused by the proposal to any existing transmitting or receiving system, or (where such disturbances may be caused) that measures will be taken to minimise or remedy any such interference;*
- f) *That the proposal must be capable of co-existing with other existing or permitted wind energy developments in terms of cumulative impact particularly on visual amenity and landscape, including impacts from development in neighbouring local authority areas; and*
- g) *A realistic means of achieving the removal of any apparatus when redundant and the restoration of the site are proposed."*

Table 7 below provides the other policies in the local plan document that are particularly relevant to this development.

<p><b>Policy S1: Development boundaries</b></p> <p><i>"Development proposals on sites outwith development boundaries (i.e. in the countryside) will generally be supported where they are of a scale and nature appropriate to the location and where they are in accordance with the relevant policies of the Local Plan."</i></p>
<p><b>Policy S5: Safeguard Areas</b></p> <p><i>"Planning permission for development within the consultation zones of notifiable installations, pipelines or hazards will only be granted where the proposal accords with the strategy and policies of this Local Plan and there is no objection by the Health &amp; Safety Executive, Civil Aviation Authority or other relevant statutory agency."</i></p>
<p><b>Policy S6: Development Principles</b></p> <p><i>"Proposals for development should where appropriate have regard to the relevant principles set out in Schedule 1 which includes reference to amenity considerations; roads and parking; landscaping, open space and biodiversity; drainage and flood risk, and supporting information."</i></p>
<p><b>Policy ER1: Natura 2000 and Ramsar Sites</b></p> <p><i>"Development likely to have a significant effect on a designated, candidate or proposed Natura 2000 site (Special Protection Areas and Special Areas of Conservation), or Ramsar site and not connected with or necessary to the conservation management of the site must undergo an appropriate assessment as required by Regulation 48 of the Conservation (Natural Habitats etc.) Regulations 1994. Development will only be permitted exceptionally and where the assessment indicates that:</i></p> <ul style="list-style-type: none"> <li><i>a) it will not adversely affect the integrity of the site; or</i></li> <li><i>b) there are no alternative solutions; and</i></li> <li><i>c) there are imperative reasons of overriding public interest, including those of a social or economic nature.</i></li> </ul> <p><i>Where proposals affect a priority habitat and/or priority species as defined by the Habitats Directive (92/43/EEC), the only overriding public interest must relate to human health, public safety or beneficial consequences of primary importance to the environment. Other allowable exceptions are subject to the views of the European Commission."</i></p>
<p><b>Policy ER4: Wider natural heritage and biodiversity</b></p> <p><i>"The Council will not normally grant planning permission for development that would have a significant adverse impact on species or habitats protected under British or European Law, identified as a priority in UK or Local Biodiversity Action Plans or on other valuable habitats or species.</i></p> <p><i>Development proposals that affect such species or habitats will be required to include evidence that an assessment of nature conservation interest has been taken into account. Where development is permitted, the retention and enhancement of natural heritage and biodiversity will be secured through appropriate planning conditions or the use of Section 75 Agreements as necessary."</i></p>
<p><b>Policy ER5: Conservation of Landscape Character</b></p> <p><i>"Development proposals should take account of the guidance provided by the Tayside Landscape Character Assessment and where appropriate will be considered against the following criteria:</i></p> <ul style="list-style-type: none"> <li><i>d) Sites selected should be capable of absorbing the proposed development to ensure that it fits into the landscape;</i></li> <li><i>e) Where required, landscape mitigation measures should be in character with, or enhance, the existing landscape setting;</i></li> <li><i>f) New buildings/structures should respect the pattern, scale, siting, form, design, colour and density of existing development; and</i></li> <li><i>g) Priority should be given to locating new development in towns, villages or building groups in preference to isolated development."</i></li> </ul>



<p><b>Policy ER11: Noise Pollution</b></p> <p><i>"Development which adversely affects health, the natural or built environment or general amenity as a result of an unacceptable increase in noise levels will not be permitted unless there is an overriding need which cannot be accommodated elsewhere.</i></p> <p><i>Proposals for development generating unacceptable noise levels will not generally be permitted adjacent to existing or proposed noise sensitive land uses. Proposals for new noise-sensitive development which would be subject to unacceptable levels of noise from an existing noise source or from a proposed use will not be permitted."</i></p>
<p><b>Policy ER16: Development Affecting the Setting of a Listed Building</b></p> <p><i>"Development proposals will only be permitted where they do not adversely affect the setting of a listed building. New development should avoid building in front of important elevations, felling mature trees and breaching boundary walls."</i></p>
<p><b>Policy ER18: Archaeological Sites of National Importance</b></p> <p><i>"Priority will be given to preserving Scheduled Ancient Monuments in situ. Developments affecting Scheduled Ancient Monuments and other nationally significant archaeological sites and historic landscapes and their settings will only be permitted where it can be adequately demonstrated that either:</i></p> <ul style="list-style-type: none"> <li><i>a) the proposed development will not result in damage to the scheduled monument or site of national archaeological interest or the integrity of its setting; or</i></li> <li><i>b) there is overriding and proven public interest to be gained from the proposed development that outweighs the national significance attached to the preservation of the monument or archaeological importance of the site. In the case of Scheduled Ancient Monuments, the development must be in the national interest in order to outweigh the national importance attached to their preservation; and</i></li> <li><i>c) the need for the development cannot reasonably be met in other less archaeologically damaging locations or by reasonable alternative means; and</i></li> <li><i>d) the proposal has been sited and designed to minimise damage to the archaeological remains.</i></li> </ul> <p><i>Where development is considered acceptable and preservation of the site in its original location is not possible, the excavation and recording of the site will be required in advance of development, at the developer's expense."</i></p>
<p><b>Policy ER19: Archaeological Sites of Local Importance</b></p> <p><i>"Where development proposals affect unscheduled sites of known or suspected archaeological interest, Angus Council will require the prospective developer to arrange for an archaeological evaluation to determine the importance of the site, its sensitivity to development and the most appropriate means for preserving or recording any archaeological information. The evaluation will be taken into account when determining whether planning permission should be granted with or without conditions or refused.</i></p> <p><i>Where development is generally acceptable and preservation of archaeological features in situ is not feasible Angus Council will require through appropriate conditions attached to planning consents or through a Section 75 Agreement that provision is made at the developer's expense for the excavation and recording of threatened features prior to development commencing."</i></p>
<p><b>Policy ER20: Gardens and Designed Landscapes</b></p> <p><i>"Sites included in the "Inventory of Gardens and Designed Landscapes in Scotland", and any others that may be identified during the plan period, will be protected from development that adversely affects their character, amenity value and historic importance. Development proposals will only be permitted where it can be demonstrated that:</i></p> <ul style="list-style-type: none"> <li><i>a) The proposal will not significantly damage the essential characteristics of the garden and designed landscape or its setting; or</i></li> <li><i>b) There is a proven public interest, in allowing the development, which cannot be met in other less damaging locations or by reasonable alternative means. Protection will also be given to non-inventory historic gardens, surviving features of designed landscapes, and parks of regional or local importance, including their setting."</i></li> </ul>

**Policy ER29: Agricultural Land**

*"Proposals for development that would result in the permanent loss of prime quality agricultural land and/or have a detrimental effect on the viability of farming units will only normally be permitted where the land is allocated by this Local Plan or considered essential for implementation of the Local Plan strategy."*

**Table 7: Relevant policies of the Angus Local Plan relating to the development**

These individual policies are discussed further in this document.

**3.5.3. Angus Council Implementation Guide for Renewable Energy Proposals (June 2012)**

The Angus Local Plan Review establishes the Development Plan policies to be taken into account when assessing proposals for renewable energy projects: Policies ER34: Renewable Energy Development; and ER35: Wind Energy Development. In support of the development plan position the Implementation Guide provides:

- More detailed information and clarification of the main factors that will be taken into account in considering and determining renewable energy proposals in Angus;
- An application checklist;
- Specific guidance for landscape and visual assessment issues in relation to wind turbines; and
- Specific guidance for guidance on noise assessment in relation to wind turbines.

The proposed development lies within the Igneous Hills landscape type (LT) and the guidance which relates to a suitable turbine blade tip for this LT states that it is *"considered to have scope for turbines circa 80m in height which do not disrupt the principle ridgelines or adversely affect the setting of important landscape features monuments such as Kinpurney Monument and Auchterhouse hillfort"*.

The landscape advice and wider guidance has been taken into account while assessing the various technical and environmental considerations of the development, particularly with regards to the landscape and visual impact assessment.

**3.5.4. Angus Windfarms Landscape Capacity and Cumulative Impacts Study (2008)**

Angus Council appointed a landscape architect in 2008 to assess the potential for cumulative landscape and visual impacts of proposed wind developments within Angus. As part of this study, the landscape was assessed on its ability to accept change without significant or unacceptable effect on its character. The landscape in which the Ingliston Farm turbine will be located is described as Igneous Hills. The landscape capacity for this area is described as follows:

*"This area of prominent lowland hills clearly separates Dundee and the Dipslope Farmland in the south from the Broad Valley Lowland of Strathmore in the north. Extending west into Perthshire it is a considerably more extensive and higher hill area than the Low Moorland Hills to the east. The hills are of medium landscape character sensitivity. Being of medium scale and fairly complex topography they are clearly farmed and managed with only the upper slopes and hilltops open pasture or heather moor, and the small glens enclosed and populated with small scale settlements and farms connected by a network of roads and tracks. There are a number of large communications masts on the highest hills and power lines cross in some locations. Visually the area is of medium sensitivity, varying from being enclosed with short*



*distance views and a low population within, to being a prominent backdrop to Strathmore and Dundee when seen from without. Overall the landscape is of medium sensitivity.*

*There are no landscape designations but a number of footpaths, viewpoints and small fishing lochs as well as hillforts, scattered dwellings and settlements giving this area a medium landscape value. Overall the Sidlaw Hills have a medium capacity for development. The scale and type of landscape suggests that careful siting of windfarms of a medium to small scale only would be appropriate."*

This study will be discussed further within the Landscape and Visual Impact Assessment chapter of this document.

## **4. Work to Date**

This chapter provides a summary of the works completed to date relating to wind energy development.

### **4.1. Requirement for Environmental Assessment**

Under the Town and Country planning act (Scotland) 1997, planned developments above a certain scale or activity require consent from the Local Planning Authority (LPA). For more significant developments this may require the inclusion of supporting Environmental documentation to address the full extent, and potential mitigation, of those environmental impacts considered by the LPA to be relevant to the project.

Major planned developments are normally required to complete a full Environmental Impact Assessment (EIA), a systematic process of quantifying those environmental concerns related to the proposed project. The most relevant and up to date document outlining the requirement for an EIA is the Environmental Impact Assessment (Scotland) Regulations 1999.

An EIA must be carried out if the particular development is likely to give rise to significant environmental effects. A written request for a screening opinion was made to Angus Council on 20<sup>th</sup> June 2013 outlining details of the proposal (location, scale, location map). The response stated that the proposed development was not considered to require an EIA<sup>8</sup>.

The response did however recommend the following topics be addressed as part of the planning application:

- Relevant planning policy;
- Site selection and description of project;
- Landscape and visual assessment;
- Cumulative visual assessment;
- Noise assessment;
- Ecological assessment;
- Pollution prevention measures;
- Transportation and access;
- Cultural Heritage; and
- Electromagnetic interference/air traffic safety.

### **4.2. Initial Development & Screening Work**

A number of different site layouts were considered during the development process. Various constraints to the development were identified and examined in detail. Location of water courses, houses, telecommunication links, ecologically sensitive areas, noise sensitive areas, archaeological sites and visually sensitive areas were noted. Using Geographical Information Systems (GIS) software, separation distances were applied to these constraints. Different sizes of turbine were examined, relating both to height, generating capacity and noise impact. An

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<sup>8</sup>Response from Neil Duthie, 29/07/13

initial constraints map was produced for the site and is shown in Figure 8 below. Buffers have been included for the land ownership boundary (blue, buffered by 1.1 x blade length to avoid oversail onto third party land), residential (green, buffered to 500m for non-financially involved properties and yellow, buffered to 400m for financially involved properties), overhead lines (purple, buffered to 1.5 x tip height) and roads (orange, buffered to 1.1 x tip height).



**Figure 8: Initial constraints map**

Following further assessment of other development constraints (e.g. noise, shadow flicker, visual impacts etc), it was considered that the proposed EWT Directwind wind turbine of 77m tip height would be a suitable turbine model for the Ingliston Farm site.

There are areas to the north of the proposed development site, which are on lower ground and also lie outwith any development buffers. However, a development in any of these locations would not be viable as the summit at Castleward (273m AGL), to the south of the proposed turbine location, will inhibit laminar airflow from the predominant southerly and south westerly directions. The turbulence created by this obstacle will cause unacceptable wear on the generator, and the resultant drop in wind speed will render the project unfeasible. As such, these alternative locations were ruled out at an early stage in the project's development.

#### **4.2.1. Other Consultation**

Other stakeholders were contacted as part of the screening study. An overview of the responses received are provided in Table 8 below.

Consultee	Comments	Further work required
Historic Scotland	No objection to the proposed development in principle, but would expect certain aspects to be assessed.	Assessment of cultural heritage assets in the area. This is provided in Chapter 8 of this document.
Scottish Natural Heritage (SNH)	No specific comments to make on the proposal. Wildfowl and Wetland Trust (WWT) goose data held by SNH indicate that land immediately around the proposed turbine does not form part of the preferred foraging areas for pink-footed or greylag geese and as a result VP surveys are not essential in this instance.	Ecology survey carried out by EnviroCentre Ltd. Full report provided within the appendices of this document.
Telecommunication link operators, including Ofcom, Atkins and Joint Radio Company (JRC)	No telecommunications will be affected by the proposal.	No further assessment necessary.

**Table 8: Other pre-application consultee responses received**

The above points and general requirements discussed in the screening stage have informed the environmental assessment and ultimately the final design of the development. Pre planning consultation has been carried out where possible however, due to the level of pre-application queries received, some statutory consultees state they are unable to provide a response (e.g. MOD, NATS) and in these situations Locogen's experience has been utilised to assess the potential for impact.

## **5. Landscape & Visual**

### **5.1. Introduction**

Locogen commissioned a chartered landscape architect (Douglas Harman CMLI) to undertake a Landscape and Visual Impact Assessment (LVIA) of the proposed development. Based on a 25km study area, it identifies the baseline against which the effects of the proposed development are assessed and concentrates on predicting the likely effects during the operational phase. The scheme design, including any mitigation measures incorporated to minimise adverse effects, is informed by the findings of the baseline study.

Effects on features identified as important to the landscape quality and effects on the landscape character of the site and its setting are assessed. Although interrelated, effects on views of the site and its setting and visual amenity, are assessed separately.

Landscape effects are on the fabric, character and quality of the landscape and are concerned with:

- Landscape elements;
- Landscape character – regional and local distinctiveness; and
- Special interests e.g. designations, conservation sites, cultural associations.

Visual effects on people are concerned with the changes in available views through intrusion or obstruction and whether important opportunities to enjoy views may be improved or reduced.

The objectives of the assessment are to:

- Describe and evaluate the landscape and visual amenity of the site and surrounding area which may be affected by the proposed development;
- Identify and assess the significance of any effects on landscape or visual amenity, associated with the design, operation and reinstatement of the proposed development;
- Identify mitigation measures which will be implemented in order to avoid, reduce or remedy adverse effects; and
- Describe any enhancements of the landscape or visual amenity incorporated into the proposals.

The findings of the LVIA are presented in the following sections:

#### **5.1.1. Baseline Assessment**

- Planning policy context: a summary of the regional and local landscape related planning policies relevant to the proposed development;
- Baseline description: a description of the landscape and visual resource of the study area conducted through desk study and site survey; and
- Design optimisation and mitigation strategy: a summary of the design process in response to landscape and visual issues.

#### **5.1.2. Impact Assessment**

- Viewpoint assessment: a detailed assessment of landscape and visual effects at a selection of representative viewpoints;
- Landscape effects: assessment of the potential residual effects upon the landscape resource, landscape character areas and designated landscapes;

- Visual effects: assessment of potential residual effects on people of the changes in available views through intrusion or obstruction and whether important opportunities to enjoy views may be improved or reduced;
- Cumulative landscape and visual effects: assessment of the potential residual effects arising from the proposed development in conjunction with built/consented wind farms within the study area and those at planning application stage; and
- Summary and Conclusions.

### **5.1.3. Appended Methodology**

A description of the methods and associated guidance used to inform the assessment process is provided in Appendix A, at the end of this Supporting Environmental Document.

### **5.1.4. Summary of proposed development**

The proposed development will consist of the following elements (a detailed description of the proposed development can be found in Chapter 2 of this Supporting Environmental Document:

- Wind turbine – the proposed turbine is 50m to hub height, has a blade diameter of 54m and is 77m to blade tip;
- Foundation – a foundation with expected dimensions of 13m x 13m. Once constructed this structure will be backfilled so that only the tower base and pedestal will be visible;
- Transformer kiosk – it is proposed that a turbine transformer is either located within the base of the tower (preferred option) or alternatively in a small kiosk located next to the base of the tower with the necessary switchgear and protection equipment;
- Sub-station building – a substation building will be located near the base of the turbine. The approximate dimensions of the building will be 10.3m x 3m and 3.15m in height. This can be painted the most unobtrusive colour that conforms to its surroundings. Typical colours are grey, green or brown. A suitable structure will be confirmed with Scottish and Southern Energy prior to construction;
- Access road – the construction of a dedicated access road to the proposed wind turbine totalling approximately 2.1km in length, 730m of which would require an upgrade of an existing track;
- Construction compound – the construction of a temporary hardstanding area for the assembly of the crane and rotor. This would measure an approximate area of 20m x 35m with an adjacent area for lay down of turbine components;
- A borrow pit – measuring 92m x 44m x 0.7m deep. This will be re-instated to permanent grassland up to the edge of the hardstanding, access track, foundation and substation kiosk, after construction. The hardstanding, foundation, substation kiosk and part of the access track will all be included within the proposed boundary of the borrow pit; and
- Underground cable – an 11kV cable connecting the turbine to a suitable grid connection point will be undergrounded to minimise visual impacts.

## **5.2. Planning Policy context**

The development plans relevant to this application are the TAYplan Strategic Development Plan (2012) and the Angus Local Plan Review (2009). The adopted policies of the planning authority relevant to landscape are listed in Sections 5.2.1 to 5.2.2 and Section 5.2.3 summarises the '*Implementation Guide for Renewable Energy Proposals*' (2012) which explains and clarifies the existing Angus Local Plan Review policy base.

### 5.2.1. TAYplan Strategic Development Plan (2012)

The Tayplan Strategic Development Plan has replaced the Dundee and Angus Structure Plan (2009). The plan provides a broad-brush direction for the next 20 years about where new development and infrastructure should take place. The current Strategic Development Plan was approved in June 2012 and the Plan is constantly reviewed. The four Local Authorities in the TAYplan area (including Angus) have their own Local Development Plan which identifies the detail of what development should take place for the next ten years and they must reflect the TAYplan strategy.

The plan recognises '*opportunities to grow the renewable energy sector as a whole within the TAYplan region. The issue is no longer about whether such facilities are needed but instead about helping to ensure they are delivered in the most appropriate locations*'.

The TAYplan Plan does not provide the locations for energy infrastructure; this role is for Local Development Plans. It is the role of this Plan to ensure consistency between Local Development Plans in fulfilling Scottish Planning Policy requirements to define areas of search for renewable energy infrastructure. As part of this, the following policy is relevant to this application:

#### **Policy 6: Energy and Waste/Resource Management Infrastructure**

*"A - Local Development Plans should identify areas that are suitable for different forms of renewable heat and electricity infrastructure...."*

*"C - Local Development Plans and development proposals should ensure that all areas of search, allocated sites, routes and decisions on development proposals for energy and waste/resource management infrastructure have been justified, at a minimum, on the basis of these considerations:*

- *The specific land take requirements associated with the infrastructure technology and associated statutory safety exclusion zones where appropriate;*
- *Waste/resource management proposals are justified against the Scottish Government's Zero Waste Plan and support the delivery of the waste/resource management hierarchy;*
- *Proximity of resources (e.g. woodland, wind or waste material); and to users/customers, grid connections and distribution networks for the heat, power or physical materials and waste products, where appropriate;*
- *Anticipated effects of construction and operation on air quality, emissions, noise, odour, surface and ground water pollution, drainage, waste disposal, radar installations and flight paths, and, of nuisance impacts on off-site properties;*
- *Sensitivity of landscapes (informed by landscape character assessments and other work), the water environment, biodiversity, geo-diversity, habitats, tourism, recreational access and listed/scheduled buildings and structures;*
- *Impacts of associated new grid connections and distribution or access infrastructure;*
- *Cumulative impacts of the scale and massing of multiple developments, including existing infrastructure;*
- *Impacts upon neighbouring planning authorities (both within and outwith TAYplan); and,*
- *Consistency with the National Planning Framework and its Action Programme."*



### **5.2.2. Angus Local Plan Review (2009)**

In delivering strategic policy, the following policies within the Angus Local Plan are key considerations in assessing the acceptability of the proposed development in landscape terms:

#### **Policy ER5: Conservation of Landscape Character**

*"Development proposals should take account of the guidance provided by the Tayside Landscape Character Assessment and where appropriate will be considered against the following criteria:*

- (a) sites selected should be capable of absorbing the proposed development to ensure that it fits into the landscape;*
- (b) where required, landscape mitigation measures should be in character with, or enhance, the existing landscape setting;*
- (c) new buildings/structures should respect the pattern, scale, siting, form, design, colour and density of existing development;*
- (d) priority should be given to locating new development in towns, villages or building groups in preference to isolated development."*

#### **Policy ER20: Historic Gardens and Designed Landscapes**

*"Sites included in the "Inventory of Gardens and Designed Landscapes in Scotland", and any others that may be identified during the plan period, will be protected from development that adversely affects their character, amenity value and historic importance. Development proposals will only be permitted where it can be demonstrated that:*

- (a) the proposal will not significantly damage the essential characteristics of the garden and designed landscape or its setting; or*
- (b) there is a proven public interest, in allowing the development, which cannot be met in other less damaging locations or by reasonable alternative means.*

*Protection will also be given to non-inventory historic gardens, surviving features of designed landscapes, and parks of regional or local importance, including their setting."*

#### **Policy ER34: Renewable Energy Developments**

*"Proposals for all forms of renewable energy development will be supported in principle and will be assessed against the following criteria:*

- (a) the siting and appearance of apparatus have been chosen to minimise the impact on amenity, while respecting operational efficiency;*
- (b) there will be no unacceptable adverse landscape and visual impacts having regard to landscape character, setting within the immediate and wider landscape, and sensitive viewpoints;*
- (c) the development will have no unacceptable detrimental effect on any sites designated for natural heritage, scientific, historic or archaeological reasons;*
- (d) no unacceptable environmental effects of transmission lines, within and beyond the site; and*
- (e) access for construction and maintenance traffic can be achieved without compromising road safety or causing unacceptable permanent and significant change to the environment and landscape."*



**Policy ER35: Wind Energy Development**

"Wind energy developments must meet the requirements of

Policy ER34 and also demonstrate:

- (a) the reasons for site selection;
- (b) that no wind turbines will cause unacceptable interference to birds, especially those that have statutory protection and are susceptible to disturbance, displacement or collision;
- (c) there is no unacceptable detrimental effect on residential amenity, existing land uses or road safety by reason of shadow flicker, noise or reflected light;
- (d) that no wind turbines will interfere with authorised aircraft activity;
- (e) that no electromagnetic disturbance is likely to be caused by the proposal to any existing transmitting or receiving system, or (where such disturbances may be caused) that measures will be taken to minimise or remedy any such interference;
- (f) that the proposal must be capable of co-existing with other existing or permitted wind energy developments in terms of cumulative impact particularly on visual amenity and landscape, including impacts from development in neighbouring local authority areas;
- (g) a realistic means of achieving the removal of any apparatus when redundant and the restoration of the site are proposed."

**5.2.3. The 'Implementation Guide for Renewable Energy Proposals' (2012)**

The 'Implementation Guide for Renewable Energy Proposals' (2012) explains and clarifies the existing Angus Local Plan Review policy base that will be used by Angus Council in determining renewable energy planning applications. It has been prepared to support the Angus Local Plan Review (adopted 2009) Policies ER34: *Renewable Energy Developments* and ER35: *Wind Energy Development*. This incorporates the findings of the 'Landscape Capacity and Cumulative Impacts Study' (2008), a strategic level study providing a context for the consideration of the cumulative effects of existing and potential future windfarm developments.

The guide develops a classification of landscape types and identifies 'Levels of Acceptable Landscape Character Change'. Outwith development boundaries, it is considered that there is scope for turbines to be accommodated in some landscapes. The guide heights are extrapolated from sources including the Tayside Landscape Character Assessment, the Landscape Capacity and Cumulative Impacts Study, Reporters findings from planning appeals, responses from statutory consultees and reflect the particular scale and landscape of Angus.

For the *Igneous Hills* Landscape Character Type (LCT) in which the site of the proposed development is located, this states:

- Existing Windfarm Character: "Landscape with Views of Windfarms";
- Acceptable Future Windfarm Character: "Landscape with Occasional Windfarms"; and
- Guidance: "Considered to have scope for turbines circa 80 m in height which do not disrupt the principle ridgelines or adversely affect the setting of important landscape features monuments such as Kinpurney Monument and Auchterhouse hillfort."

The guidance also states:

*"The relative height and style of turbine (e.g. tower construction, number of blades, blade length) should increasingly reflect those already consented to promoted a harmonious development pattern."*

The application of this guidance to the design of the proposed development is discussed in Section 5.4.

#### **5.2.4. Summary of policy context**

In summary, development plan policy is generally supportive of wind energy development. This is subject to specific developments avoiding unacceptable landscape and visual impacts and with limitations on the cumulative impact of more than one development within Angus or in neighbouring local authority areas. The *Tayside Landscape Character Assessment* (SNH 1999) is the basis for describing landscape character and the '*Implementation Guide for Renewable Energy Proposals*' (2012) provides guidance for the assessment of the development proposals. This states that the *Igneous Hills* LCT in which the proposed development is located is '*considered to have scope for turbines circa 80 m in height*'.

At a strategic level therefore, the proposed development is acceptable in landscape policy terms notwithstanding any significant adverse effects identified in this Landscape & Visual Impact Assessment and the associated application of Local Plan Policy criteria.

Further guidance on the capacity of the Angus landscape to accommodate a range of wind energy developments is set out in the '*Landscape Capacity and Cumulative Impacts Study*' (2008). A summary of this in relation to the proposed development is set out in Section 5.3.4 of this report.

### **5.3. Baseline description**

The baseline description establishes the existing landscape and visual resource against which the effects of the proposed development are predicted. It describes the site and its setting and examines the existing landscape designations and landscapes character types within the study area and their associated sensitivity to wind energy development. Visual receptors including settlements, road and rail users, users of recreational routes and their associated sensitivity are also identified along with an overview of the landscape and visual receptors to be assessed at the representative viewpoints.

#### **5.3.1. The site and surrounding landscape**

The site of the proposed development is located on Ingliston Farm, situated within the northern fringes of the Sidlaw Hills in Angus (see Figure ING001). The village of Balkeerie is located immediately to the west of the land ownership boundary with Dundee approximately 10km to the south, Forfar 11km to the north-east and Coupar Angus 12km to the south-west.

The proposed turbine location is on the northern slopes of Ingliston Hill at approximately 232m AOD and to the north of Balkeerie Hill, which rises to a height of 273m AOD. The site comprises of several medium to large sloping pastoral fields with boundaries defined by post and wire fences with stone walls along a local road which dissects the site on lower ground towards the northern part of the site. There is a small disused quarry near to the proposed turbine location and one further north to the south of the local road. To the north of the local road, Ingliston Farmstead is located on lower ground to the north-east of Balkeerie. Within the immediate surroundings, the landscape is very open in character apart from Ingliston Wood, which forms part of the eastern boundary to the site.

The surrounding landscape to the south exhibits a large scale, open character with coniferous forestry plantations and woodland, a dispersed settlement pattern and intrusive influences including power lines, pylons, communication masts and existing wind energy development

including Ark Hill Wind Farm, located approximately 2km to the south of the site. Kinpurnie Tower, located on Kinpurney Hill forms an important landmark feature approximately 3.3km to the south-west of the site. There are also a number of hillforts occupying prominent hilltop locations including Auchterhouse Hillfort, located approximately 4.6km to the south of the site.

To the north, the site overlooks the extensive low lying broad Vale of Strathmore. This contains some of the best agricultural land in Scotland with a network of busy roads and a pattern of villages and small towns. Further north, the Grampians form a distant but important backdrop to the area.

From areas of higher ground across the site, views to the north and west are generally long range with shorter range views to the south and east, curtailed by rising ground and Ingliston Wood. Views towards to the site are limited to small areas of open hill tops and slopes to the south of the site. From the north, there are large areas along the Vale of Strathmore where the site is visible although a pattern of woodlands and the influence of large wooded estates provide a degree of local screening from many locations.

### **5.3.2. Landscape designations**

A very small part of the Cairngorms National Park is located within the study area, approximately 23km to the north of the site. Other landscape designations within the study area include Gardens and Designed Landscapes (GDLs), Local Landscape Designations and Country Parks (see Drawing ING006).

#### ***Gardens and Designed Landscapes***

There are nineteen Gardens and Designed Landscape (GDLs) within the study area, seven of which are within 15km from the proposed development. Due to their national importance, GDLs are assessed as having a *high* sensitivity to change.

#### ***Local Landscape Designations***

There are parts of two Local Landscape Designations (part of an Area of Great Landscape Value to the east of Perth and the Tay Coast Special Landscape Area in Fife) within the study area. Both of these designations are located over 15km of the proposed development and due to their regional importance, they are considered as having a *medium-high* sensitivity to change.

#### ***Country Parks***

There are also four Country Parks within the study area, two of which are within 15 km from the proposed development. As a local recreational designation, Country Parks are considered to be of *medium* sensitivity to change.

#### ***Summary of landscape designations within the study area***

For all landscape designations within 15km from the turbine location, a description and associated sensitivity are set out in Table 9. Outside of 15km, all other designations have been listed. A number of other features of cultural importance occur within the study area. These individual features are assessed in more detail in Chapter 8.

Landscape Designation	Description	Distance to turbine (km)	Sensitivity
<b>All designations within 15km</b>			
Glamis Castle GDL	Located within the broad vale of Strathmore, Glamis Castle designed landscape dates from the late 17 <sup>th</sup> century and is outstanding in almost every value category. The Castle is set in the low plain of the Dean Water and the land slopes gently north from the Sidlaw Hills in the south to the Castle and the Dean Water. There are magnificent views to the surrounding area from the parks and particularly from the roof of the Castle, the Grampian Mountains forming a magnificent backdrop to the north. The policy woodlands are particularly significant to the designed setting of the Castle. Views into the parks from the surrounding roads are limited by the woods and the high policy walls which form a significant scenic feature in themselves. The Castle is visible from the A928 to the west, and the farmed parks to the east are visible from the A94.	4.3	High
Drumkilbo GDL	A compact 19 <sup>th</sup> century landscape with 20 <sup>th</sup> century formal gardens. To the north there are panoramic views to the Grampian Mountains and, to the south, views to the Sidlaw Hills, both of which are important from within the site. The designed landscape of Drumkilbo is of some significance in the surrounding landscape due to the woodland canopy of the shelterbelts which enclose the gardens. The surrounding policy farmland is important to the setting of the designed landscape and particularly to views from the drive and the edge of the gardens.	4.5	High
Airlie Castle GDL	An outstanding 19 <sup>th</sup> century landscape on several counts: historically, architecturally and for nature conservation. The formal gardens are beautifully laid out and the whole composition of natural gorge and designed features is highly significant in the surrounding scenery. The Castle stands on the south-east side of the confluence of the River Isla and the Melgam Water both of which occupy deep gorges in the landscape. From the Castle, fine views are gained all around, in particular to the Grampians in the north and the flatter landscape of the Vale of Strathmore to the south. Views out from many areas in the woods and gardens are restricted. The woodlands along the gorges of the River Isla and Melgam Waters are the most significant scenic features.	7.8	High
Clatto	The park is located on the north-eastern fringes of Dundee and immediately to the north of	9.9	Medium

<b>Landscape Designation</b>	<b>Description</b>	<b>Distance to turbine (km)</b>	<b>Sensitivity</b>
Country Park	Camperdown and Templeton Woods Country Park. It is centred on a reservoir with woodlands along the northern, southern and western edges. Facilities at include a water sports centre, children's play areas, picnic and barbecue site.		
Camperdown and Templeton Woods Country Park	Camperdown Country Park is the largest public park in Dundee. With the stunning neo-classical Camperdown House as its centre-piece, the park covers an area of over 400 acres, and is home to no fewer than 190 species of trees. One of the most popular parks in Dundee, among locals and visitors alike, Camperdown is open all year round and offers a wide range of activities and events.	10.0	Medium
Forfar Loch Country Park	Forfar Loch Country Park situated on the west side of Forfar. With woodland, grassland and wetland habitats, the park is a haven for wildlife and visitors. Forfar Loch is circled by a 2.5 mile long trail which is part of the Forfar Path Network and the loch is important for a host of recreational activities.	11.0	Medium
Ascreavie GDL	Ascreavie is situated on the southern edge of the lower foothills of the Grampian Mountains overlooking the Vale of Strathmore. The gardens lie about 1.5km north of Kirkton of Kingoldrum off the B951, and some 6 km north of Kirriemuir. There are long views to the south and south-west across the valley. There are no significant views into the gardens. It is a mid-19 <sup>th</sup> century designed landscape of parkland, woodland clumps, specimen trees and shelter planting with, near the house, alpine gardens and woodland gardens.	12.4	High
Balgay Park GDL	Balgay Park dominates Dundee's cityscape, and it is an important park because it retains its original layout comprising not only walks for pedestrians but also rides and drives. Bounded on the north by Ancrum Road, there are panoramic views of the city of Dundee including Dundee Law and the Firth of Tay, and Camperdown Park.	13.9	High
Baxter Park GDL	Baxter Park is the only complete park wholly designed by Sir Joseph Paxton in Scotland. It is located east of the town centre of Dundee within an entirely urban setting. From Gallows Hill there is a glimpse of the former panoramic view over the Firth of Tay to Fife although trees have all but obscured this view.	14.2	High
Rossie Priory GDL	An outstanding designed landscape. The setting of the policies on the south-facing slope of Rossie Hill provides fine views out to the south across the	14.3	High

Landscape Designation	Description	Distance to turbine (km)	Sensitivity
	Firth of Tay to the Ochil and Lomond Hills in Fife. Features of the designed landscape, particularly the woods, are significant in the local landscape.		
<b>Designations within 15-25km</b>			
Cairngorms National Park	Fingask Castle GDL		
Cortachy Castle GDL	Megginch Castle GDL		
Craighall Rattray GDL	Errol Park GDL		
Meikleour GDL	The Guynd GDL		
Glendoick GDL	Tay Coast Special Landscape Area		
Naughton GDL	East Perth Area of Great Landscape Value		
Guthrie Castle GDL	Crombie County Park		
House of Pitmuies GDL	Monikie Country Park		
Stobhall GDL			

**Table 9: Landscape Designations**

### 5.3.3. Landscape character: the site and study area

The landscape character of the study area has been mapped and described using the following landscape character assessments (see Drawing ING009):

- Tayside Landscape Character Assessment (1999); and
- The Fife Landscape Character Assessment (1999).

The proposed turbine is located towards the northern fringes of Sidlaw Hills within the *Igneous Hills* landscape character type (LCT). The LCT is an elevated, large-scale landscape, with conical summits and unimproved grass and moorland, distinctive scarp, dipslopes, short glens, and areas of coniferous forestry in prominent geometric plantations and shelterbelts. The LCT also reflects a long history of settlement with burial mounds, medieval castles and mottes and other hill-forts and follies exploiting the natural defences of steep slopes. There are many modern influences with telecommunication masts at the summit of a number of hills, operational wind turbines, transmission lines and a number of existing and disused quarries.

There are a further seven LCTs within 15km and eleven LCTs within 15-25km. Table 10 identifies the key characteristics and features of each LCT and their associated sensitivity to wind energy for those within 15km of the proposed development and lists the LCTs from 15 to 25km.



Landscape Character Type	Landscape character & features	Sensitivity
<b>LCTs within 15km</b>		
Igneous Hills	<ul style="list-style-type: none"> <li>• The Sidlaw hills, comprising hard volcanic rocks</li> <li>• Short burns and rivers flowing from short steep glens</li> <li>• A few large glens through the hills</li> <li>• Often distinctive scrap and dip slopes</li> <li>• Generally open landscape of almost conical summits dominated by grass moorland</li> <li>• Some extensive areas of forestry</li> <li>• Many modern influences</li> </ul>	Medium
Broad Valley Lowland	<ul style="list-style-type: none"> <li>• Broad Straths formed by glacial erosion</li> <li>• Undersized, misfit rivers</li> <li>• Complex local topography caused by glacial deposition</li> <li>• Distinctive red soils and red building stone</li> <li>• Influence of large estates, particularly in terms of woodland and policies</li> <li>• Dominance of arable and root crops</li> <li>• Tree loss weakening landscape character</li> </ul>	Medium
Low Moorland Hills	<ul style="list-style-type: none"> <li>• Eastern outliers of the Sidlaws</li> <li>• Combination of low, rounded hills and craggy, ridged upland</li> <li>• Moorland character evident in areas of heather and gorse</li> <li>• Some areas of extensive woodland</li> <li>• Rich historic heritage</li> <li>• Scattered modern settlement</li> </ul>	Medium to high
Dipslope Farmland	<ul style="list-style-type: none"> <li>• Extensive area of land, generally sloping from the north-west to the south-east</li> <li>• dominated by productive agricultural land</li> <li>• Low woodland cover, except on large estates and along river corridors</li> <li>• Variety of historic sites</li> <li>• Dispersed settlement pattern, including some suburban development</li> <li>• Limited visual impact of Dundee and Arbroath</li> </ul>	Medium
Highland Foothills	<ul style="list-style-type: none"> <li>• Complex geological structure resulting from their position along the line of the Highland Boundary Fault</li> <li>• Glacial deposits</li> <li>• Steep whale backed hills and south-west to north-east valleys</li> <li>• Winding, gorge like river valleys</li> <li>• Gateway to the Angus Glens with a rich historic heritage</li> <li>• Building materials reflecting geological transition</li> <li>• Complex, sometimes disorientating landscape with glimpses of Highland and lowland</li> </ul>	Medium to High
Highland Glens	<ul style="list-style-type: none"> <li>• Uppermost sections of principal Highland glens</li> <li>• Narrow</li> <li>• Dominated by the scale and enclosing mountains</li> <li>• Classic glacial landforms and features</li> <li>• Sparse settlement and woodland cover</li> <li>• Upland, remote character</li> <li>• In some areas the character has been weakened by modern development</li> </ul>	Medium to High

Landscape Character Type	Landscape character & features	Sensitivity
Highland Summits and Plateau	<ul style="list-style-type: none"> <li>• Areas of upland separating principle glens</li> <li>• West Highlands comprise distinct summits and ranges, separated by fault line lochs, the hills are sharply defined and often craggy</li> <li>• Mounth Highlands comprise a more extensive area of upland with spurs extending southwards, the hills are more rounded than those to the west and rock outcrops are fewer</li> <li>• Vegetation patterns closely reflect altitude and exposure and include heather, grassland, blanket bog and arctic alpine plant communities, variations reflecting underlying geology</li> <li>• Most of the area managed as open m moorland</li> <li>• Little or no settlement</li> <li>• Some extensive plantations</li> <li>• One of the remotest and wildest landscapes in the UK</li> </ul>	Medium
Firth Lowlands	<ul style="list-style-type: none"> <li>• Predominantly flat, fertile area</li> <li>• Enclosed by the steep Sidlaws escarpment to the north and bounded by the Firth of Tay to the south</li> <li>• Estuarine reed-beds and mudflats</li> <li>• Large rectangular fields</li> <li>• Decaying structure of hedges and hedgerow trees</li> <li>• Well-settled with some urban influences</li> </ul>	Medium to high
<b>LCTs within 15-25km</b>		
Lowland River Corridors		
Lowland Hills		
Coastal Hills		
Lowland Dens		
Lowland Hills and Valleys		
Lowland Glacial Melt Water Valley		
Coastal Braes		
Upland Foothills		
Coastal Terraces		
Coastal Flats		
Lowland Mixed Coasts		

**Table 10: Landscape Character Types**

#### 5.3.4. Landscape Capacity

Guidance on the capacity of the Angus landscape to accommodate a range of wind energy developments is set out in the '*Landscape Capacity and Cumulative Impacts Study*' (2008). For the *Igneous Hills* LCT in which the proposed turbine is located, the study states:

*"This area of prominent lowland hills clearly separates Dundee and the Dipslope Farmland in the south from the Broad Valley Lowland of Strathmore in the north. Extending west into Perthshire it is a considerably more extensive and higher hill area than the Low Moorland Hills to the east. The hills are of medium landscape character sensitivity.*

*Being of medium scale and fairly complex topography they are clearly farmed and managed with only the upper slopes and hilltops open pasture or heather moor, and the small glens enclosed and populated with small scale settlements and farms connected by a network of roads and tracks. There are a number of large communications masts on the highest hills and power lines cross in some locations. Visually the area is of medium sensitivity, varying from being enclosed with short distance views and a low population within, to being a prominent backdrop to Strathmore and Dundee when seen from without. Overall the landscape is of medium sensitivity.*

*There are no landscape designations but a number of footpaths, viewpoints and small fishing lochs as well as hillforts, scattered dwellings and settlements giving this area a medium landscape value.*

*Overall the Sidlaw Hills have a medium capacity for development. The scale and type of landscape suggests that careful siting of windfarms of a medium to small scale only would be appropriate."*

- **Summary of capacity**

The capacity study concludes that the *Igneous Hills* LCT has a **medium overall sensitivity** and a **medium capacity** for windfarm development. This is reinforced by the 'Implementation Guide for Renewable Energy Proposals' (2012) which states that LCT is:

*"Considered to have scope for turbines circa 80m in height which do not disrupt the principle ridgelines or adversely affect the setting of important landscape features monuments such as Kinpurney Monument and Auchterhouse hillfort."*

Therefore at a strategic level, the site is appropriate for development at the proposed scale subject to the detailed findings of this LVIA.

### 5.3.5. Individual dwellings and settlements

Table 11 identifies the villages and towns and their associated sensitivity within 15km of the proposed development that will form the basis of the residential assessment. This also includes all individual dwellings within 2km from the proposed turbine location (see Drawings ING081-082 for further details).

Within 5km, the area is characterised by a pattern of scattered dwellings and farmsteads, small clusters of dwellings and the village of Balkeerie located approximately 1.5km to the west of the turbine location. The wider study area is relatively well settled across the lowlands and includes the towns of Coupar Angus, Dundee, Forfar and Kirriemuir. The Highland landscape to the north of the study area and the Sidlaws to the south are relatively unsettled.

Receptor	Approx. distance (km)	Sensitivity
<b>Individual dwellings within 2km</b>		
51 dwellings in total (including those in the village of Balkeerie) – see Drawings ING 081-82.		
<b>Villages &amp; Towns within 15km</b>		
Milton	3.8	High
Newtyle	5.3	High
Kirton of Auchterhouse	5.4	High
Meigle	5.5	High

Receptor	Approx. distance (km)	Sensitivity
Ardler	8.2	High
Westmuir	8.4	High
Tealing	9.2	High
Lundie	9.3	High
Gateside	9.4	High
Kirriemuir	9.7	High
Alyth	10.1	High
Dundee	10.2	High
Inveraldie	10.3	High
Forfar	11.5	High
Coupar Angus	12.7	High

**Table 11: Residential Receptors**

### 5.3.6. Roads & rail routes

Main roads within the study area that will potentially experience theoretical visibility of the turbine include the A94 located within 5km from the proposed development and the A90, A926, and the A928 located beyond 5km and to the west, north and north of the site, respectively. There is a good network of secondary and local roads within the study area, many of which fall within the ZTV, particularly within 15km and to the north of the site. There is a rail route that broadly follows the coast to the south of the study area. All these routes are judged to have a *medium* sensitivity to change.

### 5.3.7. Nationally important recreational routes

The National Cycle Route 1 and the Fife Coastal Path are both located beyond 15 km from the proposed development and broadly follow the coast to the south of the study area. Considering their national importance for recreation, these are judged to have a *high* sensitivity to change.

### 5.3.8. Viewpoints

The following fourteen viewpoints have been selected as a basis for further investigation of landscape and visual effects (see Drawing ING038).

VP Location	Distance (km)	Landscape		Visual	
		LCT	Sensitivity	Receptor	Sensitivity
1. Easter Denoon	0.7	Igneous Hills	Medium	Residents	High
				Local road users	Medium
2. Denoon Law	1.1	Igneous Hills	Medium	Walkers	High
3. Local road	1.2	Broad Valley	Medium	Residents	High

VP Location	Distance (km)	Landscape		Visual	
		LCT	Sensitivity	Receptor	Sensitivity
near Eassie School		Lowland		Local road users	Medium
4. Balkeerie	1.4	Broad Valley Lowland	Medium	Residents	High
				Local road users	Medium
5. Carlunie Hill	2.4	Igneous Hills	Medium	Scheduled Monument	High
6. Eassie Bridge	3.2	Broad Valley Lowland	Medium	Residents	High
				Local road users	Medium
7. Kinpurney Hill	3.3	Igneous Hills	Medium	Walkers	High
8. Auchterhouse Hill	4.6	Igneous Hills	Medium	Walkers	High
9. Glamis Castle	5.0	Broad Valley Lowland	Medium	Visitors	High
10. B954 near Belmont Castle	5.4	Broad Valley Lowland	Medium	Minor road users	Medium
11. Local road near Dryloch	7.1	Broad Valley Lowland	Medium	Local Road users	Medium
12. A928 near Kirriemuir	9.7	Broad Valley Lowland	Medium	Residents	High
				Main road users	Medium
13. A926 near Padanaram	11.5	Broad Valley Lowland	Medium	Residents	High
				Main road users	Medium
14. A923 near Coupar Angus	12.8	Broad Valley Lowland	Medium	Residents	High
				Main road users	Medium

**Table 12: Viewpoints**

### 5.3.9. Operational, consented and proposed developments

The following schemes listed in Table 13 have been identified as the baseline scenario to further investigate the cumulative landscape and visual effects of the proposed development. The locations of these schemes are identified in Drawing ING019.

Name	No. of Turbines	Tip height (m)	Status	Distance from turbine (km)
Ark Hill	8	77.0	Installed	1.8
Henderston Quarry	1	66.0	Approved	3.3

<b>Name</b>	<b>No. of Turbines</b>	<b>Tip height (m)</b>	<b>Status</b>	<b>Distance from turbine (km)</b>
Scotson	1	79.6	Installed	4.3
Davidston Farm	1	62.0	Pending	5.0
Govals Wind Farm	6	86.5	Pending	7.1
Frawney Wind Farm	5	80.0	Pending	7.3
North Leoch	1	45.6	Approved	7.4
West Mains Farmhouse	1	61.0	Approved	7.6
Balkemback Farm	2	46.5	Approved	7.7
Reedie Farm	2	46.9	Approved	7.8
House On The Hill Kettins	1	45.4	Approved	8.8
West Adamston Farm	1	47.5	Installed	8.9
Lundie Castle Farm	1	48.5	Pending	8.9
North Tarbax	1	45.9	Approved	9.1
House On The Hill	1	46.5	Approved	9.4
Tealing	1	86.5	Approved	9.5
Former Tealing Airfield	1	86.5	Pending	9.5
Dodd Hill Wind Farm	5	126.5	Pending (Appeal)	10.6
Loyal Farm	1	47.0	Pending	10.7
Wester Meathie Farm	2	46.6	Approved	11.6
Bamff Wind Farm	7	111.0	Pending (Appeal)	14.6
Greenhillock 1	1	45.9	Approved	15.2
Greenhillock 2	1	67.0	Pending	15.2
Drowndubbs Farm	2	46.5	Pending	15.3
Glenbran Farm	1	56.3	Pending	15.4
Michelin Tyres	2	120.0	Installed	15.4
Wester Derry Farm	1	45.0	Approved	15.5
Stotfaulds Farm	1	77.0	Pending	15.7
Gallow Hill	1	46.5	Pending	17.2
Outfield Farm Abernyte	1	40.0	Approved	17.3
Lochlair Farmhouse	1	47.0	Approved	17.4
Kalulu House	2	44.8	Pending	18.1
East Memus	1	86.5	Approved	18.2
White Top	1	86.5	Pending	18.6
Netheraird of Glasclune	1	67.0	Pending	19.1
Drumderg	16	107.0	Installed	19.1



<b>Name</b>	<b>No. of Turbines</b>	<b>Tip height (m)</b>	<b>Status</b>	<b>Distance from turbine (km)</b>
Newmill Of Balgavies	1	66.5	Pending	19.3
West Mains Of Turin	1	49.0	Pending	19.5
New Downie Farm	1	54.0	Pending	19.8
Broom Farm	1	49.5	Pending	20.1
Newton Of Idvies Farm	1	47.5	Approved	20.3
Hill Of Lethendy Farm	1	66.6	Approved	20.6
Upper Balmachie Farm	1	77.0	Pending	21.0
Pitkenney Farm	1	74.0	Pending	21.9
The Corb Bridge	1	84.0	Pending (Appeal)	22.0
Wester Kilmany Farm	1	86.5	Pending	22.2
East Gormack Farm	1	66.7	Approved	22.2
Shandry Farm Rait	2	45.5	Approved	22.4
North Mains Of Cononsyth	1	66.7	Installed	22.8
Easter Logie	1	47.0	Pending	23.0
Pickerton	1	77.0	Approved	23.5
Parkconon Farm	1	45.0	Approved	23.5
Dubton Farm	1	77.0	Pending	23.9
Afflochie Farm	2	46.9	Approved	24.0
Cuthlie	1	77.0	Pending	24.3
Dunswood	1	77.0	Approved	25.0
Balnacake Farm	1	67.0	Pending	25.4
Newington Farm	1	41.5	Approved	25.6
Lordscairnie Farm	1	45.7	Approved	25.7
Balhall Lodge	1	49.0	Pending	25.9
Balhall Lodge	1	47.5	Approved	26.2
Glen Trusta	2	46.9	Approved	26.4
Stewart Tower Farm	1	45.0	Approved	27.0
Nathro Hill	17	135.0	Pending	27.1
Pitbladdo Farm	1	51.0	Approved	27.3
Hatton Mill Farm	1	77.0	Pending (Appeal)	28.0
Lumbennie Hill Pitcairlie	1	84.0	Approved	28.4
Westhall Cupar Fife	1	45.5	Installed	29.4

**Table 13: Wind Farm Developments within 30km**

### 5.3.10. Design optimisation and mitigation strategy

In the context of other technical and environmental constraints, objectives to minimise the landscape and visual effects have been considered in developing the location and design of the proposed development. Within this, the following landscape design aims have been adopted during the iterative process of site selection and scheme design to minimise any likely adverse effects:

- **Design Aim 1:** Selection of a development pattern and scale that repeats the emerging pattern of one to two turbine wind energy developments throughout the lowland landscape in Angus;
- **Design Aim 2:** Selection of a location which prevents the coalescence of currently clearly separated wind farms visible in the surrounding landscape; and
- **Design Aims 3:** Selection of a location and scale which avoids the setting of important landscape features monuments such as Kinpurney Monument and Auchterhouse hillfort.

## 5.4. Impact Assessment

### 5.4.1. Construction and decommissioning phases

In addition to the operational phase, there is also a requirement to assess the landscape and visual effects of the construction and decommissioning phases of the proposed development.

#### **Visual effects**

Any visual effects associated with the construction and decommissioning phases will primarily consist of short term effects on some residents, road users and walkers with open views of the skyline where the proposed turbine would be located resulting from the presence of install cranes and other plant machinery. For a limited number of residents and walkers within approximately 1.5km of the proposed turbine location with direct open views of the site during the construction and decommissioning phases, **mod-major** (significant) visual effects are predicted. These would only be experienced in relative short duration given the short term nature of these phases.

#### **Landscape effects**

The extent of the proposed development is shown on Drawing ING002. The construction and decommissioning phase are likely to result in the permanent loss of approximately 0.64 hectares of agricultural land as a result of the construction of the new access track, turbine foundations and substation building. The access track would be 2.1km in total, 730m of which would be along an existing farm track. A temporary borrow pit measuring 92m x 44m x 0.7m deep is also required although this would be re-instated to permanent grassland up to the edge of the hardstanding, access track, foundation and substation kiosk, after construction. The land will remain in permanent pasture agricultural use and no other landscape elements are predicted to experience direct effects from the construction and decommissioning phases.

Taking these factors into account, it is predicted these works would result in direct localised **mod-minor** (not significant) landscape effects in the short-medium term. Indirect effects on surrounding landscape character are predicted to be **moderate** (not significant) largely as a result of the crane and plant machinery affecting the surrounding rural character and the containment provided by the hill on nearby lower lying areas.

### 5.4.2. Operational phase

Overall, the additional structures associated with the proposed development (see Section 5.1.4) are judged to have a worst case **mod-minor** (not significant) additional impact on the

landscape and visual amenity of the surrounding area. The remainder of this assessment will therefore focus on the likely landscape and visual effect of the proposed wind turbine during the operational phase, having taken account of the mitigation measures described in Section 5.3.10. This is presented through separate assessments of landscape effects, visual effects and cumulative effects and informed through a detailed viewpoint assessment.

### **5.4.3. Overall pattern of theoretical visibility**

The 3 point zone of theoretical visibility (ZTV) is illustrated in Drawings ING010-014. This demonstrates that within 5km of the proposed turbine location, the large majority of the northern part of the area is within theoretical views of the turbine. This includes nearly all of the A94 and surrounding local roads, the village of Balkeerie and most of the scattered dwellings and farmsteads. To the south of the proposed turbine location, theoretical visibility is restricted by surrounding higher ground and is concentrated to relatively small areas of some north facing slopes and hill summits including Kinpurney Hill and Carlunie Hill.

Outwith 5km, nearly all of the study area to the south is outside of theoretical visibility except a swath of land to the south of the A94 and small areas of north facing slopes and hill summits to the south-east of the site. To the north of the site, theoretical visibility is much more extensive. Most of the Vale of Strathmore is within theoretical visibility including a large proportion of main, minor and local roads and settlements. Further north, there is pattern of small areas of scattered theoretical visibility across the south facing summits and slopes of the Grampian foothills.

As the ZTV takes no account of the screening effects of woodland, development and other landcover, it is likely that the patterns of broadleaved woodlands and wooded estates scattered throughout the Vale of Strathmore would significantly limit actual visibility of the turbine in practice.

## **5.5. Viewpoint Assessment**

Table 14 provides a summary of the landscape and visual assessment undertaken from the fourteen representative viewpoint locations. At each viewpoint, a detailed assessment was undertaken to identify any landscape and visual effects that is also used to inform the general assessment of landscape and visual effects.

The accompanying photomontages (Drawings ING039-080) have been prepared by combining a wireframe of the view with the photograph of the existing view and rendering the image using a model of the proposed wind turbines, also generated electronically. The images should be viewed at a distance as recommended on each montage to most closely replicate the view that will be obtained from the viewpoint.

It should be noted that every effort has been made to provide clear views of the turbine although due to intervening vegetation; clear views were not always available. Where this is the case, these viewpoints have been retained to demonstrate the limited effect of the proposed development in practice.

VP Location	LANDSCAPE					VISUAL					
	Distance	LCT	Sensitivity	Magnitude of Change	Effect	Significant	Receptor	Sensitivity	Magnitude of Change	Effect	Significant
1. Easter Denoon	0.7	Igneous Hills	Medium	<p><i>Medium-high:</i> the turbine would be relatively prominent on the nearby local skyline although all of the lower part of the tower would be screened by intervening rising ground. For views in this direction, the movement of blades would detract from the smooth profile of the open topography and the prevailing rural and tranquil quality experienced along the intimate glen floor. The sense of containment and enclosure provided by the surrounding rising ground would also be compromised. Although there are other views of the nearby Ark Hill turbines to the south, the turbine would be an uncharacteristic addition to this part of the skyline, to the north. However, given a large proportion of the tower is screened from view, the sense of containment and enclosure provided by the surrounding rising ground would reduce the perceived scale of the development. At this point, landscape pattern is not particularly strong and is largely unaffected.</p>	Moderate to mod-major	✓	Residents	High	<p><i>Medium-high:</i> residents of one nearby dwelling would experience direct views of the moving turbine blades on the nearby skyline from one upstairs room at the back of the dwelling and from the rear of the curtilage. The turbine would create a new visual focus within the important part of the view from the rear of the dwelling, dwarfing the scale of the local landform and surrounding landscape elements. It would detract from glimpsed long range views to the north-east and at this distance, the turbine would occupy a relatively large proportion of view, appearing as the most noticeable element in a predominantly short range view. It should be noted that the primary views from the dwelling are to the south and these would be unaffected by the proposed development.</p>	Mod-major to major	✓
							Local road users	Medium	<p><i>Medium:</i> The visual changes experienced by a very small number of local road users are very similar to those experienced by residents (see above) although any changes would be experienced in mostly oblique views along a short section of the road.</p>	Moderate	x

VP Location	LANDSCAPE					VISUAL					
	Distance	LCT	Sensitivity	Magnitude of Change	Effect	Significant	Receptor	Sensitivity	Magnitude of Change	Effect	Significant
2. Denoon Law	1.1	Igneous Hills	Medium	<i>Medium-high:</i> given the near full visibility of the turbine and its elevated position, the turbine would be a very prominent structure on the local skyline. It would add further movement into the landscape and would compromise the intricate landform of ridges and rolling terrain. The turbine would contrast with the semi natural character of the rugged, open ridges and the prevailing rural and tranquil experience of the surrounding landscape although this is already compromised by the nearby Ark Hill turbines. The sense of containment and enclosure provided by the surrounding rising ground and the field pattern along the hillside would also be affected. Although there are other prominent views of wind energy development to the south, the turbine would be an uncharacteristic addition to this part of the landscape, to the west.	<b>Moderate to mod-major</b>	✓	Walkers	High	<i>Medium to high:</i> Due to the secluded nature and relatively inaccessible location of Denoon Law, a very low number of walkers would experience direct views of the turbine very prominent on the local skyline although within a wider panoramic view already compromised by the nearby wind energy development of Ark Hill. It would create a major visual focus within the important part of the view towards the nearby ridges and would dwarf the scale of surrounding trees and woodland blocks. Although at this distance, the turbine would occupy a large proportion of the vertical view, appearing as the most noticeable element in a mostly short range view, the turbine would relate well to the vertical scale of landform.	<b>Mod-major to major</b>	✓

VP Location	LANDSCAPE					VISUAL					
	Distance	LCT	Sensitivity	Magnitude of Change	Effect	Significant	Receptor	Sensitivity	Magnitude of Change	Effect	Significant
3. Local road near Eassie School	1.2	Broad Valley Lowland	Medium	<p><i>Medium-high:</i> the turbine would be a prominent structure on the local skyline and would detract from the smooth profile of the open topography and the prevailing rural and tranquil quality experienced along the local road. The sense of containment and enclosure provided by the surrounding rising ground would also be affected although the turbine would relate well to the relatively large scale of the topography and vertical scale of landform. Although there are other views of distant wind energy development to the north, the turbine would be an uncharacteristic addition to the local landscape in this particular direction. The turbine would also contrast with the field pattern along the hillside to a limited degree.</p>	Moderate to mod-major	✓	Residents	High	<p><i>Medium-high:</i> residents of one nearby dwelling would experience mostly open direct views of the turbine prominent on the nearby skyline from several rooms and curtilage although garden vegetation would provide a degree of screening. The turbine would create a new visual focus within the important part of the view. The turbine would occupy a relatively large proportion of view, appearing as the most noticeable element in a short range view. The turbine would also be back lit and would generally be more noticeable as a result. It should be noted that the primary views from the dwelling are to the north across the Vale of Strathmore and these would be unaffected by the proposed development.</p>	Mod-major to major	✓
							Local road users	Medium	<p><i>Medium:</i> The visual changes experienced by a moderate number of local road users are very similar to those experienced by residents (see above) although any changes would be experienced in mostly oblique views from along this section of open road.</p>	Moderate	x



VP Location	LANDSCAPE					VISUAL					
	Distance	LCT	Sensitivity	Magnitude of Change	Effect	Significant	Receptor	Sensitivity	Magnitude of Change	Effect	Significant
4. Balkeerie	1.4	Broad Valley Lowland	Medium	<p><i>Medium-high:</i> the turbine would be a prominent structure on the local skyline and would detract from the smooth profile of the open topography and the prevailing rural and tranquil quality experienced along the local road. The sense of containment and enclosure provided by the surrounding rising ground would also be affected although the turbine would relate well to the relatively large scale of the topography. Although there are other views of distant wind energy development to the north, the turbine would be an uncharacteristic addition to the local landscape in this particular direction. The turbine would also contrast with the field pattern along the hillside to a limited degree.</p>	Moderate to mod-major	✓	Residents	High	<p><i>Medium-high:</i> residents of several nearby dwellings would experience open and direct views of the turbine prominent on the nearby skyline from several rooms and curtilage. The turbine would create a new visual focus within the important part of the view. The turbine would occupy a relatively large proportion of the vertical view, appearing as the most noticeable element in a short range view, however the turbine would relate well to the relatively large scale of the topography. The turbine would also be back lit and would generally be more noticeable as a result. Views from the rear of nearby dwellings to the north across the Vale of Strathmore would be unaffected by the proposed development.</p>	Mod-major to major	✓
							Local road users	Medium	<p><i>Medium:</i> The visual changes experienced by a moderate number of local road users are very similar to those experienced by residents (see above) although any changes would be experienced in mostly oblique views from along this section of open road.</p>	Moderate	x

VP Location	LANDSCAPE					VISUAL					
	Distance	LCT	Sensitivity	Magnitude of Change	Effect	Significant	Receptor	Sensitivity	Magnitude of Change	Effect	Significant
5. Carlunie Hill	2.4	Igneous Hills	Medium	Given that access to Carlunie Hill is extremely difficult, the experience of landscape and visual effects at this location from walkers is unlikely to be experienced in practice. Given that there is a cairn (Scheduled Ancient Monument) on the hill, the primary consideration from this location is the effect of the proposed development on its setting. An assessment of this is therefore presented in Chapter 8.							
6. Eassie Bridge	3.2	Broad Valley Lowland	Medium	None: the turbine would be screened from view by a dense intervening conifer plantation and no changes on the surrounding nearby landscape are predicted.	None	x	Residents	High	None: the turbine would be screened from view and no changes to the views of residents are predicted.	None	x
							Local road users	Medium	None: the turbine would be screened from view and no changes to the views of road users are predicted.	None	x

VP Location	LANDSCAPE					VISUAL					
	Distance	LCT	Sensitivity	Magnitude of Change	Effect	Significant	Receptor	Sensitivity	Magnitude of Change	Effect	Significant
7. Kinpurney Hill	3.3	Igneous Hills	Medium	<i>Low</i> : the turbine would be a noticeable change on an intervening ridge and back clothed by views of the Vale of Strathmore. It would add further movement into the landscape although the turbine would be in scale with the surrounding landform, nearby conifer plantations and the turbines of Ark Hill. The rural character and tranquility would only be affected to a small extent as these are already compromised by a nearby pylon and the turbines of Ark Hill which occupy a more prominent position on the nearby skyline. The landscape pattern is not particularly strong at this point and considering the influence of Ark Hill wind farm, the turbine would not be uncharacteristic to the landscape.	Mod-minor	x	Walkers	High	<i>Low-medium</i> : A moderate number of walkers and visitors to Kinpurnie Tower would experience direct views of the turbine although within a wider panoramic view already compromised by nearby wind energy development. Given the extent and close proximity of the Ark Hill turbines, there would be little change to the focus of the view and the important views of the extensive Vale of Strathmore backed by the Grampians would be largely unaffected. At this distance, the turbine would occupy a relatively small proportion of the wider view and it would be less noticeable than the more extensive and prominent turbines of Ark Hill.	Moderate to mod-major	x

VP Location	LANDSCAPE					VISUAL					
	Distance	LCT	Sensitivity	Magnitude of Change	Effect	Significant	Receptor	Sensitivity	Magnitude of Change	Effect	Significant
8. Auchterhouse Hill	4.6	Igneous Hills	Medium	<i>Low:</i> the turbine would be an evident change on an intervening wooded ridge and back clothed by views of the Vale of Strathmore. It would add further movement into the landscape although the turbine would be in scale with the surrounding landform, nearby conifer plantations and would appear smaller than the turbines of Ark Hill. The rural character and tranquility would only be affected to a very limited extent as these are already significantly compromised by a nearby pylon and the turbines of Ark Hill which occupy a more prominent position in the foreground. The landscape pattern is not particularly strong at this point and considering the influence of Ark Hill wind farm, the turbine would not be uncharacteristic.	Mod-minor	x	Walkers	High	<i>Low:</i> A relatively low number of walkers would experience direct views of the turbine although within a wider view and one already significantly compromised by the nearby turbines of Ark Hill in the foreground. There would be little change to the focus of the view and the important views of the extensive Vale of Strathmore backed by the Grampians would be largely unaffected. At this distance, the turbine would occupy a small proportion of the wider view and it would be much less noticeable than the more extensive and prominent turbines of Ark Hill.	Moderate	x
9. Glamis Castle	5.0	Broad Valley Lowland	Medium	<i>Negligible:</i> the turbine would be screened from view by dense intervening broadleaved woodland during summer months and during winter the turbine would be hardly discernible.	Minor	x	Visitors	High	<i>Negligible:</i> the turbine would be screened from view by dense intervening broadleaved woodland during summer months and during winter the turbine would be hardly discernible.	Mod-minor	x

VP Location	LANDSCAPE					VISUAL					
	Distance	LCT	Sensitivity	Magnitude of Change	Effect	Significant	Receptor	Sensitivity	Magnitude of Change	Effect	Significant
10. B954 near Belmont Castle	5.4	Broad Valley Lowland	Medium	<i>Low-medium</i> : the turbine would be a noticeable change, situated relatively prominent on the predominantly open skyline. It would add movement into the backdrop of the landscape and would detract from the sense of containment and enclosure provided by the hills to an extent. The rural character would also be affected to a degree and the change would be uncharacteristic to the backdrop of the valley given that Ark Hill is screened by a conifer plantation at this point. However, a composition of transmission poles in the foreground offsets this to an extent.	Moderate to mod-minor	x	Minor road users	Medium	<i>Low</i> : Minor road users would experience oblique views of the turbine experienced in very short duration along a relatively quiet section of minor road. Although the turbine would detract from views of Kinpurnie Tower to an extent, there would be little change to focus of the view which at this point is along the wooded road corridor with a backdrop of hills beyond. At this distance, the turbine would be in scale with the vertical height of the landform and the turbine would only occupy a relatively small proportion of the framed view.	Mod-minor	x
11. Local road near Dryloch	7.1	Broad Valley Lowland	Medium	<i>Negligible</i> : The turbine would be viewed amongst of the turbines of Ark Hill and as such, the changes to the skyline of the Sidlaw Hills as a backdrop to the valley and the containment this provides would be hardly discernible. Furthermore, the rural character of the foreground is significantly compromised by a large transmission line crossing the valley floor.	Minor	x	Local road users	Medium	<i>Low-negligible</i> : a low number of local road users would experience direct views in short duration of the turbine amongst the Ark Hill turbines. There would be no change to the focus of view towards Ark Hill on the skyline although the introduction of the proposed turbine would add to the visual complexity with the composition of existing turbines.	Mod-minor to minor	x

VP Location	LANDSCAPE					VISUAL					
	Distance	LCT	Sensitivity	Magnitude of Change	Effect	Significant	Receptor	Sensitivity	Magnitude of Change	Effect	Significant
12. A928 near Kirriemuir	9.7	Broad Valley Lowland	Medium	<p><i>Negligible</i>: The turbine would be viewed to the west of Ark Hill wind farm and Scotson turbine and as such, the changes to the skyline of the Sidlaw Hills as a backdrop to the valley and the containment this provides would be very limited. Considering the extent of existing turbines across the skyline, the strong rural character and tranquil quality of the foreground would only be affected to a very limited degree.</p>	Minor	x	Residents	High	<p><i>Low-negligible</i>: residents of several nearby dwellings would have open views from some rooms and curtilage of the turbine on the distant skyline amongst a view of existing turbines. There would be little change to the focus of view towards Ark Hill although the introduction of the proposed turbine would add to the visual complexity with the composition of existing turbines on the skyline.</p>	Moderate to mod-minor	x
							Main road users	Medium	<p><i>Low-negligible</i>: The visual changes experienced by a high number of main road users are very similar to those experienced by residents (see above) as views would be direct along a section of open road.</p>	Mod-minor to minor	x
13. A926 near Padanaram	11.5	Broad Valley Lowland	Medium	<p><i>Negligible</i>: The turbine would be viewed to the west of Ark Hill wind farm and Scotson turbine and as such, the changes to the skyline of the Sidlaw Hills as a backdrop a drop to the valley and the containment this provides would be very limited. Furthermore, the rural character of the foreground is significantly compromised by a large transmission line crossing valley</p>	Minor	x	Residents	High	<p><i>Negligible</i>: residents of a small number of nearby dwellings would have mostly oblique views from some rooms and curtilage of the turbine on the distant skyline amongst a view of existing turbines. There would be little change to the focus of view towards Ark Hill on the skyline although the introduction of the proposed turbine would add to the visual complexity with the composition of existing turbines.</p>	Mod-minor	x



VP Location	LANDSCAPE					VISUAL					
	Distance	LCT	Sensitivity	Magnitude of Change	Effect	Significant	Receptor	Sensitivity	Magnitude of Change	Effect	Significant
14. A 923 near Coupar Angus	12.8	Broad Valley Lowland	Medium	<i>Low-negligible</i> : the turbine would be a relatively noticeable change at this distance, situated on the predominantly open skyline. It would add further movement into the backdrop of the landscape and would detract from the sense of containment and enclosure provided by the hills to an extent. The rural character would also be affected to a degree although the change would be not uncharacteristic.	Mod-minor to minor	x	Main road users	Medium	<i>Negligible</i> : The visual changes experienced by a large number of local road users are very similar to those experienced by residents (see above) although any changes would be experienced in mostly oblique views from along this section of open road.	Minor	x
							Residents	High	<i>Negligible</i> : residents of one nearby dwelling would have views filtered by nearby trees of the turbine on the distant skyline. It would create a visual focus and would detract from views of Kinpurnie Tower to an extent. The turbine would be back lit for part of the day but would occupy a very small proportion of the skyline at this distance.	Mod-minor	x
							Main road users	Medium	<i>Negligible</i> : The visual changes experienced by a relatively high number of local road users are very similar to those experienced by residents (see above) although any changes would be experienced in mostly oblique views from along this section of open road.	Minor	x

**Table 14: Viewpoint Assessment**

## **5.6. Landscape effects**

### **5.6.1. Residual landscape effects**

Table 15 sets out a summary of the predicted effects on all landscape designations and LCTs within 15km from the proposed development. The findings have been informed by the detailed viewpoint assessment (see Table 14) and through further field survey assessment. For those designations from 15-25km from the turbine, a summary of likely effects are presented in Section 5.6.2. Where any significant effects are identified, a more detailed assessment is presented in Section 5.6.3.

Receptor	Sensitivity	Magnitude of Change	Effect	Significance
<b>Landscape designations</b>				
<b><i>Within 0 km to 15 km</i></b>				
Glamis Castle GDL	High	<u>Low</u> : Glamis Castle GDL is located approximately 4.3km to the north-east of the turbine at its closest point. The ZTV demonstrates that there are continuous areas of theoretical visibility of the turbine across the entire designation. Due to the heavily wooded nature of the polices surrounding the GDL and the screening effect of nearby intervening conifer plantations to the south-west, actual visibility from the grounds is likely to be limited to occasional glimpses of the turbine in very limited locations during winter months. However, panoramic views from the top of the Castle are available where the turbine is likely to be noticeable although in close proximity to the Ark Hill turbines with other developments visible across the wider view. The important views towards the Grampians would be unaffected.	Moderate	Not significant
Drumkilbo GDL	High	<u>Low</u> : Drumkilbo is located approximately 4.5km to the north-west of the turbine at its closest point and all of the designation is within theoretical views. In practice, some views of the turbine on the skyline are likely to be experienced from the house and the south-eastern part of the grounds although this would be in the context of the nearby Ark Hill turbines which already detract from the backdrop of the hills thus limiting the changes to the skyline and associated effects on the quality of the GDL.	Moderate	Not significant
Airlie Castle GDL	High	<u>None</u> : Located approximately 7.8km to the north-west of the turbine, the southern and northern parts of the glens are within theoretical views although the Castle is outside of theoretical visibility. Considering the heavily wooded nature of the glens, views of the turbine in practice are very unlikely to be experienced and no changes are predicted.	None	Not significant
Clatto Country Park	Medium	<u>None</u> : Clatto Country Park is outside of the ZTV and no changes are predicted.	None	Not significant
Camperdown and Templeton Woods	Medium	<u>None</u> : The Country Park is outside of the ZTV and no changes are predicted.	None	Not significant

Receptor	Sensitivity	Magnitude of Change	Effect	Significance
Country Park				
Forfar Loch Country Park	Medium	<i>None</i> : Located 11km to the north-east, the entire park is within theoretical views of the turbine. Taking into account the screening effect of the belt of coniferous planting along the south-western edge and trees along the A90, views of the turbine in practice are very unlikely to be experienced.	None	Not significant
Ascreavie GDL	High	<i>Negligible</i> : Ascreavie GDL is located 12.4km to the north of the turbine and all of the designation is within theoretical visibility. Although there are long views to the south and south-west across the valley, a nearby wooded belt is likely to limit views in practice to possible glimpses of the turbine above the woodland.	Mod-minor	Not significant
Balgay Park GDL	High	<i>None</i> : The GDL is outside of the ZTV and no changes are predicted.	None	Not significant
Baxter Park GDL	High	<i>None</i> : The GDL is outside of the ZTV and no changes are predicted.	None	Not significant
Rossie Priory GDL	High	<i>None</i> : The GDL is outside of the ZTV and no changes are predicted.	None	Not significant
<b>Landscape Character Types</b>				
<b>Within 0 km to 15 km</b>				
Igneous Hills	Medium	<i>Low-medium</i> : The turbine would be located within the Igneous Hills LCT. The ZTV (see Drawing ING018) demonstrates that there are near continuous areas of theoretical visibility across the landscape within approximately 2.5km of the proposed turbine location. Beyond 2.5km, theoretical visibility is restricted by surrounding higher ground and is concentrated to relatively small areas of some north facing slopes and hill summits including Kinpurney Hill and Carlunie Hill. Taking into account the prevailing open nature of the hills, the extent of actual visibility would be very similar in practice. Overall however, only a relatively small proportion of the LCT would experience views of the turbine.  The landscape assessments from viewpoints 1 and 2 (both within 1.1km from the proposed turbine location) predict a <i>medium-high</i> magnitude of change where the	Moderate to mod-minor	Not significant

Receptor	Sensitivity	Magnitude of Change	Effect	Significance
		<p>turbine would be prominent on the local skyline, adding movement into the landscape and dwarfing the scale of the surrounding intricate landform of ridges and rolling terrain. It would also compromise the semi natural character of the rugged, open ridges and the prevailing rural and tranquil experience of the surrounding landscape.</p> <p>Taking into account the effects of Ark Hill wind farm on the surrounding character and quality of the landscape, the magnitude of change decreases with distance. From viewpoint 7 (3.3km) and viewpoint 8 (4.6km) the magnitude of change is predicted to be <i>low</i>. Considering the limited extent of changes across the entire LCT and the decreasing magnitude of change with distance, the overall magnitude is predicted to be <i>low-medium</i>.</p>		
Broad Valley Lowland	Medium	<p><u><i>Low-medium</i></u>: The LCT is located in close proximity to the north of the proposed turbine location and the ZTV demonstrates that nearly all of the Broad Valley Lowland LCT is within theoretical visibility of the turbine. Due to the screening effect of the characteristic patterns of woodland blocks and the dense polices of wooded estates across the LCT, the extent of views in practice would be significantly reduced, particularly further away from the proposed turbine location.</p> <p>The landscape assessments from Balkeerie at viewpoint 3 (1.2km) and viewpoint 4 (1.4km) both predict a <i>medium-high</i> magnitude of change, largely as a result of the prominence of the turbine compromising the containment of the valley floor and detracting from the surrounding rural character and tranquil quality. At viewpoint 10 (5.4km), the magnitude of change reduces to <i>low-medium</i>.</p> <p>From those locations beyond approximately 7km, the influence of Ark Hill wind farm on the skyline becomes more evident thus limiting the magnitude of change of the proposed development on the sensitive skyline. Viewpoints 9, 11, 12, and 13 all predict a <i>negligible</i> change.</p> <p>Taking all these factors into account, the magnitude of change across the LCT is predicted to be <i>low-medium</i> overall.</p>	Moderate to mod-minor	Not significant
Low Moorland	Medium	<p><u><i>Negligible</i></u>: The Low Moorland Hills LCT is located approximately 8 km to the east of the site at its closet point with scattered areas of theoretical visibility across</p>	Mod-minor to	Not significant

Receptor	Sensitivity	Magnitude of Change	Effect	Significance
Hills		some areas of higher ground. Considering the screening effect of large conifer plantations across the area, the extent of views in practice would be significantly reduced. Where open views are apparent, the turbine would tend to be viewed on the skyline of the Sidlaws, amongst the turbines of Ark Hill and other nearby single turbines.	minor	
Dipslope Farmland	Medium	<i>None</i> : Only very small areas of the LCT are within theoretical visibility and the effect of intervening woodlands are likely to screen any views in practice.	None	Not significant
Highland Foothills	Medium to High	<i>Negligible</i> : Located mostly beyond 10km from the proposed turbine location, there are scattered areas of theoretical views across the south facing hills and slopes of the LCT. In practice, occasional conifer plantations across the hills and associated wooded glens would provide a degree of local screening. Where open views are experienced, the turbine would be viewed on the distant skyline across the Vale of Strathmore amongst Ark Hill wind farm and other nearby single turbines. Taking into account the findings of the viewpoint assessment at this distance, the overall magnitude of change is predicted to be <i>negligible</i> .	Mod-minor to minor	Not significant
Highland Glens	Medium to High	<i>Negligible</i> : The three glens are located mostly beyond 10km from the proposed turbine location with scattered areas of theoretical visibility across a relatively small proportion of the glens. Areas of woodland along the valley sides would limit views in practice to localised areas. Where open views are experienced, the turbine would be viewed on the distant skyline across the Vale of Strathmore amongst Ark Hill wind farm and other nearby single turbines. Taking into account the findings of the viewpoint assessment at this distance, the overall magnitude of change is predicted to be <i>negligible</i> .	Mod-minor to minor	Not significant
Firth Lowlands	Medium to high	<i>None</i> : The LCT is outside of the ZTV and no changes are predicted.	None	Not significant

**Table 15: Residual effects on landscape receptors**



### 5.6.2. Residual landscape effects from 15-25km

As the purpose of the assessment process is to focus on likely *significant* effects, a detailed assessment of landscape designations and LCTs from 15km to 25km from the turbine location has not been undertaken. However, the following landscape designations and LCTs are all outside of theoretical views and no effects would be experienced:

- Lowland Hills and Valleys LCT
- Lowland Glacial Melt Water Valley LCT
- Coastal Braes LCT
- Upland Foothills LCT
- Coastal Terraces LCT
- Coastal Flats LCT
- Lowland Mixed Coasts LCT
- Cairngorms National Park
- Cortachy Castle GDL
- Craighall Rattray GDL
- Glendoick GDL
- Naughton GDL
- Guthrie Castle GDL
- House of Pitmuies GDL
- Stobhall GDL
- Fingask Castle GDL
- Megginch Castle GDL
- Errol Park GDL
- The Guynd GDL
- Crombie County Park
- Monikie Country Park

The Lowland River Corridors LCT, Lowland Hills LCT, Meikleour GDL, Tay Coast Special Landscape Area and the East Perth Area of Great Landscape Value are all within theoretical visibility. However, as indicated by the findings of the viewpoint assessment, the magnitude of change is not predicted to be greater than *negligible* at this distance and where any views of the turbine would be experienced, effects would not be significant at this distance.

### 5.6.3. Summary of significant landscape effects

As demonstrated by the viewpoint assessment, **localised significant** effects are predicted on parts of the *Igneous Hills* LCT and the *Broad Valley Lowland* LCT within approximately 1.5km from the proposed turbine location.

However, **no significant** landscape effects are predicted on the overall integrity of these two LCTs or on any landscape designations or other LCTs within the study area. This demonstrates in landscape terms, that the *Igneous Hills* LCT has the capacity to accommodate the proposed development without a detrimental effect on its character. This reinforces the findings of the *Angus Windfarms - Landscape Capacity and Cumulative Impacts Study* (2008) which concludes the landscape has a medium capacity for development at the proposed scale.

## 5.7. Visual effects

### 5.7.1. Residential dwellings and settlements

Table 16 provides an assessment of the visual effects on residents from all individual dwellings within 2km from the turbine location and villages and towns within 15km. It should be noted that the study was undertaken on the basis of visits to locations to which access was obtainable without access to private property. Aerial photographs were also used to supplement site visits.

In considering the overall acceptability of the scheme, it is important to consider that where any significant effects have been identified, these often relate to views from a limited number of rooms that may have direct and open views of the turbine. In many instances, **the primary views from dwellings would not have any views towards the proposed development** and as such, views from these rooms would be unaffected.

Furthermore, given the distance from the turbine and the horizontal extent of change is limited to that of a single turbine, any significant effects on visual amenity are very **unlikely to**

**result in significant effects on residential amenity.** For a scheme of this nature, significant visual effects are likely to be experienced in close proximity to a turbine, but this does not necessarily result in the scheme being unacceptable.

Taking into account the findings of the viewpoint assessment, significant effects are very unlikely to be experienced outside of 15km and as such, the limited number of larger villages and towns that are within theoretical visibility have not been assessed in detail. Where open views of the turbine from these settlements are available, the magnitude of change is predicted to be no greater than *negligible* resulting in a worst case ***mod-minor*** (not significant) effect.

Receptor	Distance (km)	Sensitivity	Magnitude of Change	Effect	Significance
<b>Individual dwellings within 2 km – (N.B. see Drawings ING081-082 for location of numbered dwellings)</b>					
1. (7 dwellings)	1.5	High	<u>Medium-high</u> : residents of all dwellings would have some direct and open views of the turbine prominent and back lit on the nearby skyline from front facing rooms and curtilage.	Mod-major to major (no views from rear facing rooms)	Significant
2. (School)	1.2	High	<u>Low</u> : From front facing rooms, views of the turbine would be mostly screened during summer months by roadside trees with filtered views during winter months.	Moderate (no views from rear facing rooms)	Not significant
3. (1 dwelling)	1.2	High	<u>Medium-high</u> : residents would have direct and open views of the turbine prominent and back lit on the nearby skyline from front facing rooms and curtilage.	Mod-major to major (no views from rear facing rooms)	Significant
4. (1 dwelling)	1.2	High	<u>Medium-high</u> : residents would have direct and open views of the turbine prominent and back lit on the nearby skyline from front facing rooms and curtilage.	Mod-major to major (no views from rear facing rooms)	Significant
5. (2 dwellings)	1.2	High	<u>Medium</u> : residents of one dwelling would have oblique and mostly open views of the turbine prominent and back lit on the nearby skyline from rear facing rooms and curtilage.	Mod-major (no views from front facing rooms)	Significant
			<u>Low</u> : residents of one dwelling would have oblique views, mostly screened or filtered by garden trees from rear facing upstairs rooms only.	Moderate (no views from rear facing rooms)	Not significant
6-14. (14 dwellings)	1.4	High	<u>Medium-high</u> : residents of fourteen dwellings would have direct and open views of the turbine prominent and back lit on the nearby skyline from front facing rooms and curtilage.	Mod-major to major (no views from rear facing rooms)	Significant
15. (1 dwelling)	1.4	High	<u>Medium-high</u> : residents would have direct and open views of the turbine prominent and back lit on the nearby skyline from rear facing rooms and curtilage.	Mod-major to major (no views from rear facing rooms)	Significant

Receptor	Distance (km)	Sensitivity	Magnitude of Change	Effect	Significance
16. (3 dwellings)	1.5	High	<i>Medium-high:</i> residents would have direct and open views of the turbine prominent and back lit on the nearby skyline from rear facing rooms and curtilage.	Mod-major to major (no views from front facing rooms)	Significant
17. (1 dwelling)	1.5	High	<i>Medium:</i> residents would have oblique and mostly open views of the turbine prominent and back lit on the nearby skyline from rear facing rooms and curtilage.	Mod-major (no views from front facing rooms)	Significant
18. (1 dwelling)	1.6	High	<i>Low:</i> views are mostly screened by garden vegetation and nearby roadside trees although the tips maybe visible above nearby dwellings from the curtilage only.	Moderate (no views from rooms)	Not significant
19. (1 dwelling)	1.5	High	<i>Low:</i> views are mostly screened by garden vegetation and nearby roadside trees although the tips maybe visible above nearby dwellings from the curtilage only.	Moderate (no views from rooms)	Not significant
20. (1 dwelling)	1.5	High	<i>None:</i> views are likely to be screened by nearby trees and built development.	None	Not significant
21. (1 dwelling)	1.5	High	<i>Medium-high:</i> residents would have direct and open views of the turbine prominent and back lit on the nearby skyline from some front facing rooms and curtilage.	Mod-major to major (no views from rear facing rooms)	Significant
22. (1 dwelling)	1.6	High	<i>Low:</i> views would mostly be screened by garden vegetation and nearby roadside trees although the tips maybe visible above nearby dwellings from the curtilage only.	Moderate (no views from rooms)	Not significant
23. (1 dwelling)	1.6	High	<i>Medium:</i> views would mostly be screened by garden vegetation and nearby roadside trees although open oblique views from some front facing rooms and curtilage would be experienced.	Mod-major (no views from rear facing rooms)	Significant
24. (1 dwelling)	1.7	High	<i>None:</i> views would likely to be screened by nearby trees	None	Not significant

Receptor	Distance (km)	Sensitivity	Magnitude of Change	Effect	Significance
			and built development.		
25. (1 dwelling)	1.4	High	<i>Low</i> : views are likely to be screened by adjacent farm buildings although there may be some views of the turbine tips above adjacent buildings from the curtilage.	Moderate	Not significant
26. (1 dwelling)	1.3	High	<i>Low-medium</i> : some direct views maybe possible although partly filtered by intervening trees.	Moderate to mod-major	Significant
27. (1 dwelling)	1.5	High	<i>Low</i> : views of the turbine are likely to be screened although the tips maybe visible above an intervening conifer plantation.	Moderate	Not significant
28. (1 dwelling)	1.7	High	<i>None</i> : views are likely to be screened by nearby trees and adjacent farm buildings.	None	Not significant
29. (1 dwelling)	1.9	High	<i>None</i> : views are likely to be screened by surrounding trees and woodland.	None	Not significant
30. (1 dwelling)	1.1	High	<i>None</i> : views are likely to be screened by surrounding trees and woodland.	None	Not significant
31. (2 dwellings)	1.3	High	<i>Medium</i> : residents of 2 dwellings would have open views of the turbine on the nearby skyline from a small number of areas within the curtilage only.	Mod-major (no views from rooms)	Significant
32. (1 dwelling)	1.9	High	<i>None</i> : views would be screened by surrounding trees and nearby woodlands.	None	Not significant
33. (1 dwelling)	0.7	High	<i>Medium-high</i> : residents of the dwelling would have direct and open views of the turbine prominent on the nearby skyline from a single rear facing room and parts of the curtilage.	Mod-major to major (no views from main front facing rooms)	Significant
34. (1 dwelling)	0.7	High	<i>None</i> : views are likely to be screened by adjacent farm buildings.	None	Not significant

Receptor	Distance (km)	Sensitivity	Magnitude of Change	Effect	Significance
35. (1 dwelling)	0.9	High	<i>None</i> : Outside of theoretical views and no changes are predicted.	None	Not significant
36. (1 dwelling)	1.2	High	Unable to access	N/A	N/A
37. (1 dwelling)	1.9	High	<i>None</i> : views are likely to be screened by adjacent farm buildings.	None	Not significant
<b><i>Villages and towns within 15 km</i></b>					
Milton	3.8	High	<i>None</i> : the settlement is outside of the ZTV and no changes are predicted.	None	Not significant
Newtyle	5.3	High	<i>None</i> : Most of the village is within theoretical views although views are likely to be screened by intervening conifer plantations.	None	Not significant
Kirton of Auchterhouse	5.4	High	<i>None</i> : the settlement is outside of the ZTV and no changes are predicted.	None	Not significant
Meigle	5.5	High	<i>Negligible</i> : The entire village is within theoretical views and from the large majority of dwellings; views would be screened by nearby built development and surrounding woodlands. From several dwellings along the B954, views of the tips of the turbine might be possible above a nearby intervening woodland belt.	Mod-minor	Not significant
Ardler	8.2	High	<i>None</i> : the entire village is within theoretical visibility although in practice, views would be screened by nearby intervening woodlands.	None	Not significant
Westmuir	8.4	High	<i>Low</i> : the entire village is within theoretical visibility although in practice; views from the majority of dwellings would be screened by nearby built development intervening woodlands. Several dwellings along the	Moderate	Not significant



Receptor	Distance (km)	Sensitivity	Magnitude of Change	Effect	Significance
			southern edge would have open views of the turbine on the skyline.		
Tealing	9.2	High	<i>None</i> : the settlement is outside of the ZTV and no changes are predicted.	None	Not significant
Lundie	9.3	High	<i>None</i> : the settlement is outside of the ZTV and no changes are predicted.	None	Not significant
Gateside	9.4	High	<i>None</i> : the settlement is outside of the ZTV and no changes are predicted.	None	Not significant
Kirriemuir	9.7	High	<i>Low-negligible</i> : nearly the entire town is within theoretical views and from the large majority of dwellings; views would be screened by nearby built development. From several dwellings along the southern edge, views of the turbine on the skyline would be experienced.	Moderate to mod-minor	Not significant
Alyth	10.1	High	<i>Negligible</i> : The entire village is within theoretical views and from the large majority of dwellings; views would be screened by nearby built development and surrounding woodlands. From several dwellings along the southern edge, views of the turbine on the skyline might be possible amongst intervening trees and woodlands.	Mod-minor	Not significant
Dundee	10.2	High	<i>None</i> : the settlement is outside of the ZTV and no changes are predicted.	None	Not significant
Inveraldie	10.3	High	<i>None</i> : the settlement is outside of the ZTV and no changes are predicted.	None	Not significant
Forfar	11.5	High	<i>Negligible</i> : Most of the town is within theoretical views and from the large majority of dwellings; views would be screened by nearby built development and surrounding woodlands. From several dwellings along the southern	Mod-minor	Not significant

Receptor	Distance (km)	Sensitivity	Magnitude of Change	Effect	Significance
			edge, views of the turbine on the skyline might be possible amongst intervening trees.		
Coupar Angus	12.7	High	<i>Negligible</i> : The entire town is within theoretical views and from the large majority of dwellings; views would be screened by nearby built development and surrounding woodlands. From several dwellings along the east edge of the town, views of the tips of the turbine are likely to be experienced amongst intervening trees.	Mod-minor	Not significant

**Table 16: Summary of residual effects on residential settlements**

### 5.7.2. Summary of effects on Individual dwellings within 2 km

Of the 51 individual dwellings within 2km, approximately 34 would have some direct open views from either rooms and/or the curtilage of the turbine on the skyline. From these, the magnitude of change is predicted to be *medium* or *medium to high* resulting in **mod-major** or **mod-major to major** (significant) effects.

However, the extent of significant effects are often limited to a small number of rooms that may have direct and open views of the turbine or where views are experienced from parts of the curtilage only. **In many instances, the primary orientation of dwellings would be in the opposite direction to the proposed development and as such, views from these rooms would be unaffected.**

Although significant, given the distance from the turbine and the horizontal extent of change is limited to that of a single turbine, the effects are **very unlikely to result in significant effects on residential amenity.** It should be noted however that a detailed residential amenity assessment is beyond the scope of this assessment.

From 7 dwellings, views would either be oblique and/or filtered or partly screened by nearby trees and woodlands or built development. From these, effects are likely to be **not significant.**

From a further 9 dwellings, views would be screened by intervening buildings or vegetation or are outside of theoretical views and as such, no visual effects are predicted.

### 5.7.3. Summary of effects on villages and towns within 15km

Of the fifteen villages and towns assessed within 15km from the proposed turbine location, the majority of these are outside of theoretical views or in practice, any theoretical views are screened by nearby woodlands and built development. A very limited number of dwellings on the edges of some settlements would experience open views of the turbine but at a distance where effects are predicted to be **not significant.**

### 5.7.4. Roads and recreational routes

#### **Main Roads within 15km**

The ZTV indicates that approximately a 9km section of the A94 within 5km of the proposed turbine location will have potential views of the turbine. In practice, occasional roadside woodlands and trees and built development will provide some localised screening although along the majority of the route, road users would experience open but oblique views of the turbine on the skyline. Considering the duration of likely views and the distance from the turbine, the magnitude of change is predicted to be *medium* with a **moderate** and **not significant** effect.

Along the main roads outside of 5km within the theoretical views (A90, A926, and the A928), as demonstrated by the findings of the viewpoint assessment, significant effects are very unlikely to be experienced at this distance.

#### **Local & Minor roads within 15km**

There is a network of local roads within the study area. For the majority of these routes, actual visibility is limited by intervening vegetation and the magnitude of change limited by distance to the turbine and orientation of view. As demonstrated by the findings of the assessment at viewpoints in close proximity to the turbine, effects on road users are not judged to be significant given the relatively short duration of predominantly oblique views. Taking these factors into account, effects on all road users within 15km are predicted to be **not significant.**

#### **Recreational routes**

The National Cycle Route 1 and the Fife Coastal path are both located beyond 15km from the proposed development and outside of theoretical views. No effects are therefore predicted.

## 5.8. Cumulative effects

This section assesses the potential landscape and visual effects arising from the proposal in conjunction with other wind developments that have been consented, are operational or are at application stage. The proposed site forms the focus of the study area and includes all those schemes within a 30km radius (see Table 13 and Drawing ING019). The cumulative assessment identifies the ways in which the proposal may have additional effects, when considered together with the cumulative situation resulting from other planned, consented or operational wind energy developments.

### 5.8.1. Individual Cumulative Inter-Visibility

There are seventeen planned, approved or installed schemes within 10km which have the greatest potential to present significant cumulative effects with the proposed development. These are highlighted below.

Name	No. of Turbines	Tip height (m)	Status	Distance from turbine (km)
Ark Hill	8	77.0	Installed	1.8
Henderston Quarry	1	66.0	Approved	3.3
Scotson	1	79.6	Installed	4.3
Davidston Farm	1	62.0	Pending	5.0
Govals Wind Farm	6	86.5	Pending	7.1
Frawney Wind Farm	5	80.0	Pending	7.3
North Leoch	1	45.6	Approved	7.4
West Mains Farmhouse	1	61.0	Approved	7.6
Balkemback Farm	2	46.5	Approved	7.7
Reedie Farm	2	46.9	Approved	7.8
House On The Hill Kettins	1	45.4	Approved	8.8
West Adamston Farm	1	47.5	Installed	8.9
Lundie Castle Farm	1	48.5	Pending	8.9
North Tarbax	1	45.9	Approved	9.1
House On The Hill	1	46.5	Approved	9.4
Tealing	1	86.5	Approved	9.5
Former Tealing Airfield	1	86.5	Pending	9.5

**Table 17: Planned, approved or installed schemes within 10km**

Drawings ING021-037 demonstrate the areas of individual combined theoretical cumulative visibility with the seventeen schemes within 10km from the proposed turbine location. These demonstrate that there would be no combined theoretical visibility with North Leoch, West Mains Farmhouse, Balkemback Farm, West Adamston Farm, Lundie Castle Farm, Tealing and Former Tealing Airfield and as such, no cumulative effects are predicted with these schemes.

Considering the combined theoretical visibility with the remaining ten schemes within 10km, the proposed development would result in a slight increase in areas to the south-west of the turbine location (to the south of the A94) where no developments are currently theoretically visible.

The extent of combined individual theoretical visibility is greatest with Ark Hill Wind Farm, Scotson, Govals Wind Farm, Reddie Farm, House On The Hill Kettins and House On The Hill with the large majority of the Vale of Strathmore predicted to experience cumulative views. The combined theoretical visibility with North Tarbax, Frawney Wind Farm, Davidston Farm and Henderston Quarry are relatively limited in comparison. Given the screening effect of woodland blocks and the wooded estates across the Vale of Strathmore to the north of the site, actual cumulative intervisibility would be more likely in practice to the south of the site from areas of higher open ground across the Sidlaw Hills.

The fourteen representative viewpoints have been used to demonstrate the actual cumulative intervisibility and the cumulative effects of the proposed development with one or more wind farms. As noted previously, these viewpoints are considered to be representative of a range of receptor types and distances. Table 18 outlines the cumulative effect on each representative viewpoint.

VP Location	Distance	Predicted view containing Turbines – without proposed development	Predicted view including proposed development	VISUAL				
				Receptor	Sensitivity	Magnitude of Change	Effect	Significant
1. Easter Denoon	0.7	In the combined view, no other developments would be visible. To the south, successive views of Ark Hill and the tips of Henderston Quarry and Scotson are mostly screened by nearby intervening trees and built development although open views would be experienced from the front of the nearby dwelling of the Ark Hill turbines in close proximity on the skyline. To the north-east, distant views of Reddie Farm, Gallow Hill, East Memus and White Top would be screened by a nearby intervening tree belt.	The proposed development would be relatively prominent in close proximity on the nearby skyline, although siting allows for a significant proportion of the tower to be screened from view. Although it would not bring development appreciable closer, it would contrast with the pattern of Ark Hill and bring development to a new part of the view.	Residents	High	Medium-high	Mod-major to major	✓
				Local road users	Medium	Medium	Moderate	x
2. Denoon Law	1.1	In the combined view, Bamff Wind Farm and Drumderg would be evident on the distant skyline and Netheraird of Glasclune would be hardly discernible in the distance. To the south, Ark Hill would be very prominent in close proximity with the tips of Henderston Quarry and Scotson noticeable on the skyline. Further north, a number of single turbines would be evident and back clothed against a distant backdrop of the Grampians.	The proposed development would be prominent in close proximity on the nearby skyline. Although it would not bring development appreciable closer, it would contrast with the pattern of Ark Hill, and bring development to a new part of the view for the few walkers likely to visit Denoon Law.  <i>This is an assessment of the impact on what is expected to be a low number of walkers visiting the site. The impact on Cultural Heritage setting is outlined in Chapter 8.</i>	Walkers	High	Medium-high	Mod-major to major	✓



VP Location	Distance	Predicted view containing Turbines – without proposed development	Predicted view including proposed development	VISUAL				
				Receptor	Sensitivity	Magnitude of Change	Effect	Significant
3. Local road near Eassie School	1.2	In the combined view, no other developments would be visible. To the north, a number of developments would be evident in the distance.	The proposed development would be prominent in close proximity on the nearby skyline. Although it would bring development much closer and to a new part of the view, as a single turbine it would not significantly extend the influence of nearby wind energy development.	Residents	High	Low	Moderate	x
				Local road users	Medium	Low-negligible	Mod-minor to minor	x
4. Balkeerie	1.4	In the combined view, no other developments would be visible. To the north and west, successive views of distant developments would be screened by nearby built development.	N/A – the proposed development is screened from view	Residents	High	None	None	x
				Local road users	Medium	None	None	x
5. Carlunie Hill	2.4	Given that access to Carlunie Hill is extremely difficult, the experience of landscape and visual effects at this location from walkers is unlikely to be experienced in practice. Given that there is a cairn (Scheduled Monument) on the hill, the primary consideration from this location is the effect of the proposed development on its setting. An assessment of this is therefore presented in Chapter 8.						
6. Eassie Bridge	3.2	N/A – the proposed development is screened from view	N/A – the proposed development is screened from view	Residents	High	None	None	x

VP Location	Distance	Predicted view containing Turbines – without proposed development	Predicted view including proposed development	VISUAL				
				Receptor	Sensitivity	Magnitude of Change	Effect	Significant
				Local road users	Medium	None	None	x
7. Kinpurney Hill	3.3	In the combined view, Ark Hill is prominent in the foreground with a further ten developments evident across the Vale of Strathmore and beyond. In successive views to the south, Scotson is prominent on a nearby skyline, Davidston Farm and Henderston Quarry very noticeable against a backdrop of nearby hills and twelve other more distant developments scattered across the Sidlaw Hills.	The proposed development would be a noticeable change on an intervening ridge and back clothed by views of the Vale of Strathmore. It would not bring development closer or introduce a new pattern of development. It would extend the influence of turbines further towards the Vale of Strathmore, appearing as an outlier to Ark Hill and contrasting with its pattern.	Walkers	High	Low-medium	Moderate to moderate-major	x
8. Auchterhouse Hill	4.6	In the combined view, Ark Hill is prominent in the foreground with a further eight developments of varying scales scattered across the view. In successive views to the west, Scotson is prominent on a nearby skyline, with up to twenty two other developments evident to the west and east.	The proposed development would be a noticeable change on an intervening ridge and back clothed by views of the Vale of Strathmore. It would not bring development closer or introduce a new pattern of development.	Walkers	High	Low	Moderate	x
9. Glamis Castle	5.0	Taking into account the screening effect of dense surrounding policy woodlands, views of all developments are likely to be screened in practice.	Taking into account the screening effect of dense surrounding policy woodlands, cumulative views are very likely to be screened in practice.	Visitors	High	None	None	x

VP Location	Distance	Predicted view containing Turbines – without proposed development	Predicted view including proposed development	VISUAL				
				Receptor	Sensitivity	Magnitude of Change	Effect	Significant
10. B954 near Belmont Castle	5.4	In the combined view, the tips of Ark Hill are just evident above a skyline conifer plantation. Afflochie would be screened by intervening woodland. Views of all other development to the north and west would be screened by nearby woodlands and built development.	The proposed development would be quite prominent on the skyline and would be the most noticeable turbine in view. It would not bring development appreciably closer but would extend the influence of development further east across the skyline.	Minor road users	Medium	Low	Mod –minor	x
11. Local road near Dryloch	7.1	In the combined view, Govals, Ark Hill, Scotson Davidston Farm and Henderston Quarry would all be noticeable across the skyline. Successive views of developments would be screened by nearby woodlands and intervening forestry blocks.	The proposed development would be viewed amongst of the turbines of Ark Hill. It would not introduce a new pattern of development, bring development to a new part of the view or extend the influence of development. A slight degree of visual complexity with the Ark Hill turbines would however be evident with possible contrasts in turbine design.	Local Road users	Medium	Negligible	Minor	x
12. A928 near Kirriemuir	9.7	In the combined view, House On The Hill Kettins and House On The Hill, Ark Hill, Scotson and Henderston Quarry would all be noticeable across the skyline. Successive views of other developments would be screened by nearby woodlands, built development and intervening forestry blocks.	The proposed development would be viewed amongst a skyline of other developments in relatively close proximity. It would not introduce a new pattern of development or bring development to a new part of the view. It would appear slightly closer than existing developments.	Residents	High	Negligible	Mod-minor	x
				Main road users	Medium	Negligible	Minor	x

VP Location	Distance	Predicted view containing Turbines – without proposed development	Predicted view including proposed development	VISUAL				
				Receptor	Sensitivity	Magnitude of Change	Effect	Significant
13. A926 near Padanaram	11.5	In the combined view, Govals, Ark Hill, Scotson Davidston Farm and Henderston Quarry would all be noticeable across the skyline. Successive views of developments would be screened by nearby woodlands and intervening forestry blocks.	The proposed development would be viewed amongst a skyline of other developments in relatively close proximity. It would not introduce a new pattern of development or bring development to a new part of the view. It would appear slightly closer than existing developments and extend the influence of development further west across the skyline.	Residents	High	Negligible	Mod-minor	x
				Local road users	Medium	Negligible	Minor	x
14. A 923 near Coupar Angus	12.8	In the combined view, House On The Hill Kettins and House On The Hill, Ark Hill, and Henderston Quarry would all be noticeable across the skyline. Successive views of other developments would be screened by nearby woodlands and built development.	The proposed development would be viewed amongst a skyline of other developments but would extend the influence of development further east across the skyline. It would not bring development closer, introduce a new pattern of development or bring development to a new part of the view.	Residents	High	Negligible	Mod-minor	x
				Local road users	Medium	Negligible	Minor	x

**Table 18: Summary of cumulative effects**

### 5.8.2. Assessment of significant cumulative effects

Significant cumulative effects are only predicted at viewpoints 1 and 2. These relate to the views of residents in one dwelling near to viewpoint 1 and what is expected to be a low number of walkers at viewpoint 2. The nature of significant effects is primarily due to the proposed development appearing prominent in close proximity. Although the proposed turbine is very similar to the scale of the turbines of Ark Hill Wind Farm, for some close up views there is a contrast in pattern and an extension of the influence of turbines in view.

For all other viewpoints, no significant cumulative impacts are predicted.

## 5.9. Conclusion

### 5.9.1. Summary of Effects

- The Landscape and Visual Impact Assessment has demonstrated that the proposed development would not result in any significant direct effects on the physical landscape features of the site or indirect effects on its surroundings during the construction and operational phases;
- Short term significant visual effects during construction and decommissioning are predicted on a limited number of residents and walkers within approximately 1.5km of the proposed turbine location;
- Of the fourteen viewpoints, significant visual and landscape effects are only predicted at viewpoints 1-4 (all within 1.4km from the turbine location);
- No significant effects are predicted on the overall integrity of any landscape character types within the study area;
- No significant effects are predicted on any landscape designations within the study area;
- Significant visual effects are predicted on the residents of approximately 34 dwellings within 1.5km from the turbine location that would have some direct and open views of the proposed turbine on the skyline;
- No significant visual effects are predicted on any road users within the study area;
- No significant visual effects are predicted on any nationally important recreational routes within the study area; and
- Significant cumulative effects are predicted on residents at only one dwelling near to viewpoint 1 and a limited number of walkers at viewpoint 2.

### 5.9.2. Statement of Significance

Local, Regional and National planning policy are supportive of wind energy developments subject to developments avoiding unacceptable landscape and visual effects. This assessment of effects on the landscape and visual resource has identified that the proposed development will have some localised significant landscape, visual and cumulative effects which considering the nature of the development, is generally to be expected on the immediate area surrounding the turbine location.

For the landscape surrounding the site, the *Angus Windfarms - Landscape Capacity and Cumulative Impacts Study* (2008) study states:

*Overall the Sidlaw Hills have a **medium capacity** for development. The scale and type of landscape suggests that careful siting of windfarms of a medium to small scale only would be appropriate.* Furthermore, the 'Implementation Guide for Renewable Energy Proposals' states that the Igneous Hills in which the proposed development is located are:

*"Considered to have **scope for turbines circa 80 m in height** which do not disrupt the principle ridgelines or adversely affect the setting of important landscape features monuments such as Kinpurney Monument and Auchterhouse hillfort."*

The guidance also states:

*"The relative height and style of turbine (e.g. tower construction, number of blades, blade length) should increasingly reflect those already consented to promoted a harmonious development pattern."*

Overall, these factors indicate the landscape has the strategic capacity to effectively accommodate the proposed development without an unacceptable and detrimental change to its inherent character or visual amenity.

This is reinforced by the findings of this assessment which demonstrate that any significant effects are limited to within approximately 1.5km from the turbine location and overall, the proposed development avoids significant landscape and cumulative effects on important landscape features such as Kinpurney Monument and Auchterhouse hillfort.

Furthermore, from many of the nearby open hill summits and from views across the Vale of Strathmore of the sensitive skyline, the landscape character and quality is already significantly compromised by Ark Hill windfarm which limit the changes that would be introduced by the proposed development.

Although significant visual effects are predicted on a number of dwellings within 1.5km from the proposed turbine location, effects are not judged to be overbearing on residential amenity given the distance from turbine and the relatively limited extent of view a single turbine would affect. The nature of any significant visual effects is **unlikely to result in significant effects on residential amenity**.

In considering the overall acceptability of the scheme, it is important to consider that where any significant visual effects on residents have been identified, these often relate to views from a limited number of rooms that may have direct and open views of the turbine. In many instances, the primary orientation of dwellings would be in the opposite direction to the proposed development and as such, views from these rooms would be unaffected.

**In conclusion, the findings of this assessment, in context of the policy framework, indicate that the proposed development would be acceptable in landscape and visual terms, notwithstanding the predicted significant but limited effects that would occur in close proximity to the site.**



## 6. Soils & Hydrology

This chapter addresses soils, hydrology and hydrogeology in the existing environment, identifies the potential impacts of the proposed development and outlines measures to mitigate concerns as required.

The activities involved with the construction, operation and decommissioning of the wind turbine could have an impact on the hydrological elements within the surrounding area. All hydrological and hydrogeological impacts are examined including impacts on any watercourses, lochs, groundwater, other water features and sensitive receptors. Where necessary, mitigation measures have been outlined to prevent erosion, pollution, sedimentation or discolouration of receptors.

Such issues are thought to be minor at this site. Nevertheless, the risk of any negative effects have been evaluated and appropriately mitigated where necessary.

### 6.1. Methodology

The methodology used to assess the impact of the proposed development is described as follows:

- All geological and hydrological information available is gathered and potential receptors that may be at risk from the proposed development are identified;
- Each activity of the development such as construction, operation and decommissioning is assessed for the potential to create a pollution risk; and
- Proposed mitigation measures and preventative actions are detailed, as appropriate.

### 6.2. Baseline Assessment

Relevant legislation and guidance is highlighted in Table 19 below.

Legislation/Guidelines	Source of information
Legislation	<ul style="list-style-type: none"> <li>- Town &amp; Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011</li> <li>- Flood Risk Management (Scotland) Act 2009</li> <li>- Water Environment (Controlled Activities) Regulations 2005 (CAR)</li> <li>- Water Framework Directive (2000/60/EC)(WFD) and Water Environment and Water Services (Scotland) Act 2003 (WEWSA)</li> <li>- Water Resources Act 1991</li> <li>- Control of Pollution Act 1974 (as amended) (COPA)</li> </ul>
SEPA Policies	<ul style="list-style-type: none"> <li>- No. 19: Groundwater Protection Policy for Scotland, Dec 2003</li> <li>- No. 26: Policy on the Culverting of Watercourses</li> <li>- No. 54: Land Protection Policy</li> </ul>
Scottish Planning Policies	<ul style="list-style-type: none"> <li>- SPP (2010) – Flooding &amp; Drainage</li> </ul>
Planning Advice Notes (PANs)	<ul style="list-style-type: none"> <li>- PAN 51: Planning, Environmental Protection and Regulation</li> <li>- PAN 58: Environmental Impact Assessment</li> <li>- PAN 61: Planning and Sustainable Urban Drainage Systems</li> <li>- PAN 79: Water and Drainage</li> </ul>

Legislation/Guidelines	Source of information
SEPA Pollution Prevention Guidelines (PPGs)	<ul style="list-style-type: none"> <li>- PPG1: General guide to the prevention of water pollution</li> <li>- PPG4: The disposal of sewage where no mains drainage is available</li> <li>- PPG5: Works in, near or liable to affect watercourses</li> <li>- PPG6: Working at construction and demolition sites</li> <li>- PPG8: Safe storage and disposal of used oil</li> <li>- PPG21: Pollution incident response planning</li> </ul>
Other Guidelines	<ul style="list-style-type: none"> <li>- CIRIA: Environmental Good Practice on Site</li> <li>- CIRIA: Control of water pollution from construction sites, C532, 2001</li> <li>- CIRIA: Control of water pollution from linear construction projects</li> <li>- Department of Environment (DoE) – PPG14 – Development on Unstable Land (1990)</li> </ul>

**Table 19: Relevant policy and guidelines for hydrology assessment**

### 6.2.1. Site Context

This chapter details the existing geological, hydrological and hydrogeological conditions at the site and its surroundings. This includes information on nearby watercourses, groundwater and any potential risks of flooding.

#### Soils

The site is located within the Midland Valley of Scotland. The geology of the area is part of the Scone Sandstone Formation<sup>9</sup> and is described as follows:

*"Purple-brown and purple-grey, fine- to coarse-grained, commonly cross-bedded sandstones with subsidiary siltstone, mudstone, conglomerate, sparse andesitic lava flows and some calcareous beds with concretionary limestones towards the top."*

#### Surface Water

From the 1:10,000 OS map in Figure 9 below, it is seen that the nearest surface water feature is the spring which 'issues' approximately 200m to the east of the proposed turbine location before running in a west-east direction for approximately 300m before it 'sinks' underground. This surface water feature is not a drinking water supply. The site of the proposed turbine will drain in a south-north direction towards Dean Water approximately 3.75km to the north east.

<sup>9</sup> As defined by British Geological Society, <http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html>, accessed 27/08/2013.



**Figure 9: Ingliston Farm turbine location**

### Groundwater & Hydrogeology

Groundwater is present under most landforms, although some geological formations are more permeable than others. Any groundwater within the area may be used as a source of water and is also essential for irrigation within highly productive agricultural areas. The hydrogeology at the site has been examined to determine whether any groundwater at the site is at risk of contamination.

The site of the proposed development is underlain by the Vale of Strathmore bedrock and extensive sand and gravel aquifers (I.D 150261) which covers an area of 402.08km<sup>2</sup>. The quality of the groundwater has been classified as good with high confidence and the quantity of groundwater has been classified as poor with medium confidence in 2008<sup>10</sup>.

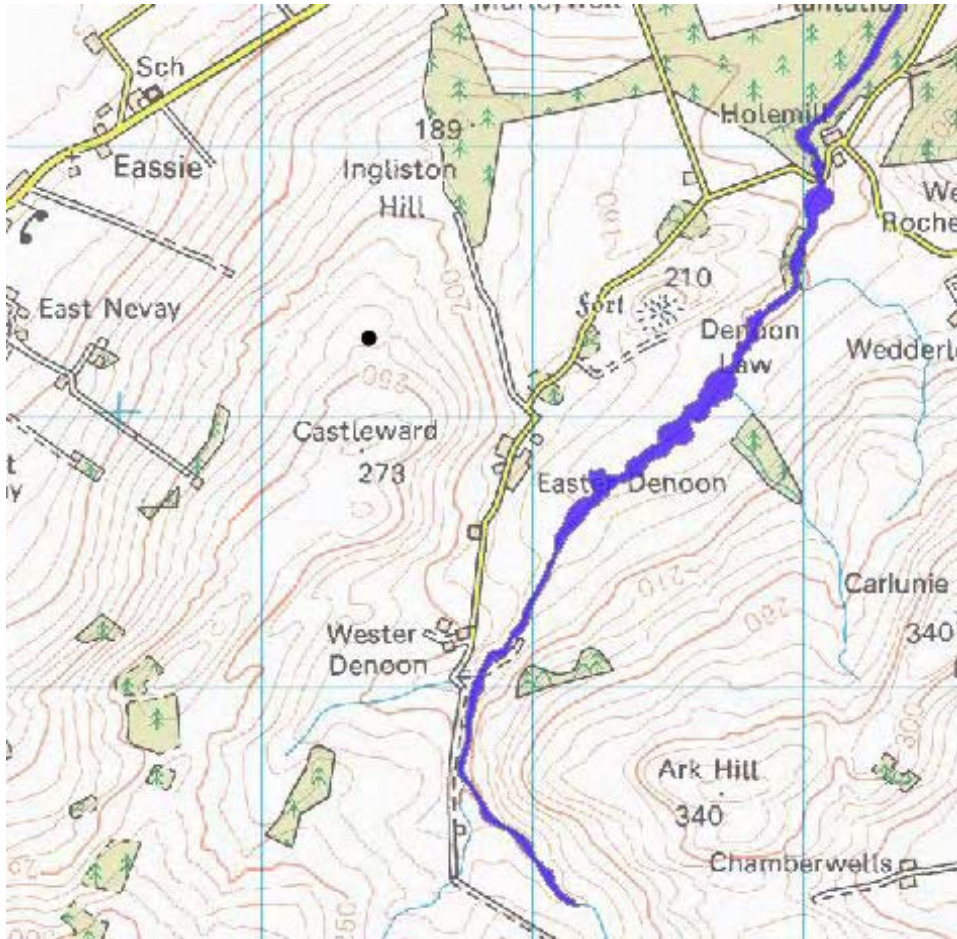
Despite the above, the Carnoustie bedrock and localised sand and gravel aquifers is classified as a Drinking Water Protection Zone. The Scottish Government has identified these areas as those which are used for the abstraction of water for human consumption, which provides more than 10m<sup>3</sup>/day as an average, or serve more than 50 persons.

<sup>10</sup> As defined by SEPA, <http://gis.sepa.org.uk/rbmp/>, accessed 27/08/2013.

Any reduction in the quality of the groundwater resource is of potential concern and should be avoided.

### Flooding in the Vicinity of the Site

The areas shaded in blue in Figure 10 below are those areas identified by SEPA as being at risk to flooding from rivers<sup>11</sup>. The nearest river to the proposed development which is at risk to flooding is Elliot Water to which the proposed development site is likely to drain. Any significant increase in run-off would have the potential to increase the risk of flooding already presented by Elliot Water, and should therefore be avoided.



**Figure 10: Flooding Risk in Vicinity of Proposed Wind Turbine Development**

The total area of new permanent hardstanding associated with the proposed development is approximately 0.64 hectares (ha). The increase in run-off associated with this is considered negligible and will not have an impact on flooding in the receiving catchment.

<sup>11</sup> As defined by SEPA, [http://www.sepa.org.uk/flooding/flood\\_extent\\_maps/view\\_the\\_map.aspx](http://www.sepa.org.uk/flooding/flood_extent_maps/view_the_map.aspx), accessed 27/08/2013.

## 6.3. Impact Assessment

### 6.3.1. Soils

The permanent proposed works require the construction of a turbine foundation on an area of 169m<sup>2</sup>, hardstanding of 700m<sup>2</sup> and approximately 1.37km of new access road on an area of permanent grassland.

There will also be the creation of a temporary borrow pit, which will extend the excavated area temporarily, as highlighted in Drawing ING103. The total excavated area will be 92m x 44m and this will include part of the access track, the crane hardstanding, access pad and turbine foundations. The subsoil removed to expose the borrow pit area will be used to re-instate the existing grassland up to the edge of the permanent development, once construction works are completed.

The removal of subsoil and bedrock to form a borrow pit, turbine base, access road and crane pad, in addition to the interference with existing site drainage is a direct permanent effect that, without mitigation, could alter the existing hydrogeological balance of the site.

The existing environment is a modified one due to existing agricultural activities and existing drainage characteristics, but generally consists of surface water runoff which is largely non-intercepted. The potential additional impacts of the development on the soils, hydrology and hydrogeology of the site are listed below:

- The excavation and removal of the subsoils and bedrock will be necessary at the proposed turbine location and for new areas of road formation. This could have a direct permanent impact on these soils and rock in the form of increased erosion and sediment release, which could in turn have additional impacts on water quality (due to sedimentation of water courses);
- The dewatering of excavations with inappropriate disposal of excess water can potentially lead to erosion or undercutting of slopes or saturation and weakening of materials;
- Soil compaction can occur due to movement of construction and maintenance traffic. This could lead to an increase in runoff and subsequently to an increase in flooding and erosion; and
- Removal of soils can result in the exposure of the underlying rock to sources of contamination. Chemical pollution could occur as a result of spillage or leakage of chemicals, runoff from vehicle washing facilities, unset concrete, storage of fuels or refuelling activities, etc. Chemical pollutants could enter groundwater supplies and have implications for damage to ecology and local water supplies.

### 6.3.2. Surface water

During each phase of the wind turbine development (construction, operation and decommissioning), a number of activities will take place on site, some of which will have the potential to affect the hydrological regime or water quality at the site or its vicinity.

#### Potential Construction Impacts

The main potential impact of the development on water quality is an increase in sediment during the construction phase. There is also the potential for oil spillages from tanks and machinery on site. A list of risks to surrounding water bodies that require appropriate mitigation measures is provided below:

- Chemical pollution – potential pollutants include spillage or leakage of chemicals, runoff from vehicle wash down facilities, unset concrete, fuel or oil, during use or storage on



site. Such pollutants can damage the ecology and quality of affected soils, watercourses and groundwater, affecting biodiversity, fish stocks and water supplies;

- Erosion and sediment release – high levels of sediment can damage fish populations, flood storage capacity and water sources. Spoil heaps from excavations for the turbine base and borrow pit will be stored temporarily; if left exposed, this could lead to an increase in silt-laden run-off draining off site;
- Soil compaction – movement of construction traffic can lead to compaction of the soil, reducing soil permeability and rainfall infiltration;
- Increase in runoff – areas of hard standing will cause local increases in runoff volume. This could influence rates of soil erosion, and alter the way local streams respond to storm rainfall;
- Cable trenches could act as a conduit for surface water flows;
- Incorrect site management of excavations for both the access track and borrow pit which could lead to loss of solids and nutrients to surface waters; and
- The construction of new infrastructure (site tracks) has the potential to obstruct existing overland flow.

The construction phase is most likely to give rise to environmental impacts as many of the associated activities have a direct influence on the amount of water, and the amount of suspended solids in the water, arising on the site. Impacts on water quality in the network of streams draining the development could affect receptors sited at some considerable distance from the proposed development. Chemical contamination of ground and surface waters is a risk throughout all phases of construction activity and requires appropriate control and management.

### **Potential Operational Impacts**

When operational, the development will have a negligible effect on surface water quality as there will be no further disturbance of soils post construction. Given that the soil extracted to expose the bedrock for the borrow pit will also be re-instated, it is not envisaged that there will be any operational impacts from the inclusion of the borrow pit.

Due to the insignificant increase in potential run-off from the site, commitment to best practice construction activities and the minimal requirement for new infrastructure, there will be negligible release of sediment to the watercourses from site operations.

During the operational phase, small quantities of oil will be used in cooling the turbine transformer. Whilst there is potential for oil spills they are in no way likely to be significant, given the low volumes of oil present and the presence of the transformer in an internal structure.

### **Potential Decommissioning Impacts**

Potential impacts during the decommissioning stage, albeit at a lesser scale, will be similar to those relating to the construction phase.

### **6.3.3. Groundwater**

In order to protect the bedrock from entry of contaminants, mitigation measures will be put in place to deal with concrete displacement within the bedrock.

Pending site investigations, it is expected that the turbine foundation will be dug at a maximum depth of approximately 2.5m and there is a low risk that groundwater will be present at this level. This will be investigated during the pre-construction ground investigation

works and will determine whether sensitive disposal of groundwater at the foundation is necessary.

## 6.4. Mitigation Measures

Mitigation measures for this wind development will focus on preventing the disturbance and pollution of soil, watercourses and groundwater. With regards to surface water contamination, new drainage pathways may be introduced and carry contaminated run-off. Mitigation measures to prevent these scenarios are outlined within this chapter.

### 6.4.1. Soils

- The designers will carry out a design risk assessment to evaluate risk levels for the construction, operation and maintenance of the works. Identified risks will be minimised by the application of the principles of avoidance, prevention and protection. Information on residual risks will be recorded and relayed to appropriate parties;
- A method statement for each element of the works will be prepared prior to any element of the work being carried out;
- Details of the relevant assumptions, relating to methods and sequencing of work will be provided to the contractor;
- No amendments to the designed works will be carried out without the prior approval of a suitably qualified and experienced engineer;
- Prior to construction, a site-specific environmental management plan for construction will be prepared in consultation with the relevant statutory bodies;
- Excavation works associated with the construction phase of the development will be monitored by suitably qualified and experienced engineering personnel; and
- The programming of the works will be such that earthworks/excavations are not scheduled to be carried out during severe weather conditions. Where such weather is forecast, suitable measures will be taken to secure the works.

### 6.4.2. Surface Water

- During construction any oil, fuel or other chemicals will be stored in a suitable temporary storage area. Oil spill cleanup materials will also be stored on site throughout the construction period;
- It is anticipated that concrete will be delivered ready made to the site. Provisions will be made to ensure that deliveries are supervised by qualified personnel and site staff should be aware of what to do in the event of spillage. Mitigation measures will be outlined within construction method statements with regards to concrete delivery and will be carried out in accordance with SEPA guidance (particularly PPG6 and PPG13);
- Washing out of the delivery vehicles will be carried out to ensure that washings do not pollute surface water at the site, and it is proposed to undertake the washing out of concrete trucks offsite at the source location;
- Any stored diesel or fuel oils will be bunded to 110% of capacity. The turbine transformer enclosure will be self-contained or bunded to preclude the release of contaminants to the environment;
- Regular visual inspections of the surrounding burns will be undertaken during the construction phase to examine the turbidity and clarity of the water;



- Underground cables will be laid in small trenches that are parallel to access tracks as far as possible. Trenches will be dug during dry weather periods and the cables will be laid quickly and backfilled to minimise water entering the trenches. Suitable drainage measures will be detailed within the construction method statement and will accord with best practice in the SUDS manual C697;
- Where possible construction will take place from existing tracks, building the new site roads ahead of machinery, such that excavators will avoid operating on bare soils;
- No work will take place on site during severe weather conditions; and
- Soil will be re-instated to the borrow pit area as soon as excavation and construction are complete, so any impacts on increased surface water drainage will be temporary.

### **6.4.3. Groundwater & Hydrology**

As with any construction project there is a risk of a pollution spill that may enter the water table and contaminate groundwater. It is considered that this risk can be satisfactorily mitigated through use of best practice construction methods. This will require compliance with all of the guidance contained in the relevant Pollution Prevention Guidance (PPG) notes listed in Table 19.

An assessment of groundwater levels at the turbine location will be carried out prior to construction. A borehole will be made to assess whether groundwater is present. This will be carried out as part of a pre-construction soil investigation survey. In the unlikely event that groundwater is present at this depth it will be necessary to temporarily lower the ground water level to avoid any contamination from materials used for the turbine foundations.

### **6.5. Conclusion**

Detailed mitigation measures have been provided with regard to the design, construction and maintenance of the proposed development. Provided that these mitigation measures are adhered to, the impacts on soils, surface water and groundwater are considered to be negligible.

## 7. Socioeconomic

### 7.1. Methodology

This chapter will outline the socioeconomic profile of the area as well as describing the tourism and recreational activity within the area. An assessment will then be made on the effect of the proposed wind development on the local economy and tourism sector through consideration of the key business and tourist sites in the region and any relevant previous studies regarding the social/economic impact of wind turbines.

### 7.2. Baseline Assessment

#### 7.2.1. Site Characteristics

The site lies in a predominantly upland agricultural setting, within the boundary of The Newtyle & Eassie Community Council, within the Ward of Kirriemuir and Dean. Tourism and recreation is locally important but is considered to be of a lesser importance to other employment sectors in the immediate area. There are a number of tourist attractions that are important in terms of their cultural heritage value in the local area.

#### 7.2.2. Population

An overview of the demographics of the surrounding area is provided in Table 20 below.

Area	Total resident population (all ages)
Immediate Output Area <sup>12</sup>	168
Dundee	154,674
Angus	108,400
Scotland	5,062,011

**Table 20: Population of area surrounding Ingliston Farm (2001 Census data)**

#### 7.2.3. Economic Activity

Employment data was provided from the 2001 Census for the immediate area and for Dundee, with the Scotland wide average provided as a comparison. This information is provided in Table 21 below.

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<sup>12</sup> Output area related to the wider postcode area of DD8 1SP, [www.scot.nhs.uk](http://www.scot.nhs.uk)

	<b>Immediate Output Area</b>	<b>Dundee</b>	<b>Scotland</b>
All persons aged 16-74 in employment	87	58,073	2,163,035
<b>% employed in each sector</b>			
- % A. Agriculture and hunting and forestry	25.29	0.55	2.2
- % B. Fishing	2.3	0.03	0.31
- % C. Mining and quarrying	0	0.6	1.29
- % D. Manufacturing	10.34	16.24	13.65
- % E. Electricity and gas and water supply	0	0.95	1.02
- % F. Construction	4.6	7.12	7.76
- % G. Wholesale & retail trade and repairs	10.34	14.71	13.3
- % H. Hotels and restaurants	4.6	4.63	4.95
- % I. Transport and storage and communication	4.6	6.26	6.89
- % J. Financial intermediaries	4.6	2.86	4.74
- % K. Real estate and renting and business activities	9.20	9.77	11.42
- % L. Public administration and defence and social security	2.30	6.08	7.23
- % M. Education	6.90	9.1	7.42
- % N. Health and social work	9.20	15.84	12.63
- % O.P.Q. Other	5.75	5.25	5.18

**Table 21: Summary of employment for immediate area and wider zones**

Over 25% of the population within the immediate area are employed in 'agriculture, hunting and forestry'; this is considerably higher than both the Dundee and Scotland averages. No data was found relating to employment within the Community Council ward but the key employment type is again expected to be agriculture given the rural nature of the majority of the area.

#### **7.2.4. Tourist Activity**

An assessment of existing tourist attractions in the locality was undertaken. The assessment focused on those attractions where the scenic value of the surrounding landscape is important to the draw and/or enjoyment of the attraction. The extent of the assessment was limited to a 10km radius from the turbine as visual impacts are considered to be of greatest significance within this zone. Table 22 below lists the identified attractions.

<b>Tourist Site</b>	<b>Description</b>	<b>Distance to proposed turbine (closest point)</b>
Angus Core Paths Network	Walking Route	1.4km
Kinpurney Hill	Scheduled Monument and Walking Route	3.3km
Auchterhouse Hill	Walking Route	4.7km
Glamis Castle	A Listed Building and Gardens and Designed Landscapes	5.0km
Airlie Castle	National Nature Reserve and Gardens and Designed Landscapes	7.9km
Clatto Country Park	Country Park	9.8km

**Table 22: Tourist activity within the area**

Further discussion regarding the impact on tourism on these attractions is provided in the following chapter.

### **7.3. Impact Assessment**

The direct and indirect impacts of the proposed development on the local area can be separated into the following areas:

1. Economic benefits for the landowner;
2. Economic and social benefits for the local community;
3. Economic benefits from construction and operation;
4. Potential adverse impacts on the wider community; and
5. Potential impact on wider tourism and recreation assets.

The potential impact of the development on each of the above areas is discussed further below.

#### **7.3.1. Economic Benefit for the Landowner**

Agricultural incomes can vary significantly year on year due to variations in weather conditions, crop quality and yield, market prices, exchange rates, and operational costs for fertiliser, fuel etc. The forthcoming reforms (2014 onwards) to direct payments under the Common Agricultural Policy (CAP) are also a concern.

The combined effect of these uncertainties has prompted the landowner to explore alternative sources of income to help support his business in the long-term. In this respect, the proposed turbine will provide a guaranteed additional source of income over the 25 year expected operational period. The proposed development also has a minimal footprint therefore current farming operations will be largely unaffected.

In addition to the considered suitability of the land for wind energy, the non-agricultural nature of the project also reduces the level of financial risk through diversification outwith the farming sector. In this respect, the renewable energy market is quite stable when compared to other sectors such as agriculture, especially after the introduction of the Feed in Tariff (FIT).

The development of a wind turbine at Ingliston Farm would lead to an additional sustainable source of income for the farmer, Mr Shaw. In addition to providing an additional source of income, the electricity generated by the proposed development will offset a key expense to the