Inverclyde council

AGENDA ITEM NO. 2(b)

Local Review Body **7 October 2015**

Continued Planning Application for Review

Resume consideration of a request for review of refusal of planning permission which the Local Review Body at the meeting held on 5 August 2015 decided to continue for an unaccompanied site inspection.

Texas Instruments
Erection of 77.8m to blade tip wind turbine:
36 Earnhill Road, Greenock (14/0392/IC)

Contents

PLANNING APPLICATION AND PLANS

Inverclyde council

Municipal Buildings Clyde Square Greenock PA15 1LY

Tel: 01475 712 406

Fax: 01475 712 468

Email: planning.dlm@inverclyde.gov.uk

Applications cannot be validated until all necessary documentation has been submitted and the required fee has been paid.

Thank you for completing this application form:

ONLINE REFERENCE 000076803-002

The online ref number is the unique reference for your online form only. The Planning Authority will allocate an Application Number when your form is validated. Please quote this reference if you need to contact the Planning Authority about this application.

Type of Application

What is this application for? Please select one of the following: *

We strongly recommend that you refer to the help text before you complete this section.

- [x] Application for Planning Permission (including changes of use and surface mineral working)
- [ ] Application for Planning Permission in Principle
- [ ] Further Application, (including renewal of planning permission, modification, variation or removal of a planning condition etc)
- [ ] Application for Approval of Matters specified in conditions

Description of Proposal

Please describe the proposal including any change of use: * (Max 500 characters)

The proposal is to install a single 500kW wind turbine connected into the electricity supply for Texas Instruments production facility.

Is this a temporary permission? * [ ] Yes [x] No

If a change of use is to be included in the proposal has it already taken place? (Answer 'No' if there is no change of use.) * [ ] Yes [x] No

Have the works already been started or completed? *

[x] No [ ] Yes - Started [ ] Yes - Completed

Applicant or Agent Details

Are you an applicant, or an agent? * (An agent is an architect, consultant or someone else acting on behalf of the applicant in connection with this application) [ ] Applicant [x] Agent

Agent Details

Please enter Agent details

Company/Organisation:	Synergie Environ Ltd
Ref. Number:	
First Name: *	Guy
Last Name: *	Robertson
Telephone Number: *	07827 322 535
Extension Number:	
Mobile Number:	
Fax Number:	
Email Address: *	guy.robertson@synergie-environ.co.uk

You must enter a Building Name or Number, or both:*

Building Name:	
Building Number:	247
Address 1 (Street): *	Westburn Road
Address 2:	
Town/City: *	Aberdeen
Country: *	UK
Postcode: *	AB25 2QH

Is the applicant an individual or an organisation/corporate entity? *

☐ Individual ☑ Organisation/Corporate entity

Applicant Details

Please enter Applicant details

Title:	Mr
Other Title:	
First Name:	Kenny
Last Name:	Goodwin
Company/Organisation: *	Texas Instruments
Telephone Number:	01475 655213
Extension Number:	
Mobile Number:	07791 442536
Fax Number:	01475 639336
Email Address:	kenny.goodwin@ti.com

You must enter a Building Name or Number, or both:*

Building Name:	Texas Instruments
Building Number:	
Address 1 (Street): *	Larkfield Industrial Estate
Address 2:	
Town/City: *	Greenock
Country: *	United Kingdon
Postcode: *	PA16 0EQ

Site Address Details

Planning Authority: Inverclyde Council

Full postal address of the site (including postcode where available):

Address 1:		Address 5:	
Address 2:		Town/City/Settlement:	
Address 3:		Post Code:	
Address 4:			

Please identify/describe the location of the site or sites.

Texas Instruments

Northing	676089	Easting	223161

Pre-Application Discussion

Have you discussed your proposal with the planning authority? * ☑ Yes ☐ No

Pre-Application Discussion Details

In what format was the feedback given? *

☐ Meeting ☑ Telephone ☑ Letter ☑ Email

Please provide a description of the feedback you were given and the name of the officer who provided this feedback. If a processing agreement [note 1] is currently in place or if you are currently discussing a processing agreement with the planning authority, please provide details of this. (This will help the authority to deal with this application more efficiently.) * (Max 500 characters)

An initial screening letter was sent to Guy Phillips who responded to say that a formal EIA was not required. The response included pre-planning advice on the scope of required supporting information, referring specifically to landscape and visual impacts, noise, shadow flicker, infrastructure, natural heritage (including avian interests), and aviation. Subsequent correspondence provided further guidance with regard to the scope of assessment required in these areas.

Title:	Mr	Other title:	
First Name:	Guy	Last Name:	Phillips
Correspondence Reference Number:	12/0014/screen	Date (dd/mm/yyyy):	06/11/12

Note 1. A processing agreement involves setting out the key stages involved in determining a planning application, identifying what information is required and from whom and setting timescales for the delivery of various stages of the process.

Site Area

Please state the site area: 0.18

Please state the measurement type used: ☑ Hectares (ha) ☐ Square Metres (sq.m)

Existing Use

Please describe the current or most recent use: (Max 500 characters)

Industrial

Access and Parking

Are you proposing a new or altered vehicle access to or from a public road? * ☐ Yes ☑ No

If Yes please describe and show on your drawings the position of any existing, altered or new access points, highlighting the changes you propose to make. You should also show existing footpaths and note if there will be any impact on these.

Are you proposing any changes to public paths, public rights of way or affecting any public rights of access? * ☐ Yes ☑ No

If Yes please show on your drawings the position of any affected areas highlighting the changes you propose to make, including arrangements for continuing or alternative public access.

How many vehicle parking spaces (garaging and open parking) currently exist on the application site? * 0

How many vehicle parking spaces (garaging and open parking) do you propose on the site (i.e. the total of existing and any new spaces or a reduced number of spaces)? * 0

Please show on your drawings the position of existing and proposed parking spaces and identify if these are for the use of particular types of vehicles (e.g. parking for disabled people, coaches, HGV vehicles, cycle spaces).

Water Supply and Drainage Arrangements

Will your proposal require new or altered water supply or drainage arrangements? * ☐ Yes ☑ No

Do your proposals make provision for sustainable drainage of surface water? (e.g. SUDS arrangements) * ☐ Yes ☑ No

Note: -

Please include details of SUDS arrangements on your plans

Selecting 'No' to the above question means that you could be in breach of Environmental legislation.

Are you proposing to connect to the public water supply network? *

☐ Yes

☐ No, using a private water supply

☑ No connection required

If No, using a private water supply, please show on plans the supply and all works needed to provide it (on or off site).

Assessment of Flood Risk

Is the site within an area of known risk of flooding? * ☐ Yes ☑ No ☐ Don't Know

If the site is within an area of known risk of flooding you may need to submit a Flood Risk Assessment before your application can be determined. You may wish to contact your Planning Authority or SEPA for advice on what information may be required.

Do you think your proposal may increase the flood risk elsewhere? * ☐ Yes ☑ No ☐ Don't Know

Trees

Are there any trees on or adjacent to the application site? * ☐ Yes ☑ No

If Yes, please mark on your drawings any trees, known protected trees and their canopy spread close to the proposal site and indicate if any are to be cut back or felled.

Waste Storage and Collection

Do the plans incorporate areas to store and aid the collection of waste (including recycling)? * ☑ Yes ☐ No

If Yes or No, please provide further details:(Max 500 characters)

A high level Site Waste Management Plan (document ref SEL/TI03) has been provided as part of the planning submission. This will be refined in due course and more specific proposals and arrangements submitted to and agreed with the planning authority in advance of construction work being carried out.

Residential Units Including Conversion

Does your proposal include new or additional houses and/or flats? * ☐ Yes ☑ No

All Types of Non Housing Development - Proposed New Floorspace

Does your proposal alter or create non-residential floorspace? * ☐ Yes ☑ No

Schedule 3 Development

Does the proposal involve a form of development listed in Schedule 3 of the Town and Country Planning (Development Management Procedure (Scotland) Regulations 2013 * ☐ Yes ☑ No ☐ Don't Know

If yes, your proposal will additionally have to be advertised in a newspaper circulating in the area of the development. Your planning authority will do this on your behalf but will charge you a fee. Please check the planning authority's website for advice on the additional fee and add this to your planning fee.

If you are unsure whether your proposal involves a form of development listed in Schedule 3, please check the Help Text and Guidance notes before contacting your planning authority.

Planning Service Employee/Elected Member Interest

Is the applicant, or the applicant's spouse/partner, either a member of staff within the planning service or an elected member of the planning authority? * ☐ Yes ☑ No

Certificates and Notices

CERTIFICATE AND NOTICE UNDER REGULATION 15 – TOWN AND COUNTRY PLANNING (DEVELOPMENT MANAGEMENT PROCEDURE) (SCOTLAND) REGULATIONS 2013

One Certificate must be completed and submitted along with this application form. This is most usually Certificate A, Form 1, Certificate B, Certificate C or Certificate E.

Are you/the applicant the sole owner of ALL the land ? * ☑ Yes ☐ No

Is any of the land part of an agricultural holding? * ☐ Yes ☑ No

Certificate Required

The following Land Ownership Certificate is required to complete this section of the proposal:

Certificate A

Land Ownership Certificate

Certificate and Notice under Regulation 15 of the Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013

Certificate A

I hereby certify that –

(1) - No person other than myself/the applicant was an owner (Any person who, in respect of any part of the land, is the owner or is the lessee under a lease thereof of which not less than 7 years remain unexpired.) of any part of the land to which the application relates at the beginning of the period of 21 days ending with the date of the accompanying application.

(2) - None of the land to which the application relates constitutes or forms part of an agricultural holding.

Signed: Guy Robertson

On behalf of: Texas Instruments

Date: 28/11/2014

☑ Please tick here to certify this Certificate. *

Checklist - Application for Planning Permission

Town and County Planning (Scotland) Act 1997

The Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013

Please take a few moments to complete the following checklist in order to ensure that you have provided all the necessary information in support of your application. Failure to submit sufficient information with your application may result in your application being deemed invalid. The planning authority will not start processing your application until it is valid.

a) If this is a further application where there is a variation of conditions attached to a previous consent, have you provided a statement to that effect? *

☐ Yes ☐ No ☑ Not applicable to this application

b) If this is an application for planning permission or planning permission in principal where there is a crown interest in the land, have you provided a statement to that effect? *

☐ Yes ☐ No ☑ Not applicable to this application

c) If this is an application for planning permission, planning permission in principle or a further application and the application is for development belonging to the categories of national or major developments (other than one under Section 42 of the planning Act), have you provided a Pre-Application Consultation Report? *

☐ Yes ☐ No ☑ Not applicable to this application

Town and County Planning (Scotland) Act 1997

The Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013

d) If this is an application for planning permission and the application relates to development belonging to the categories of national or major developments and you do not benefit from exemption under Regulation 13 of The Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013, have you provided a Design and Access Statement? *

☐ Yes ☐ No ☑ Not applicable to this application

e) If this is an application for planning permission and relates to development belonging to the category of local developments (subject to regulation 13. (2) and (3) of the Development Management Procedure (Scotland) Regulations 2013) have you provided a Design Statement? *

☐ Yes ☐ No ☑ Not applicable to this application

f) If your application relates to installation of an antenna to be employed in an electronic communication network, have you provided an ICNIRP Declaration? *

☐ Yes ☐ No ☑ Not applicable to this application

g) If this is an application for planning permission, planning permission in principle, an application for approval of matters specified in conditions or an application for mineral development, have you provided any other plans or drawings as necessary:

- ☐ Site Layout Plan or Block plan.
- ☐ Elevations.
- ☐ Floor plans.
- ☐ Cross sections.
- ☐ Roof plan.
- ☐ Master Plan/Framework Plan.
- ☐ Landscape plan.
- ☐ Photographs and/or photomontages.
- ☐ Other.

Provide copies of the following documents if applicable:

A copy of an Environmental Statement. *	☐ Yes	☑ N/A
A Design Statement or Design and Access Statement. *	☐ Yes	☑ N/A
A Flood Risk Assessment. *	☐ Yes	☑ N/A
A Drainage Impact Assessment (including proposals for Sustainable Drainage Systems). *	☐ Yes	☑ N/A
Drainage/SUDS layout. *	☐ Yes	☑ N/A
A Transport Assessment or Travel Plan. *	☑ Yes	☐ N/A
Contaminated Land Assessment. *	☐ Yes	☑ N/A
Habitat Survey. *	☑ Yes	☐ N/A
A Processing Agreement *	☐ Yes	☑ N/A

Other Statements (please specify). (Max 500 characters)

All other relevant supporting information is provided in the attached Planning Environmental Report and Associated Appendices. A Construction Environmental Management Document and Site Waste Management Plan are also attached to support the planning application.

Declare - For Application to Planning Authority

I, the applicant/agent certify that this is an application to the planning authority as described in this form. The accompanying plans/drawings and additional information are provided as a part of this application .

Declaration Name: Guy Robertson

Declaration Date: 28/11/2014

Submission Date: 28/11/2014

Payment Details

Cheque: Synergie Environ Ltd, 100302

Created: 28/11/2014 15:13

REPORT OF HANDLING DATED 6 MARCH 2015

Inverclyde council

REPORT OF HANDLING

Report By:	**Guy Phillips**	**Report No:**	**14/0392/IC**
			Local Application Development
Contact Officer:	**01475 712422**	**Date:**	**6th March 2015**
Subject:	**Erection of 77.8m to blade tip wind turbine at 36 Earnhill Road, Greenock**		

SITE DESCRIPTION

The Texas Instruments factory is on the north-west side of Earnhill Road, within Larkfield Industrial Estate, Greenock. The industrial estate is in an elevated location (approximately 140-150m AOD) visible over extensive parts of the built-up areas of Greenock and Gourock. From further afield at the Greenock Cut, within Clyde Muirshiel Regional Park, and across the Clyde Estuary towards Argyll the Texas Instruments factory and its associated cooling towers are prominent. Residential properties to the site lie nearby at Banff Road in Larkfield (approximately 300m to south-east) and at Moorfoot Drive in Trumpethill, Gourock (approximately 530m to the north).

PROPOSAL

It is proposed to construct a 77.8m to blade tip wind turbine to the north-west of the factory's north-east (side) car park. The planning application is accompanied by a planning environmental report, landscape and visual impact appraisal, noise impact assessment, shadow flicker assessment, carbon balance assessment, habitat and protected terrestrial mammal survey, natural heritage information desk study, NATS technical and operational assessment, ground investigation, site waste management plan, construction environmental management document, wind turbine scoping report, roadway and platform characteristics document and an engineering coordination memorandum. Wire frame diagrams, photomontages and a zone to view map have also been submitted.

LOCAL DEVELOPMENT PLAN POLICIES

Policy ECN1 : Business and Industrial Areas

(a) - Strategic Economic Locations

The strategic economic locations listed in Schedule 4.1 and identified on the Proposals Map as ECN1 (a) will be safeguarded, with favourable consideration given to:

(i) new development in support of green technologies and business and financial services within the Inverclyde Waterfront Strategic Economic Investment Location (SEIL);
(ii) new development and support for the continuation of current uses for the operation of the international Ocean (Container) Terminal Strategic Freight Transport Hub; and

(iii) new development proposals for business, general industrial and storage or distribution (Use Classes 4, 5 and 6); and all subject to Policy ECN3.

(b) Local Business and Industrial Areas

The business and industrial areas listed in Schedule 4.1 and identified on the Proposals Map as ECN1(b) will be safeguarded, with a presumption in favour of new development proposals for business, general industrial and storage or distribution (Use Classes 4, 5 and 6), subject to Policy ECN3.

(c) Economic Mixed Use Areas

The business and industrial areas listed in Schedule 4.1 and identified on the Proposals Map as ECN1(c) will be safeguarded, and while there will continue to be a presumption in favour of new development proposals for business, general industrial and storage or distribution (Use Classes 4, 5 and 6), other uses that would contribute to permanent employment creation or be clearly supportive of the operation of existing businesses will be supported, provided they are not uses typically associated with Town Centres, subject to Policy ECN3.

(d) Business and Industrial Areas with Potential for Change

The business and industrial areas listed in Schedule 4.1 and identified on the Proposals Map as ECN1(d) will be safeguarded, and while there will be a presumption in favour of new development proposals for business, general industrial and storage or distribution (Use Classes 4, 5 and 6), proposals for uses other than business and industrial will also be given consideration, subject to Policy ECN3 and other relevant policies of the Local Development Plan.

Policy ECN3 : Character and Amenity of Areas for Business and Industrial Use

Within the designated business and industrial areas, development proposals will be assessed against the following criteria, where appropriate:

(a) the scale, siting and design of buildings;
(b) site boundary treatment and landscaping;
(c) infrastructure, transportation, and environmental considerations (including Supplementary Guidance on the Green Network);
(d) assessment against the Council's adopted roads guidance;
(e) compatibility with neighbouring uses; and
(f) impact on the overall supply of land for business and industry.

Policy INF1 - Renewable Energy Developments

The Council will support development required for the generation of energy from renewable sources, unless any economic, environmental and social benefits of the proposal are outweighed by significant adverse effects upon:

(a) natural heritage designations (international and national designations should not be compromised);
(b) the landscape and wider environment;
(c) neighbouring settlements;
(d) tourism, recreation and conservation matters;
(e) the built heritage;
(f) biodiversity and the water environment;
(g) air quality;
(h) road safety and service infrastructure; and
(i) the cumulative effect of such proposals.

Note: Additional information to assist in submitting proposals is contained within the Supplementary Guidance on Renewable Energy.

CONSULTATIONS

Argyll and Bute Council - Argyll & Bute Council has been concerned at the visual impact of windfarm developments around the Clyde Estuary with consequent concerns for their impact on visitor experience and tourism development. Although this application is only for a single turbine, at 77.8m to blade tip it will breach the skyline significantly from many vantage points on the west and north shores of the estuary as evidenced by photomontages at viewpoints 6 (Strone Point), 13 (Hunter's Quay) and 14 (Kilcreggan). It is accepted that the background hills are already adorned with electricity pylons and other apparatus. However, the proposed turbine and the diameter of its rotating blades would represent a much more prominent and discordant feature in the landscape. Argyll & Bute Council, therefore objects to this application on grounds of landscape and visual impact.

Clyde Muirshiel Park Manager - The proposed development introduces a structural irregularity to a landscape that is predominantly of gentle undulating hills with urban fringe. It is therefore incongruous with views in this area and the Regional Park Authority objects to this proposal.

Historic Scotland - Given the presence of industrial buildings in the views from nearby archaeological sites, visual impacts although relatively significant, would not be sufficient to warrant an objection from Historic Scotland. Mitigation of these affects could be achieved by lowering the height of the turbine, perhaps replacing it with two or more much smaller ones. The Council may wish to explore this possibility with the applicant.

Council's Archaeology Consultant – No objections subject to the attachment of the following condition:

"The developer shall secure the implementation of a programme of archaeological investigation which is to be carried out by an archaeological organization acceptable to the Planning Authority. A method statement will be submitted by the applicant and approved by the Planning Authority prior to the commencement of the works."

MOD Safeguarding - No objections.

NATS - CTC - No objections.

Glasgow Airport Safeguarding - The proposed development has been examined from an aerodrome safeguarding perspective and does not conflict with safeguarding criteria. They, therefore, have no objection to this proposal.

Head of Safer and Inclusive Communities – The submitted noise assessment is insufficient to allow a determination as to whether or not there shall be a statutory noise nuisance. In the event of the Council wishing to grant planning permission the applicant should be required to update their noise data as suggested by the objectors. There are reservations with regard to the anticipated effect of shadow flicker beyond the 10 rotor diameter distance contained in Scottish Government guidance. In the event of planning permission being granted conditions should be attached to control the spread of Japanese Knotweed and potential ground contamination along with advisory notes on external lighting, drainage, construction noise, CDM regulations, surface water, and health and safety.

Head of Environmental and Commercial Services – no objections.

PUBLICITY

The application was advertised as there are no premises on neighbouring land.

SITE NOTICES

The nature of the proposal did not require a site notice.

PUBLIC PARTICIPATION

21 written representation have been received, comprising 13 public comments (including from "Save Your Regional Park", "Save Cowal's Hills" and Inverkip & Wemyss Bay Community Council) and 8 online comments (including one by Larkfield, Braeside & Branchton Community Council). All raise objections to planning permission being granted.

The objectors to the proposal are concerned that:

- it is contrary to Local Development Plan policy INF1: Renewable Energy developments where the impact of the proposals in relation to landscape and visual and residential amenity is deemed to be significant and adverse.
- it will have a direct negative and dominant impact upon the residential amenity of neighbouring properties, specifically those of Larkfield, Braeside, Pennyfern, Midton, Trumpethill, Levan Estate and Levan Farm, the recreational amenity enjoyed by users of Gourock Golf Club and the visual amemity of the proposed housing development at Levan Farm. Due to the scale of the turbine and its position above the skyline there shall be an unacceptable adverse visual impact across wide areas of Argyll, the upper Firth of Clyde and the outlook from Clyde Muirshiel Regional Park. Passengers of visiting ships may be deterred from re-visiting.
- in the event that planning permission is granted, a precedent shall be set leading to the erection of further wind turbines on the hill tops around the Clyde Estuary such as a possible proposal for 20 wind turbines at Bachan Burn, behind Dunoon.
- the applicant has not assessed the impact of the proposals on cultural heritage.
- the proposal is contrary to Scottish Planning Policy in relation to the impacts on landscape, residential amenity and shadow flicker.
- the Landscape & Visual Impact appraisal accompanying the planning application may not be up-to-date.
- The submitted Noise Impact Assessment confirms that noise monitoring equipment was stolen during the assessment period. The use of comparative measurements is questioned and the Council should confirm that this method can achieve accurate results in the assessment of whether noise will impact upon schools within the local area and other potentially affected properties. An independently commissioned noise survey determines that the applicant's noise assessment is not competent and in the event that planning permission is to be granted a further assessment is required before the application can be properly determined.
- strobe effects in sunny weather would make the turbine conspicuous.
- property values in the surrounding area shall be reduced.
- high instances of depressions and suicides in humans along with detrimental effects on wildlife, dairy yields, farmyard animal health and productivity regressions have been recorded worldwide around wind turbines.
- there is a danger from falling debris or ice from rotor blades.

ASSESSMENT

The material considerations in the determination of this planning application are the Local Development Plan, supplementary planning guidance on renewable energy, the Landscape Capacity Study for Wind Turbine Development prepared by Land Use Consultants for the Glasgow

and the Clyde Valley Strategic Development Plan Authority, the consultation responses, the written representations and the supporting information submitted with the planning application.

The site is located within an industrial estate where Local Development Plan policies ECN1 and ECN3 apply. However, as a renewable energy development, it is considered appropriate to assess the proposal against national and local planning policy and Scottish Natural Heritage guidance for such developments.

The general planning policy position, stemming from Scottish Planning Policy, is that planning authorities should support the development of a diverse range of renewable energy technologies and that development plans or supplementary guidance must clearly indicate factors that will be taken into account in decision making. The Government itself provides web based renewables advice and this is reflected in policy INF1 of the Local Development Plan and its associated supplementary guidance.

Local Development Plan policy INF1 supports development required for the generation of energy from renewable sources, unless any economic, environmental and social benefits of the proposal are outweighed by significant adverse effects upon the following relevant matters:

(b) the landscape and wider environment;
(c) neighbouring settlements;
(d) tourism, recreation and conservation matters;
(e) the built heritage;
(h) road safety and service infrastructure.

(b) & (c) Landscape and the Wider Environment and Neighbouring Settlements

The supplementary planning guidance on renewable energy classifies the proposed turbine as being of medium scale. As noted by the LVIA accompanying the planning application, the Landscape Capacity Study referred to by the supplementary guidance on renewable energy locates the site on the boundary of Landscape Character Type 20 (Rugged Moorland Hills). The supplementary guidance advises that landscape planning and management should aim to conserve the upland character of these hills. Where possible, the visual influence of existing developments should be reduced. New developments which introduce modern elements or which would undermine the sense of "wildness" and remoteness should be resisted. Overall visual sensitivity is noted as being medium. That said, the site of the proposed wind turbine falls within the built up area. The Landscape Capacity Study is silent upon the ability of the built-up area to absorb renewable energy developments.

The LVIA Viewpoint Appraisal, linked to the 19 viewpoints on the Zone to View Map and associated photomontages and wire frame diagrams, acknowledges that there are substantial effects upon Gourock Golf Club, the residential development at Levan Farm and Banff Road within the Larkfield area of Greenock. From the other 16 viewpoints within the LVIA, effects are assessed to range between low and medium. I concur with the LVIA's conclusion regarding substantial visual impacts in the immediate area surrounding the industrial estate. Larkfield Industrial Estate falls within an area which the Landscape Capacity Study for Wind Turbine Development referred to by the Council's Supplementary Guidance on Renewable Energy confirms is of medium sensitivity. That however is on the basis of the turbine being located on a rugged moorland hill. While the site is on the periphery of such a landscape feature, it is also located within the built-up area where I consider sensitivity to be significantly greater. I do accept, however, that the visual impact of the 77.8m high wind turbine upon the immediate surroundings at Larkfield Industrial Estate is not harmful.

As evidenced by the photomontages accompanying the planning application, however the visual impact of the large turbine is most significant and adverse upon the existing residential areas, golf course and the residential development site in close proximity to the industrial estate. From the sensitive viewpoints at Gourock Golf Club, the existing residential areas of

Trumpethill in Gourock and Larkfield in Greenock and the proposed residential development at Levan Farm I consider the photomontages serve to demonstrate the turbine would be seen as an unexpected and dominant feature, impacting adversely upon the visual amenity enjoyed by a large population of residents, parties engaged in recreational activity and travellers on Inverclyde's road network.

Scottish Government guidance for assessing visual impact indicates that scale is a relevant consideration, taking into account the significance of the landscape and the views, proximity, intervisibility and sensitivity of visual receptors. Similarly, SNH guidance on the siting of small scale wind energy proposals advises that poorly located wind turbines can have a significant impact on landscape and visual/amenity interests. Impacts can be particularly significant if the turbines are too large for the receiving landscape, especially in lowland, populated landscapes where the scale of the turbines will be more apparent. I consider the proposed turbine to be too large for its immediate surroundings and that it has a significant adverse impact upon visual amenity there.

Other potential impacts upon nearby housing in Greenock and Gourock arise from shadow flicker and noise. The Scottish Government's online advice "Onshore Wind Turbines" advises that where separation is provided between wind turbines and nearby dwellings of 10 rotor diameters, shadow flicker should not be a problem. In this instance that figure is approximately 580m. The turbine is, above and to the south of the Midton and Trumpethill areas of Gourock and above and to the north of the Larkfield area of Greenock. There are houses on the south side of Moorfoot Drive and the north-west side of Banff Road which fall within 10 rotor diameters distance. Moorfoot Primary School is similarly affected. The Shadow Flicker Assessment accompanying the planning application concludes that there are three residential properties in Larkfield and Moorfoot Primary School which have the potential to experience shadow flicker above 30 hours per year. The Assessment further concludes that due to the limited number of hours that shadow may potentially be cast and lighting conditions not always coinciding with weather conditions, it is practicable to mitigate for the potential shadow effect by control of the turbine. The assessment does not confirm what measures are to be put in place to ensure that the turbine is prevented from rotating when there is a risk of shadow flicker nuisance. I am, however content that if planning permission was to be granted this matter could be controlled by an appropriately worded condition. I further note that while raising some concern about potential nuisance beyond the 10 rotor diameter distance, the Head of Safer & Inclusive Communities has not raised any objections on grounds of shadow flicker.

The noise impact assessment accompanying the planning application concludes that predicted wind turbine noise levels at all residential properties will be below the measured background noise levels at the site for the wind speeds under which the unit will be operating. The Head of Safer & Inclusive Communities has, however confirmed that he is in agreement with the independently commissioned noise impact assessment submitted by the objectors and concluded that he is unable to determine whether or not the proposed wind turbine shall create a statutory noise nuisance. In the event that the proposal is to be supported, he recommends that the applicant be required to provide further noise data. There are other compelling reasons which persuade me that the proposal cannot be supported. The provision of further noise data would not change my recommendation on the planning application and I am content that there is no justifiable reason to delay determination due to noise concerns.

(d) Tourism, Recreation & Conservation Matters

The turbine's greatest visual impact upon recreation arises at the nearby Gourock Golf Club. The photomontages accompanying the planning application confirm that from the golf course the turbine would appear as a large dominant and animated structure that breaks the skyline. This is further confirmed by the applicant's LVIA which acknowledges impact to be significant upon the golf course. I conclude that enjoyment of the golf course would be adversely impacted by the proposal.

Further recreational impact arises upon more distant viewpoints and I am in agreement with the concerns raised by Argyll & Bute Council, the Clyde Muirshiel Park Authority and the objectors regarding the impact upon parties engaged in recreational pursuits at the Greenock Cut, within Argyll and on the Clyde estuary.

The adjacent Burneven Hill Site of Important Nature Conservation is noted only for its botanical interest. As such, the proposal has no detrimental impact upon it.

(e) The Built Heritage

The objectors' concerns about the applicant's omission of an assessment of the impact of the proposal on cultural heritage has been superseded by the submission of additional information. Historic Scotland and the Council's archaeological advisor have been consulted and neither party has raised any objections to planning permission being granted. The condition recommended to be attached by the archaeological advisor would be acceptable if planning permission was to be granted.

I note Historic Scotland's view that visual impact upon surrounding archaeological sites may be reduced by altering the proposal to two smaller turbines. I do not share this view and, in any event, the proposal requires to be determined as submitted.

(h) Road Safety

There are no objections to the proposal from the Head of Safer & Inclusive Communities including upon the issue of flood risk.

Under policy INF1 the applicant has supplied information in support of the economic benefits of their proposal. It concludes that the proposed wind turbine will allow the Texas Instruments factory to address, in part, issues around energy price instability and rising energy prices, thus allowing the applicant to protect jobs and to continue its extensive program of external community support and development. The applicant would also be willing to discuss any requirements for further community engagement and support, particularly where this can be targeted towards those communities and community members who could potentially be adversely impacted by the development.

Further required by the supplementary guidance to policy INF1 is the safeguarding of aviation interests. The non-objection to the proposal by the MoD, NATS and Glasgow Airport Safeguarding confirms that this issue is satisfactorily addressed.

In response to the objectors' concerns not addressed by the assessment against the Local Development Plan, I am content that the information submitted with the planning application to illustrate landscape and visual impact is sufficient to allow an informed assessment; I am in agreement that sunshine reflecting from the turbine blades may create a strobe effect in bright conditions, however that applies to any wind turbine and does not, I consider provide any specific justification for refusing planning permission; I am aware that there may be a small potential injury risk from ice throw or failure of the structures, however I consider that this does not justify refusal of planning permission; alleged impacts upon human, animal health and property values are not planning considerations that merit refusal of planning permission and; while precedent does not present a justifiable reason for refusing planning permission, I acknowledge the risk to the visual amenity and high quality landscape character of the vista around the Clyde Estuary if other large wind turbines were to be erected around its skyline.

The applicant has provided a socio economic impact assessment which identifies that they are both a significant employer in the area, and as well as competing in a global market, they have to compete with other sites within the company for cost effectiveness. However, given my unfavourable assessment on impacts on landscape and the wider environment, the neighbouring

settlements of Greenock and Gourock and recreation at Gourock Golf Club significantly outweigh any of the potential economic benefits. Accordingly, I consider the proposal fails to accord with criteria (b), (c) and (d) of Local Development Plan policy INF1 and thus determine that the proposal does not merit support.

RECOMMENDATION

That the application be refused for the following reason:

A combination of height, scale, proximity to housing, Gourock Golf Club and hilltop location within the built-up area of Inverclyde, determine that the 77.8m to blade tip wind turbine forms an unexpected and dominant feature over a range of distances, adversely affecting a large population and is, thus, contrary to criteria (b), (c) and (d) of Local Development Plan policy INF1.

Signed:

Case Officer: Guy Phillips

Stuart Jamieson
Head of Regeneration and Planning

CONSULTATION RESPONSES

Guy Phillips

From: David Ashman on behalf of Devcont Planning
Sent: 16 February 2015 08:49
To: Laura Graham
Subject: FW: REMINDER Consultation Request - Planning Application Ref. 14/0392/IC [OFFICIAL]

Consultation reply - Argyll & Bute Council

-----Original Message-----
From: Guy Phillips
Sent: 13 February 2015 15:42
To: Devcont Planning
Subject: FW: REMINDER Consultation Request - Planning Application Ref. 14/0392/IC [OFFICIAL]

Guy Phillips
Municipal Buildings
Clyde Square
Greenock
PA15 1LY

01475 712422

Let us know how satisfied you are with the service received from our
Development Management section by completing our customer survey at
Survey Monkey - Development Management

-----Original Message-----
From: Eaglesham, David [mailto:David.Eaglesham@argyll-bute.gov.uk]
Sent: 13 February 2015 15:41
To: Guy Phillips
Subject: RE: REMINDER Consultation Request - Planning Application Ref. 14/0392/IC [OFFICIAL]

Classification: OFFICIAL

Classification: OFFICIAL

Guy

Trust you now have our comments. See below...

From: devcont.planning@inverclyde.gov.uk [mailto:devcont.planning@inverclyde.gov.uk]
Sent: 13 February 2015 12:09
To: bandc, planning
Subject: Comments for Planning Application 14/0392/IC

Not Available,
You have been sent this email because you or somebody else has submitted a comment on a Planning Application to your local authority using your email address. A summary of your comments is provided below.
Comments were submitted at 12:06 PM on 13 Feb 2015 from Not Available.

Application Summary
Address: Factory 36 Earnhill Road Greenock PA16 0EQ
Proposal: Erection of 77.8m to blade tip wind turbine
Case Officer: Guy Phillips
Click for further information

Customer Details
Name: Not Available
Email: planning.bandc@argyll-bute.gov.uk

Address: Not Available

Comments Details
Commenter Type: Other External Organisation
Stance: Customer objects to the Planning Application
Reasons for comment:
Comments: Argyll & Bute Council has been concerned at the visual impact of windfarm developments around the Clyde Estuary with consequent concerns for their impact on visitor experience and tourism development. Although this application is only for a single turbine, at 77.8m to blade tip it will breach the skyline significantly from many vantage points on the west and north shores of the estuary as evidenced by photomontages at viewpoints 6 (Strone Point), 13 (Hunter's Quay) and 14 (Kilcreggan). It is accepted that the background hills are already adorned with electricity pylons and other apparatus. However, the proposed turbine and the diameter of its rotating blades would represent a much more prominent and discordant feature in the landscape. On behalf of Argyll & Bute Council, I therefore object to this application on grounds of landscape and visual impact.

Clyde Muirshiel Regional Park

Park HQ, Barnbrock
Near Kilbarchan
Renfrewshire PA10 2PZ
t: 01505 614 791
f: 01505 613 605
w: www.clydemuirshiel.co.uk
e: info@clydemuirshiel.co.uk

Our ref: WDG/AB

Date: 29 January 2015

Mr G Phillips
Planning Department
Inverclyde Council
Municipal Buildings
GREENOCK
PA15 1LY

Dear Mr Phillips,

Application for the construction of single turbine (78m to tip) at Earnshill Road, Greenock. Reference: 14/039/IC

Clyde Muirshiel Regional Park objects to this proposed development.

The Clyde Muirshiel Park Authority is a Joint Committee of Inverclyde, Renfrewshire and North Ayrshire Councils. Since 2006 its renewed Charter Aims have been:-

- to conserve and enhance natural beauty, biodiversity and cultural heritage of Clyde Muirshiel Park.
- to encourage and enable learning, understanding and enjoyment of Clyde Muirshiel Park.
- to promote and foster environmentally sustainable development for social and economic well-being of the people and communities within the Clyde Muirshiel Park area.

The proposed development is adjacent to an area designated as a Regional Park. Scottish Natural Heritage defines Regional Parks as "large areas of attractive countryside which lie close to Scotland's larger towns and cities, and which are therefore popular for outdoor recreation." By their nature, regional parks often include landscapes which are considered to be of regional importance and can also provide important havens for wildlife.

The turbine, at 78 metres to tip, would be a prominent visual feature from parts of the Greenock Cut which is a popular walking route from the visitor centre and is one of Inverclyde's core paths. Another core path, from Braeside to Levan Farm, is closer to this potential development and is on a route that may be

followed to the Regional Park's facility at Lunderston Bay. The proposed turbine would be very noticeable from long sections of both of these recreation routes.

The Viewpoint Appraisal (Table 6 in the Landscape and Visual Impact Appraisal) for the Greenock Cut suggests that the magnitude of change would be low and the effect on Clyde Muirshiel Regional Park designation and recreational assets would be slight to moderate. However, the Greenock Cut has been assessed from a distance of 3.4 kilometres and moving westwards from this point a large section of the Greenock Cut is around two kilometres from the proposed turbine. The overall impression from the Greenock Cut is therefore likely to be much more significant and would be a highly dominant visual feature from this Scheduled Ancient Monument and popular walking route. The core path from Braeside to Levan Farm follows a similar trajectory to the Greenock Cut, but is closer, with the majority of this route being one to one and a half kilometres form this potential development. It is therefore concluded that from both of these core paths there will be a significant and detrimental visual impact on recreational users of the Regional Park.

The proposed development would introduce a structural irregularity to a landscape that is predominately of gently undulating hills with urban fringe. It is therefore incongruous with views in this area and the Regional Park objects to this proposal.

If you would like to discuss any aspect of the above please contact Alan Brown at Barnbrock.

Yours sincerely

W David Gatherer
Interim Regional Park Manager

HISTORIC SCOTLAND
ALBA AOSMHOR

Longmore House
Salisbury Place
Edinburgh
EH9 1SH

Direct Line: 0131 668 8937
Switchboard: 0131 668 8600
john.raven@scotland.gsi.gov.uk

Our ref: AMH/12855/10
Our Case ID: 201406165
Your ref: 14/0392/IC

09 January 2015

Sent by e-mail:
devcont.planning@inverclyde.gov.uk

Planning and the Environment
Inverclyde Council
Cathcart House
6 Cathcart Square
GREENOCK
PA15 1LS

Dear Sirs

Town And Country Planning (Development Management Procedure) (Scotland) Regulations 2013
Erection of wind turbine (77.8m to blade tip), Factory, 36 Earnhill Road, Greenock

Thank you for consulting Historic Scotland regarding the above planning application for a development in the vicinity of a monument of legally recognised national importance and scheduled under the *Ancient Monuments and Archaeological Areas Act* 1979:

- Moorfoot Primary School, Cup-Marked Stone 345m SSW of (Index 12855)

Scottish Ministers (through Historic Scotland) are a statutory consultee where planning applications may affect the setting of a scheduled monument.

When consulted by the applicant at pre-application stage, Historic Scotland responded noting that the proposed development was: likely to have a significant impact upon the monument's setting; that any impacts may be mitigated by the industrial estate surrounding the development area, and; that visualisations would be required to demonstrate the extent of impacts.

Subsequent to this consultation the applicant supplied mapping information suggesting that the turbine was to be located on the eastern side of the industrial estate, whereby we indicated that this would be unlikely to raise significant concerns for our interests.

The location now proposed is where we understood the turbine site to be when first consulted. The substance of our initial response therefore remains valid. The visualisation requested has not been incorporated as part of the application material. Consequently, neither we nor your Council have sufficient information upon which to assess the potential scale of impacts this proposed development might have.

Historic Scotland therefore **objects** to this application and recommend that a photomontage, showing a view of the development from immediate to the northwest of the monument is requested. Once we are in receipt of this information we will be able to provide an informed view on the acceptability or otherwise of this development and potentially remove our objection.

If you require any further information, please contact me.

Yours faithfully

JOHN RAVEN
Heritage Management Team Leader (Monuments): West

HISTORIC SCOTLAND
ALBA AOSMHOR

Longmore House
Salisbury Place
Edinburgh
EH9 1SH

Direct Line: 0131 668 8937
Switchboard: 0131 668 8600
John.Raven@scotland.gsi.gov.uk

Sent by e-mail:
devcont.planning@inverclyde.gov.uk

Planning and the Environment
Inverclyde Council
Cathcart House
6 Cathcart Square
GREENOCK
PA15 1LS

Our ref: AMH/12855/10
Our Case ID: 201406736
Your ref: 14/0392/IC

06 February 2015

Dear Sirs

Town And Country Planning (Development Management Procedure) (Scotland) Regulations 2013
Erection of 77.8m to blade tip wind turbine, Factory, 36 Earnhill Road, Greenock

Historic Scotland were previously consulted by your Council regarding the above application. In our response, dated 09 January, we objected to the application. This was due to the lack of information regarding, and concerns about, the potential impact this proposed development might have upon the setting of a nearby Scheduled Monument:

- Moorfoot Primary School, Cup-Marked Stone 345m SSW of (index 12855)

The applicant supplied the information requested directly to us on 28 January. This allows us to provide you with an informed assessment of the proposals.

Monuments of this type are poorly understood but remain evocative, comprised of the artistic endeavours of Scotland's prehistoric occupants. The siting of this monument is relatively typical, nestled high up in a shallow valley, or bowl of ground, near to and with views over a source of fresh water. The rough scrub and birch woodlands surrounding the monument are probably not so dissimilar to the environment when the cup-marks were first carved.

The visualisations provided show that the turbine would be likely to be dominant feature on the skyline in views from the west of and from the monument. However, it would sit in that skyline alongside existing large industrial buildings. Whilst the existing adjacent woodlands would be likely to screen much of the turbine in these views, it is unclear how long that woodland would be left unmanaged or if it would be subject to thinning, felling or windblow. It is therefore difficult to know how much weight to place on this as a mitigation measure.

Nevertheless, given the presence of the nearby industrial buildings in those views which would be affected by the development, on balance, it appears that the impacts,

although relatively significant, would not be sufficient to warrant an objection from Historic Scotland. Mitigation of these affects could be achieved by lowering the height of the turbine, perhaps replacing it with two or more much smaller ones. Your Council may wish to explore this possibility with the applicant.

If you require any further information or wish to discuss this case further, please contact me.

Yours faithfully

JOHN RAVEN
Team Leader (Monuments): West

Argyll Archaeology

Clare Ellis BA, PhD, MIFA, FSA Scot

Argyll Archaeology
Davaar Cottage
Campbeltown
Argyll
PA28 6RE

01586 550239

David Ashman
Development Management Team Leader
Regeneration and Planning
Inverclyde Council
Municipal Buildings
Clyde Square
Greenock
PA15 1LY

Our ref: 311
Your ref: 14/0392/IC

30th January 2015

Dear Mr Ashman

Planning application 14/0392/IC Assessment of the archaeological resource

I refer to the above application for planning consent for the siting of one 77.8m high wind turbine.

I have reviewed all the accessible and online information relating to the potential archaeological resource of the proposed development site and the immediate surrounding area. I would like to make the following comments.

There are no recorded archaeological sites within the boundary of the proposed development. However, there are a considerable number of archaeological sites within the immediate vicinity of the application area and these include: Moorfoot Primary School, cup-marked stone (Scheduled Monument 12855) and RCAHMS No. NS27NW7 & NS27NW8; other possible cupmarks (RCAHMS No. NS27NW9 and No. NS27NW6); a rock carving (RCAHMS No. NS27NW177); a late 17th century vandalized preaching site with possible cupmarks RCAHMS No. NS27NW2; chert and quartz flakes (RCHAMS No. NS27NW10); and a decoy site (RCHAMS No. NS27NW132). Further afield other cup marked rocks have been recorded as well as

probable 18th or 19th century cultivation remains and field systems.

The recorded sites imply the exploitation of the area from the prehistoric period right through to the 20th century. Such a concentration of cup mark rocks is rare and given that some of the majority of these occur on a bedrock outcrops there is the potential for further examples to remain as yet unidentified. Although the proposed scheme may not impact directly upon the Scheduled Monument of Moorfoot Primary School (12855) Historic Scotland should be consulted for their view if this has not already been done.

Government policy as set out in Scottish Planning Policy is that planning authorities should ensure that prospective developers arrange for the archaeological issues raised by their proposals to be addressed. In this case given the density of prehistoric cup mark sites, the recovery of lithics from the surface of the sand underlying the peat and apparent late 17th century activity there is the potential that buried archaeological features and deposits may survive within the development area. Therefore I would advise that the Council consider attaching an archaeological condition to any consent that may be granted. I suggest that the most appropriate method would be a controlled topsoil strip of the footings of the turbine base and any new access route, with the option for an additional watching brief on any deep excavation works. The programme of works would also include any necessary archaeological excavation, post-excavation analysis and if required publication. This condition may be worded as follows:

The developer shall secure the implementation of a programme of archaeological investigation which is to be carried out by an archaeological organization acceptable to the Planning Authority. A method statement will be submitted by the applicant and approved by the Planning authority prior to the commencement of the works.

The applicant or developer will need to secure the services of a professional archaeological contractor to undertake the programme of archaeological investigation.

Yours Sincerely

Dr Clare Ellis

VAT No.: 144 4429 19
Tel/Fax: 01586 550239
Email: ellisclare@argyll-archaeology.co.uk
www.argyll-archaeology.co.uk
Davaar Cottage, Kilkerran Road, Campbeltown, Argyll. PA28 6RE

Defence Infrastructure Organisation

Kalie Jagpal
Assistant Safeguarding Officer
Ministry of Defence
Safeguarding – Wind Energy
Kingston Road
Sutton Coldfield
West Midlands B75 7RL
United Kingdom

Telephone [MOD]: +44 (0)121 311 3674
Facsimile [MOD]: +44 (0)121 311 2218
E-mail: DIOODC-IPSSG2a2@mod.uk

Your Reference: 14/0392/IC

Our Reference: DIO/SUT/43/10/1/21749

Guy Phillips
Inverclyde Council

19/01/15

Dear Mr Phillips

Please quote in any correspondence: DIO/SUT/43/10/1/21749

Site Name: Factory 36

Proposal: Erection of 1 Wind Turbine

Planning Application Number: 14/0392/IC

Site Address: Earthill Road, Greenock, PA16 0EQ

Thank you for consulting the Ministry of Defence (MOD) on the above Planning Application in your communication dated 16/12/2014.

I am writing to tell you that the MOD has no objection to the proposal.

The application is for 1 turbine at 78.17 metres to blade tip. This has been assessed using the grid references below as submitted in the planning application or in the developers' or your pro-forma.

Turbine	100km Square letter	Easting	Northing
1	NS	23161	76089

The principal safeguarding concern of the MOD with respect to the development of wind turbines relates to their potential to create a physical obstruction to air traffic movements and cause interference to Air Traffic Control and Air Defence radar installations.

Defence Infrastructure Organisation Safeguarding wishes to be consulted and notified of the progression of planning applications and submissions relating to this proposal to verify that it will not adversely affect defence interests.

If planning permission is granted we would like to be advised of the following prior to commencement of construction;

- the date construction starts and ends;

- the maximum height of construction equipment;
- the latitude and longitude of every turbine.

This information is vital as it will be plotted on flying charts to make sure that military aircraft avoid this area.

If the application is altered in any way we must be consulted again as even the slightest change could unacceptably affect us.

I hope this adequately explains our position on the matter. If you require further information or would like to discuss this matter further please do not hesitate to contact me.

Further information about the effects of wind turbines on MOD interests can be obtained from the following websites:

MOD: https://www.gov.uk/government/publications/wind-farms-ministry-of-defence-safeguarding

Yours sincerely

Mrs Kalie Jagpal
Assistant Safeguarding Officer – Wind Energy
Defence Infrastructure Organisation

SAFEGUARDING SOLUTIONS TO DEFENCE NEEDS

Guy Phillips

From: David Ashman on behalf of Devcont Planning
Sent: 16 December 2014 15:28
To: Jim Lynn
Subject: FW: Your Ref: 14/0392/IC (Our Ref: SG16702)

NATS consultation reply

From: ALLEN, Sarah J [mailto:Sarah.ALLEN@nats.co.uk] **On Behalf Of** NATS Safeguarding
Sent: 16 December 2014 13:38
To: Devcont Planning
Subject: Your Ref: 14/0392/IC (Our Ref: SG16702)

The proposed development has been examined from a technical safeguarding aspect and does not conflict with our safeguarding criteria. Accordingly, NATS (En Route) Public Limited Company ("NERL") has no safeguarding objection to the proposal.

However, please be aware that this response applies specifically to the above consultation and only reflects the position of NATS (that is responsible for the management of en route air traffic) based on the information supplied at the time of this application. This letter does not provide any indication of the position of any other party, whether they be an airport, airspace user or otherwise. It remains your responsibility to ensure that all the appropriate consultees are properly consulted.

If any changes are proposed to the information supplied to NATS in regard to this application which become the basis of a revised, amended or further application for approval, then as a statutory consultee NERL requires that it be further consulted on any such changes prior to any planning permission or any consent being granted.

Yours faithfully,

Sarah Allen
Technical Administrator
On behalf of NERL Safeguarding Office

GLASGOW AIRPORT
PROUD TO SERVE SCOTLAND

FAO Guy Phillips
Inverclyde Council
By Email

23 December 2014

Dear Guy

Re: 14/0392/IC Erection of 77.8m to blade tip wind turbine at 36 Earnhill Road
Our reference: GLA3067

I refer to your consultation request received in this office on 16th December 2014.

The proposed development has been examined from an aerodrome safeguarding perspective and could conflict with safeguarding criteria. Accordingly, a more detailed assessment requires to be undertaken regarding the potential impact on Glasgow Airport.

Whilst every effort will be made to reply as soon as possible, we may not be able to reply within 21 days of receipt of your consultation request. We, therefore, submit a holding objection until we are able to advise you of the results of our investigations.

You should note that where a Planning Authority proposes to grant permission against the advice of Glasgow Airport, it shall notify Glasgow Airport, the Civil Aviation Authority and the Scottish Ministers as per Circular 2/2003: Town and Country Planning (Safeguarded Aerodromes, Technical Sites and Military Explosives Storage Areas) (Scotland) Direction 2003.

Yours sincerely

Kirsteen MacDonald

Safeguarding Manager
Glasgow Airport
0141 842 7960
Kirsteen_MacDonald@glasgowairport.com

GLASGOW AIRPORT
PROUD TO SERVE SCOTLAND

FAO Guy Phillips
Inverclyde Council
By Email

08 January 2015

Dear Guy

Re: 14/0392/IC Erection of 77.8m to blade tip wind turbine at Earnhill Road
Our Ref: GLA3067

I refer to your consultation request received in this office on 16th December 2014.

The proposed development has been examined from an aerodrome safeguarding perspective and does not conflict with safeguarding criteria. We, therefore, have no objection to this proposal.

Yours sincerely

Kirsteen MacDonald

Safeguarding Manager
Glasgow Airport
0141 842 7960
Kirsteen_MacDonald@glasgowairport.com

Inverclyde council

Environment and Community Protection

Memorandum Safer Communities Planning Application Consultation Response	
To: **Planning Services** For the Attention of GUY PHILLIPS	
From: **Safer and Inclusive Communities**	Date of Issue to Planning: **19th February 2015**

Lead Officer: **JIM BLAIR**	
Tel: **01475 71 4305**	Email: **jim.blair@inverclyde.gov.uk**

Safer Communities Reference (optional):	
Planning Application Reference:	**14/0392/IC**
Planning Application Address:	**Factory 36 Earnhill Road GREENOCK PA16 0EQ**
Planning Application Proposal:	**Erection of 77.8m to blade tip wind turbine**

Team	Officer	Date
Food & Health	Michael Lapsley	
Environment & Safety *Contaminated Land*	Sharon Lindsay Roslyn McIntosh	
Public Health & Housing	Jim Blair	17.12.14
Environment and Enforcement	Stewart Mackenzie	

Amend table entries as appropriate and insert date when each officer review is completed.

Healthy Working Lives

Positive About Disabled People

Recommended Conditions:

It is recommended that the undernoted conditions be placed on any consent the council may grant:

Delete or amend as appropriate

Food & Health

No Comments

Environment & Safety

No Comments

Contaminated Land

No Comments

1. That prior to the start of development, details of a survey for the presence of Japanese Knotweed shall be submitted to and approved in writing by the Planning Authority and that, for the avoidance of doubt; this shall contain a methodology and treatment statement where any is found. Development shall not proceed until treatment is completed as per the methodology and treatment statement. Any variation to the treatment methodologies will require subsequent approval by the Planning Authority prior to development starting on site.

Reason: To help arrest the spread of Japanese Knotweed in the interests of environmental protection.

2. That the development shall not commence until an environmental investigation and risk assessment, including any necessary remediation strategy with timescale for implementation, of all pollutant linkages has been submitted to and approved, in writing by the Planning Authority. The investigations and assessment shall be site-specific and completed in accordance with acceptable codes of practice. The remediation strategy shall include verification/validation methodologies. This may be incorporated as part of a ground condition report and should include an appraisal of options.

Reason: To satisfactorily address potential contamination issues in the interests of environmental safety.

3. That on completion of remediation and verification/validation works and prior to the site being occupied, the developer shall submit a Completion Report for approval, in writing by the Planning Authority, confirming that the works have been carried out in accordance with the remediation strategy. This report shall demonstrate that no pollutant linkages remain or are likely to occur and include (but not limited to) a collation of verification/validation certificates, analysis information, remediation lifespan, maintenance/aftercare information and details of imported/disposed/reused materials relevant to the site.

Reason: To provide verification that remediation has been carried out to the Authority's satisfaction.

4. That the presence of any previously unrecorded contamination or variation to reported ground conditions that becomes evident during site works shall be brought to the attention of the Planning Authority within one week. Consequential amendments to the Remediation Strategy shall not be implemented unless it has been submitted to and approved, in writing by the Planning Authority.

Reason: To ensure that all contamination issues are recorded and dealt with appropriately.

5. The use of the development shall not commence until the applicant has submitted a completion report for approval, in writing by the Planning Authority detailing all fill or landscaping material imported onto the site. This report shall contain information of the materials source, volume, intended use and verification of chemical quality (including soil-leachate and organic content etc) with plans delineating placement and thickness.

Reason: To protect receptors from the harmful effects of imported contamination.

Public Health & Housing

COMMENT: "This section has strong reservations regarding this application primarily with regard to the anticipated effect of shadow flicker.

However, the report specifically excludes all consideration of property lying outwith the notional limit of 10 x rotor diameter.

This section is already investigating a case within Inverclyde where shadow flicker has occurred outwith the 10 X perimeter. Officers have confirmed the severity of its impact on the house affected and are currently considering frequency of occurrence and duration.

Should the Council choose to grant this application future development of the undeveloped land north of the turbines would for most purposes be compromised."

6. All external lighting on the application site should comply with the Scottish Government Guidance Note "Controlling Light Pollution and Reducing Lighting Energy Consumption".

Reason: To protect the amenity of the immediate area, the creation of nuisance due to light pollution and to support the reduction of energy consumption.

Environment and Enforcement

No Comments

7. The applicant must consult or arrange for their main contractor to consult with either Stewart Mackenzie or Emilie Smith at Inverclyde Council, Safer Communities (01475 714200), prior to the commencement of works to agree times and methods to minimise noise disruption from the site.

Reason: To protect the amenities of occupiers of premises from unreasonable noise and vibration levels.

8. The level of noise emissions from the wind turbine when measured at any dwelling (with the exception of the dwellings to the North of the site (Moorfoot Drive area)), lawfully existing at the date of permission shall not exceed:

   a. between the hours of 23:00 and 07:00 the greater of 43dB L_A90 (10 min) or 5dB(A) above the Night Hours Background Noise level at that property; or

   b. between the hours of 07:00 and 23:00 the greater of 40dB L_A90 ((10 min) or 5 dB(A) above the quiet Waking Hours Day Time Background Noise Level at that property.

Reason: To protect the amenities of occupiers of premises from unreasonable noise and vibration levels.

9. The level of noise emissions from the wind turbine when measured at any dwelling to the North of the site (Moorfoot Drive area), lawfully existing at the date of permission shall not exceed:

   a. between the hours of 23:00 and 07:00 43dB L_A90 (10 min)

   b. between the hours of 07:00 and 23:00 40dB L_A90 (10 min)

This reflects the fact that we do not have the full background noise picture at this area. Once full background readings can be provided for the Moorfoot Drive area we could reconsider this.

Reason: To protect the amenities of occupiers of premises from unreasonable noise and vibration levels.

Recommended Advisory Notes

It is strongly recommended that the undernoted Advisory Notes be placed on any consent the Council may grant:

i. **Site Drainage:** Suitable and sufficient measures for the effective collection and disposal of surface water should be implemented during construction phase of the project as well as within the completed development to prevent flooding within this and nearby property.

ii. The applicant should be fully aware of the **Construction (Design & Management) Regulations 2007 (CDM 2007)** and it's implications on client duties etc.

iii. **Surface Water:** Any SUDS appraisal must to give appropriate weight to not only any potential risk of pollution to watercourses but to suitable and sufficient measures for the effective collection and disposal of surface water to prevent flooding. Measures should be implemented during the construction phase of the project as well as the within the completed development to prevent flooding within the application site and in property / land nearby.

iv. **Consultation on Proposed Use:** It is strongly recommended that prior to the commencement of any works the applicant consults with Officers of Safer and Inclusive Communities to ensure structural compliance with legislation relating to;

   a) Food Safety Legislation,

   b) Health and Safety at Work etc. Act 1974,

TO: HEAD OF REGENERATION & PLANNING
FROM: HEAD OF ENVIRONMENTAL & COMMERCIAL SERVICES

Your Ref: 14/392/IC
Our Ref: DAC/14/04/14/392/IC
Contact: D A Chisholm
Tel: (01475) 7144841

INVERCLYDE COUNCIL
ENVIRONMENTAL & COMMERCIAL SERVICES
OBSERVATIONS ON PLANNING APPLICATION

Planning Application No: 14/392/IC **Dated:** 12/2/15 **Received:** 13/2/15
Applicant: Texas Instruments
Proposed Development: Erection of 77.8m to blade tip wind turbine
Location: 36 Earnhill Road Greenock
Type of Consent: Detailed Permission/~~In Principle/Approval of Matters/ Change of Use~~
No. of drawings submitted: 12

	Comments
1	Consultations should take place with this Service prior to any abnormal load movements.

NOTES FOR INTIMATION TO APPLICANT

CONSTRUCTION CONSENT (S21)*	Not Required/~~Required for all road works~~
ROAD BOND (S17)*	Not Required/~~Required if building works are to be undertaken before roads are completed~~
ROAD OPENING PERMIT (S56)*	Not Required/~~Required for all works in the public road~~

***Relevant Section of the Roads (Scotland) Act 1984**

Signed ..... **Date** .....
HEAD OF ENVIRONMENTAL & COMMERCIAL SERVICES

08/06/15DAC

From: George Kerr
Sent: Wed, 7 Jan 2015 14:37:46 +0000
To: Guy Robertson
Cc: Guy Phillips
Subject:RE: Proposed Wind Turbine At Texas Instruments, Earnhill Road, Greenock 14/0392/IC

Guy

Further to our discussion around the detailed drawing for your proposals, I can confirm that there is no longer any requirement for a flood risk assessment.

Regards

George

From: Guy Robertson [mailto:guy.robertson@synergie-environ.co.uk]
Sent: 06 January 2015 09:52
To: George Kerr
Cc: Guy Phillips
Subject: RE: Proposed Wind Turbine At Texas Instruments, Earnhill Road, Greenock 14/0392/IC

Hi George,

The attached Block Plan shows the extent of the existing track and concrete block slab (300mm thick) which it is intended will be utilised for the purpose of accessing the site and installing the turbine. There isn't any requirement for or intention to create any additional track or hard standing areas; the project will utilise what's already there, precisely to minimise construction impacts. I'm happy of course to provide you with whatever info you require but I'm struggling to see what sort of calculations you're looking for? There shouldn't be any additional surface water run-off as we are not creating any additional hard standing.

If you can give me the detail of which areas you think are at risk of flooding and specifically what calculations you need, I'll get our engineers onto it.

Thanks.

Regards

Guy

Guy Robertson MCIWM| Principal Environmental Consultant | Synergie Environ Ltd

Tel 0141 263 0020 | Mob 07827 322 535

Trinity House, 31 Lynedoch Street, Glasgow, G3 6AA

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From: George Kerr [mailto:George.Kerr@inverclyde.gov.uk]
Sent: 06 January 2015 09:04
To: guy.robertson@synergie-environ.co.uk
Subject: RE: Proposed Wind Turbine At Texas Instruments, Earnhill Road, Greenock 14/0392/IC

Guy

As you correctly point out, the site itself is not at any risk of flooding. However, there is significant problem with flooding from the culverted watercourse downstream and I need to make sure that changes to the surface water run-off from your site will not exacerbate this problem. I note that you have stated that there will be no increase in hard standing areas, but all I have to go on is the site location plan.

Please provide more detail to show the difference between existing and proposed hard standing and calculations to demonstrate any change in surface water run-off.

Regards

George

George S Kerr

Supervisory Engineer (Flooding)

Inverclyde council

Environmental & Commercial Services

71 East Hamilton St.

Greenock

PA15 2UA

T: 01475 714760

E: george.kerr@inverclyde.gov.uk

From: Guy Phillips
Sent: 06 January 2015 08:31
To: George Kerr
Subject: FW: Proposed Wind Turbine At Texas Instruments, Earnhill Road, Greenock 14/0392/IC
Importance: High

George,

I am content that you discuss this direct with Guy Robertson. Please keep me copied in and advise of the outcome.

Guy Phillips

Municipal Buildings

Clyde Square

Greenock

PA15 1LY

01475 712422

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Survey Monkey - Development Management

From: Guy Robertson [mailto:]
Sent: 05 January 2015 17:10
To: George Kerr
Cc: Guy Phillips; uisdean.fraser@synergie-environ.co.uk
Subject: RE: Proposed Wind Turbine At Texas Instruments, Earnhill Road, Greenock 14/0392/IC
Importance: High

George,

Ref guy's email below, the Scoping Report submitted with the application does not make specific reference to any requirement for a flood risk assessment. The SEPA indicative flood map clearly shows the site does not present any flood risk. In any case, the turbine installation in this case does not require the construction of any new access roads or lay down areas – i.e. the main project elements with the potential to give rise to flood risk. My extensive previous correspondence with the Council (through Guy and others) has not at any stage made reference to the requirement for a flood risk assessment so I'm unclear what the justification is, or why the issue has arisen unexpectedly at this late stage. In light of these factors, can you please advise me as to your specific justification(s) for a flood risk assessment and what you feel the scope of such an assessment might cover? You'll appreciate we will need this information to inform our client.

I can call and discuss if you think that would be helpful – please let me know ASAP.

Regards

Guy

Guy Robertson MCIWM| Principal Environmental Consultant | Synergie Environ Ltd

Tel 0141 263 0020 | Mob 07827 322 535

Trinity House, 31 Lynedoch Street, Glasgow, G3 6AA

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From: Guy Phillips [mailto:Guy.Phillips@inverclyde.gov.uk]
Sent: 05 January 2015 16:14
To: Guy Robertson
Cc: George Kerr
Subject: Proposed Wind Turbine At Texas Instruments, Earnhill Road, Greenock 14/0392/IC

Guy,

Happy New Year.

The Council's flooding officer, George Kerr advises as follows:

"There is not drainage or flooding report provided in the planning documents. A flood risk assessment will be required as outlined in the Scoping Report."

Can you please liaise direct with George in order to determine the content of the requested FRA. For the avoidance of doubt, the FRA is required before the planning application can be determined.

I look forward to your reply.

Guy Phillips

Municipal Buildings

Clyde Square

Greenock

PA15 1LY

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Survey Monkey - Development Management

REPRESENTATIONS

EXTRACT OF LETTER

Comments for Planning Application 14/0392/IC

Application Summary
Application Number: 14/0392/IC
Address: Factory 36 Earnhill Road GREENOCK PA16 0EQ
Proposal: Erection of 77.8m to blade tip wind turbine
Case Officer: Guy Phillips

Customer Details
Name: Mr andrew vivers
Address: arniefoul glamis forfar

Comment Details
Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:I write to object based on the detrimental health effects this application will probably have on its turbine neighbours, based on my own experiences and the 5 reasons listed below.

The effects of Infrasound and Low Frequency Noise (ILFN) are cumulative, and individuals are affected by ILFN in different timescales, but the bottom line is that if you have a life threatening ailment, or are susceptible to one, and live near a wind turbine, then you chances of recovery are greatly diminished, whether you have signed a non disclosure agreement or not.

Cancer Clusters and Heart Seizure Hotspots are now being observed around wind farms.

Your pets and livestock could also be seriously affected.

As you will read, single turbines can be just as damaging to health as large wind factories (turbines have nothing to do with farms/farming - check the dictionary).

The current Solar Radiation Management (SRM) techniques are creating up to 8% less surface wind. This means that the expensive, harmful, intermittent and variable wind energy is even more futile.

Should this application be allowed, in the interests of public health, please ensure that ILFN monitoring before and after turbine erection is a required condition.

1. THE LINK BETWEEN VIBRO ACOUSTIC DISEASE (VAD) AND WIND FARM SYNDROME (WTS)

The peak frequencies emitted by wind turbines are below 5 Hz.
VAD is an acknowledged medical disease caused primarily by the frequencies of Infrasound (0 - 20Hz) and Low Frequency Noise (20 - 500Hz).
These frequencies are commonly grouped together as ILFN (0 - 500Hz). [1]

Respiratory pathology induced by ILFN is not a novel subject given that in the 1960's, within the context of U.S. and U.S.S.R. Space Programs, its existence was being reported. [2]
Central nervous system disorders in workers exposed to ILFN were first observed 25 years ago among aircraft technicians. Concurrently, respiratory pathology was identified in these workers, and later reproduced in ILFN-exposed animal models. [3]

In 1987, the first autopsy of a deceased VAD patient was performed. The extent of ILFN induced damage was overwhelming, and the information obtained is, guiding many of the associated and ongoing research projects. [4]

In both human and animal models, ILFN exposure causes thickening of cardiovascular structures.

Pericardial thickening with no inflammatory process, and in the absence of diastolic dysfunction, is the hallmark of VAD.

Depressions, increased irritability and aggressiveness, a tendency for isolation, and decreased cognitive skills are all part of the clinical picture of VAD.

In VAD, the end-product of collagen and elastin growth is reinforcement of structural integrity. This is seen in blood vessels, cardiac structures, trachea, lung, and kidney of both VAD patients and ILFN-exposed animals. This means that blood vessels can become thicker, thus impeding the normal blood flow. Within the cardiac structures, the parietal pericardium and the mitral and aortic valves also become thickened

When echocardiography, brain MRI or histological studies are performed, structural changes can be identified, all consistently show significant changes in VAD patients and ILFN-exposed animals.

Wind Turbines are known to emit a broad spectrum of ILFN frequencies, with peak frequencies at below 5Hz.

In Portugal ILFN has been extensively researched, and occupational VAD symptoms have been grouped according to length of exposure during work hours.

Those living and working near wind turbines are obviously exposed to Infrasound 24/7. Exposure at night can often result in considerably sleep deprivation.

The detrimental health effects of sleep deprivation are well recognised medically.

The Hayes Mackenzie 2006 report which is often quoted by Government and Council officials gives a time to symptom chart for VAD. [5] The chart is shown below, and is based on occupational exposure to noise (ILFN).

VAD symptoms
Stage 1 (Mild) 1-4 yrs: Slight mood swings; Indigestion; Heart burn; Mouth/throat infections; Bronchitis.

Stage 2 (Moderate) 4-10 yrs: Chest pain; Definite mood swings; Back pain; Fatigue; Fungal, viral & parasitic infections; Inflammation of stomach lining; Pain and blood in urine; Conjunctivitis; Allergies.

Stage 3 Severe (10 + yrs): Psychiatric disturbances; Haemorrhages of nasal, digestive & conjunctive mucosa; Varicose veins & haemorrhoids (piles); Duodenal ulcers; spastic colitis; Decrease in visual acuity; Headaches; Severe joint pain; Intense muscular pain; Neurological disturbances.

Among the most serious consequences of untreated VAD are rage-reactions, epilepsy, and suicide.

As a rough calculation, without considering sleep deprivation, the time of symptom appearance for ILFN induced WTS should be the VAD time, reduced by a factor of around 4.2 (turbine neighbours who live and work near turbines, 24hrs x 7days x 48working weeks = 8064 hrs exposure per yr, assuming 4 weeks holiday away from turbines; occupational exposure, 8hrs x 5days x 48weeks = 1920 hrs exposure per yr. 8064 divided by 1920 = 4.2).

Thus a 4yr VAD symptom exposure would manifest in 1yr for a WTS exposure, and a 10 year VAD symptom in 2.5yrs for WTS, which indeed appears to be the case.

IFLN induced WTS
Less than 1 yr: Headaches; Dizziness; Sleep deprivation; Haemorrhoids; Umbilical hernia; High blood pressure; Fatigue; Tinnitus; Vertigo; Poor concentration & memory; Slight mood swings.

1-4 yrs: Nausea/seasickness; Panic attacks; Annoyance, anger & aggression; Increased agitation of those with Autistic Spectrum Disorder and ADD/ADHD; Increased blood sugar levels.

4-10 yrs: Thickening of pericardium and blood vessel walls plus other soft tissue damage.

Many other chronic health problems are thought to be created or accelerated, probably by infrasound-induced increased levels of cortisol (which lowers our immune system).

On 5 Sept 2014, the Waubra Foundation wrote to NSW Planning Assessment Commission regarding the Gullen Range Wind Development [6]. This letter contains much important information regarding ILFN.

The facts are clear:

1. Wind turbines emit ILFN, and can do so even when the blades are not turning.
2. ILFN is harmful to humans and other life forms, and can kill.
3. In the interests of Public Health, the Scottish Government and local Councils should immediately impose a condition on turbine applications that ILFN is measured before and after turbine erection.
4. ILFN monitoring should be a mandatory tool that is used to assess any reported health effects from turbines.

References

1. http://www.ncbi.nlm.nih.gov/pubmed/17014895
2. http://www.ncbi.nlm.nih.gov/pubmed/17315094
3. http://www.ncbi.nlm.nih.gov/pubmed/16969569
4. http://www.ncbi.nlm.nih.gov/pubmed/15273020
5. http://www.hayesmckenzie.co.uk/downloads/LF%20and%20Infrasound%20Noise%20Immission%20from%20Wind%20Farms%20and%20the%20Potential%20for%20Vibro%20Acoustic%20Disease%20-%20Malcolm%20D%20Hayes.pdf
6. http://waubrafoundation.org.au/wp-content/uploads/2014/09/GRWF_WF_Submission_to_PAC_Final_Sept_2014.pdf

2. INFRASOUND BULLET POINTS

People with a blocked or anatomically small helicotrema (a narrow pathway in the cochlea of the ear) have an increased sensitivity to Infrasound and Low Frequency Noise (ILFN), as are those who are susceptible to car/sea/motion sickness.

The main resonant frequencies of a persons internal organs are below 5 Hz. The peak frequencies emitted by turbines are below 5 Hz. Earths resonance frequency is 7.83 hertz, exactly the same as the alpha waves of our brain (which controls our creativity, performance, stress, anxiety and immune system). The frequencies to which the various brain areas respond vary from 3 to 50 Hz, specifically: touch 9 Hz; coordination 10 Hz; sound 15 Hz; subconscious thought 20 Hz; visual images 25 Hz.

Some people are sensitive to ILFN out to 30km from a turbine(s).

ILFN frequencies between 3 and 12 Hz cause Rapid Eye Movement (REM) sleep disruption and general sleep deprivation. This in turn can: increase mood swings (happy/violent); inhibit or modify dreams; make people depressed and/or apathetic. The detrimental health effects of sleep deprivation are well documented.

ILFN exposure can cause the body to secrete cortisol which increases blood pressure and blood

sugar levels, and has an immunosuppressive action. A suppressed immune system will allow existing health problems to accelerate and make it easier for new ones to be created. The effects are worse if exposed to ILFN during sleep hours.

Our bodies try to protect vital organs from ILFN bombardment by laying down extra collagen, causing a thickening of the pericardium and blood vessel walls for instance, which will also increase the likelihood life threatening health problems.

The wavelength of ILFN at 1Hz is 340mtrs. 5Hz is therefore 68mtrs. The basic calculation for room wall dimension resonance is half the wavelength, but remember: an attic could extend the whole length of a house, thus if a house is 14 mtrs long, wall resonance could be caused by ILFN at around 12Hz; internal walls can be very thin and not form part of the house foundations; diagonal room measurement is also important. All this may help explain why infrasound is often more noticeable in the smallest room usually the cludgie (loo; often has an outside wall).

Temperature inversion (temperature rising with height before cooling usually around dawn and dusk) can cause sound which would normally dissipate into higher atmosphere to be refracted down. The curve of this sound usually comes back to ground level at about 5km distance from the turbine. If ILFN follows this pattern, it will join the other ground hugging infrasound, increasing the potential danger. ILFN does similarly bounce off cloud base etc.

Audible sound is emitted from turbines in a butterfly wing shape, with minimal noise directly downwind, upwind, right or left. Larger forewings are downwind. Infrasound may do the same. Turbines can emit ILFN even when the blades are not turning. A gentle breeze can cause the tower and/or blades to resonate.

Many people who believe they are suffering adverse health effects from wind turbines are hesitant to report their symptoms due to the manner in which their claims have often been discounted or ignored by the wind industry and government officials (Hansard, 2009, pp.G-516, G-547). Experts contend that the quantity, consistency, and ubiquity of the complaints constitute epidemiological evidence of a strong link between turbine noise, ill health, and disruption of sleep (BMJ2012; 344:e 1527).

Individuals should not have to prove the effect, only perceive it. Self reporting is an important tool in the process.

The World Health Organisation (WHO) considers a sleep journal as a valid tool for documenting sleep disturbance.

On 21 Jan 2013, the State of Wisconsin (USA) imposed a moratorium on industrial turbines until further health research is conducted.

On 7 Nov 2013, a Falmouth judge (USA) ordered local turbines to cease operating between 7pm and 7am and all day Sunday in order to avoid irreparable physical and psychological harm to local residents.

3. RECENT USES OF DIRECTED ILFN

The use of directed ILFN is a known weapon and interrogation aid. It is an untraceable murder weapon, as it leaves no evidence of its use on the victim.

ILFN becomes particularly deadly during the early morning sleep hours. This is when the body normally produces the lowest levels of Cortisol. Artificially stimulating Cortisol production during this time disrupts the bodys normal Cortisol production in the worst possible way. In effect, the sleeping body perceives infrasound as a threat and elevates Cortisol production to cope. Since one is asleep, the Cortisol is not used, and remains in the body, damaging life-essential body functions.
Prolonged Cortisol production in our bodies eventually causes death. [1]

I understand that some of the recent uses of directed ILFN are:

Greenham Common, UK. 1984 (mostly women).

In the summer of 1984, more than 2,000 British troops suddenly pulled back, leaving the fence unguarded.
Peace activist Kim Besley recalls that as curious women approached the gate, they started experiencing odd health effects: swollen tongues, changed heartbeats, immobility, feelings of terror, pains in the upper body.
Besley found her 30-year-old daughter too ill to stand. Other symptoms typical of electromagnetic exposure included skin burns, severe headaches, drowsiness, post-menopausal menstrual bleeding and menstruation at abnormal times. Besleys daughters cycle changed to 14 days and took a year to return to normal.
Two late-term spontaneous miscarriages, impaired speech, and an apparent circulatory failure prompted the women to begin monitoring for a directed-energy beam, Using an EMR meter, they measured beams sweeping their camp at 100-times normal background levels. [2]

2. Iraq (2003 to present)
Very Low Frequency (VLF) weapons include the dozens of poppers and domes deployed in Iraq, which can be dialed to long wave frequencies capable of traveling great distances through the ground or intervening structures. As air force Lt Col. Peter L. Hays, Director of the Institute for National Security Studies reveals, Transmission of long wavelength sound creates biophysical effects; nausea, loss of bowels, disorientation, vomiting, potential internal organ damage or death may occur.
Lt Col Hays calls VLF weapons superior because their directed energy beams do not lose their hurtful properties when traveling through air to tissue. A French weapon radiating at 7 hertz made the people in range sick for hours.
Such variable effects have been known scientifically since 1963, when electromagnetics researchers Dr. Robert Beck found that exposure to certain frequencies sparks riotous behaviour, while other frequency beams can cause a sense of well-beingor deep depression.
The recovery rate from directed ILFN exposure among US troops (they tend to lose the plot, wander off and go AWOL) seems to be about a day or so, whereas the locals are not getting over it in less than a week or more on average. [2]

3. O2 plus the 2012 Olympics. London.
Long Range Accoustic Devices (LRAD) have been photographed at the O2, and were installed on the Thames during the 2012 Olympics. There is little doubt that these communication devices can also utilise ILFN for crowd dispersement. [3]

4. Gaza (ongoing)
There are several reports of ILFN weapons (LRADs) being used by the Israel against Palestinians in Gaza. The combination of low frequencies at high intensities can create discrepancies in the inputs to the brain. Basically the brain receives a signal that your body has lost balance. You feel like you are tilting even when you are not. The discrepancies can cause headaches and nauseait simulates seasickness. [4]

5. Fukushima 2011
Directed ILFN at around 2.5 Hz can cause earth tremors, earthquakes, landslides, and will increase lightning (particularly in clouds formed on sprayed bevy metals) . Watch the 7 min video here [5]. Since 2011 US military presence in Japan has increased considerably.

[1] http://www.darkgovernment.com/news/infrasound-stress-inducing-weapons/
[2] http://www.jimstonefreelance.com/beammed.html
[3] http://motherboard.vice.com/read/a-history-of-using-sound-as-a-weapon
[4] http://www.multistalkervictims.org/catchcanada/literature/brochure/CATCH/Scream_Article.pdf
[5] http://www.geoengineeringwatch.org/was-haarp-a-factor-in-the-fukushima-earthquake/

4. ARK HILL WIND TURBINES - ONE YEAR ON
(8 x 80m Enercon E48 turbines. Mar 2013 4 April 2014)

I live at Arniefoul which is 5km East of the Ark Hill wind turbines and 1.6km West of the proposed Govals wind turbines (6 x 87m turbines). The prevailing wind is from the West.

Ark Hill was commissioned on 5 March 2013 and at that time

. When I awoke I could often hear the whooshing of the turbine blades. Assuming it was the audible sound that was disturbing me, I moved my bed further away from the window and slept with the window closed. This made no difference to my sleep deprivation usually being woken at around 3am until 5am. With the window closed I rarely hear the turbine noise, but I can sometimes feel their rhythm and therefore deduce that it is an inaudible noise (Low Frequency Noise and Infrasound) that is causing the lack of sleep.

In June 2013 spells when out walking on the hills surrounding Arniefoul. It was at this time I noticed a correlation between the turbines, the wind direction and became constant and on some nights extremely loud.

appear to be worse when there is a Southerly wind. The Ark Hill turbines rotate clockwise and therefore it is probably an emission during the down stroke that creates the harmful effects. This suggests it may have little to do with the supporting structure and therefore an upwind or downwind design of turbine will make little difference.

Surprisingly, the prevailing Westerly wind seems to cause slightly less symptoms than a Southerly wind. Turbine noise, however, is most audible when there is little prevailing wind at ground level and at treetop level, but sufficient wind at turbine blade area to turn the blades at a critical speed. In similar conditions to these, when there is an Easterly wind we can easily hear traffic on the A90, 5km to our East, even though there is the huge bund of the Sidlaw Hills between us.

A North or East wind causes again, although should the Govals wind turbines be erected, I expect to suffer greatly from those turbines during these wind directions.

January and February 2014 were particularly bad months with predominately Southerly and Westerly winds causing much sleep deprivation, loud tinnitus, lack of concentration and irritability.

On 9 February 2014, I started recording morning and evening. It fluctuates considerably with a recorded high of . On 28 March for instance, after several days of Easterly wind, it was at a more acceptable There appear to be correlations between wind, atmospheric and weather conditions.

From 6 12 March we stayed near Tarfside, Glen Esk (currently no turbines near there). All my symptoms reduced noticeably,

An obvious option is to sell my property and move (where to?). My work is in the local area and therefore this is not really a business option. Nor is it an emotional option since my family has enjoyed being at Arniefoul for nearly a century.

I have heard of landowners with turbines who now regret having turbines on their land, yet are unable to speak out due to non disclosure clauses in their contracts with developers. Also, I suspect that there are many people living near wind turbines who suffer similar conditions to mine but who remain silent for fear of property devaluation, tenancy or employment concerns, and the like.

I am sure that should the Govals and Frawney (5 x 80m, same make as Ark Hill and West Knock Farm, Buchan) wind turbines be erected, with Forfar and Letham being on the down-wind side,

there will be people with similar sensitivity as myself who will suffer. Children are thought to be more sensitive to turbine noises than adults.

People sometimes say that I look well considering the symptoms I describe. I am reluctant to take drugs/medication, with their own potential side effects, when I do not believe they are treating the root cause. I have always made considerable efforts to maintain a high level of fitness.

I understand that:
Low frequency noise and Infrasound (such as emitted by wind turbines) are sound waves that are felt by the body rather than heard, probably by the utricle. Depending upon the amplitude or intensity, it produces feelings of extreme discomfort, a feeling that the body is vibrating. Depending upon the frequency and intensity, infrasound can keep you awake, or induce sleep. Therefore, it can cause sleep deprivation.
Infrasound induces stress and causes the body to secrete the hormone Cortisol. This effect is a medically recognised danger of long-term infrasound exposure.
Cortisol, plays a vital role in preparing our body for stressful fight or flight episodes. It increases blood pressure and blood sugar levels, and has an immunosuppressive action that provides needed alertness and energy during stressful experiences. However, during long term stress, or if Cortisol production is prolonged, its effects on the human body can become severe. A weakened or suppressed immune system will allow existing health problems to accelerate, and make it easier for new ones to be created.
Exposure to infrasound during early sleep hours can be particularly harmful. This is when the body normally produces the lowest levels of Cortisol. This might explain my 3am awakening and subsequent wakefulness. Artificially stimulating Cortisol production during sleep means that the Cortisol is not used and remains in the body, potentially damaging essential body functions.
A sound wave in air is a sequence of pressure changes. A sound wave in a liquid or solid is more like a vibration. This helps explain how Low Frequency Noise and Infrasound travel great distances and easily pass through solid walls, and can set up vibrations or resonances in rooms and body cavities.

There is well-documented and peer-reviewed evidence of the detrimental health effects that turbine emissions have on humans. It is unethical to expose people to something already suspected of being harmful.

Where is the Duty of Care?

Andrew Vivers
Arniefoul, Glamis, DD8 1UD
4 April 2014

Email from a Glamis Community Councillor - Received 5 April 2014
Dear Andrew

I am very surprised you suffer thus from the wind farm as we live closer and never notice such symptoms. Perhaps your

. If I was i would not publicise the fact - what do you hope to achieve by such a leaflet?

I suggest you should simply sell up and move, as the Govals wind farm will surely be much closer to you than Arkhill wind farm

Kind regards
(note: is a renewables energy consultant, ex director of Ark Hill Wind Farm, ex factor of Strathmore Estates [25% ownership of Ark Hill], and a Glamis Community Councillor)

Addendum 14/4/14
A major achievement of distributing the above "Ark Hill - One Year On" leaflet, was that an acoustics engineer has come to stay for two nights.
I understand that:
There appears to be a correlation between my being woken and subsequent wakefulness, and peaks in low infrasound frequencies up to 3Hz.
The peak frequencies emitted by turbines are typically less that 5Hz. Our UK legislation on this matter, ETSU-R-97, is totally inadequate since it is only concerned with 'audible' noise, ie. above 20Hz (few people can hear sounds below 20Hz).
The fact that we can not hear a sound does not make it any less harmful.

Audible sound attenuates (decreases in energy/volume) at a rate of minus 6 decibels (dB) per doubling of distance from the source. Infrasound attenuates at minus 3dB per doubling of distance, out to about 50km (which is probably why our Ministry of Defense has opposed wind turbine applications within 50 km of the Eskdalemuir Seismic Array). Also, infrasound tends to have more of a ground hugging nature and does not readily dissipate into the high atmosphere. This helps explain why the effects of infrasound are noticed at much greater distances than audible sound.

For humans, the annoyance threshold for audible sound is around 2dB. Interestingly, the annoyance factor does not then increase with increasing volume/energy.

Turbines can emit infrasound even if the blade is not turning. A gently breeze can cause the tower and/or blades to resonate and emit infrasound.

Depending on various factors, a single turbine can emit as much infrasound as a large wind

factory. Ark Hill (8 turbines) for instance, was at times comparable to a 100+ turbine wind factory.
The fact that industrial sized turbines emit Infrasound/Low Frequency Noise (ILFN) can not be disputed.
The fact that ILFN is harmful to humans can not be disputed.
There is ample peer-reviewed evidence from around the world that "proves beyond reasonable doubt" that wind turbine neighbours experience detrimental health effects.
The logical conclusion is that the ILFN emissions from turbines are causing the ill health, however, even if it is not, turbines should be dismantled until the cause is found and rectified.
The wind industry make claims similar to: 'Turbines are not known to cause harm to humans'. The above information must cast considerable doubt on their claims. Also, their statements are certainly not the same as saying "Turbines are known not to cause harm to humans"
It is unethical to expose people to something already suspected of being harmful. I ask again, "Where is the 'Duty of Care'"?

3. WIND TURBINE SYNDROME (Excerpts from letters to my MSP)
Letter dated 27 April 2014
Health concerns in Scotland are ignored because of a sentence, a mere aside in a bracket.
We are told by Angus Council that current Scottish Government guidance states there is NO EVIDENCEof turbine health effects arising from infrasound or low frequency noise generated by the wind turbines that were tested. [1]. This quote is from a bracketed sentence in that link which gives no direct reference to the actual Hayes Mackenzie 2006 report from which it took the information; a report that is EIGHT years old and during which time turbines in Scotland have grown considerably in number, height and capacity.
Reports of ill-health associated with turbines are now prolific around the world.
The Hayes Mackenzie 2006 powerpoint presentation Low Frequency and Infrasound Noise Immission (sic) from Wind Farms and the potential for Vibro-Acoustic disease [2] shows that Infrasound and Low Frequency Noise (ILFN) are emitted by turbines; it states that ILFN can be harmful to humans (known as Vibroacoustic Disease or VAD) and gives a time/symptom chart; it then concludes that it is UNLIKELY that symptoms will result through induced internal body vibration from incident wind farm noise.
This is definitely not the same as the Scottish Government quote above. UNLIKELY is not NO EVIDENCE.
I ask : are measurements independently and continuously taken of ILFN emissions by turbines in Scotland. Are they correlated with reported health effects?
Are we to understand that turbines in Scotland do not affect the local population, yet they do elsewhere in the world?
This report also states: Dr Mariana Alves-Pereira, in discussion with Dr Amanda Harry in the UK and Dr Nina Pierpont in the US, is now looking into the low- frequency noise and infrasound produced by industrial wind turbines to determine whether they too can cause VAD. Dr Alves-

Pereira's initial assessment, based on noise measurements taken inside and outside the homes of wind turbine neighbours, is that turbines are indeed a likely cause of VAD. Dr Pierpont named the effect as Wind Turbine Syndrome (WTS).

With regard to the VAD chart, the report makes a comparison between aircraft technicians, who may experience high levels of ILFN for short periods during their working day, and wind turbine neighbours who experience constant or intermittent and variable ILFN (the tower and/or blades can resonate and emit ILFN even when the blades are not turning). Added to this must be the additional factor for those who live and try to sleep near wind turbines, is that ILFN exposure, which disrupts sleep via repetitive physiological stress and wakening, will do damage to health via sleep deprivation and chronic stress (both of which are well-established in clinical medicine and in the research literature, as harmful).

The report did not produce a WTS chart which would have shown a reduced time of symptom appearance for turbine neighbours. See note 1.

WTS and peer-reviewed reports of the detrimental health effects of turbines have been ignored for up to 20 years, based on an inaccurate quote and an old document that was not directly considering industrial wind turbines.

In another 2006 report by Hayes Mackenzie for the DTI, titled Measurement of Low Frequency Noise at Three UK Wind Farms [3] from which the powerpoint presentation is taken, the only conclusions it makes (pages 2, 46 & 66), are based on one sentence from the World Health Organisation (WHO) document Community Noise (para 7.1.4 page 64) dated 1995, which itself is not directly concerning wind turbines. That WHO report is nearly TWENTY years old!! The recommendations (page 68) do not appear to have been acted upon. Also see note 2.

I urge you to read this very informative article [4].

As I mentioned in my 4 April letter, ILFN causes the body to secrete cortisol which has an immunosuppressive action. A suppressed immune system will allow existing health problems to accelerate and make it easier for new ones to be created.!

I also understand that our bodies try to protect vital organs from ILFN bombardment by laying down extra collagen, causing a thickening of the pericardium and blood vessel walls for instance, which will also increase the likelihood life threatening effects.

ILFN should be added to the list of Silent Killers. Not everyone gets cancer - that doesnt make it any less real.

Scotlands wind energy policy is a slower, but no less effective version of the Highland Clearances of 1746 onwards. Properties are sterilised (Angus Council words) or banned from occupancy (Ark Hill); people are forced to relocate or possibly succumb to WTS and probable early death; and our turbine covered hills and glens are becoming desolate places where few people wish to visit or live.

May I refer you to the Kelley research from the 1980's which proved that wind turbine generated impulsive infrasound and low frequency noise from a single down bladed wind turbine directly caused annoyance symptoms at levels of sound energy which could not be heard. Also, Professor Salt's research shows some of the neuropsychological pathways involved [5].

Thank you for your continued interest and action. It is greatly appreciated by many thousands of people in Scotland and around the world, who for various reasons are unable to sell their property

or relocate and are therefore forced to succumb to the detrimental health effects of WTS as a result of our futile energy policies, inaccurate quotations and outdated documentation.
Note 1. As a rough calculation (without considering sleep deprivation), the time of symptom appearance for WTS should be the VAD time reduced by a factor of around 4.2 (turbine neighbours who live and work near turbines, 24hrs x 7days x 48working weeks = 8064 hrs exposure per yr, assuming 4 weeks holiday away from turbines; technicians, 8hrs x 5days x 48weeks = 1920 hrs exposure per yr. 8064 divided by 1920 = 4.2). Thus a 4yr VAD symptom exposure would manifest in 1yr for a WTS exposure, and a 10 year VAD symptom in 2.5yrs for WTS, which indeed appears to be the case!
Note 2. Similarly, one wonders why ETSU-R-97 (The Assessment and Rating of Noise from Wind Farms) uses 35dBA L90 for all turbine locations when it is commonly accepted that typical daytime background noise levels are around 18 to 20dBA L90 in remote rural areas, 30 to 40dBA L90 in typical or quite suburban areas, and 50 to 60dBA L90 for busy urban areas. Night time levels would be much lower.
http:// www.scotland.gov.uk/Resource/0044/00440315.pdf
2. http://www.hayesmckenzie.co.uk/downloads/LF%20and%20Infrasound%20Noise%20Immission%20from%20Wind%20Farms%20and%20the%20Potential%20for%20Vibro%20Acoustic%20Disease%20-%20Malcolm%20D%20Hayes.pdf
3. http://www.hayesmckenzie.co.uk/downloads/Measurement%20of%20Low%20Frequency%20Noise%20at%20Three%20UK%20Wind%20Farms.pdf
4. http://blogs.telegraph.co.uk/news/jamesdelingpole/100248760/wind-farm-noise-a-government-cover-up/
5. http://waubrafoundation.org.au/2013/explicit-warning-notice/ and http://www.windturbinesyndrome.com/2014/medical-school-research-team- confirms-wind-turbine-infrasound-can-produce-wind-turbine-syndrome- usa/?var=cna

Letter dated 8 July 2014
Thank you for your letter of 29 May and for sight of Derek Mackay's letter. He makes the assumption that a moratorium would lead to a resumption of this policy without any changes. I argue that the moratorium could lead to a cessation of this policy, or at least to a resumption with much tighter conditions and health protection which would include Infrasound (ILFN) monitoring. Whilst the Scottish Government may chose to be unaware of "a peer reviewed, proven, widely experienced dose-response link between wind turbine operation and health impacts", may I refer him to: http://waubrafoundation.org.au/resources/wind-turbine- noise-adverse-health-effects-june-2014/.
He makes reference to my "particular situation". I can assure him that there are many people around Scotland and the world who are suffering similar symptoms as myself but he may not have heard of them because:
they are too ill or already dead
they have not been give access to all relevant information, or have not yet made the connection between their deteriorating health and turbine emissions

if they have made the connection, they are unwilling to make a complaint due to employment, tenancy, property devaluation or other concerns, and indeed maybe their fear of being ridiculed if they have made the connection and voiced concerns and complaints, they have given up due to the manner in which their claims have often been discounted or ignored by the wind industry and government officials (Hansard, 2009, pp.G-516, G-547). Experts contend that the quantity, consistency, and ubiquity of the complaints constitute epidemiological evidence of a strong link between turbine noise, ill health, and disruption of sleep (BMJ2012; 344:e 1527)

As I have mentioned before, I am not complaining about the audible noise from the Ark Hill turbines.

I am seriously complaining about the effects of the infrasound (ILFN) emissions from these turbines - which is not audible. These effects are cumulative, and therefore any visiting officer is unlikely to notice any effects.

The only way for any type of assessment of ILFN is to use good quality ILFN measuring equipment. As you will read in the addendum to my 'Ark Hill - One Year On' (attached), an acoustics expert came here in early April with suitable monitoring equipment and showed a direct time correlation with my being woken and subsequent wakefulness, and infrasound peaks at 3 Hz. A second monitoring box was placed much closer to the turbines and I am confident that the infrasound came from the turbines and not from some other anomaly that has only occurred since the turbines were erected. Please also see my 'Bullet Points' (attached).

The facts are clear:

Wind turbines emit ILFN, and can do so even when the blades are not turning.

ILFN is harmful to humans and other life forms, and can kill.

In the interests of Public Health, the Scottish Government and local Councils should impose a condition on turbine applications that ILFN is measured before and after turbine erection (for a period of a few weeks/months).

ILFN measurement should be a mandatory tool that is used to assess any reported health effects from turbines. This could show a direct time correlation between symptom and ILFN peaks.

Please also see: http://business.financialpost.com/2014/11/25/lawrence-solomon-ill-winds-blow-from-wind-turbines/

I hope this is of interest and that the correct action will be taken to protect public health.

Comments for Planning Application 14/0392/IC

Application Summary

Application Number: 14/0392/IC
Address: Factory 36 Earnhill Road Greenock PA16 0EQ
Proposal: Erection of 77.8m to blade tip wind turbine
Case Officer: Guy Phillips

Customer Details

Name: Mr Scott McAnenay
Address: 2a Edinburgh Drive Gourock

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:I strongly object to this proposal on the grounds that it will adversely affect the health of primary age pupils of Moorfoot Primary School. The shadow flicker, or strobe effect, which wind turbines cause is well documented. Due to the position of this proposed turbine, on the hill above Moorfoot Primary School, at certain times of the day and at different seasons, this shadow flicker would be likely to cause seizures and have strongly adverse health effects on young children. The residents surrounding the school would also be affected by this strobe effect.
This would be disastrous. Not only for the affected children and residents affected by both noise pollution and shadow flicker, whom should be of prime importance to all of us, but also for the public image of the council were they to approve this application.
I believe this would also strongly affect the property prices of homes surrounding the proposed development. This must not be allowed to happen in our beautiful town

Comments for Planning Application 14/0392/IC

Application Summary

Application Number: 14/0392/IC
Address: Factory 36 Earnhill Road Greenock PA16 0EQ
Proposal: Erection of 77.8m to blade tip wind turbine
Case Officer: Guy Phillips

Customer Details

Name: Mrs Clair Bradley
Address: 16 Ashton road Gourock

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:I don't think this should go ahead as it will b unsightly and will cause ill health to the school children and residents surrounding it.

Comments for Planning Application 14/0392/IC

Application Summary

Application Number: 14/0392/IC
Address: Factory 36 Earnhill Road Greenock PA16 0EQ
Proposal: Erection of 77.8m to blade tip wind turbine
Case Officer: Guy Phillips

Customer Details

Name: Mrs Evelina Longworth
Address: 5 Luss Place Greenock

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:The location of this proposed wind turbine is entirely unsuitable.
The turbine is far too close to hundreds of homes. Some houses are as close as 200metres.
The residential amenity of hundreds of people will be adversely affected by noise and shadow flicker.

Comments for Planning Application 14/0392/IC

Application Summary

Application Number: 14/0392/IC
Address: Factory 36 Earnhill Road Greenock PA16 0EQ
Proposal: Erection of 77.8m to blade tip wind turbine
Case Officer: Guy Phillips

Customer Details

Name: Mrs Jennifer Stevenson
Address: 33 darroch drive Gourock

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:OBJECT don't ruin our children's health and future !!!!

Comments for Planning Application 14/0392/IC

Application Summary

Application Number: 14/0392/IC
Address: Factory 36 Earnhill Road Greenock PA16 0EQ
Proposal: Erection of 77.8m to blade tip wind turbine
Case Officer: Guy Phillips

Customer Details

Name: Mrs Jillian Callag
Address: 11 Kingsway Gourock

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:Don't ruin our children's health!

Comments for Planning Application 14/0392/IC

Application Summary
Application Number: 14/0392/IC
Address: Factory 36 Earnhill Road Greenock PA16 0EQ
Proposal: Erection of 77.8m to blade tip wind turbine
Case Officer: Guy Phillips

Customer Details
Name: Mr Paul Travers
Address: 52 Braeside Rd Greenock

Comment Details
Commenter Type: Community Council
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:Proposed erection of 77.8 metre wind turbine by Texas instruments (Planning Ref 14/0392/IC)

I write in connection with the above planning application. We have examined the plans and We know the site well. The Lbbcc wish to object strongly to the erection of this wind turbine in this location.

This structure will dominate the streetscape and many of the houses in the Larkfield Braeside & Branchton area as well as dominating the skyline not only in our Community council ward 8 but in neighbouring Greenock southwest ward 7 & Gourock ward 10.

We also feel that the application breaches the existing applied principle of no development above the skyline. That should have been applied when the company built two cooling towers north west of the main building.

There are two schools in our neighbouring ward 10 that could be affected by the Hum & Swish from the blades of the turbine gearing mechanism and generators. (within 1000m).

The community council also has fears that the houses/schools within 500 to 1000metres will be affected by Shadow Flicker on all sides of the Turbine.

Paul Travers

Chairperson

Lbbcc

www.lbbcc.co.uk

Comments for Planning Application 14/0392/IC

Application Summary

Application Number: 14/0392/IC
Address: Factory 36 Earnhill Road Greenock PA16 0EQ
Proposal: Erection of 77.8m to blade tip wind turbine
Case Officer: Guy Phillips

Customer Details

Name: Mr Alistair McIntyre
Address: 6 Ashrove Avenue Gourock

Comment Details

Commenter Type: Member of Public
Stance: Customer objects to the Planning Application
Comment Reasons:
Comment:The proposed location will make this wind turbine visible to large areas of Greenock and Gourock. Many view them as no more than an eye sore, and this would be detrimental to the area of Moorland located between the Trumpethill area of Gourock and Larfield. It would also cause noise within large areas of the Towns.

Jim Lynn

From: David Ashman on behalf of Devcont Planning
Sent: 30 January 2015 13:26
To: Jim Lynn
Subject: FW: Texas Instruments Wind Turbine

Same gentleman as previous e-mail!

-----Original Message-----
From: Ronnie Ahlfeld
Sent: 30 January 2015 12:48
To: John Mackenzie
Cc: [redacted]
Subject: RE: Texas Instruments Wind Turbine

John. For info I have already registered my objections based on Ronnie's input. This has been formally accepted. Please ensure if you have not already done so , you have sent your own objections to planning. Best Rgds.

Ronnie

-----Original Message-----
From: John Mackenzie [mailto:[redacted]
Sent: 30 January 2015 12:03
To: Ronnie Ahlfeld
Cc: [redacted]; Devcont Planning
Subject: Texas Instruments Wind Turbine

Dear Ronnie

I wish to register my concern about the proposed building of Wind Turbines at Earnhill Road

Apart from the environmental and social issues, the fact that a multinational like Texas Instruments will endeavour to bulldoze this through causes me even further concern.

In addition as in the past,these profit driven multinationals can be here today and gone tomorrow and we should not leave ourselves open to job blackmail

The open letter issued by Ronnie Gormley encapsulates my concerns and I would hope this gains your support

It would also be interesting to ascertain the views of all the parties that that make up the council as this would be a key factor in how I vote in the forthcoming election. Can you also assist in this matter

Many thanks

John MacKenzie
14 Urquhart Drive
Gourock
PA19 1JG

Sent from my iPhone

Jim Lynn

From: David Ashman on behalf of Devcont Planning
Sent: 30 January 2015 13:24
To: Jim Lynn
Subject: FW: Planning ref 14/0392/IC Texas Instruments

-----Original Message-----
From: John Mackenzie [mailto:[redacted]]
Sent: 30 January 2015 13:05
To: Devcont Planning
Subject: Planning ref 14/0392/IC Texas Instruments

Dear sir

I wish to protest in the strongest possible terms against the above proposal

My concerns are encapsulated in Ronnie Gormleys open letter

John MacKenzie
14 urquhart drive
Gourock
PA19 1JG

Sent from my iPhone

2750

14 Finnart Crescent
Gourock
PA19 1EL
29th January 2015

The Director of Planning,

Inverclyde Council.

Dear Sir, I am writing to you to register my strong opposition to the proposed erection of the wind turbine at Texas Instruments, Earnhill Road, Greenock (planning ref 14/0392/1C).

My concerns relate to noise and shadow flicker, not only thinking of myself as a resident, but also the nearby schools and golf course.

Our council and community have worked hard over recent years to attract visitors to Inverclyde and a structure as large as that proposed, would be a blot on our landscape and greatly impact on the local landscape.

I trust you will fully consider the facts before reaching a decision, thank you.

Yours sincerely,

John Wright

Jim Lynn

From: David Ashman on behalf of Devcont Planning
Sent: 30 January 2015 09:09
To: Jim Lynn
Subject: FW: Objection to 14/0392/IC - Erection of 77.8m to blade tip wind turbine etc
Attachments: Untitled.jpg

Obj

From: [mailto:[redacted]
Sent: 29 January 2015 17:06
To: Devcont Planning
Subject: Objection to 14/0392/IC - Erection of 77.8m to blade tip wind turbine etc

This objection is on behalf of the **Save *Your Regional Park* campaign**.

We object to this application because of the detrimental visual impact that it would create

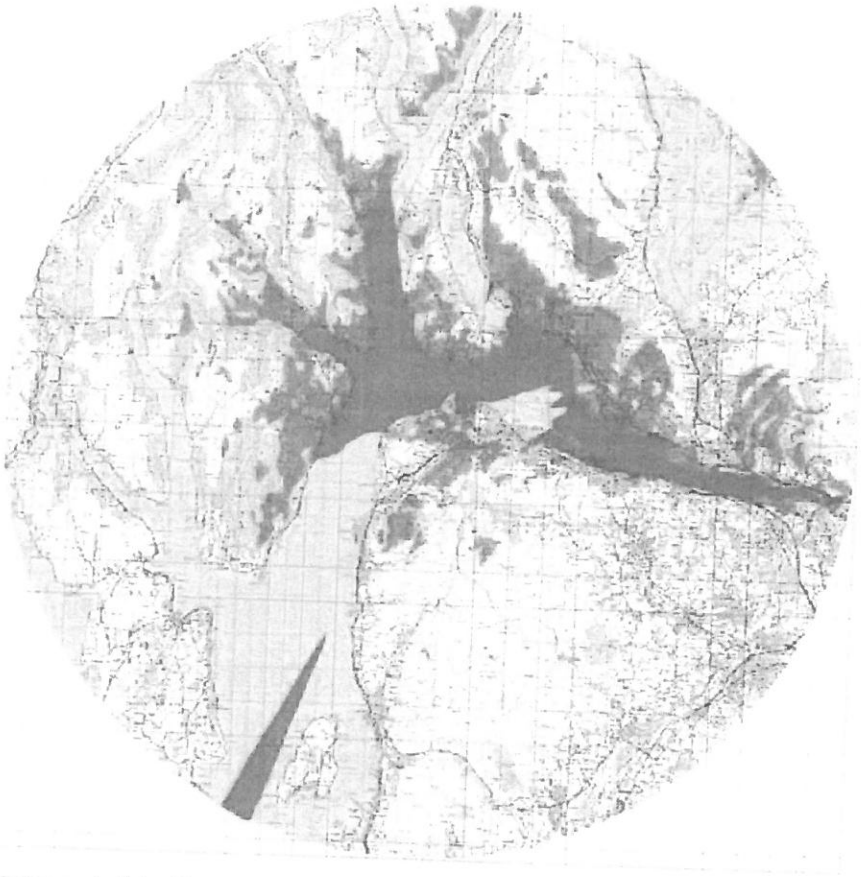
1 looking both from a large area within the park and

2 looking towards the Regional Park from areas outside the park as demonstrated on the ZTV below.

While we appreciate that this would be situated just outside Clyde Muirshiel it is in the Green Belt and we believe that it would have a major detrimental effect on people's enjoyment of the magnificent views looking North, West and East from the northern areas of the park.

It has been one of our objectives to keep the Park and the Firth of Clyde area views free of views of wind turbines . The whole area around the Park plus the Cowal, Roseneath, Helensburgh and Loch Lomond & Trossachs National Park area is very reliant on tourist revenue. In addition to 'normal' tourists there are now around 80000 to 90000 people coming up the Clyde to Greenock on Cruise ships and enjoying the spectacle of our islands and hills.

Marine leisure, is an ever growing and important part of Inverclyde, North Ayrshire and Argyll & Bute. The very many boat / yacht owners we have met and to whom we have spoken, are very keen that turbines are not allowed on these hills and would be likely to move their boats away from here to other marinas in the event that our hills became infested with visible wind turbines. remember that a very large proportion of boats in the marinas, do not belong to locals so they can easily move to other areas.



Please note this objection and acknowledge its receipt

Regards

Nigel Willis
Chairman
***Save Your Regional Park* campaign**
www.saveyourregionalpark.co.uk
and now on Facebook - https://www.facebook.com/Saveyourregionalpark

The Director of Planning
Inverclyde Council
Municipal Buildings
Clyde Square
Greenock PA15 1LY
F.A.O. Guy Phillips

Email: Devcont.planning@inverclyde.go.uk

22nd January 2015

Dear Mr Phillips,

Proposed Erection of 77.8m Wind Turbine by Texas Instruments at Earnhill Road Greenock.

Planning Ref: 14/0392/IC

We refer to the above planning application and write to record our strongest possible objection to the proposal.

At almost 80m in height and with a rotor diameter of around 50m this proposal is totally unacceptable for such an urban location. Sitting as it does on the very top of Earnhill, it will have a very major impact on the landscape setting of much of Gourock and Greenock. It will dominate the skyline above the towns and have a major impact on thousands of residents, will be seen from as far away as Dunoon and Kilcreggan and dominate the skyline from Loch Thom, Gourock West and all the way round to the Lyle Hill and the Battery Park. (all as evidenced by the photo montages submitted by the applicant).

It will have a major impact on the residential communities of Larkfield, Braeside, Pennyfern, Midton,Trumpet Hill, Gourock Golf Course, Levan Estate and Levan Farm, where it will dominate the streetscapes and where apart from the visual impact and loss of amenity, it will give rise to incessant noise and shadow flicker, (a strobe type effect of sun light being interrupted by rotor blades) both of which have major health issues, destroy quality of life, and have a major impact on property values.

It also sits directly above Moorfoot Primary School which will be severely affected by noise and shadow flicker, affecting concentration and learning and likely to have medical implications such as headaches and nausea as is well documented and evidenced on the internet and worldwide. St Ninian's Primary School, St Columba's High and Inverclyde Academy are also close by and likely to be affected.

Our grounds for objection include:

1. Visibility –

Has high visibility from far and wide within the district and also from across the river(Dunoon and Kilcreggan). It will dominate many of the residential streets in the western and south western parts of Inverclyde with properties in Levan, Trumpethill, Midton, Larkfield and Braeside particularly affected due to proximity of the proposal. However it will also affect many other areas given the size and visibility of the Turbine given its location on top of Earnhill.

2. Landscape Intrusion.

Breaches existing and strongly held and applied principle of no development above the skyline. This principle was applied when the original factory was built but subsequently breached by the two large Cooling Towers to the north west of the original building and can be seen from as far away as Dunoon. To give you some idea of the scale involved this proposal is approx 6 times the height of the existing cooling towers.

The turbine would appear as a dominant feature in the surrounding landscape, particularly to those residential properties in the surrounding area.

3. Proximity to Housing. There are numerous residential estates in close proximity and affected by the proposal as mentioned above.

4. Proximity to Schools. There are numerous schools that are likely to be affected by the proposal.

5. Noise. The hum and swish from turbine blades and gearing and generator mechanisms. Local residents are already troubled by noise from the existing cooling towers and this proposal will merely add to the existing problem. At around 6 times the height of the towers the noise is likely to carry even further.

6 Shadow Flicker. The strobe effect of sunlight being constantly interrupted by rotor blades. This will be a particular problem on the Gourock side of the proposal and can affect properties up to 1000m and beyond.

7. Loss of capital Value. Detrimental effect on house prices and marketability of properties within sight of the proposal or affected by its noise or flicker.

Although we are led to understand that loss of value and marketability may not be considered a planning issue it will be a major consideration for anyone who is trying to sell a house in close proximity to the proposal or overshadowed or overlooked by it. This is particularly the case for the residential communities mentioned above. There will be thousands of people negatively affected by this proposal and we would hope that officials and the elected members will take this into consideration when reaching any decision.

8. **Major loss of amenity** for the thousands of residents that will have to live with the proposal.

9. Danger to health from falling debris or ice from rotor blades. This is a real danger given proximity to existing properties.

10. Is contrary to Local Development Plan policies.

11. Leisure and Tourism. The proposal will have a significant and dominant affect on Gourock Golf Club as it sits directly above the course. Not only is it obtrusive and highly visible which detracts from the visual amenity of the course (it's views are one of the major selling points of the course) but will generate noise and shadow flicker which will wash over sections of the course to the detriment and perhaps health of those who are playing. It is likely to lead to loss of membership which could have major financial implications for the club

The Clyde estuary is one of the most scenic stretches of water anywhere in the world. It is created in large part by the rising scenic landscape either side of the river. It is an attraction for yachting enthusiasts and cruise ships from all over the world all of whom acknowledge its beauty.

This proposal, unless it is refused, may well set a precedent and result in further applications for more Turbines at this location and along our hill tops, (a common ploy we are led to believe) which together with other proposals across the Clyde, like the **"Bachan Burn"** proposal of 20 x 135m Turbines on top of the hills above Dunoon (which is soon to be lodged by a German developer) will result in desecration of our hillsides on both sides of the river, destroying one of the best river approaches and visual landscapes in the world, leaving residents on both sides of the river and future generations wondering how and why this could have been allowed to happen and **who** allowed it to happen.

We trust that the council's planning officials and elected members will see fit to refuse this unwelcome proposal and creeping destruction of our landscape.

Yours faithfully

2679

Ranachan House,
Cluniter Road,
Innellan,
Dunoon.
PA23 7SA.

19th January 2015.

Inverclyde Council (Planning),
Municipal Buildings,
Greenock,
PA15 1LY.

With reference to Planning Application: 14/0392/IC for a 77metre high wind turbine.

I wish to register an objection to this installation with you on the following grounds.

The proposed site on Earnhill Road will render the turbine highly visible.
I believe that its position will be visibly offensive not only to residents in the area but also to tourists.
There are ships visiting Greenock and the Holy Loch whose passengers come to enjoy the Scottish countryside. This turbine will certainly impair their vision and a number will be deterred from returning. I live directly across the Firth of Clyde and there are many wind turbines that can be seen, some of which do attract attention by reflecting sunlight during their rotation. Although these are not too troublesome I feel that on this location at 77 metres high it is more likely that reflective sunlight flashing will be apparent.

Yours faithfully,

Ernie Smart.

[redacted]

Jim Lynn

From: David Ashman on behalf of Devcont Planning
Sent: 23 January 2015 13:33
To: Jim Lynn
Subject: FW: Proposed Mast At Earnhill Road, Greenock. Planning Ref. 14/0392/IC

Obj

From: Bill Hawthorne [mailto:
Sent: 23 January 2015 10:40
To: Devcont Planning
Subject: Proposed Mast At Earnhill Road, Greenock. Planning Ref. 14/0392/IC

Dear Sirs,

We wish to place on record our very strong opposition to the proposal by Texas Instruments to erect a wind Turbine at their facility in Larkfield Industrial Estate.

As has been found and catalogued in many communities around the world, this will have a major impact on the residential areas of Larkfield, Braeside, Pennyfern, Midton,Trumpet Hill, Gourock, Gourock Golf Course and all surrounding areas where, apart from the visual impact and loss of amenity, it will give rise to incessant noise and light pollution, (a strobe type effect of sun light being constantly interrupted by rotor blades) both of which have major health issues, destroy quality of life, and have a major impact on property values. It also sits directly above Moorfoot School which will be severely affected by noise and light pollution, affecting concentration and learning and likely to have medical implications such as headaches and nausea as well documented from experiences worldwide.

As local residents with an interest in maintaining and preserving our beautiful landscape we believe that it will have a major impact on the landscape setting of Inverclyde. It will dominate the skyline above Gourock, have a major impact on thousands of residents and will be seen from as far away as Dunoon and Kilcreggan dominating the skyline from Loch Thom to the Lyle Hill and the Battery Park.

Major Considerations for opposing this application include;-

1. Visibility -
From far and wide within the district and from the river and beyond (Dunoon and Kilcreggan).
2. Landscape Intrusion.
Breaches existing and strongly held and applied principle of no development above the skyline. This principle was applied when the original factory was built but subsequently breached by the two large Cooling Towers to the north west of the original building and can be seen from as far away as Dunoon. We estimate that this proposal is approx. 6 or 7 times the height of the cooling towers.
3. Proximity to housing.
4. Proximity to Schools.
5. Noise.
Hum and swish from turbine blades, generator and gearing mechanism.
6.Flicker.
The strobe effect of sunlight being constantly interrupted by rotor blades.
7. Detrimental effect on house prices and marketability of properties within sight of the proposal or affected by its noise or flicker.

It will have a major effect on anyone who is trying to sell a house in close proximity to the proposal or overshadowed or overlooked by it. This is particularly the case for the residential communities mentioned above.

8. Major loss of amenity for those using Gourock Golf Course and the thousands of residents that will have to live with the proposal.

9. Health related issues.

Studies conducted in many communities worldwide where even individual wind turbines have been installed for some time have recorded extraordinarily high instances of depressions and suicides clustered around the installations together with major detrimental effects on wildlife, dairy yields, farmyard animal health and productivity regressions.

We sincerely hope that the planning process will conclude that this application is completely unacceptable in a location so close to populated areas.

Yours Sincerly

William and Jacqueline Hawthorne

[redacted]

Grant Kennedy

From: David Ashman on behalf of Devcont Planning
Sent: 26 January 2015 09:28
To: Grant Kennedy
Subject: FW: Texas Instrument Application for Wind Turbine

-----Original Message-----
From: Dmartinhamilton [mailto:[redacted]
Sent: 23 January 2015 15:55
To: Devcont Planning
Subject: Texas Instrument Application for Wind Turbine

Dear Sirs,
I would like to register my objection to the above .
In my view such a structure would be intrusive and visibly appalling in this area as well as a loss of amenity. It would also most certainly devalue the whole of the surrounding property and become an almost 'no go area'

Yours faithfully

Douglas M Hamilton
9 Welbeck St
Greenock
PA16 7RW

2678.

Ranachan House,
Cluniter Road,
Innellan,
Dunoon.
PA23 7SA.

19th January 2015.

Inverclyde Council (Planning),
Municipal Buildings,
Greenock,
PA15 1LY.

With reference to Planning Application: 14/0392/IC for a 77metre high wind turbine.

I wish to register an objection to this installation with you on the following grounds.

The proposed site on Earnhill Road will render the turbine highly visible. I believe that its position will be visibly offensive not only to residents in the area but also to tourists.
There are ships visiting Greenock and the Holy Loch whose passengers come to enjoy the Scottish countryside. This turbine will certainly impair their vision and a number will be deterred from returning. I live directly across the Firth of Clyde and there are many wind turbines that can be seen, some of which do attract attention by reflecting sunlight during their rotation. Although these are not too troublesome I feel that on this location at 77 metres high it is more likely that reflective sunlight flashing will be apparent.

Yours faithfully,

[redacted]

June E A Smart.

Lyall Cliff
Self-Catering
141 Alexandra Parade,
East Bay, Dunoon,
Argyll PA23 8AW
www.lyallcliff.co.uk
Telephone / Fax: 01369 702041

17/1/15

The Senior Planner,
Inverclyde Council,
Planning Department
Municipal Buildings
Greenock PA15 1LY

2655

086

Dear Sir,

Planning Application ref: 14/0392/IC for Erection of a wind turbine, 77m high(to blade tip) on land at Texas Instruments, Earnhill Road, Greenock/OBJECTION

We run a small tourism business on the East Bay promenade in Dunoon, with fine easterly views over the Firth of Clyde towards Gourock.

We **object** to the above Planning Application, which would have an unacceptable adverse visual impact across wide areas of the upper Firth of Clyde, including Dunoon, and the nearby Loch Lomond and Trossachs National Park.

The proposed turbine would be highly visible from many important roads, such as the A 815 at Dunoon, Kirn, & Hunter's Quay, the A 880 at Strone, and the B 833 at Kilcreggan. It would also have a high adverse impact on views from surrounding hills above Dunoon such as Dunan, Kilbride Hill, and the Kilmun Hills, which are very popular with tourists and walkers.

The proposed location on high ground at Earnhill Road is quite unsuitable, due in part to its high exposure to the west and north.

There could also be Shadow Flicker effects from the giant rotors at certain times of day in sunny weather. These would make the giant turbine especially conspicuous.

We urge you to **refuse** planning permission for this giant turbine, and would be grateful if you could acknowledge this letter of objection, and keep us informed about proceedings on this issue.

Yours sincerely,

[redacted]

Philip Norris (Proprietor)

2654

Save Cowal's Hills
C/O Argyll Business Centre
204 Argyll St
Dunoon PA23 7HA

16/1/15

The Senior Planner,
Inverclyde Council,
Planning Department
Municipal Buildings
Greenock PA15 1LY

Dear Sirs,

Planning Application ref: 14/0392/IC for Erection of a wind turbine, 77m high(to blade tip) on land at Texas Instruments, Earnhill Road, Greenock

We wish to **object** to the above Planning Application, which would have an unacceptable adverse visual impact across wide areas of the upper Firth of Clyde, including Dunoon, and the nearby Loch Lomond and Trossachs National Park.

It would also be highly visible from many sequential routes, such as the A 815 at Dunoon, Kirn, & Hunter's Quay, the A 880 at Strone, and the B 833 at Kilcreggan.

The proposed location on high ground at Earnhill Road is quite unsuitable, due in part to its high exposure to the west and north.

There could also be Shadow Flicker effects from the giant rotors at certain times of day in sunny weather. These would make the giant turbine especially conspicuous, and could also have an adverse effect on nearby residents.

We urge you to **refuse** planning permission for this giant turbine, and would be grateful if you could keep us in touch with proceedings on this issue.

Yours sincerely,

[redacted]

Heather Monteith
for ***Save Cowal's Hills***

keppie

15th January 2014

Our Ref: LE/P14-151

Inverclyde Council
Municipal Buildings
Clyde Square
Greenock
PA15 1LY

sent via email only to guy.phillips@inverclyde.gov.uk

F.A.O. GUY PHILLIPS

Dear Guy,

PLANNING APPLICATION REF: 14/0392/IC FOR THE ERECTION OF 77.8M TO BLADE TIP WIND TURBINE AT FACTORY 36, EARNHILL ROAD, GREENOCK, PA16 0EQ

PLANNING OBJECTION

Keppie Planning and Development have been instructed by our client Westminster Investments to submit an objection against the planning application for the erection of a 77.8m to blade tip wind turbine at Factory 36, Earnhill Road, Greenock, PA16 0EQ.

It is firstly noted that the deadline for comments in relation to the application will be accepted by the Council up until the determination of the application.

Our client wishes to object to this application based on the following grounds:

- The proposals are contrary to Local Development Plan Policy INF1: Renewable Energy Developments where the impact of the proposals in relation to landscape and visual , and residential amenity is deemed to be significant and adverse;
- The proposals will have a direct negative and dominant impact upon the residential amenity of neighbouring properties, specifically those of Larkfield, Braeside, Pennyfern, Midton, Trumethill, Levan Estate and Levan Farm (as illustrated by the attached distances plan prepared by our clients architect);
- The proposals will have a direct negative and dominant impact upon the recreational amenity enjoyed by users of Gourock Golf Club;
- The proposals will have a direct negative and dominant impact upon the visual amenity of the proposed housing development at Levan Farm, an allocated development opportunity site within the Local Development Plan where an approval of matters specified in conditions application is currently pending consideration;

- The applicant has not assessed the impact the proposals may have upon cultural heritage features such as the Cup-Marked Stone near Moorfoot Primary School and Larkfield Battery Anti-aircraft battery which are both Scheduled Ancient Monuments in the surrounding environment. It is considered that an assessment of the impact upon cultural heritage features should be investigated.
- The proposals are contrary to Scottish Planning Policy Guidance in relation to the impacts upon the landscape, residential amenity and resultant shadow flicker impacts of the development;
- The Landscape and Visual Impact Appraisal information submitted may not be upto date and where appropriate new updated information should be provided to allow the Council to fully assess the proposals in context.
- The submitted Noise Impact Assessment states that noise monitoring equipment was stolen during the assessment period. The use of comparative measurements is questioned and we would like the Council to confirm that the use of this method can provide accurate results in the assessment of whether noise will impact upon Moorfoot Primary School and other potentially effected properties.

Local Development Plan Review

It is noted at the outset that the proposals are not strategic in nature and therefore an assessment against the Strategic Development Plan (Glasgow and the Clyde Valley SDP) is not expected in this instance.

Local Development Plan **Policy INF1: Renewable Energy Developments** states that the Council will support renewable energy developments *"unless any economic, environmental and social benefits of the proposal are outweighed by significant adverse effects upon (relevant objection criteria detailed only):*

(b) the landscape and wider environment
(c) neighbouring settlements
(d) tourism, recreation and conservation matters
(e) the built heritage

It is considered that the proposed development of a single turbine in this location would have a significant negative impact upon the landscape and wider environment and that in particular the impact illustrated in viewpoint location 10 (figure 14) represents an unacceptable visual impact upon the proposed residential development at Levan Farm, which is part of the neighbouring settlement of Gourock. It should be noted that an approval of matters specified in conditions application for the first phase of residential development of the land at Levan Farm is currently being considered by the Council and it is fully intended that this development will progress when all relevant consents have

been achieved (expected Spring 2015). It should be further noted that viewpoint 10 represents a distance of 1.4km, whereas the true effect of the turbine on the nearest proposed housing within the wider Levan Farm development will be approximately 900m distant. Therefore the impact would have a greater effect upon the proposed housing that that which is currently demonstrated.

With regard to the submitted Landscape and Visual Impact Appraisal, Table 6 provides an appraisal of the selected viewpoints. Viewpoint 10, figure 14 relates to the proposed development at Levan Farm and a photomontage and analysis has been prepared to assess the impact of the proposals upon this viewpoint. It is clear to see from the submitted photomontage of viewpoint 10 that the proposed turbine at a height of 77.8m will be a dominant and unexpected intrusion into the landscape at this location. The commentary in the LVIA highlights that the turbine would be *"seen in context with no other development"*. This and the fact that a substantial proportion of the turbine tower, all of the hub and the full extent of the blades will be seen clearly within the existing natural landscape results in an unacceptable impact upon the visual amenity to be experienced by the proposed housing development at Levan Farm.

The LVIA goes on to state the following in relation to the effect the turbine would have upon viewpoint 10 (Levan Farm): *"the turbine would be fairly prominent within views although it would not be intimidating in scale or location on the horizon. The effect would be Moderate/Substantial"*. We disagree that the turbine wouldn't be intimidating; it would dominate the proposed housing and create an unacceptable impact upon the residential amenity to be enjoyed by future occupants. It is fully considered by our client that this impact would be visually intrusive and unacceptable.

With regard to the neighbouring settlements as referred to in criterion (c), it is noted that whilst the turbine is located within an industrial estate, the estate is in close proximity to residential properties and slightly further afield to the north is Moorfoot Primary School and more residential properties. The visual impact of the proposed turbine upon these properties is clearly demonstrated in the submitted photomontages, viewpoints 4, 5, 9 and 15. The LVIA has described some of these viewpoints as having a substantial effect upon the landscape, and it is conceded by the LVIA that the proposals will result in *"significant effects on residential amenity"* which *"would be contrary to"* Local Plan guidance used to assess the proposals *"in terms of residential amenity and views against the skyline"*. The LVIA states that the decision maker should weigh up the "positive contributions" of the proposals against the significant effects the proposals will have upon the residential amenity and dominant impacts the proposals will have upon the landscape. It is considered that the negative impacts that the proposals will have upon the landscape and residential amenity heavily outweigh the contributions the wind turbine makes to the national power supply, as it is understood that the anticipated level of electricity to be provided to the grid will be minimal once the generated electricity is prioritised to operate the existing industrial unit. It is considered that more appropriate methods of electricity generation which would not have such a severe impact upon residential amenity and landscape value should be investigated.

In response to criterion (d) of Policy INF1 where the Policy seeks to ensure there are no significant adverse effects upon tourism, recreation and conservation matters, it is highlighted that the proposals, due to their close proximity, could have an adverse effect upon membership of the Golf Club, which in turn could impact upon the viability of the business. The photomontage submitted with the application package which illustrates the impact upon the Golf Course (figure 13a, viewpoint 9) is taken from a vantage point near the club house. It is considered that there will be many other views within the course which will be severely impacted to a greater level by the proposed turbine and that the enjoyment of the course may be adversely impacted by the dominating views, noise and shadow flicker produced by the proposed turbine. With regard to the submitted Shadow Flicker Assessment, it is highlighted that there has not been any assessment provided in relation to the impacts of shadow flicker upon the recreational users of Gourock Golf Course. Figure 4.1 of the Shadow Flicker Assessment illustrates that there will be substantial portions of the course falling within the 580m zone of potential occurrence of shadow flicker which could adversely impact the recreational use of the course due to the potential for shadow flicker to impact upon games being played throughout the day. It is considered that the proposed turbine would impact negatively upon recreational uses.

It is considered that the proposed development would have a negative impact upon criterion (b), (c) and (d) of Policy INF1 and is therefore contrary to the provisions of the Local Development Plan in this regard.

In response to criterion (e) of Policy INF1 it is noted that the applicant has not assessed the impact the proposals may have upon cultural heritage features such as the Cup-Marked Stone near Moorfoot Primary School and Larkfield Battery Anti-aircraft battery which are both Scheduled Ancient Monuments in the surrounding environment. It is considered that an assessment of the impact upon cultural heritage features should be investigated. Until such time that the impact upon the built heritage features has been assessed, it is considered that the proposals would also be contrary to Policy INF1 (e) of the Local Development Plan.

Scottish Planning Policy (2014)

Scottish Planning Policy seeks to promote renewable energy developments in the right places and provides a number of considerations, against which, proposals should be assessed against. The considerations vary depending on the scale of the proposal and the characteristics of the area, but one of the main considerations is the landscape and visual impact of the proposals. As noted previously, it is considered that the impact the proposal will have upon the landscape and visual amenity in the surrounding area would be dominant and unacceptable and there are no overriding material considerations which would constitute a diversion from national and local planning policy when the impact upon the landscape is considered to be significant and unacceptable in this location.

The SPP also seeks to ensure that decision makers fully consider the impacts upon communities and individual buildings which include taking account of the impact upon residential amenity. As noted

previously, the viewpoints submitted with the application (particularly 4, 5, 9 and 15) clearly demonstrate that the turbine will appear dominating in many of these viewpoints. It is acknowledged that where a viewpoint is assessed as being 'significant', this doesn't necessarily automatically render if unacceptable, however in this instance it is considered that the dominating nature of the turbine in this location, due to its scale, would result in an unacceptable impact upon the residential amenity of those properties in the surrounding area, as demonstrated by the photomontages submitted.

The SPP also seeks to ensure that the impacts of shadow flicker are fully considered in the assessment of any wind energy proposals. It is noted that the applicant has carried out and submitted a shadow flicker assessment. Firstly it is noted that the impacts upon the recreational amenity of the Golf Course have not been assessed in the Shadow Flicker Assessment, which given that substantial portions of the course fall within the 580m zone of potential occurrence of shadow flicker which could adversely impact the recreational use of the course. Secondly, this assessment has concluded that there are 3 residential properties, an industrial property and Moorfoot Primary School which would experience shadow flicker above 30 hours per year. It is understood that there is a commonly prescribed/accepted industry standard of 30 hours per year, above which it is considered that impacts would need to be mitigated. The applicant suggests that mitigation is available to prevent any issues with shadow flicker and that this could be controlled by the turbine being turned off during circumstances where the shadow flicker would occur unacceptably at these properties. The applicant does not appear to have submitted any details which explain how this process would work in practise; we would be obliged if the Council could confirm that they are happy with this form of proposed mitigation and confirm whether they are happy that this proposed mitigation provides the required level of certainty that the impact of shadow flicker can be controlled appropriately.

If the Council are happy with the mitigation proposed and should they proceed to approve these proposals, it is strongly suggested that the Council apply a suitably worded condition to any consent which ensures that the turbine will be controlled/turned off when weather conditions would result in unacceptable shadow flicker impacts upon any of these aforementioned properties or any subsequent properties (i.e. those which were excluded by the criteria applied by in the shadow flicker assessment) which are found (post construction and during operation) to be adversely affected by shadow flicker caused by the proposed turbine.

However, until the proposed mitigation has been reviewed and accepted by the Council and unless a suitable control mechanism is secured, the proposals would be considered unacceptable in terms of their impact upon residential, employment and educational provisions in the area.
It is therefore considered that the proposals are contrary to the spirit of Scottish Planning Policy and should be refused on the basis of the impact upon the landscape, residential amenity, and the resultant negative impacts relating to shadow flicker.

Further Information Requests

In addition to the previously noted assessment of the impact upon built heritage features, it is considered that with regard to the submitted Landscape and Visual Impact Appraisal (LVIA) which accompanies the planning application, that further information may be required. It is noted that the LVIA report is dated May 2014 and that the application was not submitted to the Council until November 2014. We would question whether the information contained within the LVIA is fully upto date, particularly with regard to the cumulative assessment as there could have been changes within the landscape and surrounding area which need to be considered in the assessment since the document was prepared in May 2014.

The submitted Noise Impact Assessment states that noise monitoring equipment was stolen during the assessment period preventing onsite measurements of the northern aspect of the proposed turbine, namely the Moorfoot Drive area. The use and validity of comparative measurements is seriously questioned and we would like the Council to confirm that the use of this method can provide accurate results in the assessment of whether noise will impact upon Moorfoot Primary School and other potentially effected properties in the surrounding area. It should be noted that our client reserves the right to appoint an independent noise consultant to review the submitted information and we would reserve the right to submit further representations following the outcome of this assessment if it raises any further concerns or uncertainties.

Where appropriate new updated information should be provided to allow the Council to fully assess the proposals in context and we reserve the right to comment further on any new information submitted in support of the application or as a result of further technical appraisals prepared post submission.

Conclusions

As noted above, our client wishes to object to this application based on the following grounds:

- The proposals are contrary to Local Development Plan Policy INF1: Renewable Energy Developments where the impact of the proposals in relation to landscape and visual , and residential amenity is deemed to be significant and adverse;
- The proposals will have a direct negative and dominant impact upon the residential amenity of neighbouring properties, specifically those of Larkfield, Braeside, Pennyfern, Midton, Trumethill, Levan Estate and Levan Farm (as illustrated by the attached distances plan prepared by our clients architect);
- The proposals will have a direct negative and dominant impact upon the recreational amenity enjoyed by users of Gourock Golf Club;
- The proposals will have a direct negative and dominant impact upon the visual amenity of the proposed housing development at Levan Farm, an allocated development opportunity

site within the Local Development Plan where an approval of matters specified in conditions application is currently pending consideration;

- The applicant has not assessed the impact the proposals may have upon cultural heritage features such as the Cup-Marked Stone near Moorfoot Primary School and Larkfield Battery Anti-aircraft battery which are both Scheduled Ancient Monuments in the surrounding environment. It is considered that an assessment of the impact upon cultural heritage features should be investigated.
- The proposals are contrary to Scottish Planning Policy Guidance in relation to the impacts upon the landscape, residential amenity and resultant shadow flicker impacts of the development;
- The Landscape and Visual Impact Appraisal information submitted may not be upto date and where appropriate new updated information should be provided to allow the Council to fully assess the proposals in context.
- The submitted Noise Impact Assessment states that noise monitoring equipment was stolen during the assessment period. The use of comparative measurements is questioned and we would like the Council to confirm that the use of this method can provide accurate results in the assessment of whether noise will impact upon Moorfoot Primary School and other potentially effected properties.

We trust that the Council will take the above mentioned points into consideration when assessing the suitability of this site for the development and ultimately recommend that the application be refused given that the proposals are contrary to the adopted Local Development Plan and that the proposal would negatively impact the landscape and visual, residential and recreational amenity of the surrounding area.

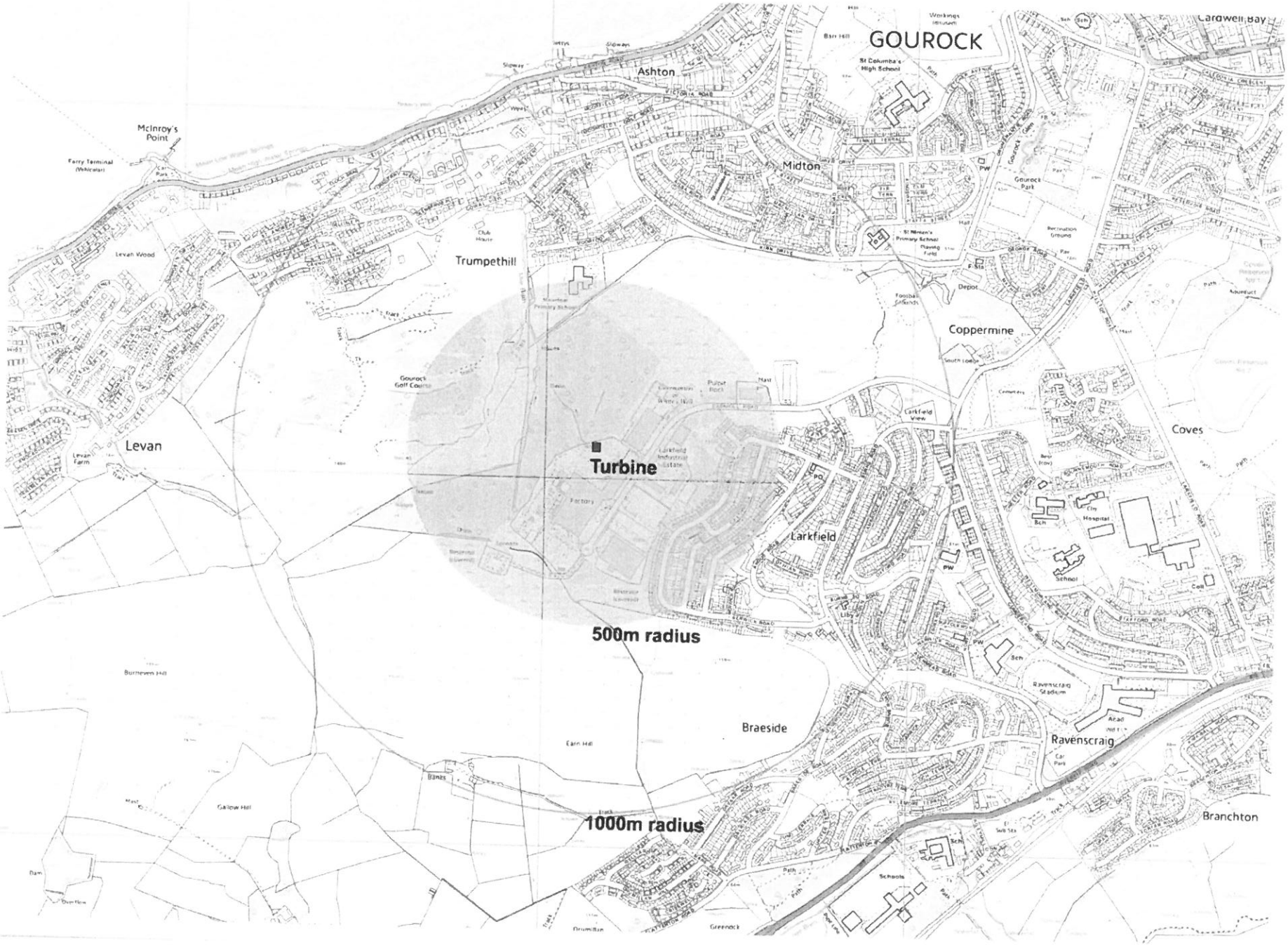
We trust that the above is clear; however should you require any further clarification on any of the information provided, please do not hesitate to contact me. In the meantime we would be grateful if you could confirm receipt of this objection prior to the deadline for comments.

Yours sincerely,

Baxter Allan
Director
ballan@keppiedesign.co.uk

Cc: Westminster Investments c/o Mr Ronnie Gormley (by email only)
Enc. Distances plan prepared by our client's architect

Distances plan - illustrates distances to surrounding properties, amenities etc.



Jim Lynn

From: David Ashman on behalf of Devcont Planning
Sent: 13 March 2015 08:47
To: Jim Lynn
Subject: FW: Wind Turbine Proposal by Texas Instruments 14/0392/IC
Attachments: R-7066-RGM-MI.pdf

From: Guy Phillips
Sent: 12 March 2015 14:13
To: Devcont Planning
Subject: FW: Wind Turbine Proposal by Texas Instruments 14/0392/IC

Further objection

Guy Phillips
Municipal Buildings
Clyde Square
Greenock
PA15 1LY

01475 712422

Let us know how satisfied you are with the service received from our Development Management section by completing our customer survey at Survey Monkey - Development Management

From: Ronnie Gormley [mailto:
Sent: 12 March 2015 14:09
To: Guy Phillips
Cc: 'Baxter Allan - Keppie Design'
Subject: Wind Turbine Proposal by Texas Instruments

Dear Mr Phillips,

Westminster Investments Objection to the Proposed Erection of Wind Turbine at Earnhill Road Greenock

In our previous objection letter submitted by Keppie Planning, we intimated that we reserved the right to get some expert opinion on the Noise Assessment submitted by the applicant.

We now enclose that additional opinion from noise consultants RMP and would be grateful if you would add this to our prior objection.

Yours sincerely,

R Gormley
For Westminster Investments.

RMP
acoustics energy vibration

42 Colinton Road
Edinburgh
EH10 5BT

T: 0845 062 0000
F: 0131 455 5121
E: rmp@napier.ac.uk
www.rmp.biz
www.soundtest.co.uk
www.airtest.org.uk

12th March 2015

Ronnie Gormley
Westminster Investments
Levan Farm
Gourock

Dear Ronnie,

WIND TURBINE APPLICATION – REVIEW OF NOISE IMPACT ASSESSMENT FOR PROPOSED TURBINE AT TEXAS INSTRUMENTS, GOUROCK

Thank you for instructing RMP to review the noise impact assessment (P6044 dated 3rd December 2014) prepared by Ethos Environmental Limited in support the turbine application.

We have reviewed the report and for the reasons set out below, have concluded that the report does not form a competent assessment in terms of the ETSU and IOA guidance and should not be relied upon to adequately assess the potential noise impact. In the event that the local authority was minded to approve the application we would consider that a further assessment is required before the local authority could properly determine the application.

Review of report

Section 1.2 and 2.3 references the appropriate guidance documents for undertaking this type of noise impact assessment.

Section 3.2 confirms that due to theft of the measuring equipment, no background data was obtained in the Moorfoot area. We would not consider that approximating the noise environment at the Moorfoot area by looking at the difference between the Banff Road and Moorfoot locations over a one hour measurement to be appropriate. To accurately define a locations background noise environment it is necessary to obtain at least 10 $L_{A90\ (10min)}$ data points at each corresponding 10 min wind speed reading from 3m/s to 10 m/s. Whilst the loss of the equipment was unfortunate, additional monitoring should have been carried out to replace the missing data.

Section 3.3 confirms that the wind speed was also measured for correlation with the noise data. It is assumed that the monitoring location was close to the proposed turbine. No details on the equipment used is presented and if its accuracy complies with section 2.6.10 of the IOA guidance. No mention of monitoring the rainfall simultaneously is made in the report. This is required by section 2.7 of the IOA guidance. Any periods of noise data containing rainfall must be excluded from the data set.

Table 1 presents the results of the wind speed measurements. From the results presented it appears that the wind speed was monitored in 1hr periods and not 10 min periods as required by ETSU. The IOA guidance also requires that 10 min periods are used and that they are synchronised with the noise measurement periods to within 15 seconds. **Failure to record the wind speed in 10 min intervals, results in it being impossible to undertake an ETSU assessment as the wind and noise data cannot be accurately analysed.**

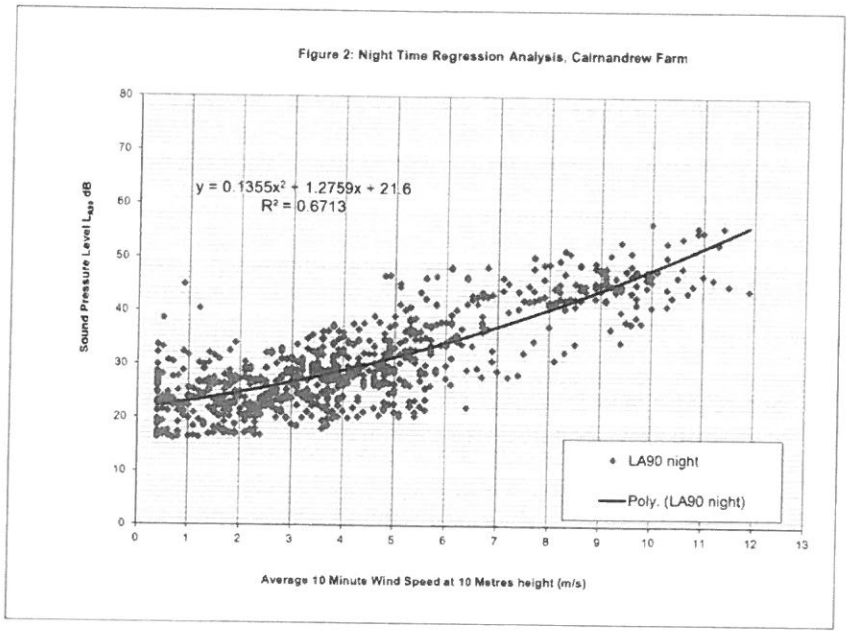
Section 3.4 confirms that a Type 1 sound level meter was used. No photograph of the installation is included. Confirmation should be made that the windshield used is appropriate for wind turbine background assessment. The normal single layer 100mm diameter shields are generally not appropriate. Most assessment are undertaken using double layer shields with the outer shield having a diameter of 150-200mm.

Section 4.1 presents the warranted turbine sound power levels. No comment is made on the uncertainly in the warranted levels. A correction of +1-2 dB for uncertainty would typically be included, if no published uncertainty is available.

Section 4.2 presents the predicted turbine noise level at various residential properties. However the levels are only predicted at 4m/s and 12 m/s. ETSU and the IOA guidelines require that the predictions are carried out at each m/s as the greatest impact can occur at any of the m/s depending on the turbine profile and background readings.

The predictions are also shown in the form of noise maps in Appendix 3. The mapping appears to show significant attenuation of the noise as it travels to Banff Road past the factory buildings. Given the relative height of the turbine and the factory buildings, this is surprising and we would have concerns about what source height was used in the noise model to represent the turbine source.

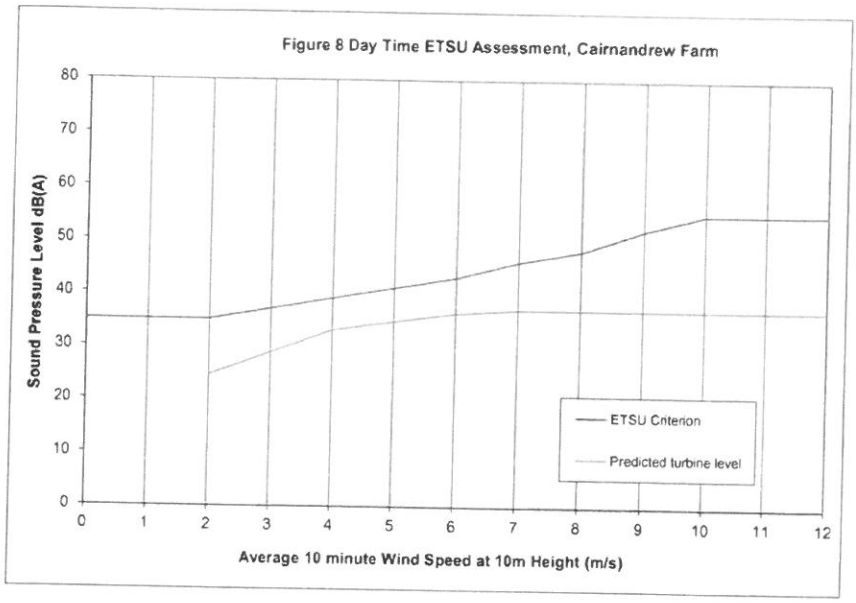
Table 4 presents the analysis of the measured wind speed against noise levels. Again this does not follow ETSU or IOA guidance as 1hr periods have been used. No regression analysis has been carried out as required by ETSU and the IOA guidance. A typical example chart which would normally be included in an assessment plotting the 10 min wind speed and noise levels is shown below.



It is also a requirement of ETSU and the IOA guidance that consideration is given to the effects of wind shear. The IOA guidance presents the current best practice for accounting for this effect. The report has made no allowance for this effect, which is likely to result in the predicted turbine noise data being compared against the wrong wind speed background data.

Section 5 discusses the results of the assessment. However as the background noise has not been properly established at each wind speed in accordance with ETSU and the IOA guidance, it is not possible to undertake a proper ETSU assessment of the potential noise impact.

In order to undertake a competent impact assessment in accordance with ETSU and the IOA guidance it is required to present an analysis of the predicted turbine noise levels against the derived ETSU criteria, based on the background noise level. A typical example of this assessment is shown below. This analysis has not been carried out for the proposed application.



Section 6 concluded the report stating that the assessment has been carried out in accordance with the ETSU and IOA guidance. As identified above the reports methodology has not followed the referenced guidance and the findings cannot be relied upon as accurately assessing the impact.

As the proper meteorological data is not available, there is no alternative but to fully repeat the site assessment following the ETSU and IOA guidelines.

Should there be any point requiring clarification, please do not hesitate to contact the undersigned.

Yours faithfully,

Richard Mackenzie
for
Robin Mackenzie Partnership

Grant Kennedy

From: David Ashman on behalf of Devcont Planning
Sent: 09 January 2015 11:29
To: Grant Kennedy
Subject: FW: Planning Application 14/0392/IC Erection of 77.8m Wind Turbine at Earnhill Road Greenock

Follow Up Flag: Follow up
Flag Status: Flagged

From: Guy Phillips
Sent: 09 January 2015 08:38
To: Devcont Planning
Subject: FW: Planning Application 14/0392/IC Erection of 77.8m Wind Turbine at Earnhill Road Greenock

Objection

Guy Phillips
Municipal Buildings
Clyde Square
Greenock
PA15 1LY

01475 712422

Let us know how satisfied you are with the service received from our Development Management section by completing our customer survey at Survey Monkey - Development Management

From: Ronnie Gormley [mailto:
Sent: 08 January 2015 17:32
To: Guy Phillips
Subject: Planning Application 14/0392/IC Erection of 77.8m Wind Turbine at Earnhill Road Greenock

Dear Mr Phillips,

We write to advise that we have major objections to the above application and are in the process of considering the supporting documents that have been lodged.

However the timing of the lodging of the application just before the Christmas and New Year holiday period has left the time period for proper scrutiny and validation of the documents presented very restrictive. As you will appreciate the applicant has had many months to produce the information and in the interest of fair play we would request that final consideration of the application be deferred until we can have the technical information properly assessed by suitable professionals.

In addition we note that the applicant has not carried out a Noise Assessment on:

A) The residential properties at Trumpethill Estate.
B) Moorfoot School.
C) Levan Farm (Existing or proposed).

The applicant advises (as far as I can make out) that its equipment was stolen during this exercise and therefore the applicant has estimated these readings based on readings taken at Larkfield on the southern side of the Turbine.

Given the serious impact that Noise can have from these developments and the effect on hundreds of house, we would submit that it is really not good enough to suggest that estimated levels based on a totally different location be accepted in support of the application. We would respectfully request that these levels be properly assessed based on actual results and at a time when the wind direction is coming from the application site.

Flicker.

The applicant suggests that only a relatively small number of houses plus Moorfoot School fall within the affected range based on 10 times the Rotor diameter. We refute this and will intend submitting evidence to the contrary.

Best regards,

Ronnie Gormley

Councillor David Wilson
Ward 1 – Inverclyde East
Municipal Buildings
Greenock
PA15 1LX

Chair: Planning Board
Chair: Local Review Body

Inverclyde council

2771

Mr & Mrs R Gormley
Levan Farm
Tantallion Avenue
Gourock
PA19 1HA

Direct Line: 01475 712727
Fax: 01475 712976
Email: david.wilson@inverclyde.gov.uk
Our Ref: DW/RM
Your Ref:
Date: 30 January 2015

Dear Mr Gormley,

Thank you for your most comprehensive objection.

I have passed on your observations to the relevant planning officer.

Yours sincerely

David Wilson
Councillor
Chair: Planning Board

EXTRACT OF LETTER

2767

Tel:
Mobile:

Mr & Mrs R Gormley
Levan Farm
Tantallon Avenue
Gourock PA19 1HA
Scotland.

The Director of Planning
Inverclyde Council
Municipal Buildings
Clyde Square
Greenock PA15 1LY
F.A.O. Guy Phillips

20th January 2015

Dear Mr Phillips,

Proposed Erection of 77.8m Wind Turbine by Texas Instruments at Earnhill Road Greenock.

Planning Ref: 14/0392/IC

We refer to the above planning application and write to record our strongest possible objection to the proposal.

Not only will the height and scale of this proposal have a major negative impact on the executive housing development taking place at Levan Farm, but, sitting as it does on the very top of Earnhill, will have a very major impact on the landscape setting of much of Gourock and Greenock. At almost 80m tall and with rotor blades some 50m across in diameter, it will dominate the skyline above the towns and have a major impact on thousands of residents, will be seen from as far away as Dunoon and Kilcreggan and dominate the skyline from Loch Thom, Gourock West and all the way round to the Lyle Hill and the Battery Park. (all as evidenced by the photo montages submitted by the applicant).

It will have a major impact on the residential communities of Larkfield, Braeside, Pennyfern, Midton,Trumpet Hill, Gourock Golf Course, Levan Estate and Levan Farm, (as can be seen from the photo montages submitted by applicant) where apart from the visual impact and loss of amenity, it will give rise to incessant noise and shadow flicker, (a strobe type effect of sun light being interrupted by rotor blades) both of which have major health issues, destroy quality of life, and have a major impact on property values. **(see Appendix 2)**

It also sits directly above Moorfoot Primary School which will be severely affected by noise and shadow flicker, affecting concentration and learning and likely to have medical implications such as headaches and nausea as is well documented and evidenced on the internet and worldwide. St Ninian's Primary School, St Columba's High and Inverclyde Academy are also close by and likely to be affected.

Please **see appendix 1** for additional comment on Shadow Flicker.

Our grounds for objection include:

1. Visibility –

The size and scale of the proposal will mean it is highly visible from far and wide within the district and from across the river(Dunoon and Kilcreggan). It will dominate many of the residential streets in the western and south western parts of Inverclyde as can be seen from the enclosed map, **(appendix 2)** with properties in Levan, Trumpethill, Midton, Larkfield and Braeside particularly affected due to proximity of the proposal. However it will also affect many other areas given the size and visibility of the Turbine given its location on top of Earnhill.

2. Landscape Intrusion.

Breaches existing and strongly held and applied principle of no development above the skyline. This principle was applied when the original factory was built but subsequently breached by the two large Cooling Towers to the north west of the original building and can be seen from as far away as Dunoon. To give you some idea of the scale involved this proposal is approx 6 times the height of the existing cooling towers.

The turbine would appear as a dominant feature in the surrounding landscape, particularly to those residential properties in the surrounding area.

3. Proximity to Housing. There are numerous residential estates in close proximity and affected by the proposal as mentioned above. The amenity of these houses will be badly affected by visual intrusion of the turbine into their streetscape and from noise and shadow flicker as mentioned below. (see appendix 2)

4. Proximity to Schools. Moorfoot Primary lies directly below the proposal and even by admission of the developer will be affected by it in terms of visual amenity, noise and shadow flicker. Others such as St Ninians, St Columbas and Inverclyde Academy are also likely to be affected to varying degrees.

5. Noise. (see residential properties and schools within 500m and 1000m of Turbine on attached map likely to be affected) .

Hum and swish from turbine blades, generator and gearing mechanism. Depending on wind direction this can affect properties up to 1000m and beyond. There is already a problem with noise from the cooling towers affecting properties within the above ranges and this proposal will add to the existing problem.

6.Shadow Flicker. The strobe effect of sunlight being constantly interrupted by rotor blades. This will be a particular problem on the Gourock side of the proposal and can affect properties up to 1000m and beyond.**(Please refer appendix 1)**

7. Loss of capital Value. Detrimental effect on house prices and marketability of properties within sight of the proposal or affected by its noise or flicker. Please refer to **"savecowal.org"** website and press **"Links"** for example of Shadow Flicker.

We have a colleague in Eaglesham on the south side of Glasgow who has three turbines close by, the nearest of which is 975m away from his house. He is driven mad by the noise (that he describes as like having an aircraft constantly overhead) and shadow flicker which washes over his house for 3-4 hours a day during which he cannot occupy four rooms in his house. He would sell his house tomorrow but is unable to do so. He reckons his house has lost approx 40% in value.

Although loss of value and marketability may not be considered a planning issue, it will be a major consideration for anyone who is trying to sell a house in close proximity to the proposal or overshadowed or overlooked by it. This is particularly the case for the residential communities mentioned above. There will be thousands of people negatively affected by this proposal and we would hope that officials and the elected members will take this into consideration when reaching any decision.

8. **Major loss of amenity** for the thousands of residents that will have to live with the proposal.

9. **Danger to health** from falling debris or ice from rotor blades. This is a real danger given proximity to existing properties.

10. The proposal is contrary to the Local Plan policies particularly INF1.

11.Leisure and Tourism. The proposal will have a significant and dominant affect on Gourock Golf Club as it sits directly above the course. Not only is it obtrusive and highly visible which detracts from the visual amenity of the course but will generate noise and shadow flicker which will wash over areas of the course to the detriment and perhaps health of those who are playing. It is likely to lead to loss of membership which could have major financial implications for the club.

The Clyde estuary is one of the most scenic stretches of water anywhere in the world. It is created in large part by the rising scenic landscape either side of the river. It is an attraction for yachting enthusiasts and cruise ships from all over the world all of whom acknowledge its beauty.

This proposal, unless it is refused, may well set a precedent and result in further applications for more Turbines at this location and along our hill tops, (a common ploy we are led to believe) which together with other proposals across the Clyde, like the **"Bachan Burn"** proposal of 20 x 135m Turbines on top of the hills above Dunoon (which is soon to be lodged by a German developer) will result in desecration of our hillsides on both sides of the river, destroying one of the best river approaches and visual landscapes in the world, leaving residents on both sides of the river and future generations wondering how and why this could have been allowed to happen and **who** allowed it to happen.

We trust that the council's planning officials and elected members will see fit to refuse this unwelcome proposal and creeping destruction of our landscape.

Yours faithfully

R. Gormley

Marion Gormley

Effect of Shadow Flicker

Appendix 1

From: Bill
Sent: 08 January 2015 12:20
To: Ronnie Gormley
Subject: Wind Turbine

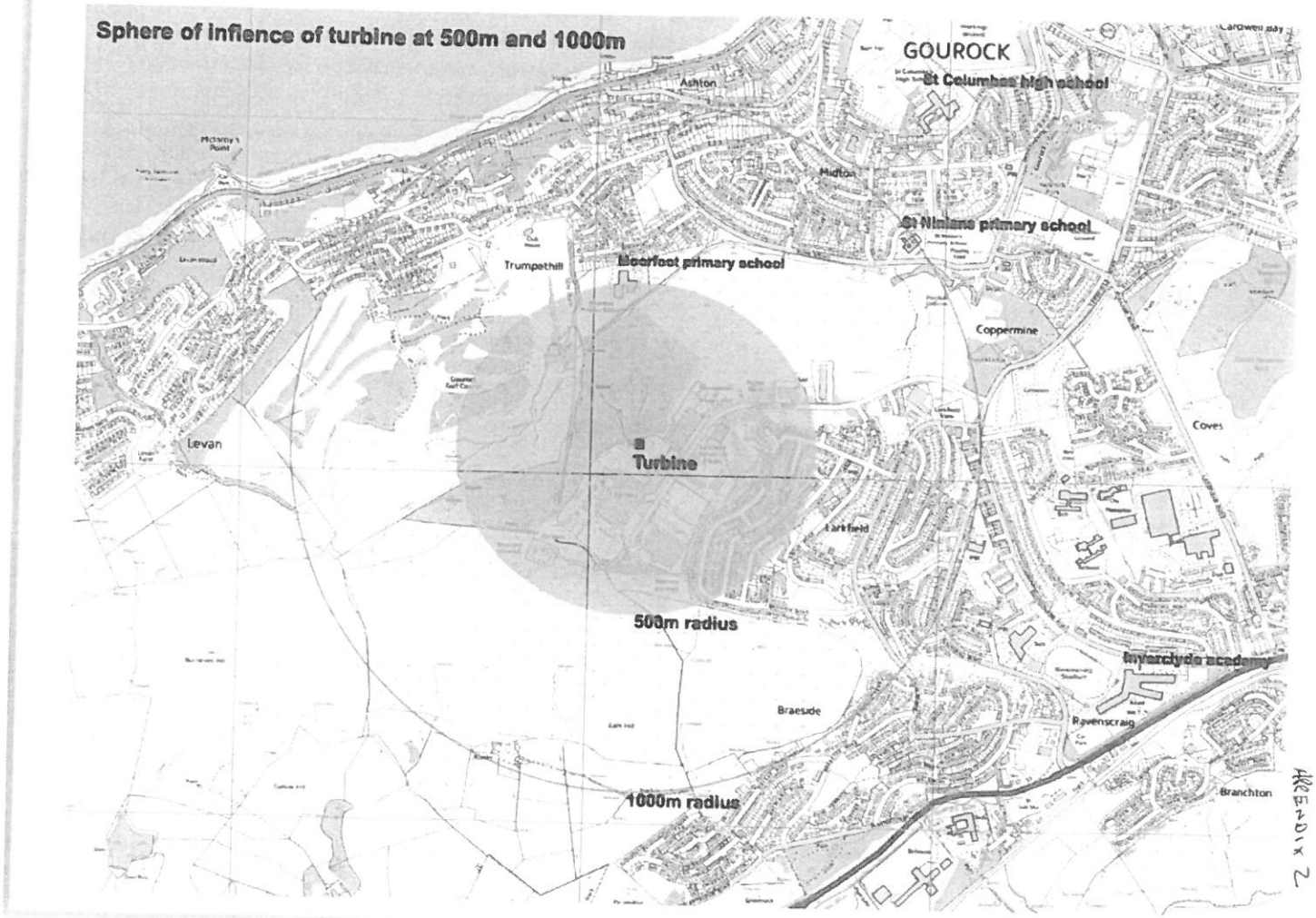
Hi Ronnie,
Happen to be on contraption when your mail came through. The one aspect I am familiar with is the strobe effect. As the erection is more or less due south of a populated area, for several hours every day, that area would be subjected to the strobe effect, which from my professional experience can induce an epileptic type reaction, at the best, inability to react to your surroundings, at the worst unconsciousness. I have seen the unconsciousness happen at first hand.
There was a motorway in England where there were a series of accidents which happened at the same time of day, at the same time of year, along the same stretch. For no apparent reason cars would suddenly veer off into another lane or cross the central reservation. There was a paling fence higher than road level, through which the sun shone at a certain time of day, and depending the speed of the vehicle, the strobe effect caused susceptible persons to lose control, and perpetrated many fatal accidents. It took a while for the penny to drop, and the fence was removed. I believe this scenario is now recognised in roads and their landscaping, thus preventing recurrence.

Cheers
Bi

From: Bill
Sent: 10 January 2015 17:05
To: Ronnie Gormley
Subject: Wind Turbine

Hi Ronnie,
Yes you can use this information. My first- hand experience of someone being rendered unconscious by flicker was when I was in my final year in Optics in 1963. We were doing projects, and one of my colleagues was experimenting with "flicker". We used first year students as guinea pigs. my colleague, was adjusting the flicker frequency, when suddenly , the subject, took an epileptic fit, and became unconscious. I am in touch with frequently, lives in , but unfortunately , who became subsequently, is no longer with us.
Can you imagine someone driving along a road in Midton in the middle of a sunny day, susceptible to the flicker coming from the south situated turbine, losing control of their car *~~~/@*********. It does not bear thinking about, particularly if it is the school lunchtime!!!

Cheers Bill


Sphere of inflience of turbine at 500m and 1000m
GOUROCK
St Columbas high school
Ashton
Midton
St Ninians primary school
Trumpethill
Moorfoot primary school
Coppermine
Coves
Levan
Turbine
Larkfield
500m radius
Inverclyde academy
Braeside
Ravenscraig
1000m radius
Branchton

APPENDIX 2

Tel:
Mobile:
email:

Mr & Mrs R Gormley
Levan Farm
Tantallon Avenue
Gourock PA19 1HA
Scotland.

Councillor David Wilson
Inverclyde Council
Municipal Buildings
Greenock PA15 1LX

27th January 2015

Dear Councillor Wilson,

Proposed Erection of 77.8m Wind Turbine by Texas Instruments at Earnhill Road Greenock

I hope you do not mind me writing to you directly on the above matter but believe it important enough to do so, particularly as the application and its consequent affect on a very large number of people in the district appears to have flown largely under the radar. I also suspect that many people have no idea about the scale and impact that the proposal will have on the immediate area and the wider environs of the district.

We are all for helping local companies, but would suggest that additional profitability for Texas Instruments should not come before the interest of or be at the expense of local residents and the wider community of Inverclyde as this proposal undoubtedly is.

We hope, like us, you will consider the size, scale and location of this proposal to be totally inappropriate when it comes before you for consideration.

I shall try emailing the enclosed data to you for convenience but the map makes it quite a large file so am sending this hard version just in case.

I would be happy to discuss the matter in person at your convenience if you thought this would be helpful.

Best regards.

Yours sincerely,

Ronnie Gormley

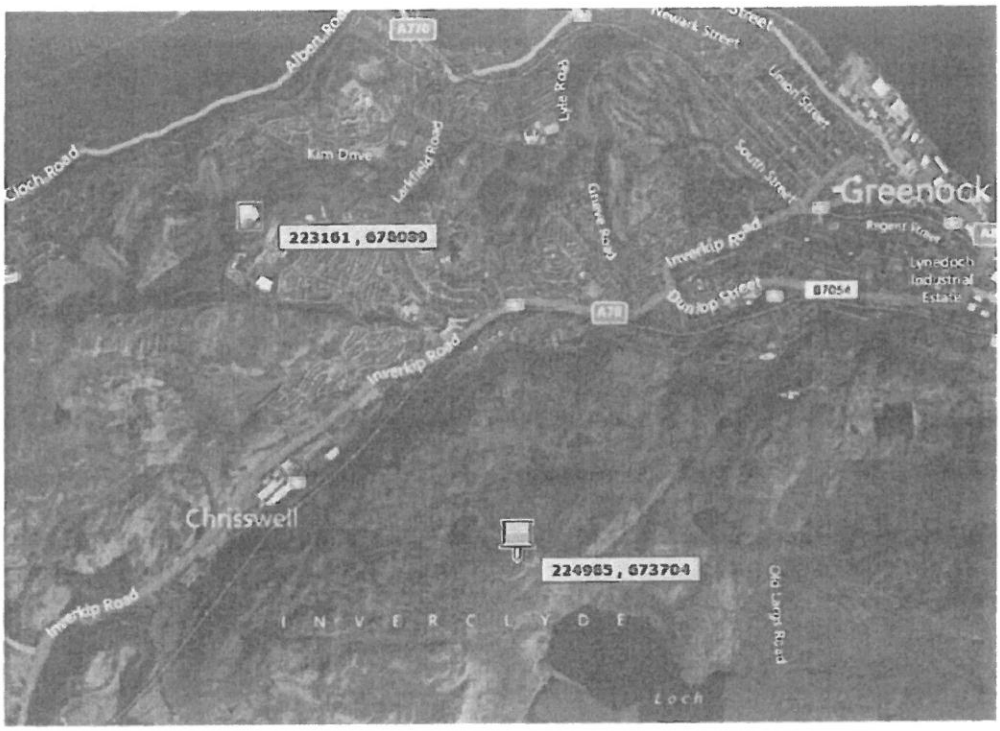
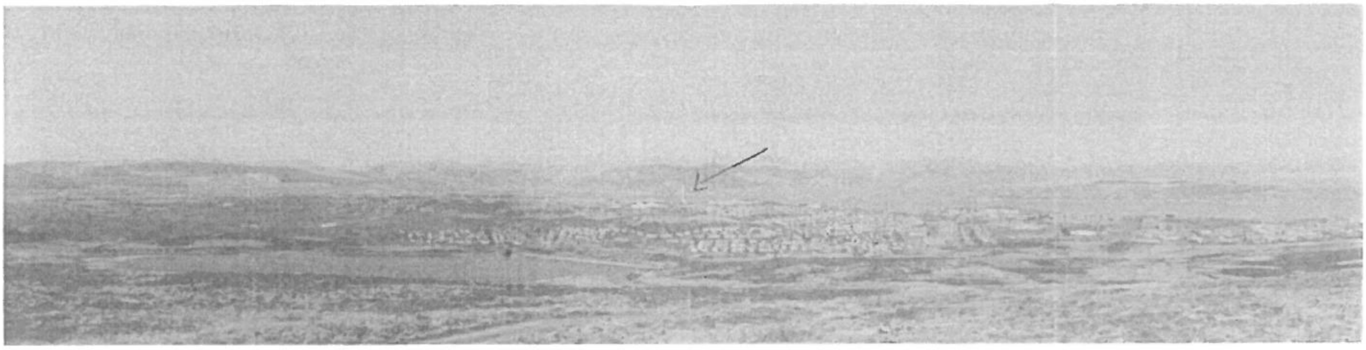


Figure 11a Viewpoint 7 was taken from this location to the north west of Loch Thom



THIS PHOTOMONTAGE ILLUSTRATES
THE IMPACT FROM NORTH WEST
OF [illegible]

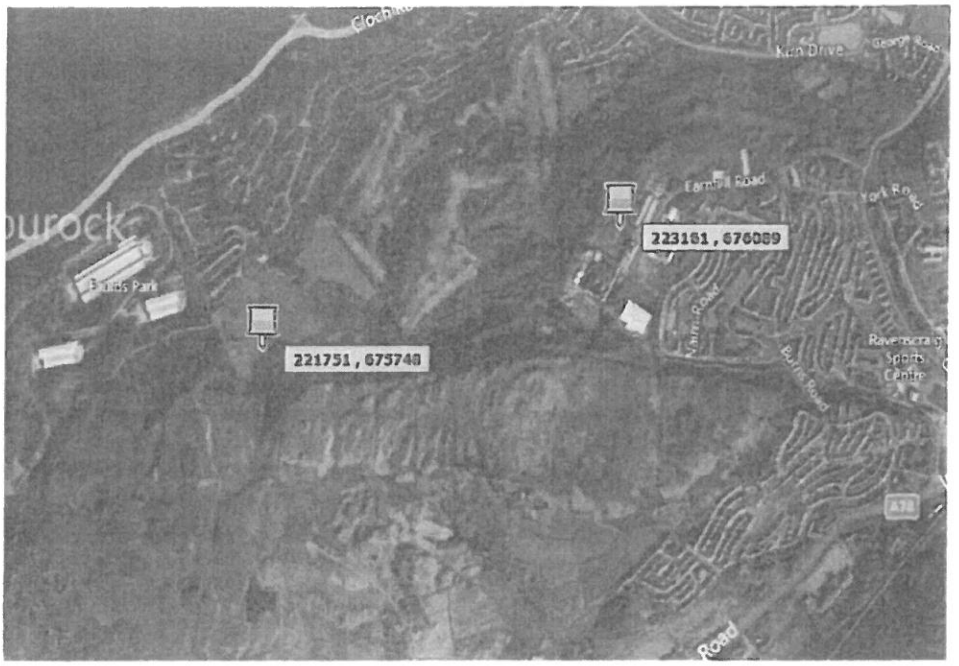
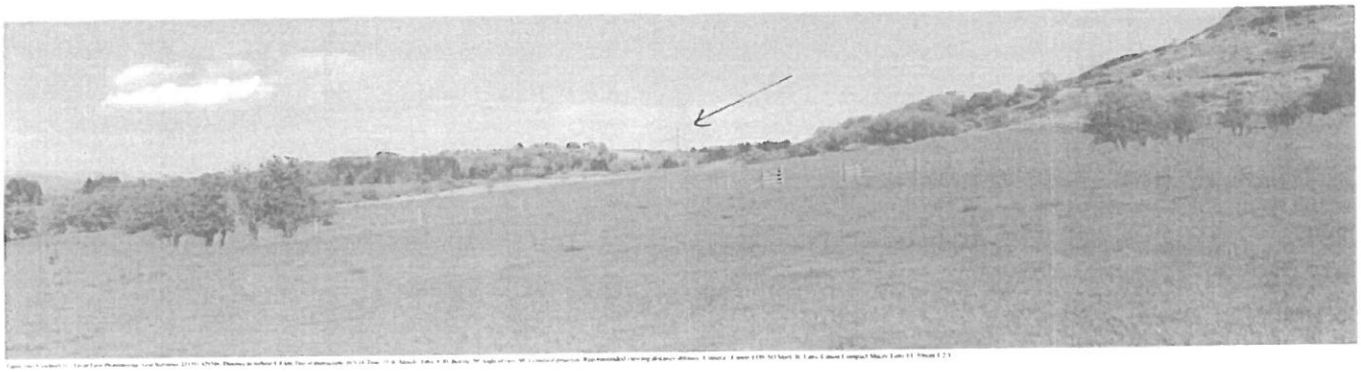


Figure 14b Viewpoint 10 was taken from land at Levan Farm



THIS PHOTOMONTAGE ILLUSTRATES
THE VIEW FROM LANE 41
LOOKING EAST.

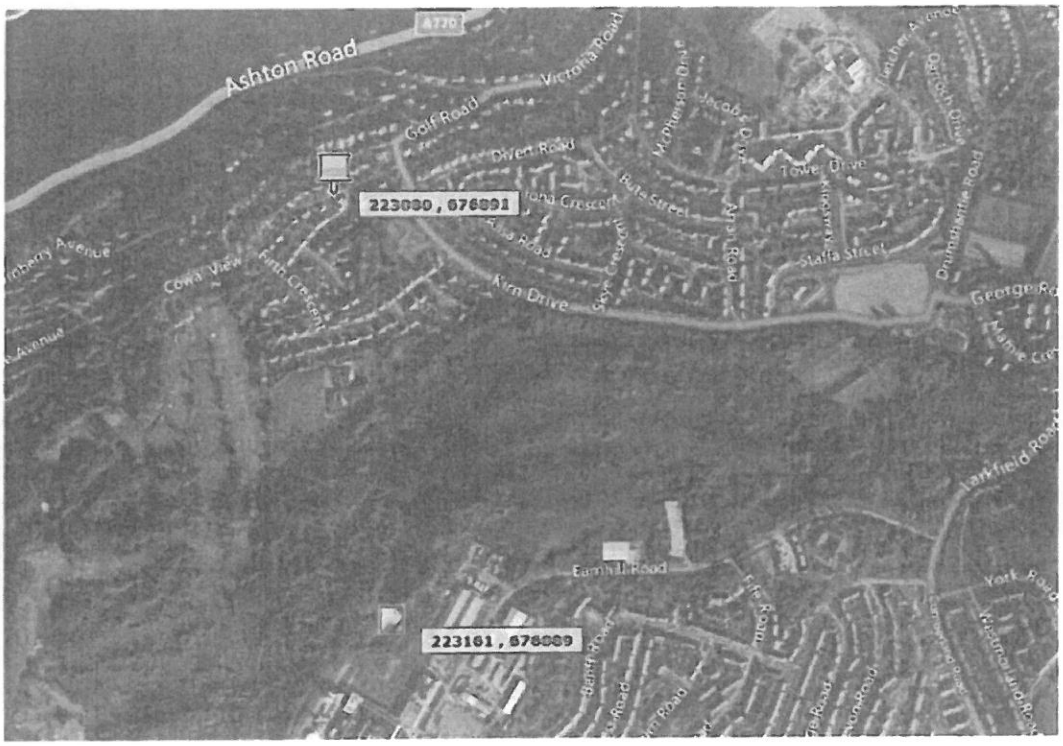
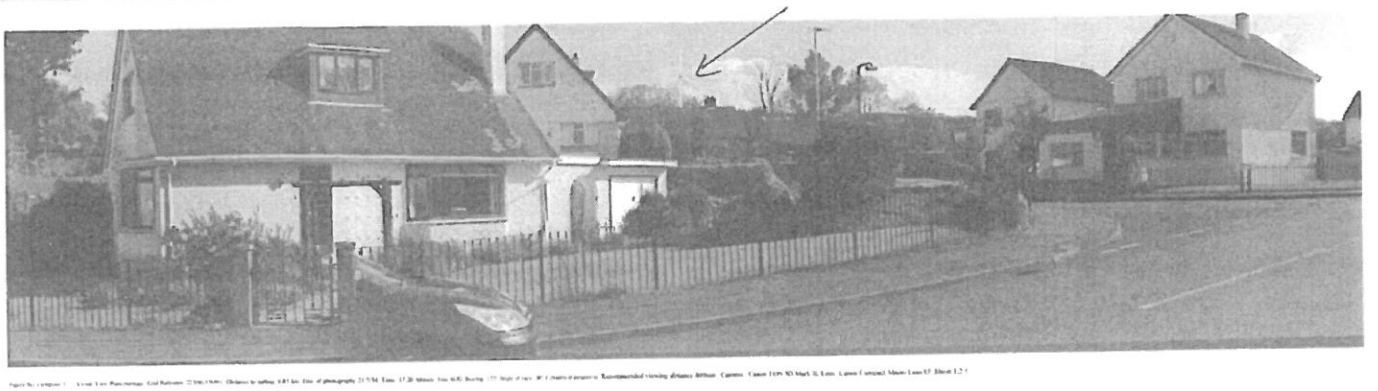


Figure 9a Viewpoint was taken from this location opposite no. 7 Cowal View



THIS PHOTOMONTAGE ILLUSTRATES
THE IMPACT FROM OPPOSITE
No 7 COMAL VIEW

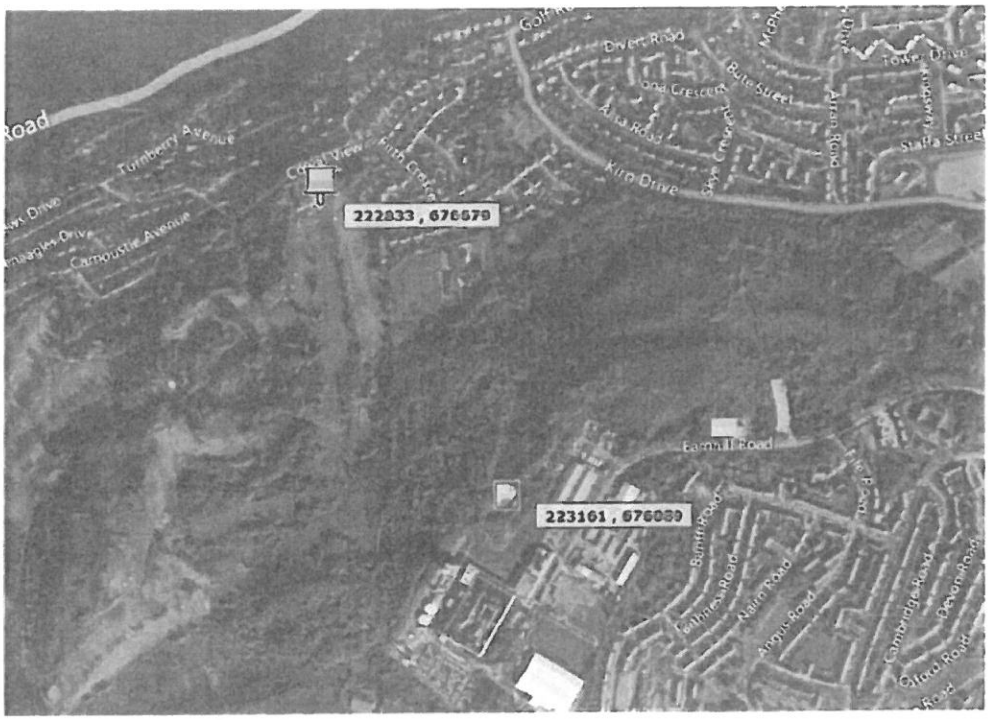
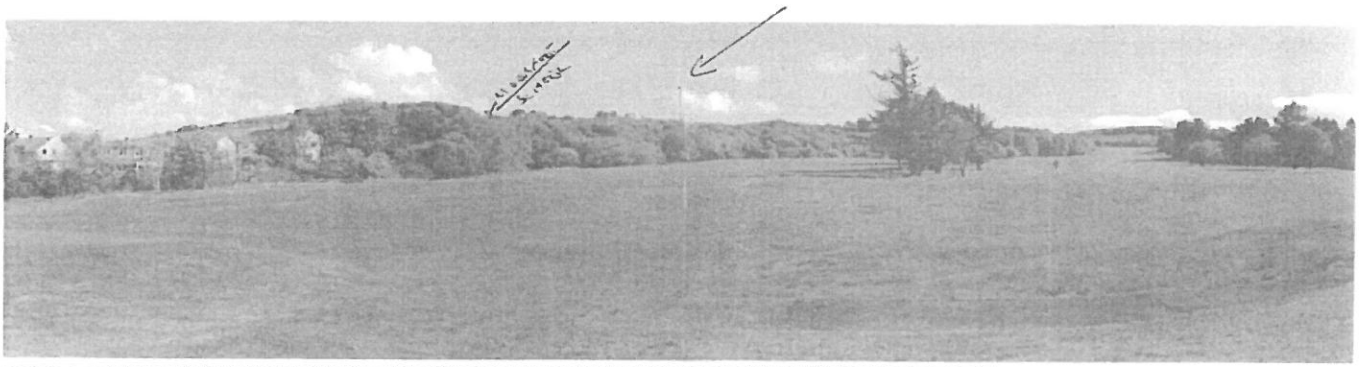


Figure 13a Viewpoint 9 was taken from this location within Gourock Golf Club



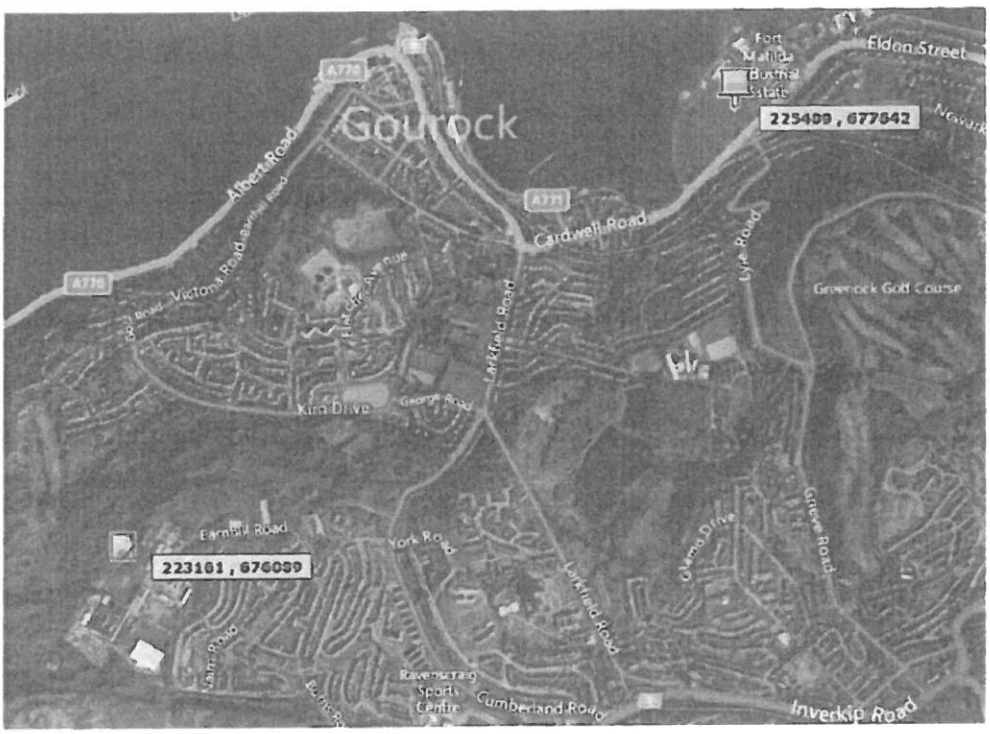
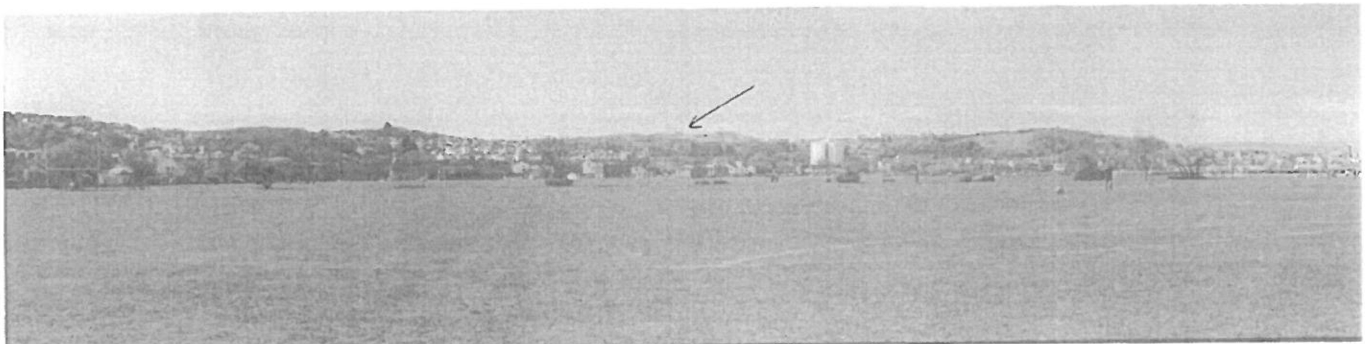


Figure 15a, Viewpoint 11 was taken from Battery Park, north of Eldon Road



THIS PHOTOMONTAGE ILLUSTRATES
THE IMPACT FROM BATTERY PARK,
NORTH OF [illegible] ROAD

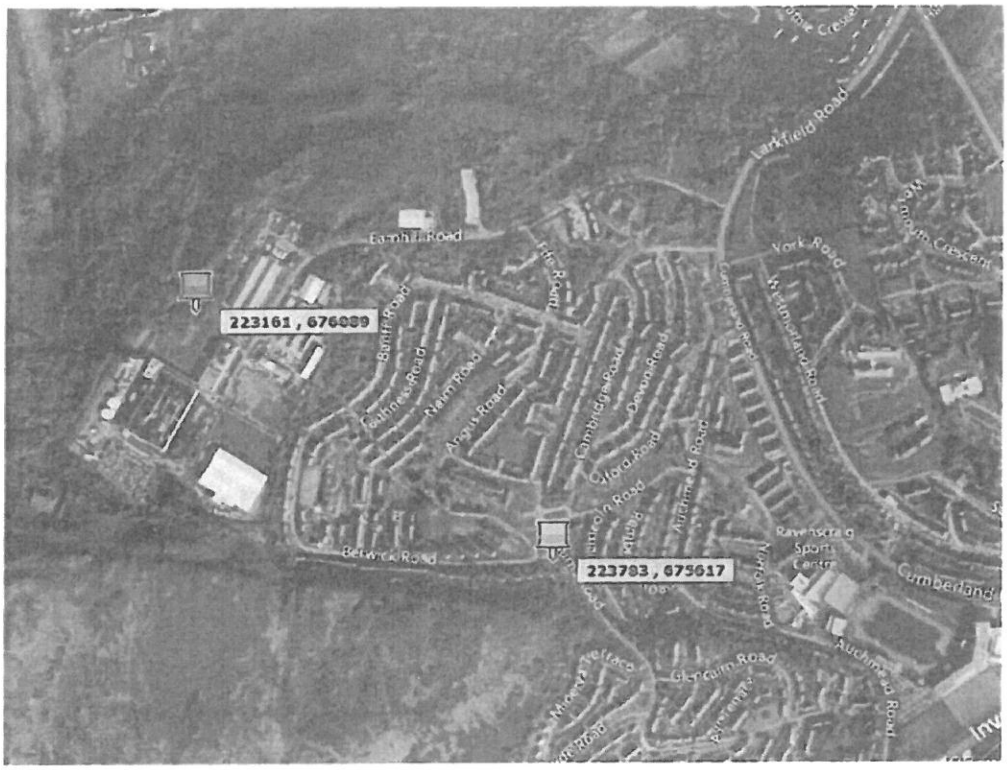
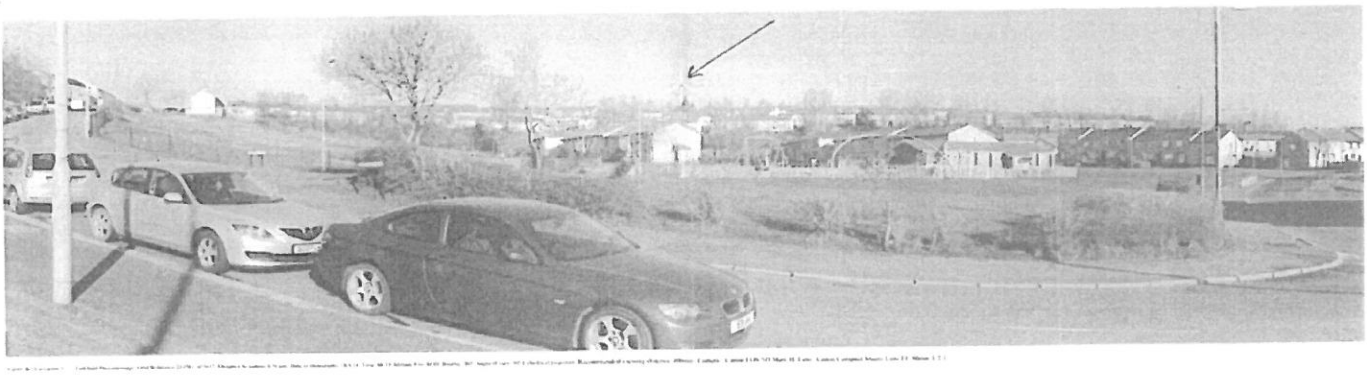


Figure 8a Viewpoint 4 was taken from this location on Berwick Road/Burns Road



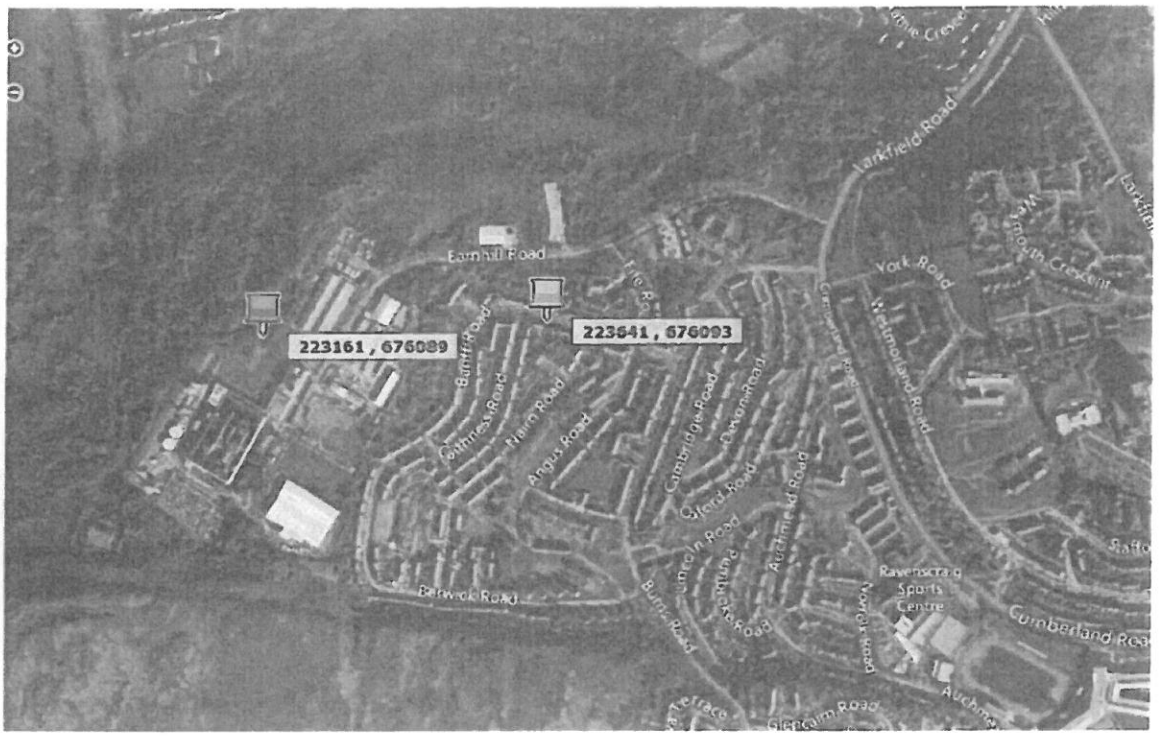


Figure 19a Viewpoint 15 was taken from this location on Banff View (near no. 51/54)

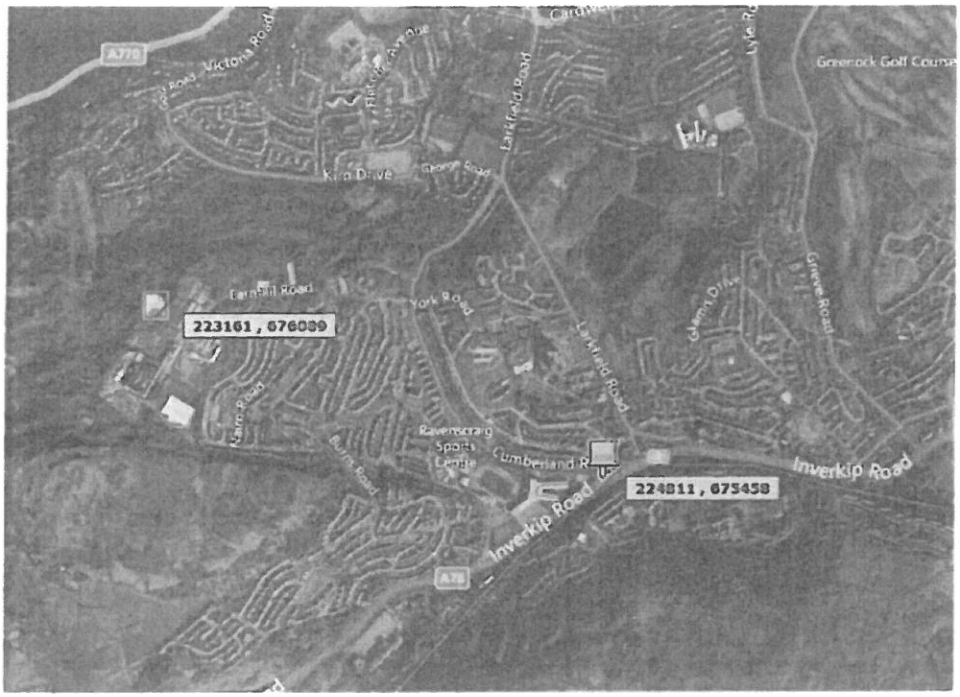
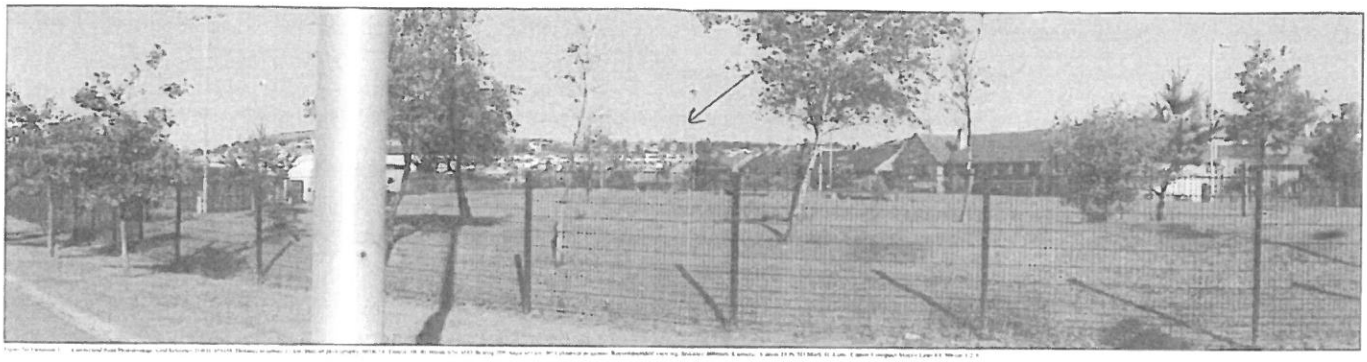


Figure 7a Viewpoint 3 was taken from this location on Inverkip Road (A78)



Contact Details

Name Eileen Virtue

Address 1 7 Cullen Crescent

Address 2

Town Inverkip

County Inverclyde

Postcode PA16 0HY

Telephone

E-mail [redacted]

Fax

Enquiry Details

Planning Application Site Address: 14/0392/IC

Nature of Enquiry: Comments

What are your comments? I am writing on behalf of Inverkip & Wemyss Bay Community Council to submit our objection to planning application 14/0392/IC Texas Instruments application for 77.2m Wind turbine. We wish to register our concerns and objections on behalf of our residents for following reasons: 1. This development will be highly visible from many parts of Inverclyde, Firth of Clyde and Clyde Muirshiel Regional Park which will have a detrimental effect to both residents and visitors to the area. Lower Clyde/Firth of Clyde is identified as a 'strategic environmental and scenic (tourism) resource' in the Inverclyde Local Plan. This panoramic outlook is a significant asset for Inverclyde and Argyll, there is a desire to see these views protected. 2. The size and positioning of the proposed turbine is out of keeping with advice in Scottish Planning Policy and will have a significant detrimental impact on local residents. We have no fixed policy against wind turbines, but we feel strongly in this case, that the size and prominent positioning of this wind turbine is inappropriate and detrimental to the whole community. Please let us know if you need any further info from us.

How can we help? (your question) Please register our comments and objections to the proposed planning application.

The Director of Planning
Inverclyde Council
Municipal Buildings
Clyde Square
Greenock PA15 1LY
F.A.O. Guy Phillips

Email: Devcont.planning@inverclyde.go.uk

22nd January 2015

Dear Mr Phillips,

Proposed Erection of 77.8m Wind Turbine by Texas Instruments at Earnhill Road Greenock.

Planning Ref: 14/0392/IC

We refer to the above planning application and write to record our strongest possible objection to the proposal.

At almost 80m in height and with a rotor diameter of around 50m this proposal is totally unacceptable for such an urban location. Sitting as it does on the very top of Earnhill, it will have a very major impact on the landscape setting of much of Gourock and Greenock. It will dominate the skyline above the towns and have a major impact on thousands of residents, will be seen from as far away as Dunoon and Kilcreggan and dominate the skyline from Loch Thom, Gourock West and all the way round to the Lyle Hill and the Battery Park. (all as evidenced by the photo montages submitted by the applicant).

It will have a major impact on the residential communities of Larkfield, Braeside, Pennyfern, Midton,Trumpet Hill, Gourock Golf Course, Levan Estate and Levan Farm, where it will dominate the streetscapes and where apart from the visual impact and loss of amenity, it will give rise to incessant noise and shadow flicker, (a strobe type effect of sun light being interrupted by rotor blades) both of which have major health issues, destroy quality of life, and have a major impact on property values.

It also sits directly above Moorfoot Primary School which will be severely affected by noise and shadow flicker, affecting concentration and learning and likely to have medical implications such as headaches and nausea as is well documented and evidenced on the internet and worldwide. St Ninian's Primary School, St Columba's High and Inverclyde Academy are also close by and likely to be affected.

8. **Major loss of amenity** for the thousands of residents that will have to live with the proposal.

9. **Danger to health** from falling debris or ice from rotor blades. This is a real danger given proximity to existing properties.

10. Is contrary to Local Development Plan policies.

11. Leisure and Tourism. The proposal will have a significant and dominant affect on Gourock Golf Club as it sits directly above the course. Not only is it obtrusive and highly visible which detracts from the visual amenity of the course (it's views are one of the major selling points of the course) but will generate noise and shadow flicker which will wash over sections of the course to the detriment and perhaps health of those who are playing. It is likely to lead to loss of membership which could have major financial implications for the club

The Clyde estuary is one of the most scenic stretches of water anywhere in the world. It is created in large part by the rising scenic landscape either side of the river. It is an attraction for yachting enthusiasts and cruise ships from all over the world all of whom acknowledge its beauty.

This proposal, unless it is refused, may well set a precedent and result in further applications for more Turbines at this location and along our hill tops, (a common ploy we are led to believe) which together with other proposals across the Clyde, like the **"Bachan Burn"** proposal of 20 x 135m Turbines on top of the hills above Dunoon (which is soon to be lodged by a German developer) will result in desecration of our hillsides on both sides of the river, destroying one of the best river approaches and visual landscapes in the world, leaving residents on both sides of the river and future generations wondering how and why this could have been allowed to happen and **who** allowed it to happen.

We trust that the council's planning officials and elected members will see fit to refuse this unwelcome proposal and creeping destruction of our landscape.

Yours faithfully

DECISION NOTICE DATED 16 MARCH 2015

DECISION NOTICE

Refusal of Planning Permission
Issued under Delegated Powers

Inverclyde council

Regeneration and Planning
Municipal Buildings
Clyde Square
Greenock PA15 1LY

Planning Ref: 14/0392/IC

Online Ref:000076803-002

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

Texas Instruments
Mr Kenny Goodwin
Texas Instruments
Larkfield Industrial Estate
Greenock
PA16 0EQ
United Kingdon

Synergie Environ Ltd
Guy Robertson
247 Westburn Road
ABERDEEN
AB25 2QH

With reference to your application dated 28th November 2014 for planning permission under the above mentioned Act and Regulation for the following development:-

Erection of 77.8m to blade tip wind turbine at

36 Earnhill Road, Greenock

Category of Application: Local Application Development

The INVERCLYDE COUNCIL in exercise of their powers under the abovementioned Act and Regulation hereby refuse planning permission for the said development.

The reason for the Council's decision is:-

1. A combination of height, scale, proximity to housing, Gourock Golf Club and hilltop location within the built-up area of Inverclyde, determine that the 77.8m to blade tip wind turbine forms an unexpected and dominant feature over a range of distances, adversely affecting a large population and is, thus, contrary to criteria (b), (c) and (d) of Local Development Plan policy INF1.

The reason why the Council made this decision is explained in the attached Report of Handling.

Dated this 16th day of March 2015

Head of Regeneration and Planning

Healthy Working Lives

POSITIVE ABOUT DISABLED PEOPLE

1 If the applicant is aggrieved by the decision of the Planning Authority to refuse permission for or approval required by condition in respect of the proposed development, or to grant permission or approval subject to conditions, he may seek a review of the decision within three months beginning with the date of this notice. The request for review shall be addressed to The Head of Legal and Administration, Inverclyde Council, Municipal Buildings, Greenock,PA15 1LY.

2 If permission to develop land is refused or granted subject to conditions, and the owner of the land claims that the land has become incapable of reasonably beneficial use in its existing state and cannot be rendered capable of reasonably beneficial use by the carrying out of any development which has been or would be permitted, he may serve on the planning authority a purchase notice requiring the purchase of his interest in the land in accordance with Part 5 of the Town and Country Planning (Scotland) Act 1997

Refused Plans: Can be viewed Online at http://planning.inverclyde.gov.uk/Online/

Drawing No:	Version:	Dated:
HISTORIC SCOTLAND		
100022432		
7927-01	Rev A	03.11.2014
7927-02		01.11.2014
GD050418	Rev R00	10.11.2008
GD008112	Rev R1	26.04.2007
7927-AT-01		01.10.2014
7927-AT-02		01.10.2014
7927-AT-03		01.10.2014
SP2142493	Rev 4.0	24.12.2008
7927-SK01		01.11.2014
001		04.06.2013

NOTICE OF REVIEW FORM AND SUPPORTING DOCUMENTATION

NOTICE OF REVIEW

UNDER SECTION 43A(8) OF THE TOWN AND COUNTRY PLANNING (SCOTLAND) ACT 1997 (AS AMENDED)IN RESPECT OF DECISIONS ON LOCAL DEVELOPMENTS

THE TOWN AND COUNTRY PLANNING (SCHEMES OF DELEGATION AND LOCAL REVIEW PROCEDURE) (SCOTLAND) REGULATIONS 2013

THE TOWN AND COUNTRY PLANNING (APPEALS) (SCOTLAND) REGULATIONS 2013

IMPORTANT: Please read and follow the guidance notes provided when completing this form. Failure to supply all the relevant information could invalidate your notice of review.

Use BLOCK CAPITALS if completing in manuscript

Applicant(s)

Name	Kenny Goodwin
Address	Texas Instruments UK Ltd Larkfield Ind Est Earnhill Rd
Postcode	PA160EQ
Contact Telephone 1	01475 655213
Contact Telephone 2	01475 633733
Fax No	01475 639336
E-mail*	Kenny.goodwin@ti.com

Agent *(if any)*

Name	
Address	
Postcode	
Contact Telephone 1	
Contact Telephone 2	
Fax No	
E-mail*	

Mark this box to confirm all contact should be through this representative: ☐

* Do you agree to correspondence regarding your review being sent by e-mail? Yes ☐ No ☐

Planning authority	Inverclyde
Planning authority's application reference number	14/0392/IC
Site address	Texas Instruments UK Ltd Larkfield Ind Est Earnhill Rd
Description of proposed development	500kW Wind Turbine
Date of application	28 November 2014
Date of decision (if any)	16 March 2015

Note. This notice must be served on the planning authority within three months of the date of the decision notice or from the date of expiry of the period allowed for determining the application.

Nature of application

1. Application for planning permission (including householder application) ☒
2. Application for planning permission in principle ☐
3. Further application (including development that has not yet commenced and where a time limit has been imposed; renewal of planning permission; and/or modification, variation or removal of a planning condition) ☐
4. Application for approval of matters specified in conditions ☐

Reasons for seeking review

1. Refusal of application by appointed officer ☒
2. Failure by appointed officer to determine the application within the period allowed for determination of the application ☐
3. Conditions imposed on consent by appointed officer ☐

Review procedure

The Local Review Body will decide on the procedure to be used to determine your review and may at any time during the review process require that further information or representations be made to enable them to determine the review. Further information may be required by one or a combination of procedures, such as: written submissions; the holding of one or more hearing sessions and/or inspecting the land which is the subject of the review case.

Please indicate what procedure (or combination of procedures) you think is most appropriate for the handling of your review. You may tick more than one box if you wish the review to be conducted by a combination of procedures.

1. Further written submissions ☒
2. One or more hearing sessions ☒
3. Site inspection ☐
4 Assessment of review documents only, with no further procedure ☐

If you have marked box 1 or 2, please explain here which of the matters (as set out in your statement below) you believe ought to be subject of that procedure, and why you consider further submissions or a hearing are necessary:

In addition to the information provided in our original submission we would like to provide further commentary on the importance of this project to the site. We feel that some parts within the original submission, specifically socio-economic impact, were not suitably highlighted and we request the opportunity to further clarify this aspect

We will also look to provide some additional clarity on some of the negative aspects alluded to within the case officers' decision

We feel that it is difficult to adequately put over the detail within our appeal by the written word alone, therefore in order to ensure all aspects are delivered in context and can be fully explained, we feel it necessary that we be permitted to present our appeal to the LRB in person

Site inspection

In the event that the Local Review Body decides to inspect the review site, in your opinion:

		Yes	No
1.	Can the site be viewed entirely from public land?	☐	☒
2	Is it possible for the site to be accessed safely, and without barriers to entry?	☐	☒

If there are reasons why you think the Local Review Body would be unable to undertake an unaccompanied site inspection, please explain here:

Texas Instrument UK ltd is a secure site and as such for security and H&S reasons we would not be able to permit an unaccompanied site visit to the turbine location however we would be glad to host any site visit which was felt necessary

Statement

You must state, in full, why you are seeking a review on your application. Your statement must set out all matters you consider require to be taken into account in determining your review. Note: you may not have a further opportunity to add to your statement of review at a later date. It is therefore essential that you submit with your notice of review, all necessary information and evidence that you rely on and wish the Local Review Body to consider as part of your review.

If the Local Review Body issues a notice requesting further information from any other person or body, you will have a period of 14 days in which to comment on any additional matter which has been raised by that person or body.

State here the reasons for your notice of review and all matters you wish to raise. If necessary, this can be continued or provided in full in a separate document. You may also submit additional documentation with this form.

TI wishes to request a review to specifically highlight the socio-economic impact the refusal of the wind turbine application could have on the site based on the challenges faced to stay cost competitive

We have submitted a further presentation in order to hopefully clarify these very real challenges

Based on the extensive reports & studies that we have undertaken to present this project for planning permission, we have also sought to provide a brief results summary, again to provide some further clarity on some aspects which was possibly not overly apparent within the Planning Officers decision notice. We have re-submitted the noise report and shadow flicker reports from our original application as additional information

Have you raised any matters which were not before the appointed officer at the time the determination on your application was made?

Yes ☐ No ☒

If yes, you should explain in the box below, why you are raising new material, why it was not raised with the appointed officer before your application was determined and why you consider it should now be considered in your review.

List of documents and evidence

Please provide a list of all supporting documents, materials and evidence which you wish to submit with your notice of review and intend to rely on in support of your review.

TI Appeal Presentation
Original Noise Report
Original Shadow Flicker Report
Request for Screening Opinion

Note. The planning authority will make a copy of the notice of review, the review documents and any notice of the procedure of the review available for inspection at an office of the planning authority until such time as the review is determined. It may also be available on the planning authority website.

Checklist

Please mark the appropriate boxes to confirm you have provided all supporting documents and evidence relevant to your review:

☒ Full completion of all parts of this form

☒ Statement of your reasons for requiring a review

☒ All documents, materials and evidence which you intend to rely on (e.g. plans and drawings or other documents) which are now the subject of this review.

Note. Where the review relates to a further application e.g. renewal of planning permission or modification, variation or removal of a planning condition or where it relates to an application for approval of matters specified in conditions, it is advisable to provide the application reference number, approved plans and decision notice from that earlier consent.

Declaration

I the applicant/agent [delete as appropriate] hereby serve notice on the planning authority to review the application as set out on this form and in the supporting documents.

Signed | Date 5/6/15

TEXAS INSTRUMENTS LTD

Shadow Flicker Assessment

September 2014

Report Prepared by:
Synergie Environ Limited,
31 Lynedoch Street,
Glasgow,
G3 6AA
Tel: 0141 263 0020
info@synergie-environ.co.uk

Contents

1. INTRODUCTION

This report presents the results of a shadow flicker assessment undertaken to identify if there was the potential for shadow flicker from the proposed wind turbine at Texas Instruments, Larkfield Industrial Estate, Greenock, Inverclyde.

Shadow flicker is the flickering effect caused when rotating wind turbine blades periodically cast shadows through constrained openings such as the windows of properties which are in the shadow of a wind turbine. Shadow flicker most commonly occurs when the sun is low in the sky and will only occur at specific times of the day and periods of the year.

For the potential of shadow flicker effect to exist, a number of factors need to occur coincidentally:

- Clear skies and good visibility;
- The sun needs to be low in sky;
- Windows of properties must be exposed to the periodic shading effect caused by the turbine;
- There must be sufficient wind blowing rotate the wind turbine blades;
- The direction of the wind has to be a perpendicular plane to an imaginary line drawn the wind turbine, the sun and the property window.

In the UK the potential zone where shadow flicker is considered to be theoretically possible is 130 degrees either side of north where windows of properties face the turbine and for a distance of up to 10 times the rotor diameter of the turbine.

2. LEGISLATION AND POLICY CONTEXT

Scottish Government web-based advice on onshore wind turbines (previously known as PAN45) gives the following information on shadow flicker:

"*Under certain combinations of geographical position, time of day and time of year, the sun may pass behind the rotor and cast a shadow over neighbouring properties. When the blades rotate, the shadow flicks on and off; the effect is known as "shadow flicker". It occurs only within buildings where the flicker appears through a narrow window opening. The seasonal duration of this effect can be calculated from the geometry of the machine and the latitude of the potential site. Where this could be a problem, developers should provide calculations to quantify the effect. In most cases however, where separation is provided between wind turbines and nearby dwellings (as a general rule 10 rotor diameters), "shadow flicker" should not be a problem.*"

The potential for shadow flicker to induce health effects has not been included in this assessment. The common frequency at which photosensitive epilepsy might be triggered varies from person to person ,however it is generally between 5 and 30 flickers per second

(Hertz), and from 2.5 to 3 Hertz at the lowest[1]. The proposed wind turbine at Texas Instruments has an operational speed to 30.8 revolutions per minute, with three blades and consequently a blade will pass a particular point with a frequency of 1.54 Herz, which is below the minimum reported limit for photosensitive epilepsy.

3. METHOD OF ASSESSMENT

The potential shadow flicker of the proposed wind turbine at Texas Instruments was modelled using the specialist wind farm software REsoft WindFarm. This package was verified by DECC[2] as a predictive tool for shadow flicker assessment, recognised for its ability to predict "worse case" scenarios for shadow flicker effects. This considers the location of the turbine, the surrounding terrain, property locations, property orientations, window placement and the path of the sun across the sky at various times of the year. However, it does not, unless specifically programmed to, include the potential effects of vegetation and other buildings at screening properties from the potential shading effects of the wind turbine.

The sensitivity towards shadow flicker of an affected receptor depends upon its usage type, normal hours of occupancy, and the likelihood of shadow flicker instances coinciding with occupancy. Shadow flicker inside an empty office of industrial estate before, or after normal business hours, is less likely to cause problems than inside a residence in the late afternoon or early evening. Also, the affected party's stance relating to the wind turbine, as well as other factors (for example financial involvement in the project) may influence their sensitivity to some extent.

However for the purpose of this assessment it has been assumed that all receptors will be considered to be sensitive at all times. This will produce a more conservative result, but will reduce the amount of uncertainty created by making assumptions about sensitivity.

Background information used in this assessment was:

- 1:50,000 Ordnance Survey Mapping;
- OS Landform Profile terrain mapping at 5 m height intervals;
- Google Earth and Streetview 2014.

4. RESULTS

The potential zone of shadow flicker was modelled in a zone 130 degrees either side of north and within 580m of the turbine (10 times the rotor diameter of the proposed Gamesa G58 turbine). This zone is shown in Figure 4.1.

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[1] National Society for Epilepsy (2007) Information on epilepsy - Photosensitive epilepsy and PPS22 a companion guide.

[2] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48052/1416-update-uk-shadow-flicker-evidence-base.pdf

Properties within this zone where shadow flicker may occur include:

- To the north of the proposed turbine:
  - The area including Moorfoot Drive, Finnart Crescent and Firth Crescent;

- To the east and south east of the proposed turbine:
  - The area approximately defined as within Banff Road, Berwick Road and Burns Road

The potential extent and duration of shadow flicker was modelled on a sample of properties that fall within these two zones and at various distances from the location of the proposed turbine. The location of these sample properties is identified in Table 1 below:

Table 1 – Locations of sample properties

Property No	Grid Point		Altitude	Distance From the Turbine (m)
	Easting Point	Northing Point		
H 1	223480	676104	128	334
H 2	223442	675982	133	299
H 3	223349	675893	137	253
H 4	223709	676051	114	559
H 5	223582	675893	112	459
H 6	223466	675646	121	512
H 7	223697	675906	105	565
H 8	223593	675762	101	528
H 9	223724	675635	95	708
H 10	223338	675680	130	415
H 11	222942	676615	83	602
H 12	223193	676658	80	609
H 13	223069	676633	83	588
H 14	223271	676749	71	709
PS	223073	676524	90	480
IB	223362	676111	140	220

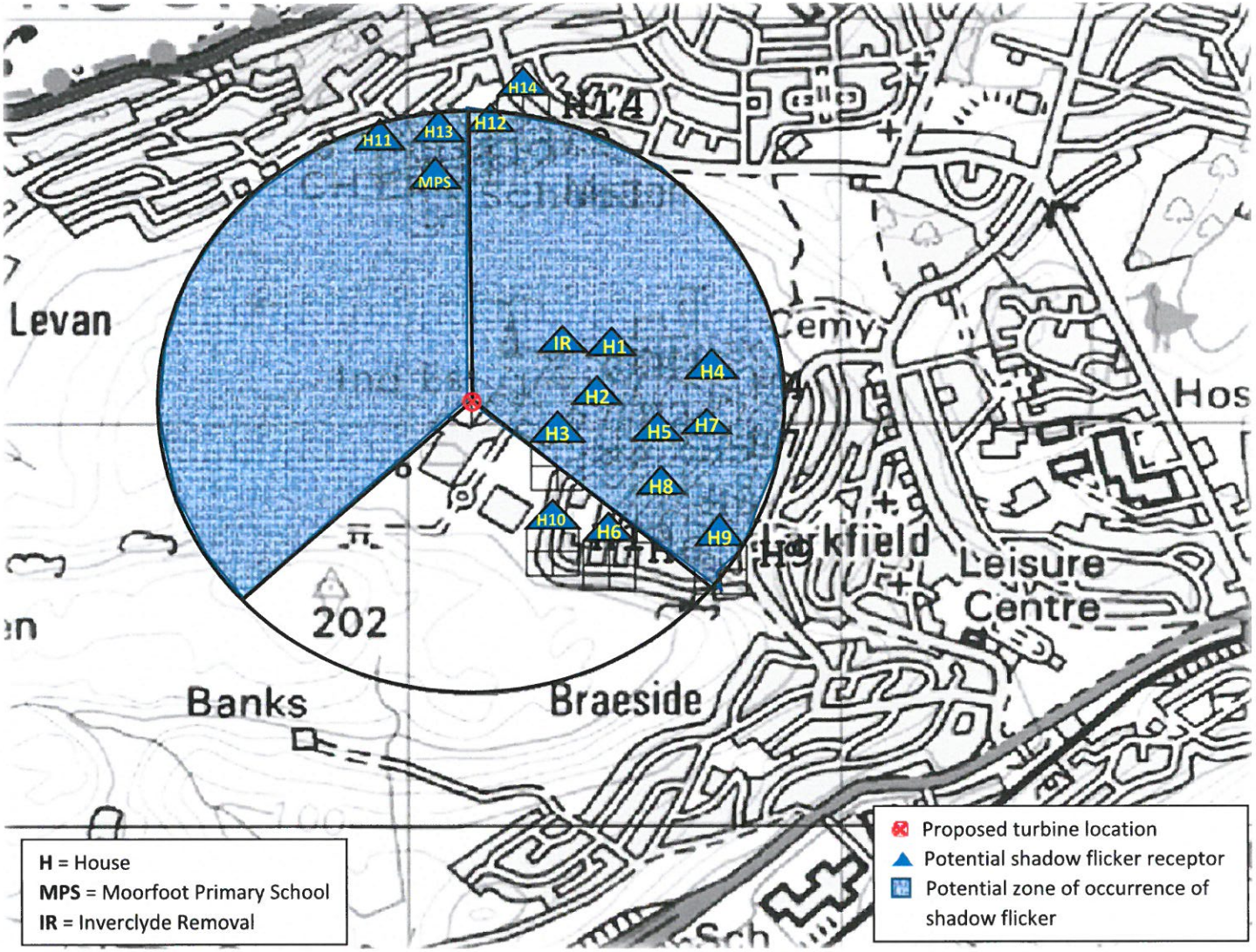


Figure 4.1 - Potential zone where shadow flicker could occur

For these properties the potential for shadow flicker was based upon the assumptions that:

- The windows of houses facing the proposed wind turbine were 2 metres long and 1.5 meters high and located 3 metres above ground level. This was based upon a site visit the local area supported with information from Google Streetview 2014;
- The windows of Moorfoot Primary School were 2 meters long and 1.5 meters high and the central height of the windows was 1.75 meters above ground level.
- The windows of the Inverclyde Removal facing the proposed wind turbine were 12 meters long and 1.5 meters high and located 1.5 meters above ground level.
- There is no screening between the turbine and the window of the property (vegetation or buildings);
- The sun is shining all day in a clear sky from sunrise to sunset 365 days per year. The model takes in to account the movement of the sun relative to the time of day and year;
- The turbine rotor is always facing the receptor (window) and the blaked and continually rotating 365 days per year;
- Houses 1, 2 and 3 have been assessed on the basis of there being windows with the potential to be affected orientated towards 320 degrees on the ground floor and upper floor.
- Houses 4, 5, 6 and 10 have been assessed on the basis of there being windows with the potential to be affected orientated towards 285 degrees on the ground floor and upper floor;
- Houses 7, 8 and 9 have been assessed on the basis of there being windows with the potential to be affected orientated towards 195 degrees on the ground floor and upper floor;
- Houses 11, 12, 13 and 14 have been assessed on the basis of there being windows with the potential to be affected orientated towards 130 degrees on the ground floor and upper floor.
- Moorfoot Primary School has been assessed on the basis of there being windows with the potential to be affected orientated towards 160 degrees on the ground floor and upper floor.
- Inverclyde Removal has been assessed on the basis of there being windows with the potential to be affected orientated towards 280 degrees on the ground floor and upper floor.

The results of the shadow assessment are shown below in Table 2 below.

Table 2 – Shadow Flicker Event Summary

House No	Degrees from North	No of days per year an event occurs	Max. hours per day	Mean hours per day	Total time per year (hours)
1	320	55	0.70	0.55	30.3
2	320	91	0.81	0.62	56.1
3	320	0	0.00	0.00	0.0
4	285	36	0.44	0.34	12.3
5	285	76	0.55	0.41	31.3
6	285	0	0.00	0.00	0.0
7	195	43	0.44	0.35	15.0
8	195	0	0.00	0.00	0.0
9	195	0	0.00	0.00	0.0
10	285	0	0.00	0.00	0.0
11	130	72	0.44	0.39	27.8
12	130	56	0.44	0.39	20.8
13	130	60	0.46	0.39	23.7
14	130	46	0.37	0.31	14.5
MPS	160	78	0.54	0.48	37.4
IR	280	90	1.14	0.87	78.2

The potential worst case duration and temporal nature of shadow flicker in those properties where it was predicted to occur is shown in Figure 4.2. Potential shadow flicker effects for individual properties modelled in this assessment are shown in Appendix A .

Based upon this assessment a total of 11 of the sample of properties were identified as having the potential to experience some degree of shadow flicker. Of these, Inverclyde Removal (223362, 676111; Larkfield Industrial Estate, Renfrewshire) had the potential to experience up to 78.2 hours shadow flicker per year (1.79% of the time), Moorfoot Primary School (223073, 676524; Moorfoot Drive) had the potential to experience up to 37.4 hours shadow flicker per year (0.85% of the time), house 2 (223442, 675982; Banff Road) had the potential to experience up to 56.1 hours shadow flicker per year (1.29% of the time), houses 1 and 5 had the potential to experience up to 30.3 and 31.3 hours shadow flicker (0.69 and 0.71% of the time) respectively. At all of the other properties included in this sample it was identified that the potential to experience shadow flicker was less than 30 hours per year.

As discussed earlier, in practice the sensitivity of receptors will vary with time depending on a wide variety of factors – e.g. the usage patterns of people inside their homes. Therefore the time of day and year during which shadow flicker may occur is an important factor to note in the analysis of potential shadow flicker effects. As flicker is only an issue if it is actually experienced in practice these factors can have a very significant impact on the potential sensitivity of a receptor. However, this analysis of course presents the "worst case" scenario - for a more detailed understanding of the potential effects of shadow flicker it would be necessary to identify usage patterns, the exact dimensions and orientation of

the receiving windows and existing screening from buildings and vegetation which may reduce or eliminate the potential for shadow flicker in those properties where it has been identified.

At present there are no UK of Scottish guidelines which provide quantitative criteria for assessing the significance of shadow flicker and this issue is poorly defined in other parts of Europe.

However, in Germany there are details guidelines on limits and conditions for calculating shadow impact. These guidelines state that shadow flicker should not exceed:

- 30 hours per year worst case and;
- 30 minutes per day worst case.

Under these guidelines any predicted shadow flicker effect that is less than the 30 minutes per day 30 hours per year is considered to be negligible and therefore not significant.

Based upon these values it was identified that properties 1 (223480, 676104; Banff Road), 2 (223442, 675982; Banff Road), 5 (223582, 675893; Nairn Road), Inverclyde Removal (223362, 676111; Larkfield Industrial Estate, Renfrewshire) and Moorfoot Primary School (223073, 676524; Moorfoot Drive) have the potential to experience shadow flicker above the German guideline values.

Figure 5.2 shows the areas, which have the potential to experience shadow flicker above 30 hours per year.

5. MITIGATION

The calculation method used here to identify the potential for shadow flicker events are based upon bare terrain to represent worst-case predictions. Where shadow flicker may occur it can be the case that established vegetation or buildings can mitigate the effect by blocking or limiting the shadow falling on the window where it has been predicted to do so.

In general mitigation strategies to limit or prevent the potential for shadow flicker effects from on-shore wind turbine developments follow the hierarchy (in descending order of priority):

- Siting to limit the potential for shadow flicker;
- Shutdown of the turbine when the potential for shadow flicker is greatest;
- Blinds to reduce shadow flicker effects over the potential receiving windows in properties where shadow flicker has been identified as a potential issue;
- Screening using vegetation or barriers to limit or remove the potential for shadow flicker in properties where this has been identified as a potential issue.

The proposed location of the wind turbine at Texas Instruments is on a site which has existing spatial limitations in terms of site ownership, siting the turbine to limit the potential effects of turbulence, to ensure sufficient topple distance from industrial buildings and to avoid interference in existing radio-telecommunications networks.

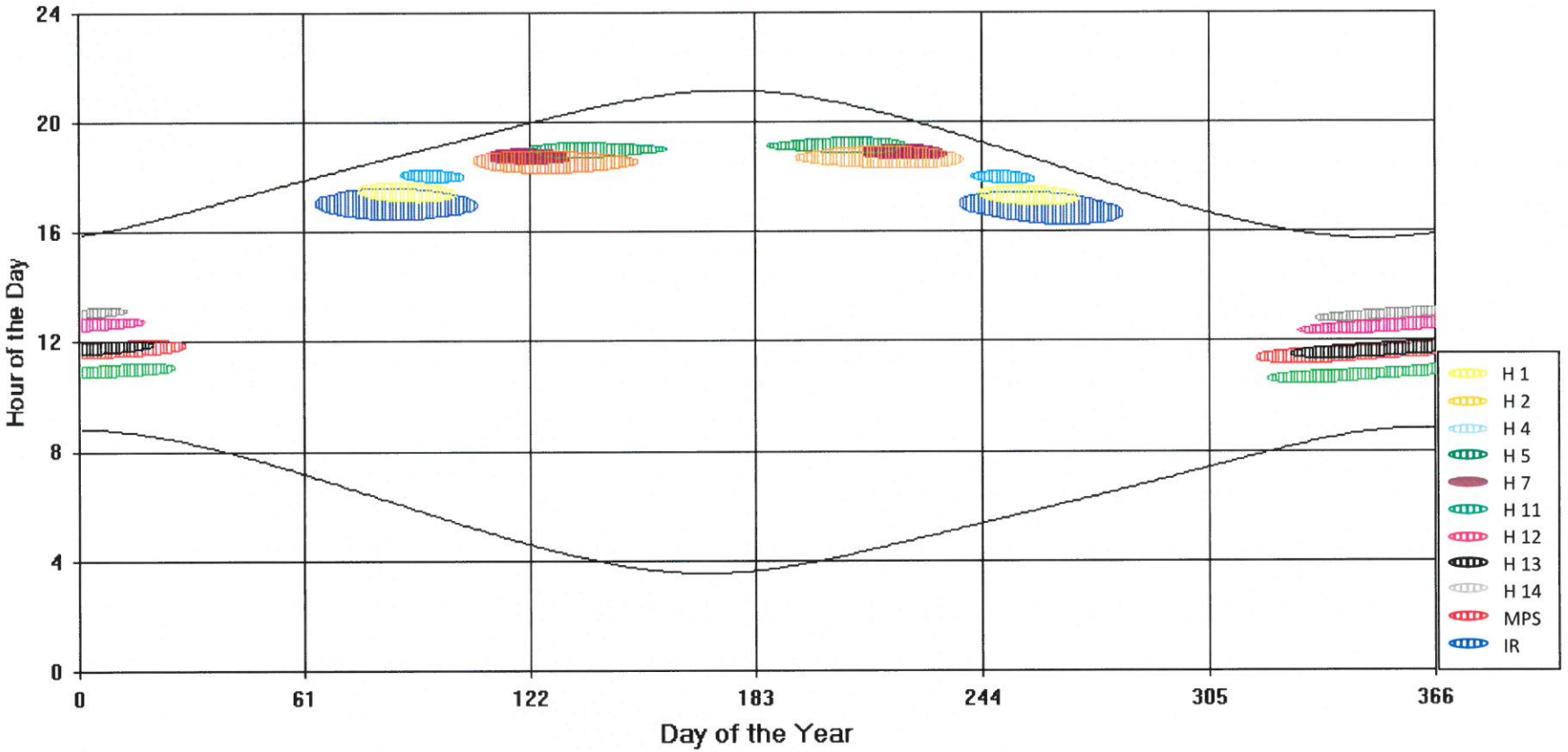


Figure 5.1 - Potential duration and temporary extent of shadow flicker on properties identified in Table 2

Figure 5.2 - Potential zone where shadow flicker could experience over 30 hours per year

The aerial image shows that there is established vegetation and Inverclyde Removal industrial buildings located to the west of Banff Road, Figure 5.3. To the south of Moorfoot Drive there is an established area of low trees, Figure 5.4. These are likely to provide total or partial screening from the potential shadow flicker for at least some of the time.

Based upon real time (2014) wind monitoring data obtained from the proposed turbine location, the prevailing winds are from the south-west to west and the east. Consequently, it is likely that the turbine will be orientated obliquely in the residential area to the east of the proposed turbine location (Banff Road) for the majority of the time. This factor, combined with the possibility of cloud cover and screening vegetation, is likely to reduce the shadow flicker events in practice.

For the properties located in the area of Moorfoot Drive, the prevailing wind direction and vegetation, when combined with the potential for cloud cover, is likely to further reduce shadow flicker events.

If once the turbine is installed, and shadow flicker is observed by local residents (and reports to this effect are received by eitherthe developer, site operator or Local Authority) it is suggested an appropriate investigation should be carried out to confirm the occurrence, or otherwise. Should flicker be confirmed then it is proposed that to prevent any re-occurrence a suitable control system is installed and employed to calculate, in real time, whether shadow flicker may affect a property. This would be based upon pre-programmed co-ordinates for the properties and wind turbine, and the intensity of sunlight as measured by a device attached to the turbine tower. When the control system calculates that the sunlight is bright enough to cast a shadow and that a turbine is orientated in such a way that shadow will fall on a particular property it would automatically shut the turbine down, re-starting is when the potential for shadow flicker has moved away from the property.

Figure 5.3 – Aerial view of Inverclyde removal industrial building

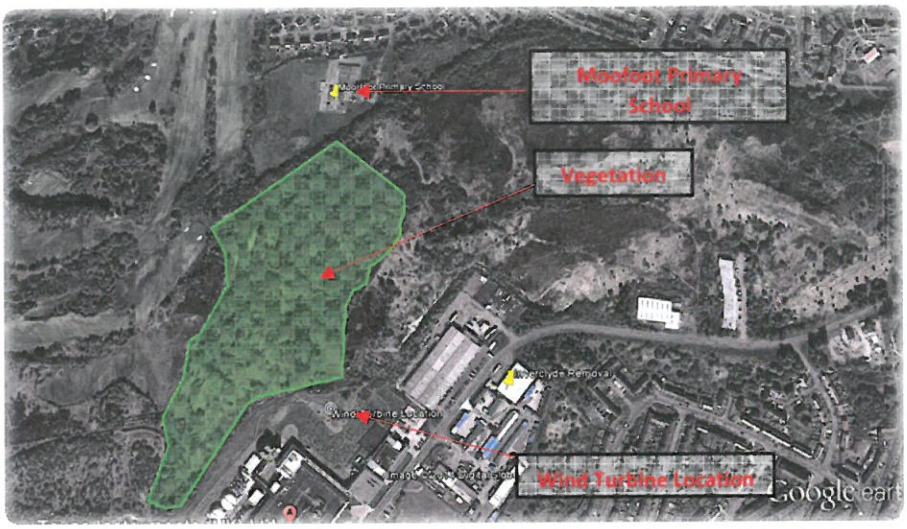


Figure 5.4 - Aerial view of Moofoot Primary School

6. CONCLUSIONS

The assessment was limited to those areas within 10 rotor diameters of the site (580 m) and prediction have been made regarding the 'astronomic worst case' maximum potential occurrence of shadow flicker which could be caused by proposed wind turbine location.

For this assessment size of the windows of the properties were assumed 2 meters wide and 1.5 meters high and the height of the centre of the windows above the ground level was assumed 3 meters. The windows of the Inverclyde Removals were assumed 12 meters wide and 1.5 meters high with the centre of the windows 1.5 meters high above the ground level. Finally the windows of the Moofoot Primary School were assumed 2 meters wide and 1.5 meters high with the centre of the windows 1.75 meters high above the ground level.

Shadows may be cast on a maximum of 91 days over a year, which is on house 2 (Banff Road), with total of 56.5 hours over a year and shadows may be cast on a maximum of 78.2 hours over a year on Inverclyde Removal (Larkfield Industrial Estate) with total number of 90 days over a year.

It was identified that properties 1 (Banff Road), 2 (Banff Road), 5 (Nairn Road), Inverclyde Removal (Larkfield Industrial Estate) and Moorfoot Primary School (Moorfoot Drive) have the potential to experience shadow flicker above 30 hours per year. The rest of the assessed properties are either have the shadow flicker under 30 hours per year or have the potential to do not experience any shadow flicker, which including houses 3, 6, 8, 9 and 10.

For Inverclyde Removal, which has the highest effect of shadows from the wind turbine, the events will last for 1 hour, 8 minutes and 40 seconds (1.14 hours) on any one day and for

residential properties House 2, which has the highest shadow flicker, the event will last no more than 49 minutes (0.81 hours) on any one day.

Due to the limited number of hours that shadow flicker has the potential to occur, and the actual likelihood is this happening in practice, it should be relatively simple to mitigate for any adverse shadow flicker impacts by monitoring the situation once the turbine is installed and controlling (shutting down) the turbine itself if this is in fact required.

A. Appendix A – SHADOW FLICKER ON INDIVIDUAL HOUSES FROM WIND TURBINE

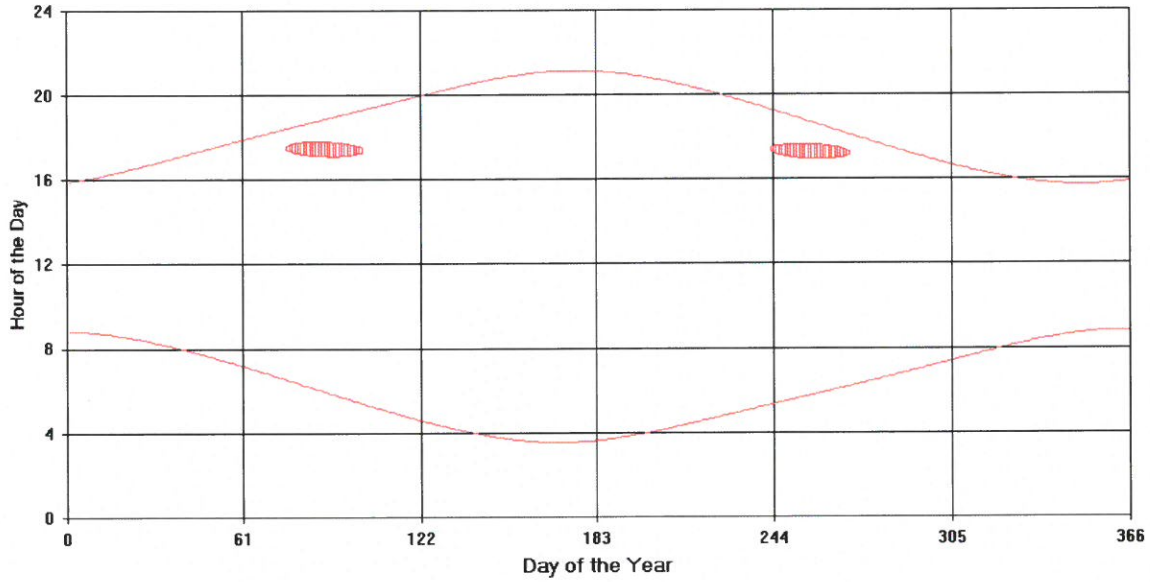


Figure A.1 *- Shadow Flicker on house 1 (223480, 676104; Banff Rd.) from the turbine*

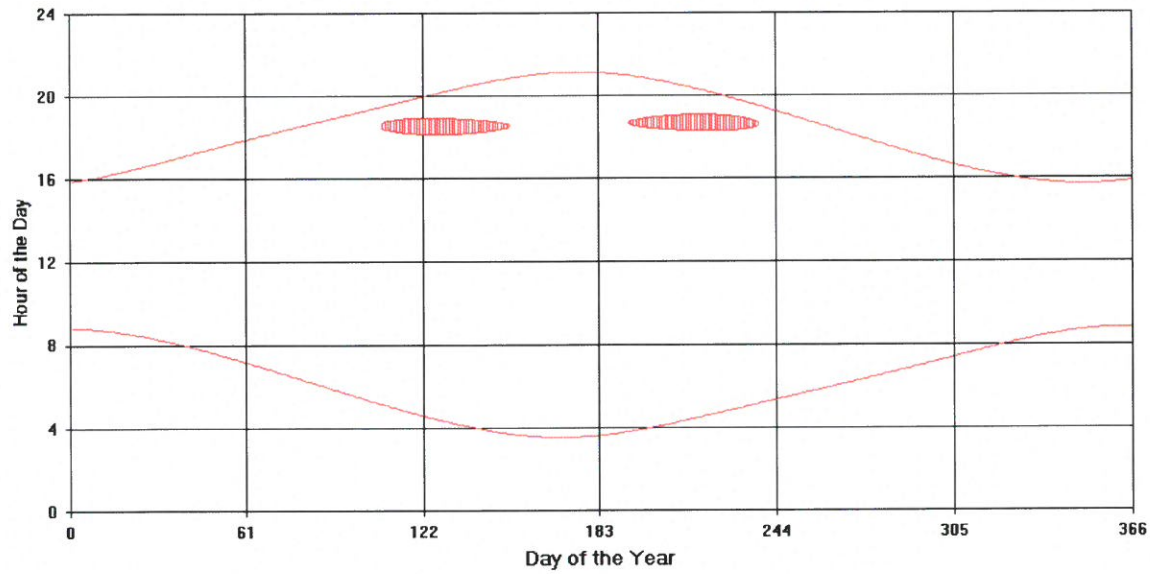


Figure A.2 *- Shadow Flicker on house 2 (223442, 675982; Banff Rd.) from the turbine*

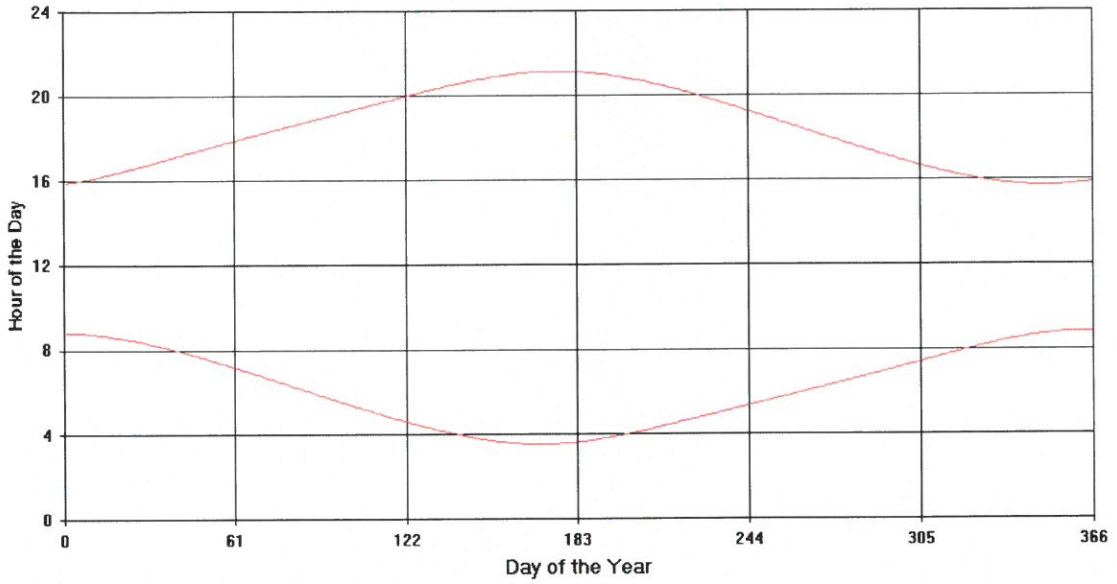


Figure A.3 *- Shadow Flicker on houses 3 (223349, 675893; Banff Rd.), 6 (223466, 675646; Nairn Rd.), 8 (223593, 675762; Angus Rd.), 9 (223724, 675635; Angus Rd.) and 10 (223338, 675680; Banff Rd.) from the turbine*

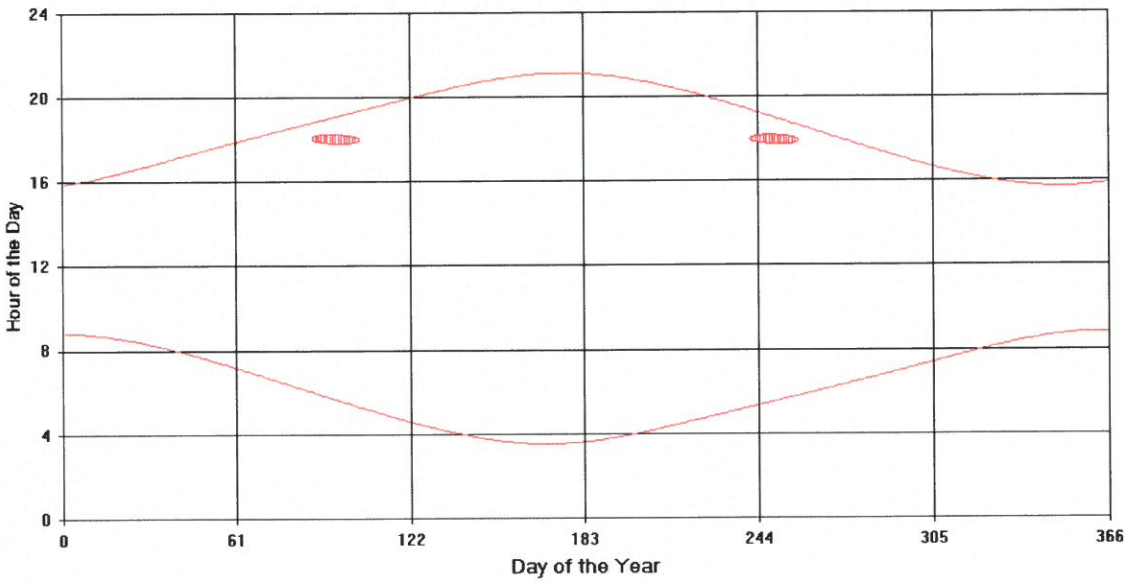


Figure A.4 *- Shadow Flicker on house 4 (223709, 676051; Nairn Rd.) from the turbine*

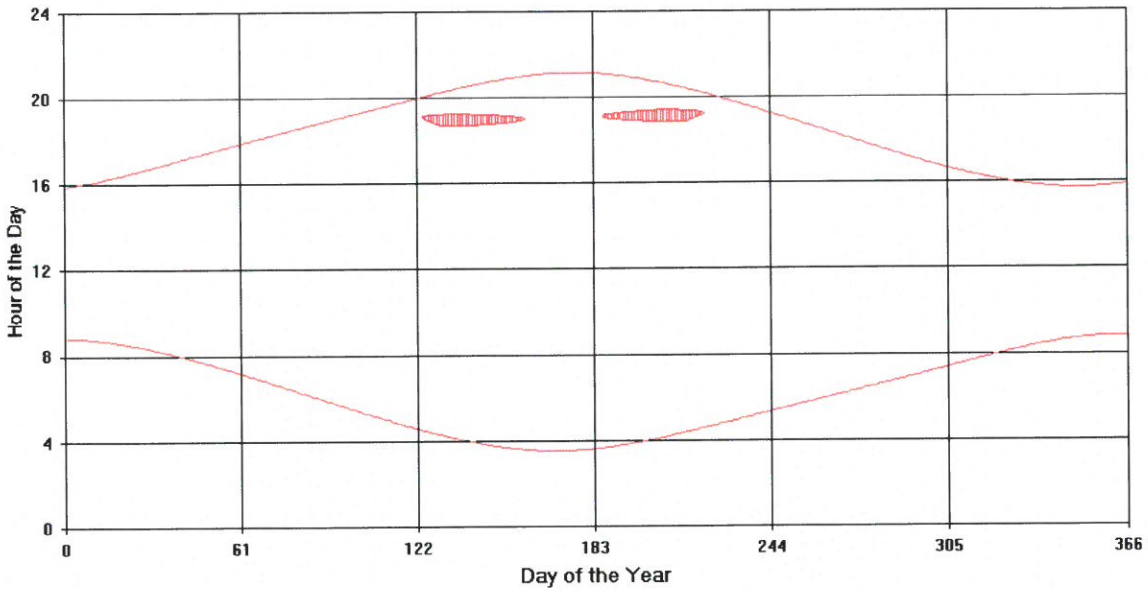


Figure A.5 *- Shadow Flicker on house 5 (223582, 675893; Nairn Rd.) from the turbine*

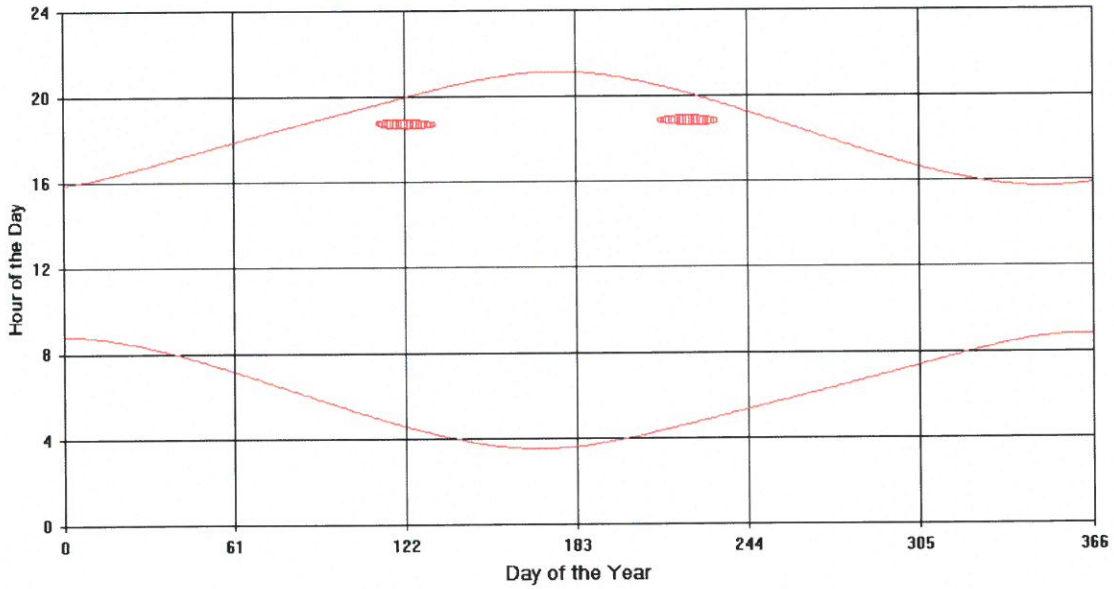


Figure A.6 *- Shadow Flicker on house 7 (223697, 675906; Angus Rd.) from the turbine*

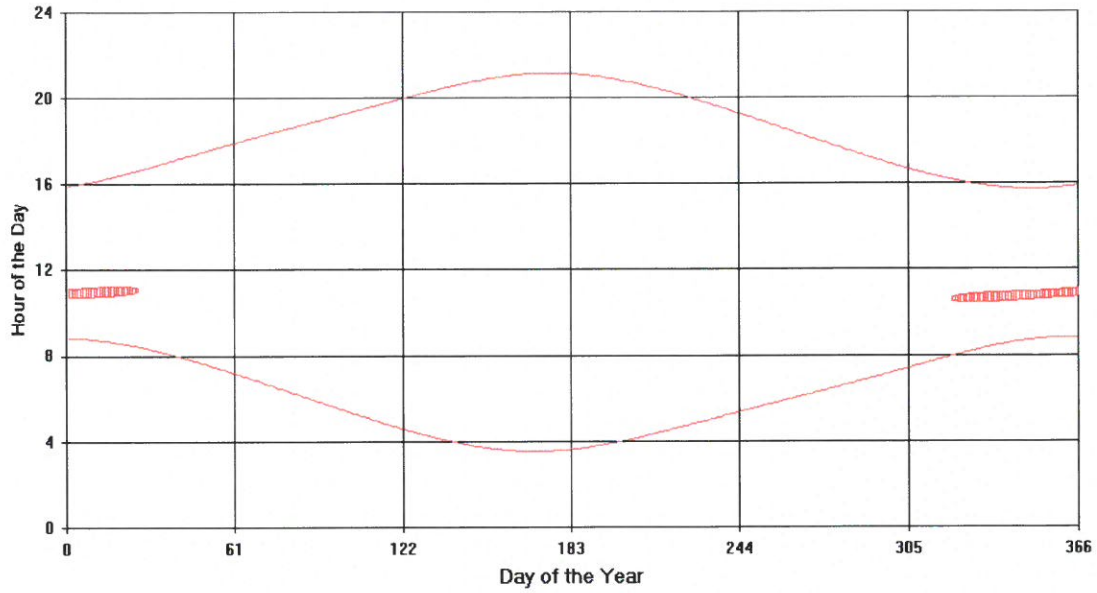


Figure A.7 *- Shadow Flicker on house 11 (222942, 676615; Moorfoot Dr.) from the turbine*

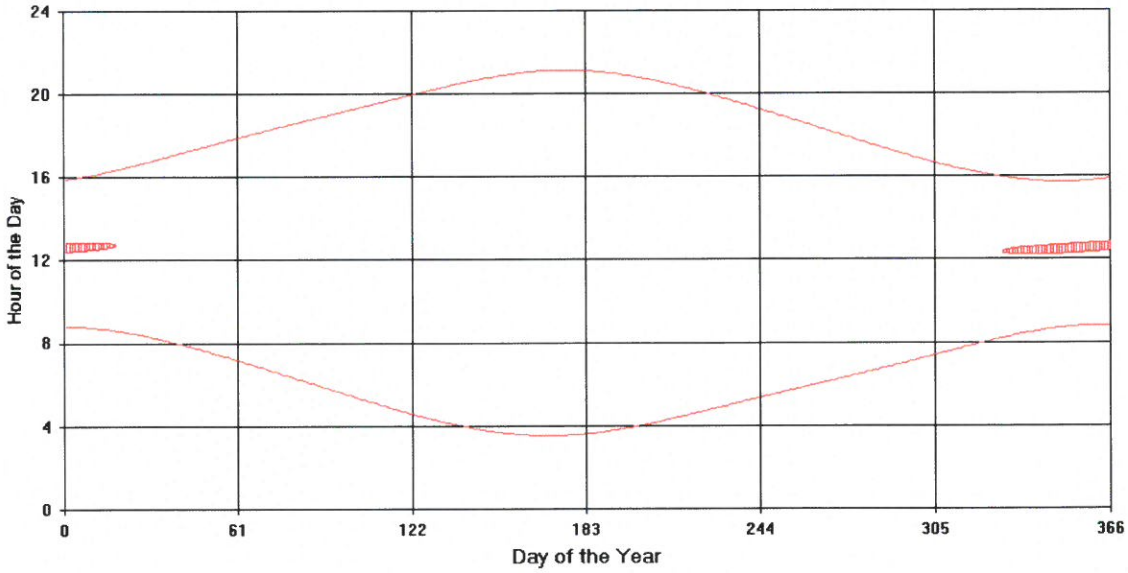


Figure A.8 *- Shadow Flicker on house 12 (223193, 676658; Moorfoot Dr.) from the turbine*

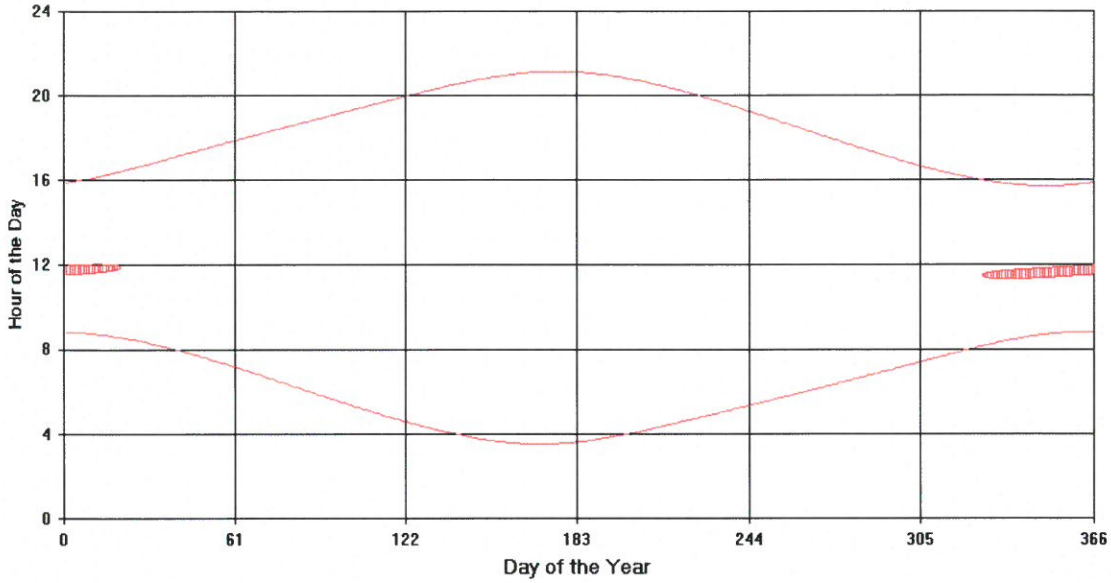


Figure A.9 *- Shadow Flicker on house 13 (223069, 676633; Moorfoot Dr.) from the turbine*

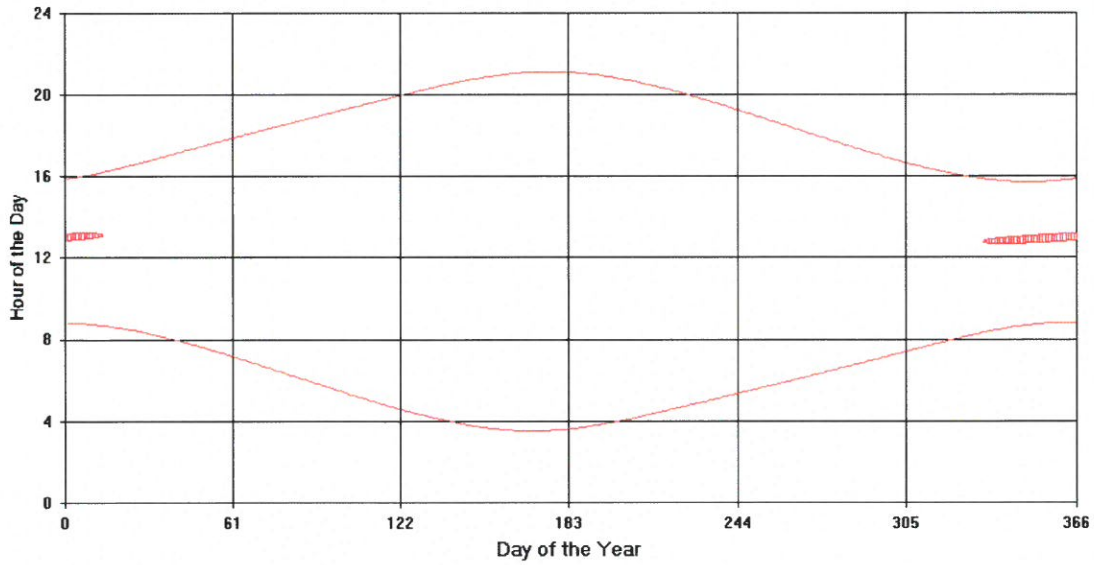


Figure A.10 *- Shadow Flicker on house 14 (223271, 676749; Mootdoot Dr.) from the turbine*

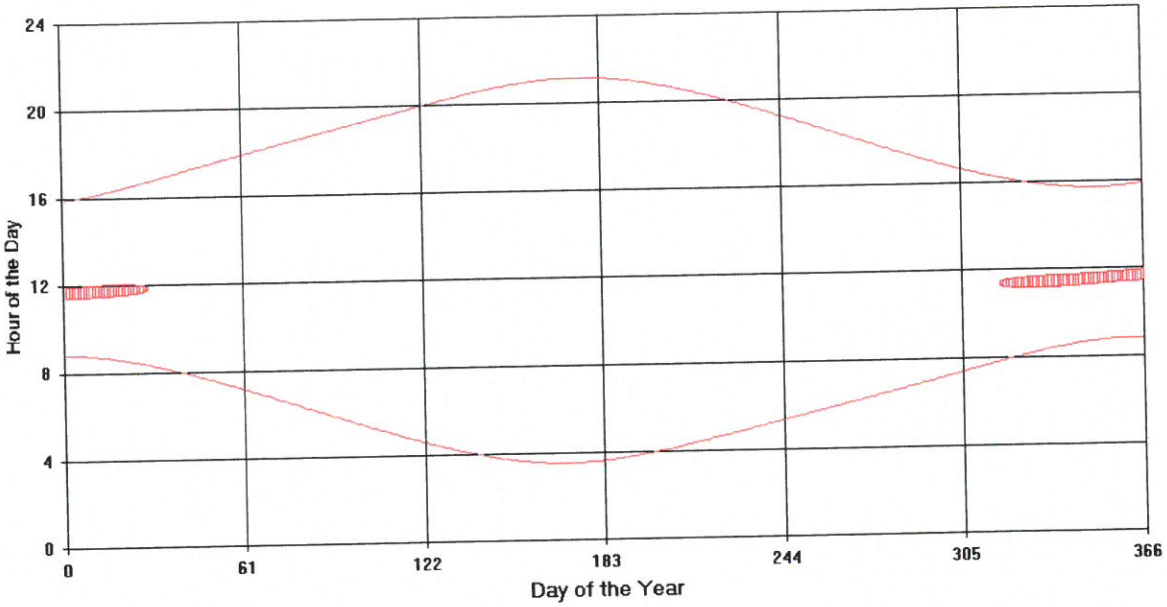


Figure A.11 *- Shadow Flicker on Moorfoot Primary School (223073, 676524; Mootdoot Dr.) from the turbine*

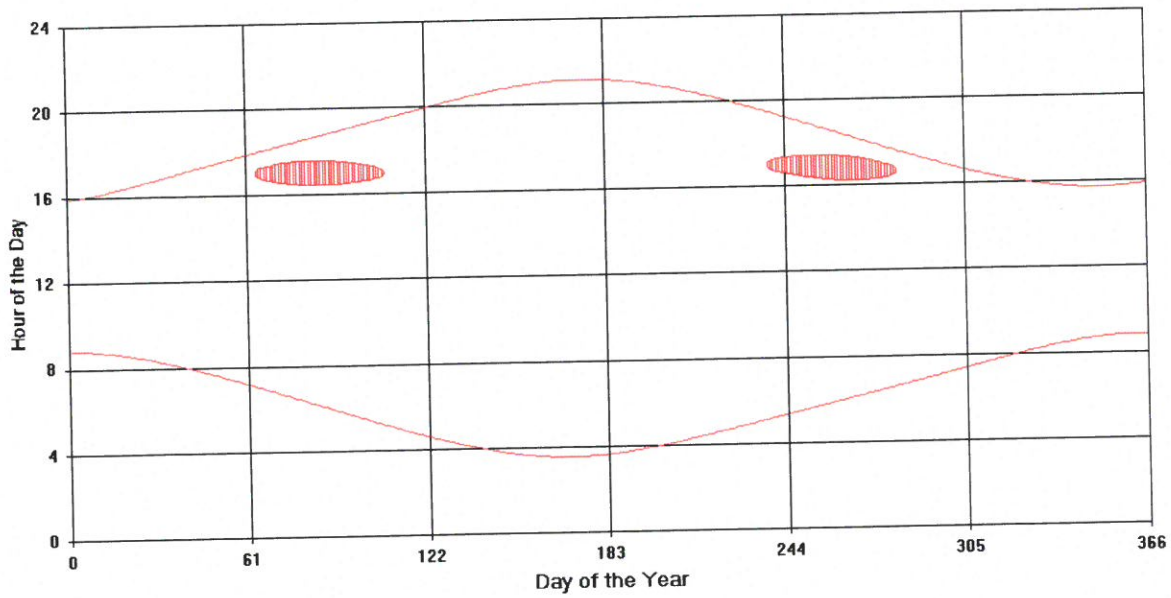


Figure A.12 *- Shadow Flicker on Inverclyde Removals (223362, 676111; Larkfield Industrial Estate, Renfrewshire.) from the turbine*

B. APPENDIX B – RAW ANALYSIS DATA

Project: TEXAS 1
Run Name: KTEXAS 1002.WFK
Title: Shadow Flicker Assessment
Time: 14:40:30, 17 Sep 2014

SUMMARY OF MERGED SHADOW TIMES ON EACH WINDOW FOR ALL TURBINES

House	Easting	Northing	Width (m)	Depth (m)	Height (m)	Degrees from North	Tilt angle	Days per year	Max hours per day	Mean hours per day	Total hours
1	223480	676104	2.0	1.5	3.0	320.0	0.0	55	0.70	0.55	30.3
2	223442	675982	2.0	1.5	3.0	320.0	0.0	91	0.81	0.62	56.1
3	223349	675893	2.0	1.5	3.0	320.0	0.0	0	0.00	0.00	0.0
4	223709	676051	2.0	1.5	3.0	285.0	0.0	36	0.44	0.34	12.3
5	223582	675893	2.0	1.5	3.0	285.0	0.0	76	0.55	0.41	31.3
6	223466	675646	2.0	1.5	3.0	285.0	0.0	0	0.00	0.00	0.0
7	223697	675906	2.0	1.5	3.0	195.0	0.0	43	0.44	0.35	15.0
8	223593	675762	2.0	1.5	3.0	195.0	0.0	0	0.00	0.00	0.0
9	223724	675635	2.0	1.5	3.0	195.0	0.0	0	0.00	0.00	0.0
10	223338	675680	2.0	1.5	3.0	285.0	0.0	0	0.00	0.00	0.0
11	222942	676615	2.0	1.5	3.0	130.0	0.0	72	0.44	0.39	27.8
12	223193	676658	2.0	1.5	3.0	130.0	0.0	56	0.43	0.37	20.5
13	223069	676633	2.0	1.5	3.0	130.0	0.0	60	0.45	0.39	23.5
14	223271	676749	2.0	1.5	3.0	130.0	0.0	46	0.37	0.31	14.5
MPS	223073	676524	2.0	1.5	1.8	160.0	0.0	78	0.54	0.48	37.4
IR	223362	676111	12.0	1.5	1.5	280.0	0.0	90	1.14	0.87	78.2

Project: TEXAS 1
Run Name: KTEXAS 1003.WFK
Title: Shadow Flicker Assessment
Time: 15:17:29, 17 Sep 2014

SHADOW TIMES ON EACH HOUSE

House	Easting	Northing
1	223480	676104

Turbine	Easting	Northing	Date	Start Time	End Time	Duration	% Cover
1	223150	676050	16-03	17:24:10	17:39:05	00:14:55	66.65
1	223150	676050	17-03	17:20:41	17:41:58	00:21:17	100.00
1	223150	676050	18-03	17:18:09	17:43:55	00:25:45	100.00
1	223150	676050	19-03	17:16:07	17:45:23	00:29:16	100.00
1	223150	676050	20-03	17:14:25	17:46:34	00:32:09	100.00
1	223150	676050	21-03	17:12:58	17:47:29	00:34:31	100.00
1	223150	676050	22-03	17:11:44	17:48:11	00:36:27	100.00
1	223150	676050	23-03	17:10:40	17:48:42	00:38:02	100.00
1	223150	676050	24-03	17:09:46	17:49:03	00:39:17	100.00
1	223150	676050	25-03	17:08:59	17:49:15	00:40:15	100.00
1	223150	676050	26-03	17:08:22	17:49:19	00:40:57	100.00
1	223150	676050	27-03	17:07:51	17:49:16	00:41:25	100.00
1	223150	676050	28-03	17:07:21	17:49:05	00:41:44	100.00
1	223150	676050	29-03	17:06:59	17:48:47	00:41:48	100.00
1	223150	676050	30-03	17:06:44	17:48:22	00:41:39	100.00
1	223150	676050	31-03	17:06:36	17:47:50	00:41:15	100.00
1	223150	676050	01-04	17:06:35	17:47:11	00:40:36	100.00
1	223150	676050	02-04	17:06:42	17:46:25	00:39:43	100.00
1	223150	676050	03-04	17:06:56	17:45:30	00:38:34	100.00
1	223150	676050	04-04	17:07:20	17:44:26	00:37:07	100.00
1	223150	676050	05-04	17:07:52	17:43:13	00:35:21	100.00
1	223150	676050	06-04	17:08:36	17:41:53	00:33:17	100.00
1	223150	676050	07-04	17:09:32	17:40:23	00:30:50	100.00
1	223150	676050	08-04	17:10:45	17:38:37	00:27:52	100.00
1	223150	676050	09-04	17:12:19	17:36:29	00:24:11	100.00
1	223150	676050	10-04	17:14:26	17:33:49	00:19:23	100.00
1	223150	676050	11-04	17:17:43	17:29:59	00:12:17	43.12
1	223150	676050	30-08	17:20:37	17:26:12	00:05:35	8.69
1	223150	676050	31-08	17:15:00	17:31:11	00:16:11	75.73
1	223150	676050	01-09	17:11:52	17:33:41	00:21:49	100.00
1	223150	676050	02-09	17:09:28	17:35:26	00:25:58	100.00
1	223150	676050	03-09	17:07:30	17:36:45	00:29:15	100.00
1	223150	676050	04-09	17:05:49	17:37:46	00:31:57	100.00
1	223150	676050	05-09	17:04:22	17:38:33	00:34:11	100.00
1	223150	676050	06-09	17:03:06	17:39:13	00:36:06	100.00
1	223150	676050	07-09	17:02:00	17:39:43	00:37:43	100.00
1	223150	676050	08-09	17:01:02	17:40:04	00:39:02	100.00
1	223150	676050	09-09	17:00:12	17:40:17	00:40:04	100.00
1	223150	676050	10-09	16:59:30	17:40:21	00:40:52	100.00
1	223150	676050	11-09	16:58:54	17:40:19	00:41:25	100.00
1	223150	676050	12-09	16:58:25	17:40:09	00:41:44	100.00
1	223150	676050	13-09	16:58:03	17:39:52	00:41:49	100.00
1	223150	676050	14-09	16:57:47	17:39:28	00:41:41	100.00
1	223150	676050	15-09	16:57:38	17:38:57	00:41:19	100.00
1	223150	676050	16-09	16:57:30	17:38:19	00:40:49	100.00
1	223150	676050	17-09	16:57:30	17:37:34	00:40:04	100.00
1	223150	676050	18-09	16:57:38	17:36:41	00:39:03	100.00
1	223150	676050	19-09	16:57:54	17:35:39	00:37:45	100.00
1	223150	676050	20-09	16:58:19	17:34:27	00:36:08	100.00
1	223150	676050	21-09	16:58:55	17:33:05	00:34:10	100.00
1	223150	676050	22-09	16:59:44	17:31:29	00:31:45	100.00

1	223150	676050	23-09	17:00:49	17:29:37	00:28:49	100.00
1	223150	676050	24-09	17:02:14	17:27:29	00:25:16	100.00
1	223150	676050	25-09	17:04:11	17:24:52	00:20:41	100.00
1	223150	676050	26-09	17:07:08	17:21:14	00:14:06	58.83

House	Easting	Northing
2	223442	675982

Turbine	Easting	Northing	Date	Start Time	End Time	Duration	% Cover
1	223150	676050	16-04	18:29:13	18:42:08	00:12:54	42.51
1	223150	676050	17-04	18:25:19	18:45:37	00:20:18	100.00
1	223150	676050	18-04	18:22:36	18:47:55	00:25:19	100.00
1	223150	676050	19-04	18:20:27	18:49:39	00:29:12	100.00
1	223150	676050	20-04	18:18:40	18:51:12	00:32:32	100.00
1	223150	676050	21-04	18:17:09	18:52:28	00:35:20	100.00
1	223150	676050	22-04	18:15:50	18:53:32	00:37:42	100.00
1	223150	676050	23-04	18:14:41	18:54:25	00:39:44	100.00
1	223150	676050	24-04	18:13:41	18:55:09	00:41:28	100.00
1	223150	676050	25-04	18:12:49	18:55:46	00:42:57	100.00
1	223150	676050	26-04	18:12:03	18:56:17	00:44:13	100.00
1	223150	676050	27-04	18:11:24	18:56:42	00:45:17	100.00
1	223150	676050	28-04	18:10:51	18:57:01	00:46:10	100.00
1	223150	676050	29-04	18:10:23	18:57:17	00:46:54	100.00
1	223150	676050	30-04	18:10:00	18:57:27	00:47:27	100.00
1	223150	676050	01-05	18:09:42	18:57:34	00:47:52	100.00
1	223150	676050	02-05	18:09:28	18:57:38	00:48:09	100.00
1	223150	676050	03-05	18:09:19	18:57:37	00:48:18	100.00
1	223150	676050	04-05	18:09:14	18:57:34	00:48:20	100.00
1	223150	676050	05-05	18:09:13	18:57:27	00:48:14	100.00
1	223150	676050	06-05	18:09:15	18:57:17	00:48:02	100.00
1	223150	676050	07-05	18:09:17	18:57:05	00:47:48	100.00
1	223150	676050	08-05	18:09:22	18:56:49	00:47:27	100.00
1	223150	676050	09-05	18:09:31	18:56:31	00:47:00	100.00
1	223150	676050	10-05	18:09:43	18:56:10	00:46:27	100.00
1	223150	676050	11-05	18:09:59	18:55:47	00:45:48	100.00
1	223150	676050	12-05	18:10:18	18:55:21	00:45:03	100.00
1	223150	676050	13-05	18:10:41	18:54:52	00:44:11	100.00
1	223150	676050	14-05	18:11:07	18:54:21	00:43:14	100.00
1	223150	676050	15-05	18:11:37	18:53:48	00:42:11	100.00
1	223150	676050	16-05	18:12:10	18:53:12	00:41:02	100.00
1	223150	676050	17-05	18:12:46	18:52:34	00:39:48	100.00
1	223150	676050	18-05	18:13:26	18:51:57	00:38:31	100.00
1	223150	676050	19-05	18:14:09	18:51:17	00:37:08	100.00
1	223150	676050	20-05	18:14:57	18:50:34	00:35:38	100.00
1	223150	676050	21-05	18:15:48	18:49:49	00:34:01	100.00
1	223150	676050	22-05	18:16:43	18:48:59	00:32:17	100.00
1	223150	676050	23-05	18:17:43	18:48:08	00:30:25	100.00
1	223150	676050	24-05	18:18:48	18:47:11	00:28:23	100.00
1	223150	676050	25-05	18:19:59	18:46:10	00:26:11	100.00
1	223150	676050	26-05	18:21:16	18:45:03	00:23:47	100.00
1	223150	676050	27-05	18:22:43	18:43:48	00:21:05	100.00
1	223150	676050	28-05	18:24:21	18:42:22	00:18:01	74.84
1	223150	676050	29-05	18:26:19	18:40:38	00:14:20	46.60
1	223150	676050	30-05	18:28:55	18:38:16	00:09:21	19.54
1	223150	676050	12-07	18:36:46	18:46:38	00:09:52	21.73
1	223150	676050	13-07	18:34:31	18:49:09	00:14:39	48.64
1	223150	676050	14-07	18:32:50	18:51:05	00:18:15	76.70
1	223150	676050	15-07	18:31:27	18:52:43	00:21:17	100.00
1	223150	676050	16-07	18:30:14	18:54:09	00:23:56	100.00
1	223150	676050	17-07	18:29:08	18:55:27	00:26:19	100.00
1	223150	676050	18-07	18:28:09	18:56:38	00:28:29	100.00
1	223150	676050	19-07	18:27:14	18:57:43	00:30:29	100.00

1	223150	676050	20-07	18:26:23	18:58:43	00:32:20	100.00
1	223150	676050	21-07	18:25:35	18:59:39	00:34:04	100.00
1	223150	676050	22-07	18:24:51	19:00:30	00:35:39	100.00
1	223150	676050	23-07	18:24:09	19:01:17	00:37:09	100.00
1	223150	676050	24-07	18:23:30	19:02:01	00:38:31	100.00
1	223150	676050	25-07	18:22:53	19:02:41	00:39:48	100.00
1	223150	676050	26-07	18:22:18	19:03:20	00:41:01	100.00
1	223150	676050	27-07	18:21:46	19:03:56	00:42:10	100.00
1	223150	676050	28-07	18:21:16	19:04:29	00:43:13	100.00
1	223150	676050	29-07	18:20:48	19:04:58	00:44:10	100.00
1	223150	676050	30-07	18:20:22	19:05:23	00:45:01	100.00
1	223150	676050	31-07	18:19:59	19:05:45	00:45:46	100.00
1	223150	676050	01-08	18:19:37	19:06:03	00:46:25	100.00
1	223150	676050	02-08	18:19:18	19:06:17	00:46:59	100.00
1	223150	676050	03-08	18:19:02	19:06:27	00:47:26	100.00
1	223150	676050	04-08	18:18:47	19:06:34	00:47:47	100.00
1	223150	676050	05-08	18:18:35	19:06:37	00:48:01	100.00
1	223150	676050	06-08	18:18:22	19:06:36	00:48:13	100.00
1	223150	676050	07-08	18:18:10	19:06:30	00:48:20	100.00
1	223150	676050	08-08	18:18:01	19:06:21	00:48:19	100.00
1	223150	676050	09-08	18:17:55	19:06:07	00:48:12	100.00
1	223150	676050	10-08	18:17:52	19:05:48	00:47:56	100.00
1	223150	676050	11-08	18:17:52	19:05:25	00:47:33	100.00
1	223150	676050	12-08	18:17:56	19:04:57	00:47:01	100.00
1	223150	676050	13-08	18:18:04	19:04:24	00:46:20	100.00
1	223150	676050	14-08	18:18:16	19:03:45	00:45:30	100.00
1	223150	676050	15-08	18:18:32	19:03:01	00:44:29	100.00
1	223150	676050	16-08	18:18:53	19:02:10	00:43:17	100.00
1	223150	676050	17-08	18:19:20	19:01:12	00:41:52	100.00
1	223150	676050	18-08	18:19:53	19:00:06	00:40:13	100.00
1	223150	676050	19-08	18:20:33	18:58:51	00:38:18	100.00
1	223150	676050	20-08	18:21:22	18:57:25	00:36:03	100.00
1	223150	676050	21-08	18:22:22	18:55:47	00:33:25	100.00
1	223150	676050	22-08	18:23:35	18:53:52	00:30:18	100.00
1	223150	676050	23-08	18:25:06	18:51:46	00:26:41	100.00
1	223150	676050	24-08	18:27:04	18:49:13	00:22:09	100.00
1	223150	676050	25-08	18:29:53	18:45:49	00:15:57	65.07
1	223150	676050	26-08	18:36:57	18:38:08	00:01:11	0.35

House	Easting	Northing
3	223349	675893

There are no shadows cast on this window

House	Easting	Northing
4	223709	676051

Turbine	Easting	Northing	Date	Start Time	End Time	Duration	% Cover
1	223150	676050	27-03	18:03:01	18:06:26	00:03:25	5.40
1	223150	676050	28-03	17:58:05	18:10:46	00:12:41	78.75
1	223150	676050	29-03	17:55:36	18:12:45	00:17:09	100.00
1	223150	676050	30-03	17:53:49	18:14:06	00:20:17	100.00
1	223150	676050	31-03	17:52:26	18:14:59	00:22:33	100.00
1	223150	676050	01-04	17:51:21	18:15:33	00:24:11	100.00
1	223150	676050	02-04	17:50:31	18:15:51	00:25:20	100.00
1	223150	676050	03-04	17:49:53	18:15:57	00:26:04	100.00
1	223150	676050	04-04	17:49:27	18:15:52	00:26:25	100.00
1	223150	676050	05-04	17:49:12	18:15:36	00:26:24	100.00
1	223150	676050	06-04	17:49:08	18:15:09	00:26:01	100.00
1	223150	676050	07-04	17:49:15	18:14:31	00:25:15	100.00
1	223150	676050	08-04	17:49:27	18:13:41	00:24:14	100.00
1	223150	676050	09-04	17:49:52	18:12:38	00:22:45	100.00

1	223150	676050	10-04	17:50:33	18:11:21	00:20:48	100.00
1	223150	676050	11-04	17:51:34	18:09:48	00:18:15	100.00
1	223150	676050	12-04	17:53:04	18:07:46	00:14:42	100.00
1	223150	676050	13-04	17:55:37	18:04:42	00:09:04	37.78
1	223150	676050	28-08	17:58:33	18:03:03	00:04:30	8.99
1	223150	676050	29-08	17:54:11	18:06:49	00:12:37	75.13
1	223150	676050	30-08	17:51:48	18:08:36	00:16:48	100.00
1	223150	676050	31-08	17:50:02	18:09:45	00:19:43	100.00
1	223150	676050	01-09	17:48:38	18:10:31	00:21:53	100.00
1	223150	676050	02-09	17:47:31	18:11:05	00:23:34	100.00
1	223150	676050	03-09	17:46:37	18:11:25	00:24:48	100.00
1	223150	676050	04-09	17:45:51	18:11:31	00:25:40	100.00
1	223150	676050	05-09	17:45:12	18:11:27	00:26:15	100.00
1	223150	676050	06-09	17:44:43	18:11:11	00:26:28	100.00
1	223150	676050	07-09	17:44:25	18:10:45	00:26:19	100.00
1	223150	676050	08-09	17:44:18	18:10:07	00:25:50	100.00
1	223150	676050	09-09	17:44:21	18:09:18	00:24:57	100.00
1	223150	676050	10-09	17:44:37	18:08:15	00:23:38	100.00
1	223150	676050	11-09	17:45:08	18:06:57	00:21:48	100.00
1	223150	676050	12-09	17:45:58	18:05:17	00:19:19	100.00
1	223150	676050	13-09	17:47:16	18:03:05	00:15:49	100.00
1	223150	676050	14-09	17:49:26	18:00:10	00:10:44	54.88

House	Easting	Northing
5	223582	675893

Turbine	Easting	Northing	Date	Start Time	End Time	Duration	% Cover
1	223150	676050	01-05	19:01:36	19:06:28	00:04:52	76.06
1	223150	676050	02-05	18:57:04	19:08:27	00:11:23	100.00
1	223150	676050	03-05	18:52:48	19:10:05	00:17:17	100.00
1	223150	676050	04-05	18:48:46	19:11:21	00:22:34	100.00
1	223150	676050	05-05	18:46:05	19:12:21	00:26:16	100.00
1	223150	676050	06-05	18:45:14	19:13:09	00:27:56	100.00
1	223150	676050	07-05	18:44:31	19:13:49	00:29:17	100.00
1	223150	676050	08-05	18:43:57	19:14:21	00:30:24	100.00
1	223150	676050	09-05	18:43:29	19:14:47	00:31:18	100.00
1	223150	676050	10-05	18:43:08	19:15:08	00:32:00	100.00
1	223150	676050	11-05	18:42:52	19:15:23	00:32:32	100.00
1	223150	676050	12-05	18:42:41	19:15:35	00:32:54	100.00
1	223150	676050	13-05	18:42:34	19:15:42	00:33:08	100.00
1	223150	676050	14-05	18:42:33	19:15:46	00:33:14	100.00
1	223150	676050	15-05	18:42:35	19:15:47	00:33:12	100.00
1	223150	676050	16-05	18:42:42	19:15:44	00:33:03	100.00
1	223150	676050	17-05	18:42:52	19:15:39	00:32:47	100.00
1	223150	676050	18-05	18:43:06	19:15:31	00:32:25	100.00
1	223150	676050	19-05	18:43:24	19:15:21	00:31:57	100.00
1	223150	676050	20-05	18:43:45	19:15:08	00:31:23	100.00
1	223150	676050	21-05	18:44:07	19:14:52	00:30:45	100.00
1	223150	676050	22-05	18:44:30	19:14:34	00:30:04	100.00
1	223150	676050	23-05	18:44:56	19:14:14	00:29:18	100.00
1	223150	676050	24-05	18:45:26	19:13:52	00:28:27	100.00
1	223150	676050	25-05	18:45:58	19:13:28	00:27:30	100.00
1	223150	676050	26-05	18:46:33	19:13:05	00:26:32	100.00
1	223150	676050	27-05	18:47:12	19:12:39	00:25:28	100.00
1	223150	676050	28-05	18:47:53	19:12:12	00:24:19	100.00
1	223150	676050	29-05	18:48:37	19:11:42	00:23:05	100.00
1	223150	676050	30-05	18:49:25	19:11:10	00:21:45	100.00
1	223150	676050	31-05	18:50:16	19:10:35	00:20:19	100.00
1	223150	676050	01-06	18:51:10	19:09:57	00:18:46	100.00
1	223150	676050	02-06	18:52:09	19:09:16	00:17:06	100.00
1	223150	676050	03-06	18:53:14	19:08:30	00:15:16	80.55
1	223150	676050	04-06	18:54:24	19:07:38	00:13:14	59.43

1	223150	676050	05-06	18:55:45	19:06:37	00:10:52	39.53
1	223150	676050	06-06	18:57:23	19:05:20	00:07:57	20.85
1	223150	676050	07-06	18:59:55	19:03:09	00:03:14	3.41
1	223150	676050	04-07	19:04:55	19:09:15	00:04:20	6.08
1	223150	676050	05-07	19:03:02	19:11:30	00:08:28	23.63
1	223150	676050	06-07	19:01:49	19:13:05	00:11:15	42.38
1	223150	676050	07-07	19:00:51	19:14:24	00:13:33	62.33
1	223150	676050	08-07	19:00:01	19:15:33	00:15:33	83.48
1	223150	676050	09-07	18:59:16	19:16:37	00:17:21	100.00
1	223150	676050	10-07	18:58:36	19:17:35	00:18:59	100.00
1	223150	676050	11-07	18:57:59	19:18:30	00:20:30	100.00
1	223150	676050	12-07	18:57:25	19:19:20	00:21:55	100.00
1	223150	676050	13-07	18:56:53	19:20:07	00:23:14	100.00
1	223150	676050	14-07	18:56:24	19:20:51	00:24:27	100.00
1	223150	676050	15-07	18:55:57	19:21:31	00:25:35	100.00
1	223150	676050	16-07	18:55:31	19:22:09	00:26:38	100.00
1	223150	676050	17-07	18:55:08	19:22:44	00:27:36	100.00
1	223150	676050	18-07	18:54:46	19:23:18	00:28:31	100.00
1	223150	676050	19-07	18:54:27	19:23:49	00:29:22	100.00
1	223150	676050	20-07	18:54:09	19:24:17	00:30:08	100.00
1	223150	676050	21-07	18:53:54	19:24:42	00:30:48	100.00
1	223150	676050	22-07	18:53:38	19:25:03	00:31:25	100.00
1	223150	676050	23-07	18:53:22	19:25:21	00:31:59	100.00
1	223150	676050	24-07	18:53:08	19:25:35	00:32:27	100.00
1	223150	676050	25-07	18:52:57	19:25:46	00:32:48	100.00
1	223150	676050	26-07	18:52:49	19:25:52	00:33:04	100.00
1	223150	676050	27-07	18:52:43	19:25:55	00:33:12	100.00
1	223150	676050	28-07	18:52:40	19:25:54	00:33:14	100.00
1	223150	676050	29-07	18:52:39	19:25:48	00:33:08	100.00
1	223150	676050	30-07	18:52:42	19:25:37	00:32:55	100.00
1	223150	676050	31-07	18:52:49	19:25:22	00:32:33	100.00
1	223150	676050	01-08	18:52:59	19:25:01	00:32:02	100.00
1	223150	676050	02-08	18:53:14	19:24:34	00:31:20	100.00
1	223150	676050	03-08	18:53:33	19:24:01	00:30:28	100.00
1	223150	676050	04-08	18:53:58	19:23:20	00:29:22	100.00
1	223150	676050	05-08	18:54:29	19:22:32	00:28:02	100.00
1	223150	676050	06-08	18:55:08	19:21:33	00:26:25	100.00
1	223150	676050	07-08	18:57:21	19:20:23	00:23:02	100.00
1	223150	676050	08-08	19:01:04	19:18:56	00:17:52	100.00
1	223150	676050	09-08	19:05:00	19:17:07	00:12:07	100.00
1	223150	676050	10-08	19:09:10	19:14:57	00:05:48	82.82

House	Easting	Northing
6	223466	675646

There are no shadows cast on this window

House	Easting	Northing
7	223697	675906

Turbine	Easting	Northing	Date	Start Time	End Time	Duration	% Cover
1	223150	676050	21-04	18:40:54	18:51:17	00:10:23	49.59
1	223150	676050	22-04	18:38:18	18:53:30	00:15:13	100.00
1	223150	676050	23-04	18:36:29	18:54:56	00:18:27	100.00
1	223150	676050	24-04	18:35:07	18:55:56	00:20:50	100.00
1	223150	676050	25-04	18:34:02	18:56:40	00:22:38	100.00
1	223150	676050	26-04	18:33:09	18:57:12	00:24:03	100.00
1	223150	676050	27-04	18:32:26	18:57:33	00:25:07	100.00
1	223150	676050	28-04	18:31:53	18:57:45	00:25:52	100.00
1	223150	676050	29-04	18:31:29	18:57:50	00:26:20	100.00
1	223150	676050	30-04	18:31:14	18:57:47	00:26:33	100.00
1	223150	676050	01-05	18:31:06	18:57:37	00:26:31	100.00

1	223150	676050	02-05	18:31:06	18:57:21	00:26:16	100.00
1	223150	676050	03-05	18:31:13	18:56:59	00:25:46	100.00
1	223150	676050	04-05	18:31:28	18:56:30	00:25:02	100.00
1	223150	676050	05-05	18:31:50	18:55:54	00:24:04	100.00
1	223150	676050	06-05	18:32:21	18:55:10	00:22:49	100.00
1	223150	676050	07-05	18:33:02	18:54:17	00:21:15	100.00
1	223150	676050	08-05	18:33:53	18:53:17	00:19:24	100.00
1	223150	676050	09-05	18:34:59	18:52:04	00:17:05	100.00
1	223150	676050	10-05	18:36:25	18:50:32	00:14:07	90.10
1	223150	676050	11-05	18:38:27	18:48:24	00:09:57	42.74
1	223150	676050	31-07	18:48:33	18:58:18	00:09:45	40.80
1	223150	676050	01-08	18:46:23	19:00:21	00:13:58	87.47
1	223150	676050	02-08	18:44:50	19:01:47	00:16:57	100.00
1	223150	676050	03-08	18:43:36	19:02:52	00:19:16	100.00
1	223150	676050	04-08	18:42:36	19:03:43	00:21:08	100.00
1	223150	676050	05-08	18:41:45	19:04:26	00:22:42	100.00
1	223150	676050	06-08	18:41:02	19:04:59	00:23:58	100.00
1	223150	676050	07-08	18:40:26	19:05:24	00:24:57	100.00
1	223150	676050	08-08	18:39:57	19:05:39	00:25:42	100.00
1	223150	676050	09-08	18:39:35	19:05:48	00:26:13	100.00
1	223150	676050	10-08	18:39:18	19:05:49	00:26:31	100.00
1	223150	676050	11-08	18:39:08	19:05:43	00:26:35	100.00
1	223150	676050	12-08	18:39:04	19:05:29	00:26:24	100.00
1	223150	676050	13-08	18:39:07	19:05:06	00:25:59	100.00
1	223150	676050	14-08	18:39:18	19:04:36	00:25:18	100.00
1	223150	676050	15-08	18:39:37	19:03:56	00:24:18	100.00
1	223150	676050	16-08	18:40:06	19:03:05	00:22:59	100.00
1	223150	676050	17-08	18:40:43	19:02:01	00:21:18	100.00
1	223150	676050	18-08	18:41:35	19:00:42	00:19:06	100.00
1	223150	676050	19-08	18:42:50	18:58:59	00:16:10	100.00
1	223150	676050	20-08	18:44:41	18:56:39	00:11:58	66.30
1	223150	676050	21-08	18:48:50	18:51:59	00:03:10	4.40

House	Easting	Northing
8	223593	675762

There are no shadows cast on this window

House	Easting	Northing
9	223724	675635

There are no shadows cast on this window

House	Easting	Northing
10	223338	675680

There are no shadows cast on this window

House	Easting	Northing
11	222942	676615

Turbine	Easting	Northing	Date	Start Time	End Time	Duration	% Cover
1	223150	676050	01-01	10:42:36	11:06:33	00:23:57	100.00
1	223150	676050	02-01	10:42:55	11:07:11	00:24:16	100.00
1	223150	676050	03-01	10:43:13	11:07:48	00:24:35	100.00
1	223150	676050	04-01	10:43:31	11:08:25	00:24:54	100.00
1	223150	676050	05-01	10:43:49	11:09:01	00:25:12	100.00
1	223150	676050	06-01	10:44:07	11:09:36	00:25:29	100.00
1	223150	676050	07-01	10:44:26	11:10:09	00:25:44	100.00
1	223150	676050	08-01	10:44:45	11:10:42	00:25:57	100.00
1	223150	676050	09-01	10:45:05	11:11:14	00:26:09	100.00
1	223150	676050	10-01	10:45:25	11:11:44	00:26:18	100.00

1	223150	676050	11-01	10:45:47	11:12:11	00:26:24	100.00
1	223150	676050	12-01	10:46:11	11:12:37	00:26:26	100.00
1	223150	676050	13-01	10:46:36	11:12:59	00:26:24	100.00
1	223150	676050	14-01	10:47:03	11:13:19	00:26:16	100.00
1	223150	676050	15-01	10:47:32	11:13:35	00:26:03	100.00
1	223150	676050	16-01	10:48:03	11:13:47	00:25:43	100.00
1	223150	676050	17-01	10:48:38	11:13:55	00:25:17	100.00
1	223150	676050	18-01	10:49:16	11:13:58	00:24:41	100.00
1	223150	676050	19-01	10:49:59	11:13:55	00:23:57	100.00
1	223150	676050	20-01	10:50:46	11:13:47	00:23:01	100.00
1	223150	676050	21-01	10:51:40	11:13:31	00:21:52	100.00
1	223150	676050	22-01	10:52:41	11:13:07	00:20:26	100.00
1	223150	676050	23-01	10:53:53	11:12:32	00:18:39	100.00
1	223150	676050	24-01	10:55:20	11:11:42	00:16:22	100.00
1	223150	676050	25-01	10:57:11	11:10:30	00:13:19	82.92
1	223150	676050	26-01	10:59:47	11:08:35	00:08:48	35.95
1	223150	676050	16-11	10:32:22	10:40:49	00:08:27	32.90
1	223150	676050	17-11	10:30:08	10:43:13	00:13:04	79.36
1	223150	676050	18-11	10:28:42	10:44:53	00:16:10	100.00
1	223150	676050	19-11	10:27:43	10:46:12	00:18:29	100.00
1	223150	676050	20-11	10:27:01	10:47:18	00:20:17	100.00
1	223150	676050	21-11	10:26:31	10:48:15	00:21:44	100.00
1	223150	676050	22-11	10:26:10	10:49:04	00:22:54	100.00
1	223150	676050	23-11	10:25:57	10:49:48	00:23:51	100.00
1	223150	676050	24-11	10:25:51	10:50:27	00:24:37	100.00
1	223150	676050	25-11	10:25:50	10:51:03	00:25:13	100.00
1	223150	676050	26-11	10:25:54	10:51:35	00:25:41	100.00
1	223150	676050	27-11	10:26:03	10:52:04	00:26:01	100.00
1	223150	676050	28-11	10:26:15	10:52:30	00:26:15	100.00
1	223150	676050	29-11	10:26:32	10:52:55	00:26:23	100.00
1	223150	676050	30-11	10:26:51	10:53:17	00:26:26	100.00
1	223150	676050	01-12	10:27:13	10:53:38	00:26:25	100.00
1	223150	676050	02-12	10:27:38	10:53:58	00:26:20	100.00
1	223150	676050	03-12	10:28:06	10:54:17	00:26:11	100.00
1	223150	676050	04-12	10:28:35	10:54:35	00:25:59	100.00
1	223150	676050	05-12	10:29:07	10:54:53	00:25:46	100.00
1	223150	676050	06-12	10:29:40	10:55:11	00:25:32	100.00
1	223150	676050	07-12	10:30:14	10:55:29	00:25:15	100.00
1	223150	676050	08-12	10:30:49	10:55:47	00:24:58	100.00
1	223150	676050	09-12	10:31:26	10:56:05	00:24:39	100.00
1	223150	676050	10-12	10:32:03	10:56:23	00:24:20	100.00
1	223150	676050	11-12	10:32:40	10:56:41	00:24:01	100.00
1	223150	676050	12-12	10:33:18	10:56:59	00:23:42	100.00
1	223150	676050	13-12	10:33:55	10:57:19	00:23:24	100.00
1	223150	676050	14-12	10:34:33	10:57:39	00:23:07	100.00
1	223150	676050	15-12	10:35:10	10:58:01	00:22:51	100.00
1	223150	676050	16-12	10:35:46	10:58:23	00:22:37	100.00
1	223150	676050	17-12	10:36:22	10:58:46	00:22:25	100.00
1	223150	676050	18-12	10:36:56	10:59:11	00:22:15	100.00
1	223150	676050	19-12	10:37:30	10:59:37	00:22:07	100.00
1	223150	676050	20-12	10:38:02	11:00:05	00:22:03	100.00
1	223150	676050	21-12	10:38:33	11:00:34	00:22:01	100.00
1	223150	676050	22-12	10:39:03	11:01:04	00:22:01	100.00
1	223150	676050	23-12	10:39:31	11:01:36	00:22:05	100.00
1	223150	676050	24-12	10:39:58	11:02:09	00:22:11	100.00
1	223150	676050	25-12	10:40:23	11:02:43	00:22:20	100.00
1	223150	676050	26-12	10:40:48	11:03:18	00:22:31	100.00
1	223150	676050	27-12	10:41:10	11:03:54	00:22:44	100.00
1	223150	676050	28-12	10:41:32	11:04:31	00:22:59	100.00
1	223150	676050	29-12	10:41:53	11:05:09	00:23:16	100.00
1	223150	676050	30-12	10:42:13	11:05:46	00:23:33	100.00
1	223150	676050	31-12	10:42:32	11:06:24	00:23:52	100.00

House	Easting	Northing
12	223193	676658

Turbine	Easting	Northing	Date	Start Time	End Time	Duration	% Cover
1	223150	676050	01-01	12:25:08	12:50:39	00:25:31	100.00
1	223150	676050	02-01	12:25:42	12:51:02	00:25:21	100.00
1	223150	676050	03-01	12:26:17	12:51:25	00:25:08	100.00
1	223150	676050	04-01	12:26:53	12:51:45	00:24:52	100.00
1	223150	676050	05-01	12:27:30	12:52:03	00:24:33	100.00
1	223150	676050	06-01	12:28:09	12:52:19	00:24:10	100.00
1	223150	676050	07-01	12:28:50	12:52:33	00:23:43	100.00
1	223150	676050	08-01	12:29:33	12:52:43	00:23:10	100.00
1	223150	676050	09-01	12:30:19	12:52:50	00:22:31	100.00
1	223150	676050	10-01	12:31:08	12:52:53	00:21:44	100.00
1	223150	676050	11-01	12:32:01	12:52:51	00:20:49	100.00
1	223150	676050	12-01	12:32:59	12:52:43	00:19:43	100.00
1	223150	676050	13-01	12:34:04	12:52:28	00:18:24	100.00
1	223150	676050	14-01	12:35:13	12:52:05	00:16:52	100.00
1	223150	676050	15-01	12:36:32	12:51:30	00:14:59	100.00
1	223150	676050	16-01	12:38:06	12:50:38	00:12:33	74.61
1	223150	676050	17-01	12:40:09	12:49:16	00:09:07	38.24
1	223150	676050	18-01	12:44:26	12:45:37	00:01:11	0.62
1	223150	676050	24-11	12:20:38	12:22:31	00:01:53	1.59
1	223150	676050	25-11	12:17:16	12:26:29	00:09:13	38.84
1	223150	676050	26-11	12:15:54	12:28:29	00:12:35	74.88
1	223150	676050	27-11	12:15:01	12:30:01	00:14:59	100.00
1	223150	676050	28-11	12:14:26	12:31:18	00:16:52	100.00
1	223150	676050	29-11	12:14:00	12:32:24	00:18:24	100.00
1	223150	676050	30-11	12:13:41	12:33:24	00:19:43	100.00
1	223150	676050	01-12	12:13:29	12:34:17	00:20:49	100.00
1	223150	676050	02-12	12:13:23	12:35:06	00:21:44	100.00
1	223150	676050	03-12	12:13:22	12:35:52	00:22:30	100.00
1	223150	676050	04-12	12:13:26	12:36:35	00:23:09	100.00
1	223150	676050	05-12	12:13:33	12:37:15	00:23:42	100.00
1	223150	676050	06-12	12:13:44	12:37:53	00:24:09	100.00
1	223150	676050	07-12	12:13:58	12:38:30	00:24:32	100.00
1	223150	676050	08-12	12:14:14	12:39:05	00:24:52	100.00
1	223150	676050	09-12	12:14:32	12:39:39	00:25:07	100.00
1	223150	676050	10-12	12:14:52	12:40:12	00:25:20	100.00
1	223150	676050	11-12	12:15:14	12:40:45	00:25:31	100.00
1	223150	676050	12-12	12:15:37	12:41:16	00:25:39	100.00
1	223150	676050	13-12	12:16:02	12:41:48	00:25:46	100.00
1	223150	676050	14-12	12:16:28	12:42:19	00:25:51	100.00
1	223150	676050	15-12	12:16:54	12:42:49	00:25:55	100.00
1	223150	676050	16-12	12:17:22	12:43:20	00:25:58	100.00
1	223150	676050	17-12	12:17:50	12:43:50	00:26:00	100.00
1	223150	676050	18-12	12:18:18	12:44:20	00:26:02	100.00
1	223150	676050	19-12	12:18:48	12:44:50	00:26:03	100.00
1	223150	676050	20-12	12:19:17	12:45:21	00:26:03	100.00
1	223150	676050	21-12	12:19:47	12:45:51	00:26:04	100.00
1	223150	676050	22-12	12:20:17	12:46:21	00:26:04	100.00
1	223150	676050	23-12	12:20:47	12:46:50	00:26:03	100.00
1	223150	676050	24-12	12:21:18	12:47:20	00:26:02	100.00
1	223150	676050	25-12	12:21:49	12:47:49	00:26:01	100.00
1	223150	676050	26-12	12:22:20	12:48:18	00:25:59	100.00
1	223150	676050	27-12	12:22:51	12:48:47	00:25:56	100.00
1	223150	676050	28-12	12:23:22	12:49:15	00:25:52	100.00
1	223150	676050	29-12	12:23:54	12:49:42	00:25:47	100.00
1	223150	676050	30-12	12:24:27	12:50:08	00:25:41	100.00
1	223150	676050	31-12	12:24:59	12:50:33	00:25:33	100.00

House	Easting	Northing
13	223069	676633

Turbine	Easting	Northing	Date	Start Time	End Time	Duration	% Cover
1	223150	676050	01-01	11:33:04	12:00:03	00:26:59	100.00
1	223150	676050	02-01	11:33:35	12:00:30	00:26:54	100.00
1	223150	676050	03-01	11:34:07	12:00:55	00:26:48	100.00
1	223150	676050	04-01	11:34:40	12:01:19	00:26:39	100.00
1	223150	676050	05-01	11:35:14	12:01:41	00:26:27	100.00
1	223150	676050	06-01	11:35:48	12:02:01	00:26:13	100.00
1	223150	676050	07-01	11:36:24	12:02:19	00:25:55	100.00
1	223150	676050	08-01	11:37:02	12:02:35	00:25:33	100.00
1	223150	676050	09-01	11:37:42	12:02:48	00:25:06	100.00
1	223150	676050	10-01	11:38:24	12:02:57	00:24:33	100.00
1	223150	676050	11-01	11:39:08	12:03:03	00:23:54	100.00
1	223150	676050	12-01	11:39:56	12:03:04	00:23:08	100.00
1	223150	676050	13-01	11:40:48	12:03:01	00:22:13	100.00
1	223150	676050	14-01	11:41:46	12:02:52	00:21:06	100.00
1	223150	676050	15-01	11:42:49	12:02:36	00:19:46	100.00
1	223150	676050	16-01	11:44:01	12:02:10	00:18:09	100.00
1	223150	676050	17-01	11:45:25	12:01:34	00:16:09	100.00
1	223150	676050	18-01	11:47:04	12:00:41	00:13:36	86.12
1	223150	676050	19-01	11:49:04	11:59:19	00:10:15	47.29
1	223150	676050	20-01	11:52:28	11:56:33	00:04:05	7.25
1	223150	676050	22-11	11:28:01	11:31:42	00:03:41	5.87
1	223150	676050	23-11	11:25:05	11:35:10	00:10:05	45.57
1	223150	676050	24-11	11:23:41	11:37:09	00:13:29	84.09
1	223150	676050	25-11	11:22:39	11:38:41	00:16:02	100.00
1	223150	676050	26-11	11:21:54	11:39:57	00:18:03	100.00
1	223150	676050	27-11	11:21:22	11:41:03	00:19:41	100.00
1	223150	676050	28-11	11:21:01	11:42:02	00:21:01	100.00
1	223150	676050	29-11	11:20:47	11:42:55	00:22:08	100.00
1	223150	676050	30-11	11:20:39	11:43:43	00:23:04	100.00
1	223150	676050	01-12	11:20:37	11:44:28	00:23:51	100.00
1	223150	676050	02-12	11:20:39	11:45:10	00:24:30	100.00
1	223150	676050	03-12	11:20:46	11:45:49	00:25:03	100.00
1	223150	676050	04-12	11:20:55	11:46:26	00:25:31	100.00
1	223150	676050	05-12	11:21:08	11:47:01	00:25:53	100.00
1	223150	676050	06-12	11:21:23	11:47:35	00:26:11	100.00
1	223150	676050	07-12	11:21:41	11:48:07	00:26:26	100.00
1	223150	676050	08-12	11:22:01	11:48:39	00:26:38	100.00
1	223150	676050	09-12	11:22:23	11:49:10	00:26:47	100.00
1	223150	676050	10-12	11:22:46	11:49:40	00:26:54	100.00
1	223150	676050	11-12	11:23:10	11:50:09	00:26:59	100.00
1	223150	676050	12-12	11:23:36	11:50:39	00:27:03	100.00
1	223150	676050	13-12	11:24:03	11:51:08	00:27:05	100.00
1	223150	676050	14-12	11:24:31	11:51:37	00:27:06	100.00
1	223150	676050	15-12	11:24:59	11:52:06	00:27:07	100.00
1	223150	676050	16-12	11:25:28	11:52:35	00:27:07	100.00
1	223150	676050	17-12	11:25:57	11:53:04	00:27:07	100.00
1	223150	676050	18-12	11:26:26	11:53:34	00:27:07	100.00
1	223150	676050	19-12	11:26:56	11:54:03	00:27:07	100.00
1	223150	676050	20-12	11:27:26	11:54:33	00:27:07	100.00
1	223150	676050	21-12	11:27:56	11:55:03	00:27:07	100.00
1	223150	676050	22-12	11:28:26	11:55:33	00:27:07	100.00
1	223150	676050	23-12	11:28:56	11:56:03	00:27:07	100.00
1	223150	676050	24-12	11:29:26	11:56:33	00:27:07	100.00
1	223150	676050	25-12	11:29:56	11:57:03	00:27:07	100.00
1	223150	676050	26-12	11:30:26	11:57:33	00:27:07	100.00
1	223150	676050	27-12	11:30:56	11:58:03	00:27:07	100.00
1	223150	676050	28-12	11:31:26	11:58:33	00:27:07	100.00
1	223150	676050	29-12	11:31:56	11:59:01	00:27:05	100.00

1	223150	676050	30-12	11:32:26	11:59:30	00:27:03	100.00
1	223150	676050	31-12	11:32:57	11:59:57	00:27:00	100.00

House	Easting	Northing
14	223271	676749

Turbine	Easting	Northing	Date	Start Time	End Time	Duration	% Cover
1	223150	676050	01-01	12:52:30	13:13:29	00:20:59	100.00
1	223150	676050	02-01	12:53:08	13:13:48	00:20:40	100.00
1	223150	676050	03-01	12:53:48	13:14:05	00:20:17	100.00
1	223150	676050	04-01	12:54:31	13:14:20	00:19:49	100.00
1	223150	676050	05-01	12:55:15	13:14:31	00:19:16	100.00
1	223150	676050	06-01	12:56:03	13:14:39	00:18:36	100.00
1	223150	676050	07-01	12:56:54	13:14:43	00:17:49	100.00
1	223150	676050	08-01	12:57:46	13:14:42	00:16:56	100.00
1	223150	676050	09-01	12:58:44	13:14:35	00:15:51	100.00
1	223150	676050	10-01	12:59:49	13:14:20	00:14:32	100.00
1	223150	676050	11-01	13:01:02	13:13:55	00:12:53	91.52
1	223150	676050	12-01	13:02:30	13:13:14	00:10:44	61.65
1	223150	676050	13-01	13:04:25	13:12:05	00:07:40	30.46
1	223150	676050	29-11	12:44:17	12:52:05	00:07:47	31.41
1	223150	676050	30-11	12:43:09	12:53:57	00:10:48	62.33
1	223150	676050	01-12	12:42:28	12:55:23	00:12:55	91.95
1	223150	676050	02-12	12:42:02	12:56:35	00:14:33	100.00
1	223150	676050	03-12	12:41:46	12:57:38	00:15:52	100.00
1	223150	676050	04-12	12:41:38	12:58:35	00:16:56	100.00
1	223150	676050	05-12	12:41:36	12:59:26	00:17:50	100.00
1	223150	676050	06-12	12:41:37	13:00:14	00:18:36	100.00
1	223150	676050	07-12	12:41:42	13:00:58	00:19:16	100.00
1	223150	676050	08-12	12:41:51	13:01:40	00:19:49	100.00
1	223150	676050	09-12	12:42:04	13:02:20	00:20:16	100.00
1	223150	676050	10-12	12:42:19	13:02:58	00:20:40	100.00
1	223150	676050	11-12	12:42:36	13:03:35	00:20:59	100.00
1	223150	676050	12-12	12:42:55	13:04:10	00:21:15	100.00
1	223150	676050	13-12	12:43:17	13:04:45	00:21:28	100.00
1	223150	676050	14-12	12:43:39	13:05:19	00:21:39	100.00
1	223150	676050	15-12	12:44:04	13:05:52	00:21:48	100.00
1	223150	676050	16-12	12:44:29	13:06:24	00:21:55	100.00
1	223150	676050	17-12	12:44:56	13:06:56	00:22:00	100.00
1	223150	676050	18-12	12:45:23	13:07:27	00:22:04	100.00
1	223150	676050	19-12	12:45:51	13:07:58	00:22:07	100.00
1	223150	676050	20-12	12:46:20	13:08:29	00:22:09	100.00
1	223150	676050	21-12	12:46:50	13:08:59	00:22:10	100.00
1	223150	676050	22-12	12:47:20	13:09:29	00:22:09	100.00
1	223150	676050	23-12	12:47:51	13:09:59	00:22:08	100.00
1	223150	676050	24-12	12:48:22	13:10:27	00:22:05	100.00
1	223150	676050	25-12	12:48:54	13:10:56	00:22:02	100.00
1	223150	676050	26-12	12:49:27	13:11:23	00:21:57	100.00
1	223150	676050	27-12	12:49:59	13:11:50	00:21:50	100.00
1	223150	676050	28-12	12:50:34	13:12:15	00:21:42	100.00
1	223150	676050	29-12	12:51:08	13:12:40	00:21:31	100.00
1	223150	676050	30-12	12:51:44	13:13:03	00:21:19	100.00
1	223150	676050	31-12	12:52:21	13:13:24	00:21:04	100.00

House	Easting	Northing
MPS	223073	676524

Turbine	Easting	Northing	Date	Start Time	End Time	Duration	% Cover
1	223150	676050	01-01	11:26:31	11:56:45	00:30:14	100.00
1	223150	676050	02-01	11:26:51	11:57:22	00:30:30	100.00
1	223150	676050	03-01	11:27:11	11:57:58	00:30:47	100.00

1	223150	676050	04-01 11:27:31	11:58:34	00:31:03	100.00
1	223150	676050	05-01 11:27:50	11:59:09	00:31:18	100.00
1	223150	676050	06-01 11:28:10	11:59:43	00:31:33	100.00
1	223150	676050	07-01 11:28:29	12:00:16	00:31:46	100.00
1	223150	676050	08-01 11:28:49	12:00:47	00:31:58	100.00
1	223150	676050	09-01 11:29:09	12:01:18	00:32:08	100.00
1	223150	676050	10-01 11:29:30	12:01:46	00:32:16	100.00
1	223150	676050	11-01 11:29:52	12:02:13	00:32:20	100.00
1	223150	676050	12-01 11:30:15	12:02:39	00:32:24	100.00
1	223150	676050	13-01 11:30:39	12:03:03	00:32:24	100.00
1	223150	676050	14-01 11:31:04	12:03:24	00:32:20	100.00
1	223150	676050	15-01 11:31:31	12:03:42	00:32:11	100.00
1	223150	676050	16-01 11:32:00	12:03:57	00:31:57	100.00
1	223150	676050	17-01 11:32:31	12:04:09	00:31:38	100.00
1	223150	676050	18-01 11:33:05	12:04:17	00:31:12	100.00
1	223150	676050	19-01 11:33:42	12:04:21	00:30:39	100.00
1	223150	676050	20-01 11:34:22	12:04:20	00:29:58	100.00
1	223150	676050	21-01 11:35:06	12:04:14	00:29:08	100.00
1	223150	676050	22-01 11:35:54	12:04:02	00:28:07	100.00
1	223150	676050	23-01 11:36:49	12:03:43	00:26:54	100.00
1	223150	676050	24-01 11:37:50	12:03:17	00:25:27	100.00
1	223150	676050	25-01 11:39:00	12:02:41	00:23:41	100.00
1	223150	676050	26-01 11:40:23	12:01:53	00:21:31	100.00
1	223150	676050	27-01 11:42:02	12:00:50	00:18:48	100.00
1	223150	676050	28-01 11:44:10	11:59:23	00:15:13	91.56
1	223150	676050	29-01 11:46:46	11:57:10	00:10:24	41.35
1	223150	676050	13-11 11:17:57	11:28:33	00:10:36	42.72
1	223150	676050	14-11 11:15:45	11:31:03	00:15:18	92.22
1	223150	676050	15-11 11:14:01	11:32:51	00:18:50	100.00
1	223150	676050	16-11 11:12:46	11:34:18	00:21:32	100.00
1	223150	676050	17-11 11:11:50	11:35:30	00:23:40	100.00
1	223150	676050	18-11 11:11:07	11:36:33	00:25:26	100.00
1	223150	676050	19-11 11:10:35	11:37:28	00:26:53	100.00
1	223150	676050	20-11 11:10:10	11:38:16	00:28:06	100.00
1	223150	676050	21-11 11:09:54	11:39:00	00:29:06	100.00
1	223150	676050	22-11 11:09:43	11:39:40	00:29:57	100.00
1	223150	676050	23-11 11:09:38	11:40:15	00:30:38	100.00
1	223150	676050	24-11 11:09:38	11:40:48	00:31:11	100.00
1	223150	676050	25-11 11:09:42	11:41:18	00:31:37	100.00
1	223150	676050	26-11 11:09:50	11:41:46	00:31:56	100.00
1	223150	676050	27-11 11:10:01	11:42:12	00:32:10	100.00
1	223150	676050	28-11 11:10:16	11:42:36	00:32:19	100.00
1	223150	676050	29-11 11:10:34	11:42:58	00:32:24	100.00
1	223150	676050	30-11 11:10:55	11:43:19	00:32:24	100.00
1	223150	676050	01-12 11:11:18	11:43:39	00:32:21	100.00
1	223150	676050	02-12 11:11:44	11:44:00	00:32:17	100.00
1	223150	676050	03-12 11:12:11	11:44:20	00:32:09	100.00
1	223150	676050	04-12 11:12:40	11:44:40	00:31:59	100.00
1	223150	676050	05-12 11:13:11	11:44:59	00:31:48	100.00
1	223150	676050	06-12 11:13:43	11:45:18	00:31:35	100.00
1	223150	676050	07-12 11:14:16	11:45:36	00:31:20	100.00
1	223150	676050	08-12 11:14:50	11:45:55	00:31:05	100.00
1	223150	676050	09-12 11:15:25	11:46:14	00:30:49	100.00
1	223150	676050	10-12 11:16:00	11:46:33	00:30:33	100.00
1	223150	676050	11-12 11:16:36	11:46:52	00:30:16	100.00
1	223150	676050	12-12 11:17:12	11:47:13	00:30:01	100.00
1	223150	676050	13-12 11:17:48	11:47:33	00:29:45	100.00
1	223150	676050	14-12 11:18:24	11:47:55	00:29:31	100.00
1	223150	676050	15-12 11:18:59	11:48:18	00:29:18	100.00
1	223150	676050	16-12 11:19:34	11:48:41	00:29:07	100.00
1	223150	676050	17-12 11:20:09	11:49:06	00:28:57	100.00
1	223150	676050	18-12 11:20:42	11:49:31	00:28:49	100.00
1	223150	676050	19-12 11:21:15	11:49:58	00:28:43	100.00

1	223150	676050	20-12 11:21:47	11:50:26	00:28:40	100.00
1	223150	676050	21-12 11:22:18	11:50:56	00:28:38	100.00
1	223150	676050	22-12 11:22:47	11:51:26	00:28:39	100.00
1	223150	676050	23-12 11:23:16	11:51:57	00:28:42	100.00
1	223150	676050	24-12 11:23:43	11:52:30	00:28:47	100.00
1	223150	676050	25-12 11:24:10	11:53:03	00:28:54	100.00
1	223150	676050	26-12 11:24:35	11:53:38	00:29:03	100.00
1	223150	676050	27-12 11:24:59	11:54:13	00:29:14	100.00
1	223150	676050	28-12 11:25:22	11:54:48	00:29:26	100.00
1	223150	676050	29-12 11:25:44	11:55:24	00:29:40	100.00
1	223150	676050	30-12 11:26:06	11:56:00	00:29:55	100.00
1	223150	676050	31-12 11:26:27	11:56:37	00:30:10	100.00

House	Easting	Northing
IR	223362	676111

Turbine	Easting	Northing	Date	Start Time	End Time	Duration	% Cover
1	223150	676050	04-03	16:56:21	17:09:22	00:13:01	34.06
1	223150	676050	05-03	16:51:14	17:14:01	00:22:48	100.00
1	223150	676050	06-03	16:47:48	17:16:59	00:29:11	100.00
1	223150	676050	07-03	16:45:04	17:19:13	00:34:09	100.00
1	223150	676050	08-03	16:42:46	17:20:59	00:38:14	100.00
1	223150	676050	09-03	16:40:47	17:22:28	00:41:42	100.00
1	223150	676050	10-03	16:39:01	17:24:49	00:45:47	100.00
1	223150	676050	11-03	16:37:27	17:27:03	00:49:35	100.00
1	223150	676050	12-03	16:36:03	17:28:50	00:52:47	100.00
1	223150	676050	13-03	16:34:47	17:30:18	00:55:32	100.00
1	223150	676050	14-03	16:33:38	17:31:32	00:57:54	100.00
1	223150	676050	15-03	16:32:36	17:32:34	00:59:58	100.00
1	223150	676050	16-03	16:31:40	17:33:26	01:01:46	100.00
1	223150	676050	17-03	16:30:51	17:34:10	01:03:19	100.00
1	223150	676050	18-03	16:30:06	17:34:45	01:04:39	100.00
1	223150	676050	19-03	16:29:27	17:35:13	01:05:46	100.00
1	223150	676050	20-03	16:28:54	17:35:35	01:06:41	100.00
1	223150	676050	21-03	16:28:25	17:35:50	01:07:26	100.00
1	223150	676050	22-03	16:28:01	17:36:00	01:07:59	100.00
1	223150	676050	23-03	16:27:42	17:36:05	01:08:23	100.00
1	223150	676050	24-03	16:27:28	17:36:04	01:08:36	100.00
1	223150	676050	25-03	16:27:19	17:35:58	01:08:39	100.00
1	223150	676050	26-03	16:27:16	17:35:47	01:08:32	100.00
1	223150	676050	27-03	16:27:17	17:35:32	01:08:15	100.00
1	223150	676050	28-03	16:27:23	17:35:11	01:07:48	100.00
1	223150	676050	29-03	16:27:36	17:34:46	01:07:10	100.00
1	223150	676050	30-03	16:27:54	17:34:16	01:06:22	100.00
1	223150	676050	31-03	16:28:18	17:33:41	01:05:24	100.00
1	223150	676050	01-04	16:28:48	17:33:01	01:04:13	100.00
1	223150	676050	02-04	16:29:26	17:32:17	01:02:51	100.00
1	223150	676050	03-04	16:30:12	17:31:27	01:01:15	100.00
1	223150	676050	04-04	16:31:07	17:30:32	00:59:25	100.00
1	223150	676050	05-04	16:32:12	17:29:31	00:57:19	100.00
1	223150	676050	06-04	16:33:30	17:28:24	00:54:54	100.00
1	223150	676050	07-04	16:34:37	17:27:11	00:52:34	100.00
1	223150	676050	08-04	16:35:18	17:25:53	00:50:35	100.00
1	223150	676050	09-04	16:36:06	17:24:31	00:48:25	100.00
1	223150	676050	10-04	16:37:03	17:23:01	00:45:58	100.00
1	223150	676050	11-04	16:38:11	17:21:22	00:43:11	100.00
1	223150	676050	12-04	16:39:30	17:19:31	00:40:01	100.00
1	223150	676050	13-04	16:41:04	17:17:26	00:36:22	100.00
1	223150	676050	14-04	16:42:59	17:15:02	00:32:03	100.00
1	223150	676050	15-04	16:45:22	17:12:09	00:26:47	100.00
1	223150	676050	16-04	16:48:36	17:08:26	00:19:50	76.03
1	223150	676050	17-04	16:54:34	17:02:01	00:07:26	10.44

1	223150	676050	25-08 16:53:07	17:08:28	00:15:20	44.60
1	223150	676050	26-08 16:48:39	17:12:22	00:23:42	100.00
1	223150	676050	27-08 16:45:26	17:15:00	00:29:35	100.00
1	223150	676050	28-08 16:42:48	17:17:03	00:34:15	100.00
1	223150	676050	29-08 16:40:32	17:18:43	00:38:11	100.00
1	223150	676050	30-08 16:38:32	17:20:05	00:41:33	100.00
1	223150	676050	31-08 16:36:45	17:21:15	00:44:29	100.00
1	223150	676050	01-09 16:35:09	17:22:14	00:47:05	100.00
1	223150	676050	02-09 16:33:41	17:23:03	00:49:23	100.00
1	223150	676050	03-09 16:32:20	17:23:45	00:51:25	100.00
1	223150	676050	04-09 16:31:06	17:24:25	00:53:18	100.00
1	223150	676050	05-09 16:29:07	17:24:58	00:55:50	100.00
1	223150	676050	06-09 16:27:18	17:25:24	00:58:06	100.00
1	223150	676050	07-09 16:25:40	17:25:44	01:00:04	100.00
1	223150	676050	08-09 16:24:11	17:25:59	01:01:48	100.00
1	223150	676050	09-09 16:22:50	17:26:07	01:03:18	100.00
1	223150	676050	10-09 16:21:36	17:26:11	01:04:35	100.00
1	223150	676050	11-09 16:20:29	17:26:10	01:05:41	100.00
1	223150	676050	12-09 16:19:28	17:26:04	01:06:36	100.00
1	223150	676050	13-09 16:18:32	17:25:53	01:07:21	100.00
1	223150	676050	14-09 16:17:42	17:25:37	01:07:55	100.00
1	223150	676050	15-09 16:16:57	17:25:17	01:08:19	100.00
1	223150	676050	16-09 16:16:18	17:24:52	01:08:34	100.00
1	223150	676050	17-09 16:15:43	17:24:22	01:08:39	100.00
1	223150	676050	18-09 16:15:13	17:23:47	01:08:34	100.00
1	223150	676050	19-09 16:14:48	17:23:08	01:08:19	100.00
1	223150	676050	20-09 16:14:28	17:22:23	01:07:55	100.00
1	223150	676050	21-09 16:14:13	17:21:33	01:07:20	100.00
1	223150	676050	22-09 16:14:03	17:20:38	01:06:35	100.00
1	223150	676050	23-09 16:13:58	17:19:37	01:05:39	100.00
1	223150	676050	24-09 16:13:59	17:18:30	01:04:32	100.00
1	223150	676050	25-09 16:14:05	17:17:17	01:03:12	100.00
1	223150	676050	26-09 16:14:17	17:15:56	01:01:39	100.00
1	223150	676050	27-09 16:14:34	17:14:27	00:59:52	100.00
1	223150	676050	28-09 16:14:59	17:12:48	00:57:49	100.00
1	223150	676050	29-09 16:15:30	17:10:58	00:55:28	100.00
1	223150	676050	30-09 16:16:09	17:08:55	00:52:45	100.00
1	223150	676050	01-10 16:16:57	17:06:33	00:49:36	100.00
1	223150	676050	02-10 16:17:55	17:03:47	00:45:52	100.00
1	223150	676050	03-10 16:19:04	17:00:54	00:41:50	100.00
1	223150	676050	04-10 16:20:28	16:58:54	00:38:27	100.00
1	223150	676050	05-10 16:22:09	16:56:37	00:34:28	100.00
1	223150	676050	06-10 16:24:16	16:53:56	00:29:40	100.00
1	223150	676050	07-10 16:27:03	16:50:35	00:23:32	100.00
1	223150	676050	08-10 16:31:17	16:45:48	00:14:32	42.22

Project: TEXAS 1
Run Name: KTEXAS 1002.WFK
Title: Shadow Flicker
Time: 14:40:30, 17 Sep 2014

SUMMARY OF MERGED SHADOW TIMES FROM EACH TURBINE ON ALL HOUSES

Turbine	Easting	Northing	Days per year	Max hours per day	Mean hours per day	Total hours
1	223150	676050	271	1.73	1.05	284.4

TECHNICAL REPORT P6044

TEXAS INSTRUMENTS GOUROCK

SINGLE WIND TURBINE NOISE IMPACT ASSESSMENT

Prepared For

SYNERGIE ENVIRON LTD
Trinity House
31 Lynedoch Street
GLASGOW
G3 6AA

Prepared By

ETHOS ENVIRONMENTAL LIMITED
Unit 16 Dumbryden Industrial Estate
32 Dumbryden Road
EDINBURGH
EH14 2AB

tel: 0131 453 5111
fax: 0131 453 6111
e-mail: scott@ethosenvironmental.co.uk

NOVEMBER 2014

PROJECT DETAILS

Project Title		Texas Instruments Gourock Single Wind Turbine Noise Impact Assessment		**Project Number**	
				P6044	
Document Title		Noise Impact Assessment		**Date of site work:**	**Date of issue:**
				22nd to 28th October and 18th November 2014	3rd December 2014
Revision	Date Written	Filename	P6044 Texas Instruments Single Wind Turbine Report		
Issue 1B	26/11/12		Prepared By	Checked By	
		Name	Scott Carlin	Brian Gardner	
		Signature			
Revision	Date Written	Filename	P6044 Texas Instruments Single Wind Turbine Report		
Issue 2.0	02/12/14		Prepared By	Checked By	
		Name	Scott Carlin	Brian Gardner	
		Signature			
Issue		**Filename**			
		Description			
			Prepared By	**Checked By**	
		Name			
		Signature			

Certificate No. *EMS563106*

Certificate No. *OHS563107*

Certificate No. *FS547812*

Executive Summary

The assessment has been carried out by comparing predicted noise levels with noise limits described in ETSU-R-97, *Assessment and Rating of Noise from Wind Farms*.

The assessment shows that the predicted wind turbine noise levels at all residential properties will below the background noise level at the nearest noise sensitive receptors.

At no time will the night time level of 43 dB L_{A90} be exceeded.

CONTENTS

1.0 INTRODUCTION

1.1 At the request of Mr Guy Robertson, Principal Environmental Consultant, Synergie Environ Ltd, a noise assessment was undertaken to assess the potential impact of the installation of a single wind turbine at the following site:

Texas Instruments Ltd
Larkfield Industrial Estate
Greenock
Inverclyde
PA16 0EQ

1.2 The purpose of the assessment was to undertake monitoring of current on-site noise levels at noise-sensitive receptors around the proposed site and investigate how the introduction of the new wind turbine will affect the current noise climate in the area.

This assessment used the information contained in:

- *PAN 1/2011* (Planning and Noise) and the associated Technical Advice Note (TAN).
- *ETSU-R-97*
- *A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise* (IOA May 2013)

This noise assessment was undertaken on the 22nd to 28th October and 18th November 2014 by Mr Gordon Leggate MIOA, Acoustic Consultant, Mr Bilal Ahmed, Trainee Acoustic Consultant and Mr Oliver Gashi, Trainee Acoustic Technician of Ethos Environmental Limited.

The main findings from this survey are discussed in Section 4.0 of this report.

Conclusions and recommendations are made in Section 5.0.

2.0 BACKGROUND

2.1 Noise in the Environment

Noise can have a significant impact upon health, quality of life and the environment generally. Wind turbines are generally situated in rural environments where there are few other sources of noise. When wind speeds are high, noise is likely to be masked by wind-induced noise effects, particularly that of the trees being blown. At lower wind speeds, however, or in particularly sheltered locations, the wind induced background noise may not be sufficient to mask noise from the turbines.

Noise levels are normally expressed in decibels. Noise in the environment is measured using the dBA scale which includes a correction for the response of the human ear to noises with different frequency content. A change of 3 dBA is commonly held to be the minimum perceptible under normal conditions and a change of 10 dBA corresponds roughly to halving or doubling the loudness of sound.

2.2 Noise Impact from Wind Turbines

Noise is generated by wind turbines as they rotate to generate power. Rotation only occurs above the 'cut-in' wind speed and below the 'cut-out' wind speed. Below the cut-in wind speed there is insufficient strength in the wind to generate efficiently and above the cut-out wind speed the turbine is automatically shut down to prevent any malfunctions from occurring.

The wind speed range for the Gamesa G58 T49 turbine is from 4 to 25 ms^{-1}, with reduced operations during storms. The principal sources of noise are from the blades rotating in the air (aerodynamic noise) and from internal machinery, normally the gearbox (if the machine is not a direct drive model) and, to a lesser extent, the generator (mechanical noise). The blades are carefully designed to minimise noise whilst optimising power transfer from the wind.

The noise levels from this turbine are 95 - 104 dBA depending on wind speed and power output, with this value decreasing with distance from the turbine, due to atmospheric absorption and various other attenuation factors.

2.3 Legislative Background

There are two main items of guidance used in this assessment, as follows.

2.3.1 PAN 1/2011

The Scottish Government's policies on noise-related planning issues are set out in PAN 1/2011, *'Planning and Noise'* and its Technical Advice Note (TAN), *'Assessment of Noise'*. Specifically it outlines the considerations to be taken into account when determining planning

applications for both noise-sensitive development (NSD) and for noise generating development (NGD).

The objective is to evaluate the noise impact of the Noise Generating Development (NGD) (the proposed wind turbine) on the existing Noise Sensitive Receptors (NSR).

The scope of the noise assessment does not include for construction phase noise from the proposed development.

2.3.2 *ETSU-R-97, The Assessment and Rating of Noise from Wind Farms.*

ETSU-R-97, *The Assessment and Rating of Noise from Wind Farms recommendations of the Working Group on Noise from Wind Turbines*, set up in 1993 by the Department of Trade and Industry as a result of difficulties experienced in applying the noise guidelines existing at the time to wind farm noise assessments.

The group comprised independent experts on wind turbine noise, wind farm developers, DTI personnel and local authority Environmental Health Officers. In September 1996 the Working Group published its findings by way of report ETSU-R-97. This document describes a framework for the with reference to existing standards and guidance relating to noise emission from various measurement of wind farm noise and contains suggested noise limits, which were derived sources.

ETSU-R-97 recommends that, although noise limits should be set relative to existing background, and should reflect the variation of both turbine and background noise with wind speed, this can imply very low noise limits in particularly quiet areas, in which case "it is not necessary to use a margin above background in such low-noise environments. This would be unduly restrictive on developments which are recognised as having wider global benefits. Such low limits are, in any event, not necessary in order to offer a reasonable degree of protection to the wind farm neighbour."

For day-time periods, the noise limit is 35-40 dBA or 5 dBA above the 'quiet day-time hours' prevailing background noise, whichever is the greater. The actual value within the 35-40 dB(A) range depends on the number of dwellings in the vicinity; the effect of the limit on the number of kWh generated; and the duration of the level of exposure.

For night-time periods the noise limit is 43 dBA or 5 dBA above the prevailing night-time hours background noise, whichever is the greater. The 43 dBA lower limit is based on a sleep disturbance criteria of 35 dBA with an allowance of 10 dBA for attenuation through an open window and 2 dBA subtracted to account for the use of L_{A90} rather the L_{Aeq}.

Where the occupier of a property has some financial involvement with the wind farm, the day and night-time lower noise limits are increased to 45 dBA and consideration can be given to increasing the permissible margin above background. These limits are applicable up to a wind speed of 12 m/s measured at 10 m height on the site.

Quiet day-time periods are defined as evenings from 1800-2300 plus Saturday afternoons from 1300-1800 and Sundays from 0700-1800. Night-time is defined as 2300-0700. The prevailing background noise level is set by calculation of a best fit curve through values of background noise plotted against wind speed as measured during the appropriate time period with background noise measured in terms of $L_{A90,t}$. The $L_{A90,t}$ is the noise level which is exceeded for 90% of the measurement period 't'. It is recommended that monitoring should be maintained for a period of at least one week.

Where predicted noise levels are low at the nearest residential properties, as is the case here a simplified noise limit can be applied, such that noise is restricted to the minimum ETSU-R-97 level of 35 dB LA9o for wind speeds up to 10 m/s at 10 m height. This removes the need for extensive background noise measurements for smaller or more remote schemes.

It is stated that the $L_{A90,10min}$ noise descriptor should be adopted for both background and wind farm noise levels and that, for the wind farm noise, this is likely to be between 1.5 and 2.5 dB less than the L_{Aeq} measured over the same period. The $L_{Aeq,t}$ is the equivalent continuous 'A' weighted sound pressure level occurring over the measurement period t. It is often used as a description of the average noise level. Use of the L_{A90} descriptor for wind farm noise allows reliable measurements to be made without corruption from relatively loud, transitory noise events from other sources.

ETSU-R-97 also specifies that a penalty should be added to the predicted noise levels, where any tonal component is present. The level of this penalty is described and is related to the level by which any tonal components exceed audibility.

With regard to multiple wind farms in a given area ETSU-R-97 specifies that the absolute noise limits and margins above background should relate to the cumulative effect of all wind turbines in the area contributing to the noise received at the properties in question. Existing wind farms should therefore be included in cumulative predictions of noise level for proposed wind turbines and not considered as part of the prevailing background noise. (Institute of Acoustics: *Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise* (May 2013)).

2.4 Site Details

Texas Instruments factory is located on Larkfield Industrial Estate in Gourock between two residential schemes. One to the north (Moorfoot Drive) and one to the South (Banff Road).

The site of the proposed wind turbine is adjacent to the factory at the northeast of the site. See Figures 1 and 2 below.

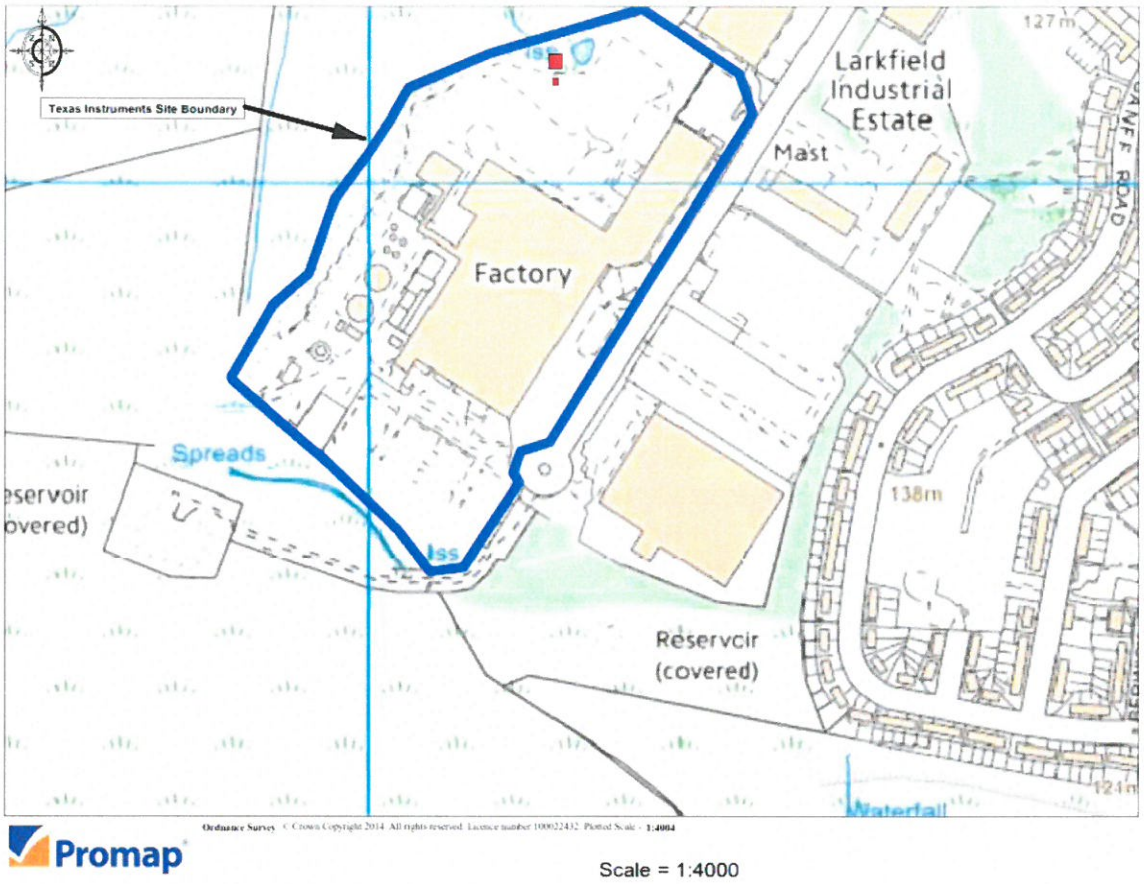


Figure 1: Location of Wind Turbine in Relation to Factory Site

Figure 2: Aerial Photograph of Factory Site

3.0 METHODOLOGY

3.1 Client Brief

The client's brief was to assess the environmental impact from a single wind turbine to be installed at the Texas Instruments Plant in Gourock.

The purpose of the assessment was to identify if the predicted noise output from the proposed wind turbine would exceed the L_{A90} level of 35 dBA for wind speeds up to 10 ms^{-1} (measured at 10m height) at the nearest residential property.

This is the noise limit set by current best practice guidance, above which detailed background noise monitoring is required to assess noise nuisance. Assuming this absolute limit is likely to be met the guidance presumes any noise nuisance is unlikely to occur.

3.2 Assessment Location

The background noise measurement was taken at approximately 1.5m from any reflecting surface (e.g. façade or wall) and at a height of 1.5m from the ground.

Background measurements were taken over a week long period at:

- Banff Road
- Moorfoot Drive
- Moorfoot Primary School

However, the sound level meters from the Moorfoot Primary School location and the Moorfoot Drive Location were stolen. As such, a simultaneous hour-long measurement was obtained at both the Banff Road site and the Moorfoot Drive location in order to evaluate a comparison between the two sites and thereby validate the remaining dataset for use at the Moorfoot site (see Appendix 4). This strategy for validation of the dataset was discussed with the local authority Environmental Officer. The noise levels at the Banff Road location were concluded to be approximately 5dB higher than those at the Moorfoot Drive location by a comparison of the one-hour night-time background monitoring results.

3.3 Monitoring Conditions

During the main monitoring period, the wind conditions were monitored using an onsite weather station. The weather data is presented in Table 1 below.

The wind speed is measured at a height of 10m as per the recommendations detailed in ETSU-R-97.

3.4 Noise Measurement Instrumentation

Measurements were taken using Norsonic 140, Type 1 integrating sound level meters and octave band analysers. This meter was placed in a Norsonic (NOR1506) environmental enclosure with an environmental microphone enclosure (NOR1212).

A Norsonic high wind speed microphone shield was also used during the assessment.

This meter satisfies IEC 60651-1993, IEC 6084-1993 and ANSI S1.4 1985. The digital filters with real time rate to 20 kHz satisfy IEC 1260-1995 Class 1 and ANSI S1.11-1986 Type 1_D meeting linearity specifications over a range of 85 dB:

- $^1/_1$ Octave, 16 Hz to 16 kHz (11 filters);
- $^1/_3$ Octave, 12.5 Hz to 20 kHz (33 filters).

All measurements were made taking due cognisance of information contained in BS7445: Part 1: 2003 *Description and measurement of environmental noise - Guide to quantities and procedures and* BS7445: Part 2: 1991 *Description and measurement of environmental noise - Guide to the acquisition of data pertinent to land use.*

Table 1: Wind Speed Data (m/s)

Day	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
20/10/2014	8.0	7.3	7.6	6.3	6.5	6.8	7.2	6.4	6.1	6.0	5.8	6.6	7.6	8.0	6.8	6.1	6.9	7.8	8.2	9.4	10.9	10.8	13.3	16.0
21/10/2014	14.7	12.8	10.4	13.5	16.1	11.3	11.0	12.3	12.4	13.1	13.9	14.7	14.3	14.0	14.1	12.6	11.9	6.0	5.7	8.6	7.4	6.9	7.6	7.4
22/10/2014	8.4	8.1	6.2	6.3	5.5	4.7	6.1	6.9	6.5	7.7	9.0	9.5	8.1	7.9	6.8	7.7	7.7	7.2	5.9	5.8	5.6	5.4	6.3	4.9
23/10/2014	5.0	6.2	6.5	6.8	7.2	6.5	5.4	5.3	6.2	5.1	5.8	7.3	8.4	7.8	7.8	7.3	8.4	8.5	6.3	6.0	8.5	7.6	6.7	6.7
24/10/2014	6.5	6.4	6.1	6.1	5.5	7.0	6.7	6.7	6.3	6.0	6.0	5.8	5.7	5.5	5.5	5.3	5.9	6.4	6.5	8.1	7.5	8.4	8.3	8.7
25/10/2014	8.0	6.6	6.3	7.2	9.0	8.9	9.9	10.3	11.5	11.4	9.8	10.2	10.3	10.5	9.0	8.5	10.2	9.4	9.8	9.5	10.0	10.2	10.0	12.0
26/10/2014	11.8	12.2	12.0	11.9	11.7	11.3	11.3	11.3	12.2	12.2	11.4	11.1	10.8	9.7	10.7	9.6	9.5	11.5	11.1	11.6	10.3	8.0	8.2	9.8
27/10/2014	10.7	10.8	10.0	8.0	8.3	8.9	9.4	9.1	8.2	8.2	7.3	8.0	7.5	6.6	7.8	8.9	9.1	10.0	10.2	9.8	9.0	10.1	9.9	10.5
28/10/2014	11.1	11.4	11.8	13.9	14.6	12.9	8.2	4.6	7.0	5.3	5.4	4.7	2.5	2.5	3.5	3.1	3.9	3.8	4.1	3.7	3.9	3.1	3.6	1.9
Average	9.4	9.1	8.5	8.9	9.4	8.7	8.4	8.1	8.5	8.3	8.3	8.7	8.4	8.1	8.0	7.7	8.2	7.8	7.5	8.1	8.1	7.8	8.2	8.7

4.0 RESULTS

4.1 Monitoring Results

A one week measurement was undertaken and both Moorfoot Primary School, Moorfoot Drive and Banff Road. As discussed, the sound level meters from Moorfoot were stolen.

The Banff data has been used as a surrogate to Moorfoot after a subsequent data comparison exercise detailed an approximate 5dBA difference between the two sites.

The time history at the Banff Road Site is presented graphically in Appendix 2.

The Wind Turbine to be installed is a *Gamesa G58 T49 Turbine*. This unit's wind speed range is from 4 to 25 ms^{-1}. This unit also has reduced operations during storms.

The principal sources of noise are from the blades rotating in the air, gearbox and generator. The noise levels from this turbine are predicted to be 95 - 104 dBA depending on wind speed and power output, with this value decreasing with distance from the turbine, due to atmospheric absorption and from various other attenuation factors.

Noise predictions have been based on source sound power levels for the proposed Gamesa G58 T49 500 kW turbine as warranted by the manufacturer and shown in Table 2 below.

The noise spectra have been taken from measurements carried out on sample turbines according to IEC 61400-11, normalised to the warranted sound power level at each integer wind speed.

Table 2: Predicted sound power levels from the G58 T49 wind turbine

Wind Speed @ 10m	G58 T49 Sound Power Level L_w dBA
4	94.8
5	98.0
6	102.1
7	103.3
8	103.6
9	103.6
10	103.6
11	103.6
12	103.6

The Cadna-A model was run at 4m/s and 12m/s wind speeds, as these are considered best and worst case monitoring periods.

4.2 Output from Noise Model Results

The residential developments around the proposed location of the turbine are Banff Road to the South, and Moorfoot Drive to the North. Moorfoot Primary School is also present to the north of the proposed location.

Receivers were placed in the Acoustic Digital Terrain Model at positions representing the nearest noise-sensitive receptors. This was done using the building evaluation option in Cadna. It should be noted that as per ETSU-R-97 the ground correction factor was set to zero (G=0.0) as it is assumed that most of the noise propagation will be over hard ground. This is more relevant to the south of the site.

Contour lines for the site were also overlaid on the Google Earth™ Image in order to correctly model any unusually topographical effects.

The source sound power levels determined according to IEC 61400-11 are provided in terms of L_{Aeq}. To obtain the L_{A90} parameter required by ETSU-R-97, it is necessary to apply a correction to the prediction results. Based on the experience of the IOA-NWG and recent research[1], the assumption described in ETSU-R-97 in this regard continues to remain valid. A correction of -2 dB is commonly applied. This has been applied to the model output levels presented in Table 3 below.

It should be noted that the house numbers detailed in the table are for reference only. Although the street name is correct, actual house numbers could not be confirmed. The house number labels are presented in Appendix 4.

Table 3: Modelled L_{A90} Values at 4ms^{-1} and 12 ms^{-1}

Name	G58 T49 Wind Turbine Levels at adjacent properties	
	At 4m/s (L_{A90} dB)	At 12m/s (L_{A90} dB)
1 Moorfoot Drive	27.9	36.7
2 Moorfoot Drive	28.0	36.8
3 Moorfoot Drive	28.0	36.8
4 Moorfoot Drive	28.0	36.8
5 Moorfoot Drive	25.0	33.8
6 Moorfoot Drive	25.0	33.8
7 Moorfoot Drive	25.0	33.8
8 Moorfoot Drive	27.9	36.7
9 Moorfoot Drive	27.8	36.6
10 Moorfoot Drive	27.5	36.3
11 Moorfoot Drive	27.7	36.5
12 Moorfoot Drive	27.5	36.3
13 Moorfoot Drive	24.0	32.8
14 Moorfoot Drive	22.7	31.5

[1] T. Evans and J. Cooper, Comparison of compliance results obtained from the various wind farm standards used in Australia, Proceedings of ACOUSTICS 2011, 2-4 November 2011, Gold Coast, Australia (The Australian Acoustical Society).

Name	G58 T49 Wind Turbine Levels at adjacent properties	
	At 4m/s (L_{A90} dB)	At 12m/s (L_{A90} dB)
15 Moorfoot Drive	24.0	32.8
16 Moorfoot Drive	27.2	36
Moorfoot Primary School	30.1	38.9
Industrial Units	45.7	54.5
Factory	33.9	42.7
Texas Instruments Factory	45.7	54.5
2 Banff Place	24.6	33.4
1 Banff Place	28.7	37.5
3 Banff Place	27.9	36.7
15 Banff Road	21.6	30.4
17 Banff Road	26.1	34.9
19 Banff Road	25.8	34.6
21 Banff Road	25.5	34.3
23 Banff Road	20.8	29.6
25 Banff Road	24.7	33.5
13 Banff Road	31.6	40.4
11 Banff Road	31.6	40.4
9 Banff Road	31.4	40.2
7 Banff Road	31.2	40.0
5 Banff Road	31.2	40.0
3 Banff Road	31.4	40.2
1 Banff Road	31.5	40.3
14 Banff Road	27.2	36
3 Caithness Road	25.7	34.5
12 Banff Road	26.9	35.7
10 Banff Road	30.6	39.4
8 Banff Road	30.4	39.2
6 Banff Road	24.5	33.3
4 Banff Road	22.5	31.3
2 Banff Road	23.6	32.4
5 Caithness Road	26.5	35.3
7 Caithness Road	25.5	34.3
9 Caithness Road	22.4	31.2
2 Caithness Road	23.4	32.2
16 Banff Road	21.4	30.2
18 Banff Road	20.3	29.1
20 Banff Road	19.9	28.7
27 Banff Road	23.6	32.4
29 Banff Road	24.3	33.1
31 Banff Road	23.0	31.8
1 Fife Drive	18.7	27.5
2 Fife Drive	20.8	29.6
3 Fife Drive	18.4	27.2
4 Fife Drive	18.1	26.9
5 Fife Drive	23.2	32
6 Fife Drive	23.5	32.3
4 Caithness Road	24.7	33.5
6 Caithness Road	25.1	33.9
8 Caithness Road	25.6	34.4
10 Caithness Road	23.3	32.1
Inverclyde Taxis	27.2	36

Name	G58 T49 Wind Turbine Levels at adjacent properties	
	At 4m/s (L_{A90} dB)	At 12m/s (L_{A90} dB)
Largefield Industrial Estate	24.5	33.3
1 Caithness Road	26.6	35.4

As can be seen from Table 3 above, the noise level will exceed 35dB L_{A90} at some of the nearest noise sensitive receptors when the unit is operating at its highest level (Lw = 103.6dBA).

These are detailed below.

- 16 Moorfoot Drive
- Moorfoot Primary School
- 1 Banff Place
- Banff Place
- Banff Road
- 7 Banff Road
- 8 Banff Road
- 9 Banff Road
- 10 Banff Road
- 11 Banff Road
- 13 Banff Road
- 14 Banff Road
- 1 Caithness Road
- 5 Caithness Road

The receptors highlighted in grey are non-residential in nature.

Table 4 below shows the measured background and LAeq correlated with wind speed measurements.

Table 4: Measured Noise Levels at Wind Speeds

Date	Time	Hourly Wind speed	Banff Road L_{A90}	Moorfoot Dr. L_{A90}	Banff Road Hourly L_{Aeq}	Moorfoot Dr. Hourly L_{Aeq}
22/10/2014	13:00:57	7.9	49.3	44.3	50.6	45.6
	14:00:57	6.8	48.9	43.9	49.9	44.9
	15:00:57	7.7	47.0	42.0	48.5	43.5
	16:00:57	7.7	48.0	43.0	48.9	43.9
	17:00:57	7.2	48.3	43.3	49.0	44.0
	18:00:57	5.9	47.2	42.2	48.7	43.7
	19:00:57	5.8	46.4	41.4	46.8	41.8
	20:00:57	5.6	45.1	40.1	45.9	40.9
	21:00:57	5.4	43.8	38.8	46.0	41.0
	22:00:57	6.3	44.9	39.9	46.0	41.0
	23:00:57	4.9	46.5	41.5	46.0	41.0
23/10/2014	00:00:57	5	44.0	39.0	43.9	38.9
	01:00:57	6.2	44.2	39.2	45.2	40.2

	02:00:57	6.5	44.8	39.8	47.4	42.4
	03:00:57	6.8	44.9	39.9	49.4	44.4
	04:00:57	7.2	47.4	42.4	47.6	42.6
	05:00:57	6.5	48.2	43.2	51.1	46.1
	06:00:57	5.4	48.9	43.9	49.0	44.0
	07:00:57	5.3	46.0	41.0	46.9	41.9
	08:00:57	6.2	45.8	40.8	55.8	50.8
	09:00:57	5.1	47.8	42.8	52.7	47.7
	10:00:57	5.8	44.9	39.9	48.1	43.1
	11:00:57	7.3	42.9	37.9	49.4	44.4
	12:00:57	8.4	46.3	41.3	48.3	43.3
	13:00:57	7.8	46.0	41.0	49.1	44.1
	14:00:57	7.8	46.6	41.6	50.7	45.7
	15:00:57	7.3	50.9	45.9	52.2	47.2
	16:00:57	8.4	45.4	40.4	47.7	42.7
	17:00:57	8.5	49.8	44.8	51.9	46.9
	18:00:57	6.3	49.0	44.0	51.5	46.5
	19:00:57	6	48.8	43.8	47.6	42.6
	20:00:57	8.5	44.8	39.8	47.6	42.6
	21:00:57	7.6	48.0	43.0	49.6	44.6
	22:00:57	6.7	48.5	43.5	48.3	43.3
	23:00:57	6.7	46.9	41.9	47.6	42.6
24/10/2014	00:00:57	6.5	45.8	40.8	47.5	42.5
	01:00:57	6.4	46.5	41.5	49.1	44.1
	02:00:57	6.1	48.8	43.8	47.1	42.1
	03:00:57	6.1	45.1	40.1	46.5	41.5
	04:00:57	5.5	46.9	41.9	46.6	41.6
	05:00:57	7	45.1	40.1	46.3	41.3
	06:00:57	6.7	48.3	43.3	49.3	44.3
	07:00:57	6.7	47.0	42.0	49.6	44.6
	08:00:57	6.3	47.0	42.0	49.0	44.0
	09:00:57	6	47.6	42.6	49.5	44.5
	10:00:57	6	47.3	42.3	47.8	42.8
	11:00:57	5.8	46.2	41.2	47.2	42.2
	12:00:57	5.7	44.8	39.8	47.3	42.3
	13:00:57	5.5	45.3	40.3	47.5	42.5
	14:00:57	5.5	46.3	41.3	47.0	42.0
	15:00:57	5.3	44.0	39.0	46.5	41.5
	16:00:57	5.9	44.3	39.3	47.0	42.0
	17:00:57	6.4	46.6	41.6	49.4	44.4
	18:00:57	6.5	46.6	41.6	48.8	43.8
	19:00:57	8.1	46.9	41.9	48.6	43.6
	20:00:57	7.5	47.2	42.2	48.5	43.5
	21:00:57	8.4	48.5	43.5	50.0	45.0
	22:00:57	8.3	48.2	43.2	50.0	45.0
	23:00:57	8.7	46.7	41.7	50.0	45.0
25/10/2014	00:00:57	8	50.1	45.1	50.2	45.2
	01:00:57	6.6	48.2	43.2	49.3	44.3
	02:00:57	6.3	47.5	42.5	46.3	41.3
	03:00:57	7.2	45.5	40.5	46.4	41.4
	04:00:57	9	44.7	39.7	47.6	42.6
	05:00:57	8.9	48.3	43.3	51.1	46.1
	06:00:57	9.9	50.4	45.4	54.4	49.4

	07:00:57	10.3	53.6	48.6	56.0	51.0
	08:00:57	11.5	54.8	49.8	54.8	49.8
	09:00:57	11.4	50.7	45.7	56.3	51.3
	10:00:57	9.8	55.1	50.1	56.2	51.2
	11:00:57	10.2	51.2	46.2	53.6	48.6
	12:00:57	10.3	50.1	45.1	56.5	51.5
	13:00:57	10.5	52.5	47.5	55.8	50.8
	14:00:57	9	53.5	48.5	55.9	50.9
	15:00:57	8.5	51.0	46.0	52.7	47.7
	16:00:57	10.2	46.8	41.8	51.8	46.8
	17:00:57	9.4	49.5	44.5	53.0	48.0
	18:00:57	9.8	48.6	43.6	52.4	47.4
	19:00:57	9.5	49.4	44.4	54.2	49.2
	20:00:57	10	50.0	45.0	52.2	47.2
	21:00:57	10.2	49.8	44.8	53.8	48.8
	22:00:57	10	50.2	45.2	54.1	49.1
	23:00:57	12	47.7	42.7	54.7	49.7
26/10/2014	00:00:57	11.8	51.2	46.2	59.0	54.0
	01:00:57	12.2	54.4	49.4	56.8	51.8
	02:00:57	12	56.4	51.4	58.1	53.1
	03:00:57	11.9	51.2	46.2	58.8	53.8
	04:00:57	11.7	53.0	48.0	58.0	53.0
	05:00:57	11.3	52.6	47.6	57.5	52.5
	06:00:57	11.3	51.9	46.9	55.2	50.2
	07:00:57	11.3	52.4	47.4	56.1	51.1
	08:00:57	12.2	54.3	49.3	58.2	53.2
	09:00:57	12.2	57.9	52.9	61.7	56.7
	10:00:57	11.4	54.5	49.5	61.0	56.0
	11:00:57	11.1	54.6	49.6	59.0	54.0
	12:00:57	10.8	52.9	47.9	55.6	50.6
	13:00:57	9.7	53.6	48.6	56.6	51.6
	14:00:57	10.7	52.5	47.5	55.4	50.4
	15:00:57	9.6	53.7	48.7	56.7	51.7
	16:00:57	9.5	51.3	46.3	54.6	49.6
	17:00:57	11.5	53.6	48.6	53.7	48.7
	18:00:57	11.1	54.0	49.0	58.8	53.8
	19:00:57	11.6	55.7	50.7	57.2	52.2
	20:00:57	10.3	55.2	50.2	57.4	52.4
	21:00:57	8	54.3	49.3	54.9	49.9
	22:00:57	8.2	49.0	44.0	50.9	45.9
	23:00:57	9.8	51.1	46.1	50.9	45.9
27/10/2014	00:00:57	10.7	48.7	43.7	54.1	49.1
	01:00:57	10.8	52.0	47.0	54.3	49.3
	02:00:57	10	52.5	47.5	54.2	49.2
	03:00:57	8	51.2	46.2	52.7	47.7
	04:00:57	8.3	49.6	44.6	50.2	45.2
	05:00:57	8.9	46.1	41.1	51.2	46.2
	06:00:57	9.4	52.2	47.2	53.3	48.3
	07:00:57	9.1	53.1	48.1	54.6	49.6
	08:00:57	8.2	52.9	47.9	52.9	47.9
	09:00:57	8.2	48.0	43.0	49.7	44.7
	10:00:57	7.3	47.1	42.1	52.6	47.6
	11:00:57	8	47.0	42.0	47.9	42.9

	12:00:57	7.5	46.0	41.0	49.2	44.2
	13:00:57	6.6	45.5	40.5	47.0	42.0
	14:00:57	7.8	46.0	41.0	46.9	41.9
	15:00:57	8.9	47.7	42.7	51.2	46.2
	16:00:57	9.1	49.1	44.1	50.5	45.5
	17:00:57	10	49.2	44.2	52.9	47.9
	18:00:57	10.2	51.2	46.2	56.0	51.0
	19:00:57	9.8	54.7	49.7	56.9	51.9
	20:00:57	9	54.7	49.7	54.5	49.5
	21:00:57	10.1	50.9	45.9	51.2	46.2
	22:00:57	9.9	47.9	42.9	53.3	48.3
	23:00:57	10.5	48.7	43.7	53.3	48.3
28/10/2014	00:00:57	11.1	50.4	45.4	57.4	52.4
	01:00:57	11.4	53.8	48.8	58.7	53.7
	02:00:57	11.8	55.5	50.5	57.3	52.3
	03:00:57	13.9	54.9	49.9	57.4	52.4
	04:00:57	14.6	57.9	52.9	65.5	60.5
	05:00:57	12.9	64.8	59.8	64.4	59.4
	06:00:57	8.2	59.1	54.1	62.3	57.3
	07:00:57	4.6	59.5	54.5	57.1	52.1
	08:00:57	7	49.1	44.1	49.9	44.9
	09:00:57	5.3	48.1	43.1	51.1	46.1
	10:00:57	5.4	47.3	42.3	49.3	44.3
	11:00:57	4.7	46.3	41.3	47.7	42.7
	12:00:57	2.5	45.0	40.0	48.3	43.3

5.0 DISCUSSION

The noise levels associated with the introduction of the additional wind turbine will generate an L_{A90} level exceeding 35dBA at some of the properties surrounding the site.

At winds speeds greater than $7ms^{-1}$ when the turbine is approaching its maximum sound power, the background noise levels are above 40dBA as such the impact of the unit will be below measured background noise levels at all of the noise sensitive receptors for the wind speed.

The night time background noise level on Banff Road is around 41-45dBA (L_{A90}) with a daytime background level of around 45-65[2]dBA. At Moorfoot Drive the night time background noise levels varies from 36dBA to 41dBA with a daytime background or around 42dBA to 60dBA[2]. The lowest level of background noise corresponds to a wind speed of $4.0ms^{-1}$. The modelled noise levels at this wind speed is well below 36dBA (see Table 3)

As such the noise generated by the single turbine unit is unlikely to be audible at the location of the nearest noise sensitive receptors.

Please refer to the Cadna-A plot in Appendix 3 which shows the noise contours for the turbine.

The highest predicted noise level at any residential dwelling is lower than the background noise measured for the wind speeds at these locations.

Factors affecting the likelihood of significant amplitude modulation effects are not considered to be applicable in the assessment. Although the mechanisms which cause amplitude modulation effects are not completely understood there appear to be certain factors which would appear to make high levels of aerodynamic modulation more likely. These include:

- *a close separation distance between turbines sited in a line, especially where such a line points towards residential properties;*
- *unusual topography, such as turbines situated on an escarpment or sheltered by the landscape; and*
- *turbines on towers shorter than would normally be specified for a given rotor diameter.*

It should be noted that any effects caused by the interaction of multiple turbines will not occur at a single turbine site such as this. In addition, it should be noted that the ratio of tower height to rotor diameter is large and there are no significant topographical features at this site, further reducing the likelihood of such effects.

[2] High wind background

6.0 CONCLUSIONS

An assessment of the likely noise impact of a proposed single wind turbine to be located within the factory premises of Texas Instruments has been carried out.

The worst case downwind turbine noise levels at the closest residential locations to the site have been predicted based on warranted sound power level data for a *Gamesa G58 T49 Turbine* 500 kW wind turbine.

Predictions were carried out according to recommendations in the Institute of Acoustics (IoA) *A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise.*

The assessment has been carried out by comparing predicted noise levels with the surrounding area background noise levels as described in ETSU-R-97, *Assessment and Rating of Noise from Wind Farms.*

The assessment shows that the predicted wind turbine noise levels at all residential properties will be below the measured background noise levels at the site for the wind speeds under which the unit will be operating.

At no time will the night time external free field noise level of 43 dB L_{A90} be exceeded.

APPENDIX 1: GLOSSARY OF TERMS

The following terminology is employed in this report:

L_{Aeq}: The continuous equivalent noise level, LAeq, of a time-varying noise; the steady noise level (in dB(A)) which, over the period of time under consideration, contains the same amount of (A-weighted) sound energy as the time-varying noise over the same period of time.

A-Weighted: The A in dB(A) refers to the A-weighted sound pressure level of the noise in decibels. A-weighting is obtained through the use of a filter in the sound level meter which is designed to produce the relative response of the human ear to sound at different frequencies.

Specific Noise Source: The noise source under investigation for assessing the likelihood of complaints.

Background Noise Level (L_{A90}): The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of a given time interval, T, measured using time weighting, F, and quoted to the nearest whole number of decibels.

Residual Noise: The ambient noise remaining at a given position in a given situation when the specific noise source is suppressed to a degree such that it does not contribute to the ambient noise.

Ambient Noise: Totally encompassing sound in a given situation at a time usually composed of sound from many sources near and far.

APPENDIX 2: MEASUREMENTS – TIME HISTORY

Chart 1: L_{Aeq} vs Time at Banff Road with Windspeed Overlay

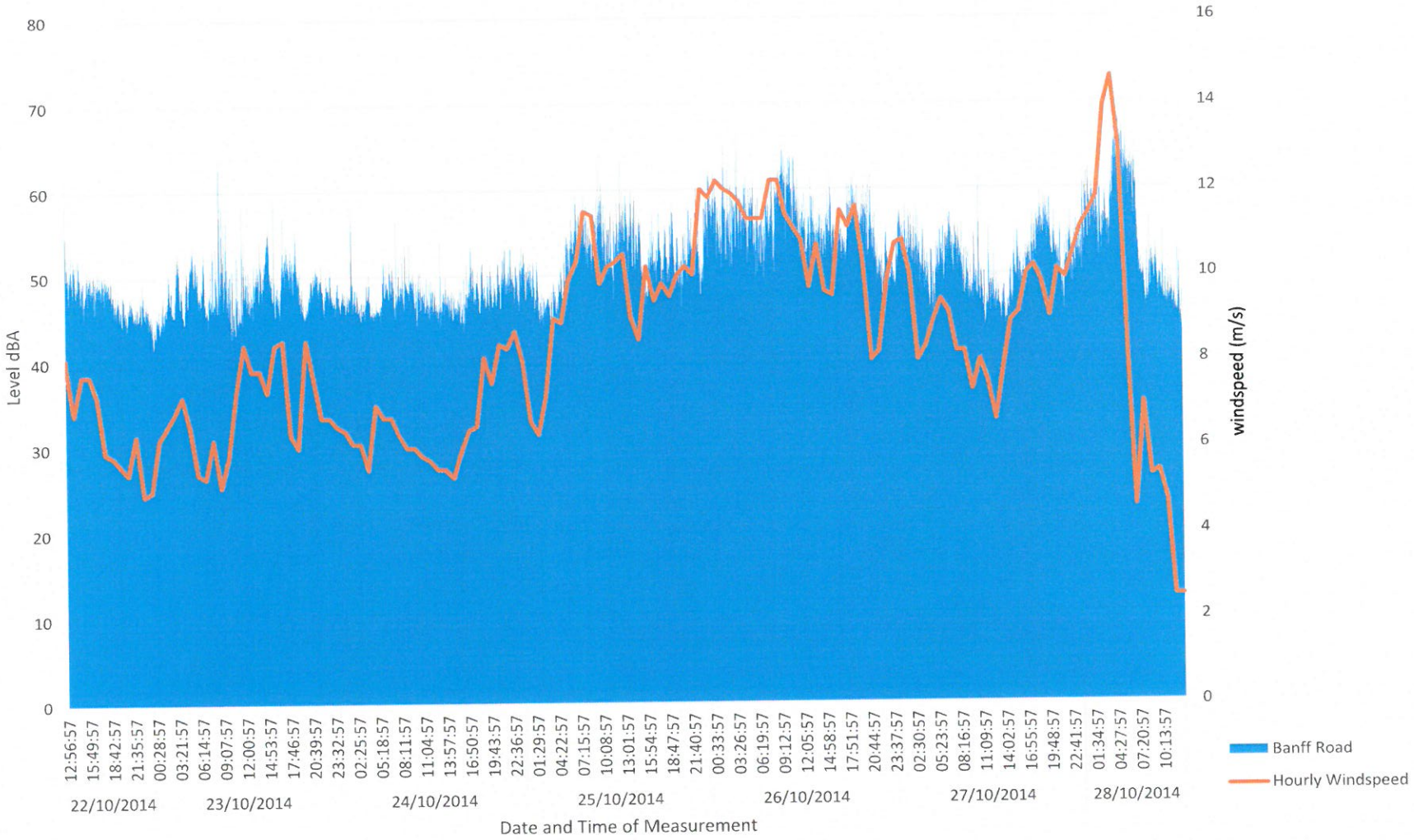


Chart 2: Banff Road $L_{A90\ (10min)}$ Plotted Against Wind Speed

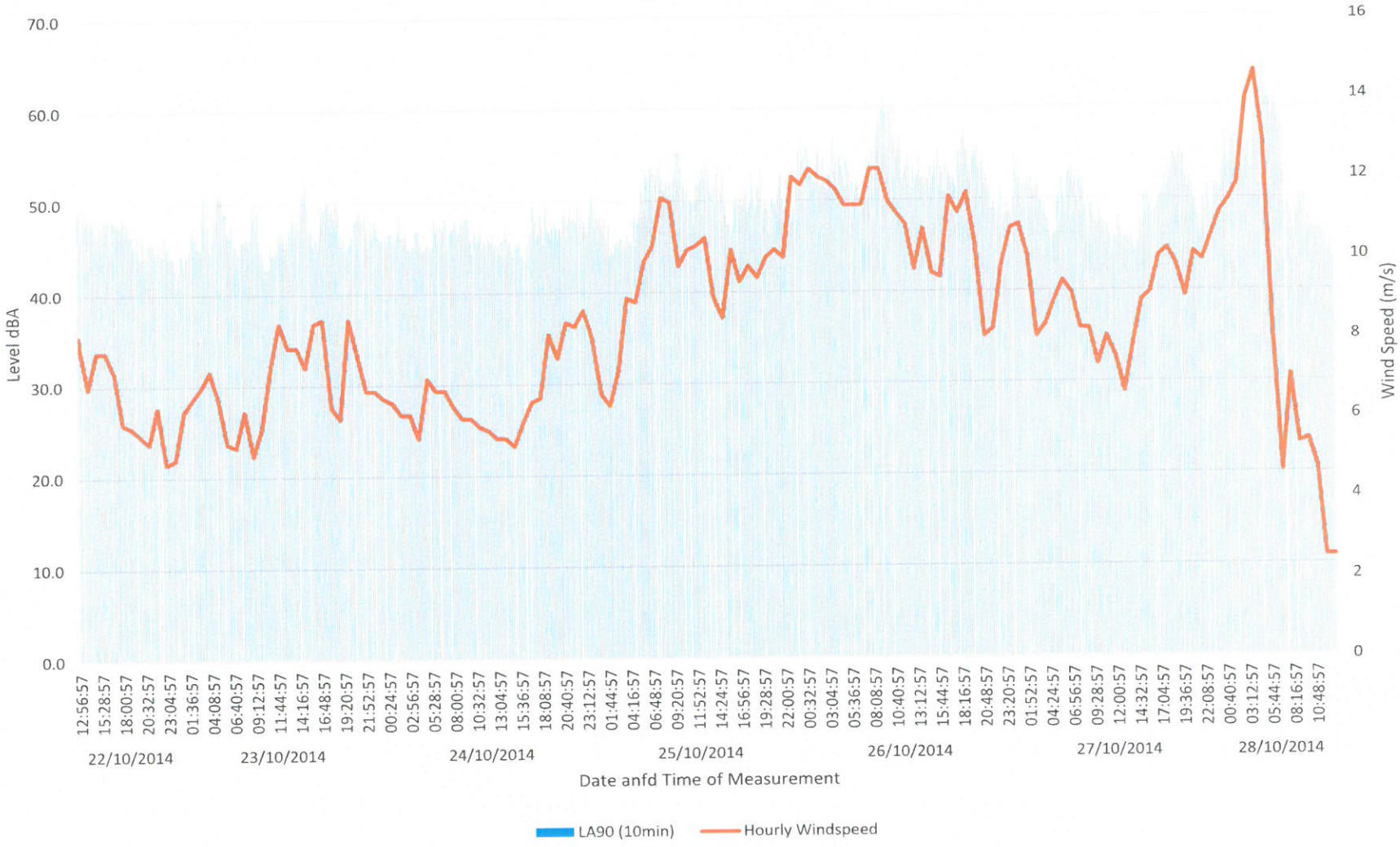
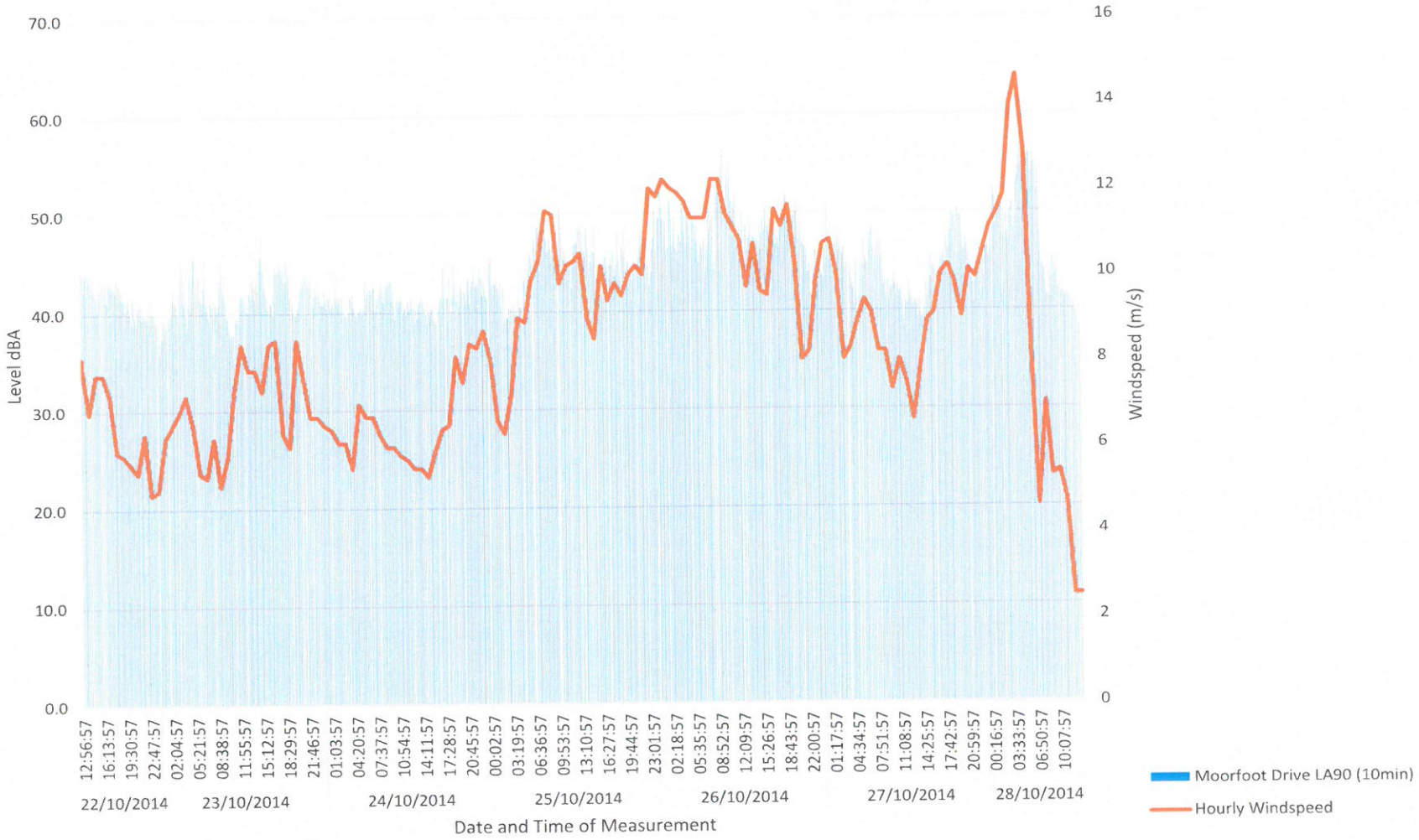
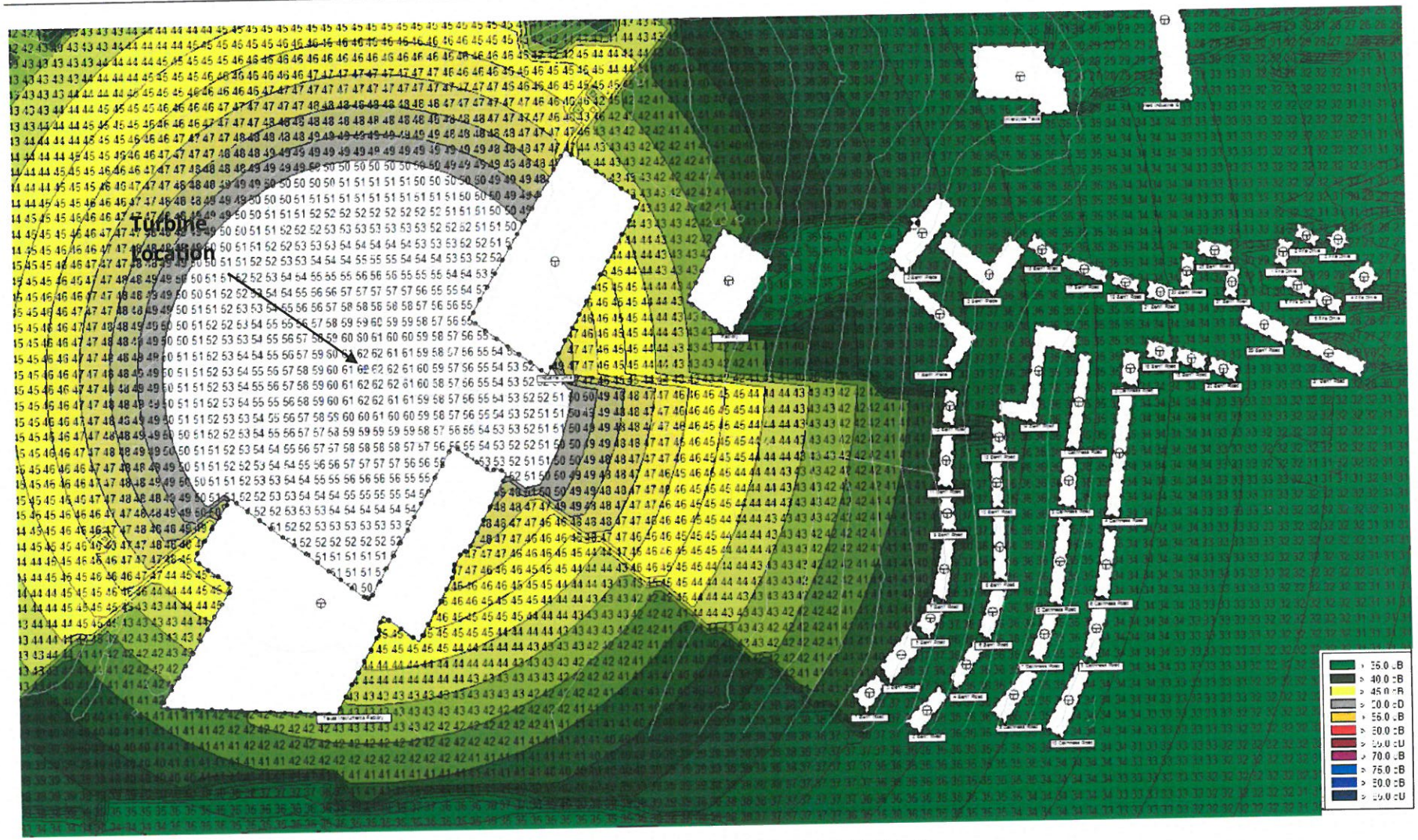
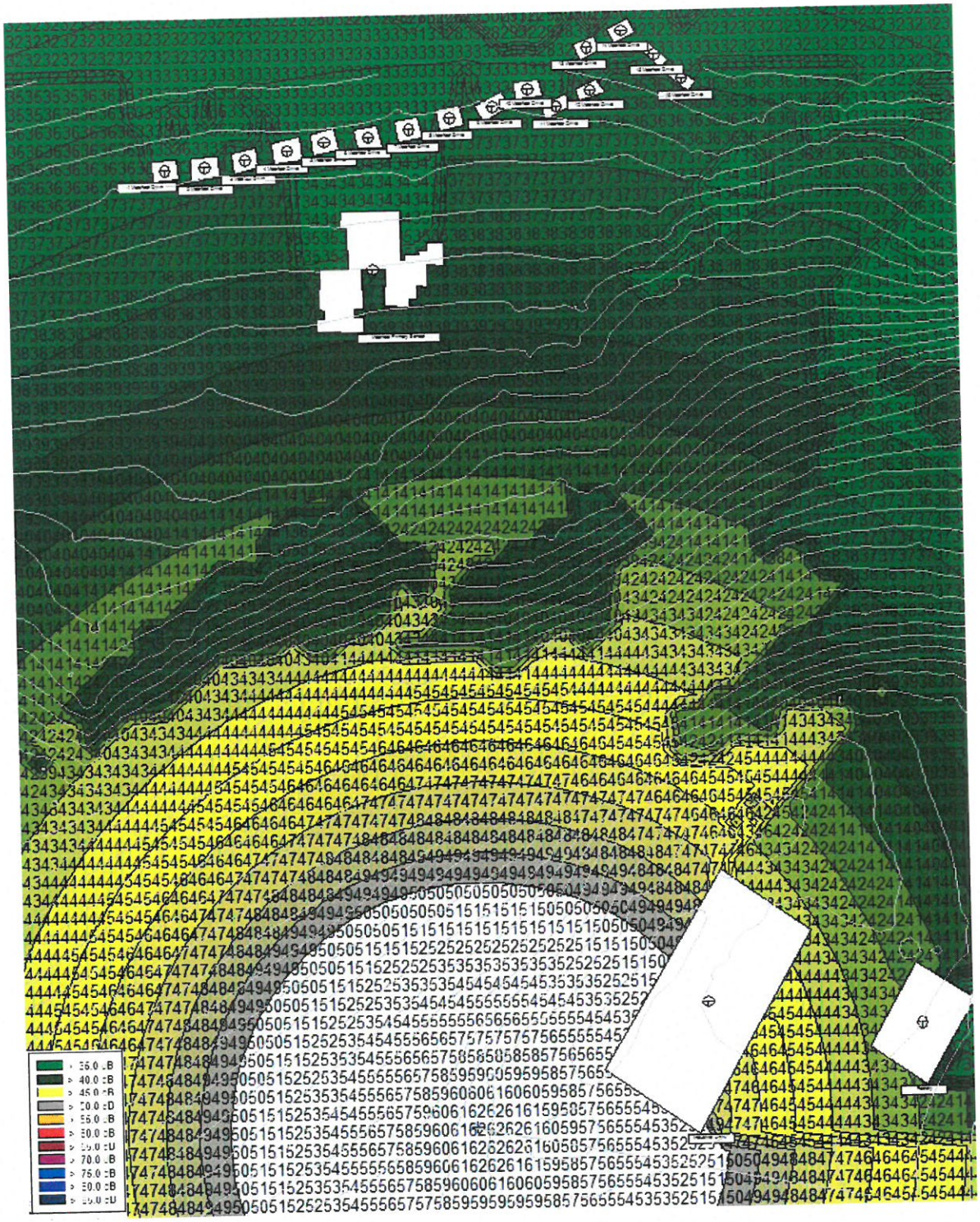


Chart 3: Moorfoot Drive $L_{A90\ (10min)}$ Plotted Against Wind Speed

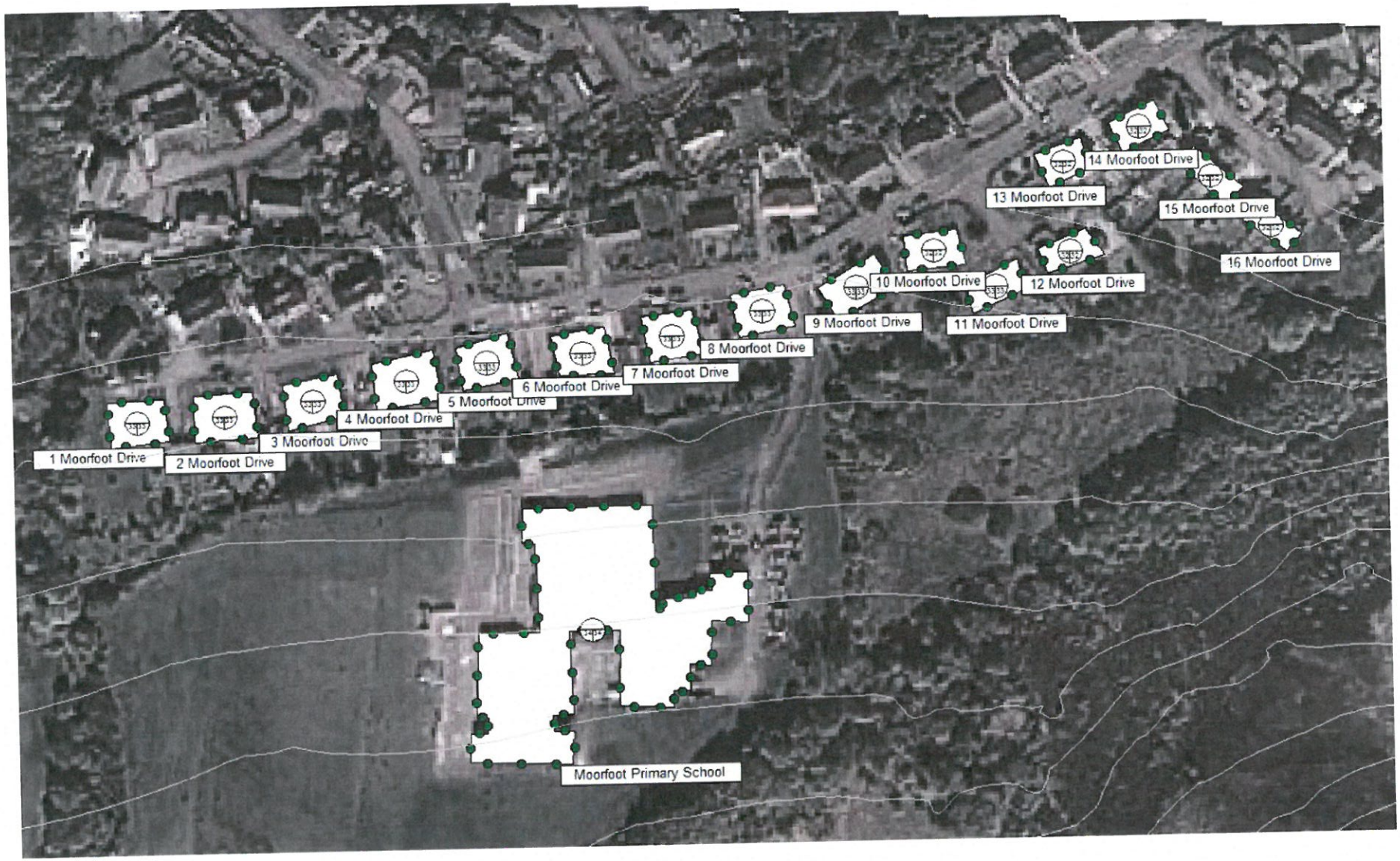


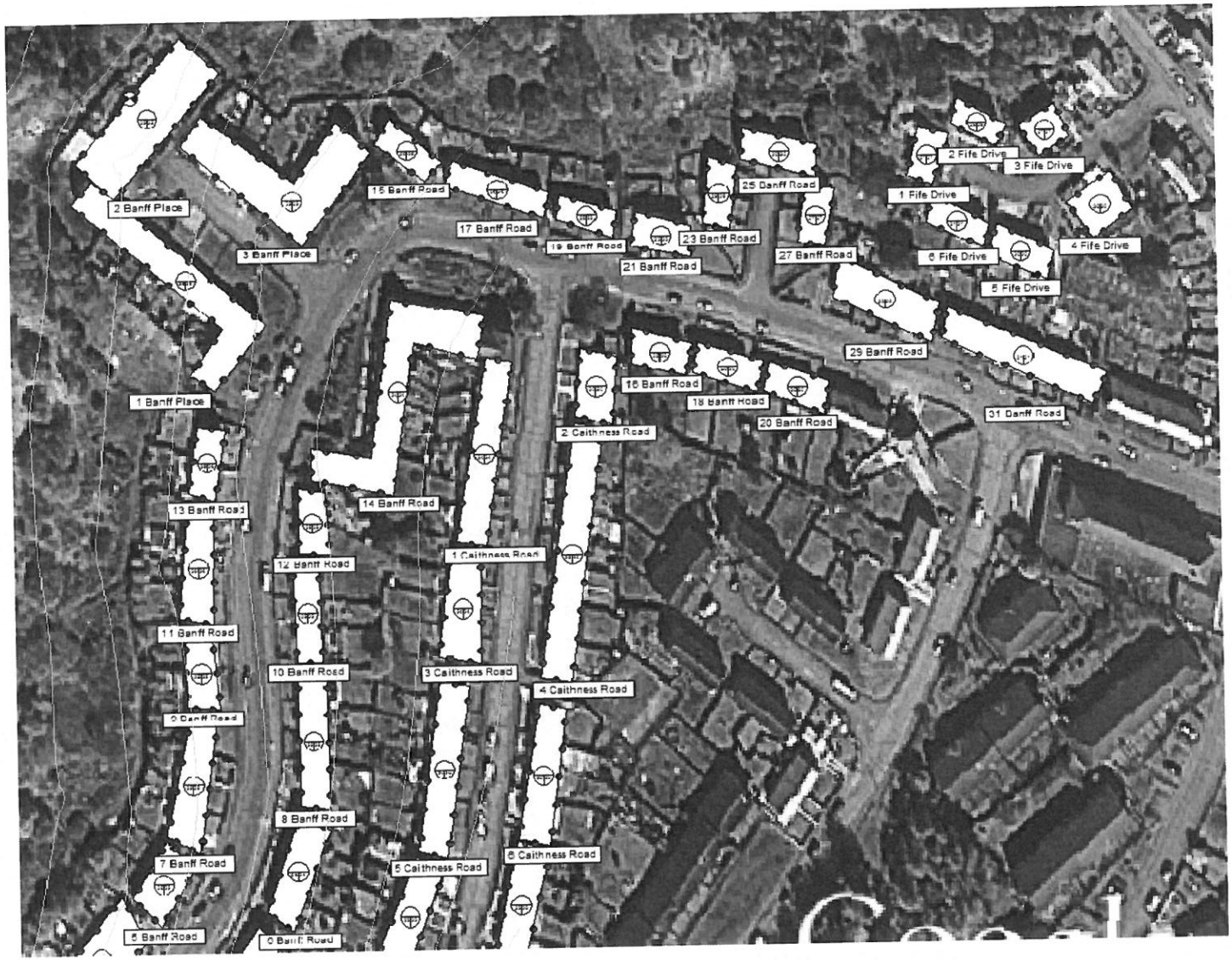
APPENDIX 3: CADNA NOISE MODEL

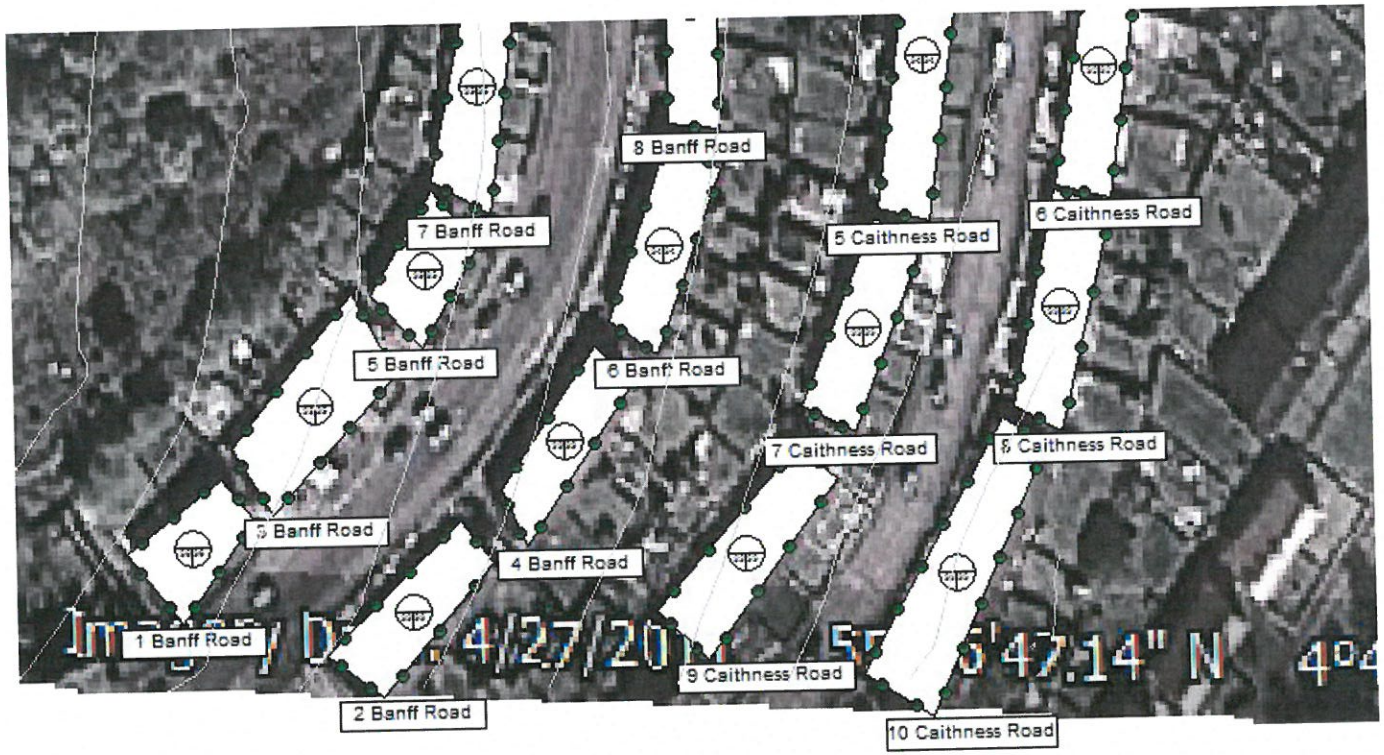




APPENDIX 4: LABELS OF HOUSES ON MODELS


1 Moorfoot Drive
2 Moorfoot Drive
3 Moorfoot Drive
4 Moorfoot Drive
5 Moorfoot Drive
6 Moorfoot Drive
7 Moorfoot Drive
8 Moorfoot Drive
9 Moorfoot Drive
10 Moorfoot Drive
11 Moorfoot Drive
12 Moorfoot Drive
13 Moorfoot Drive
14 Moorfoot Drive
15 Moorfoot Drive
16 Moorfoot Drive
Moorfoot Primary School


2 Banff Place
3 Banff Place
1 Banff Place
15 Banff Road
17 Banff Road
19 Banff Road
21 Banff Road
23 Banff Road
25 Banff Road
27 Banff Road
29 Banff Road
31 Banff Road
16 Banff Road
18 Banff Road
20 Banff Road
14 Banff Road
13 Banff Road
12 Banff Road
11 Banff Road
10 Banff Road
9 Banff Road
8 Banff Road
7 Banff Road
6 Banff Road
2 Caithness Road
1 Caithness Road
3 Caithness Road
4 Caithness Road
5 Caithness Road
6 Caithness Road
2 Fife Drive
3 Fife Drive
1 Fife Drive
4 Fife Drive
6 Fife Drive
5 Fife Drive


8 Banff Road
7 Banff Road
5 Caithness Road
6 Caithness Road
5 Banff Road
6 Banff Road
7 Caithness Road
8 Caithness Road
3 Banff Road
4 Banff Road
1 Banff Road
9 Caithness Road
2 Banff Road
10 Caithness Road

APPENDIX 5: MODELLED L_{Aeq} LEVELS

	G58 T49 Wind Turbine Levels at adjacent properties	
Name	At 4m/s Wind speed Level (dBA)	At 12m/s Wind speed Level (dBA)
1 Moorfoot Drive	27.9	36.7
2 Moorfoot Drive	28	36.8
3 Moorfoot Drive	28	36.8
4 Moorfoot Drive	28	36.8
5 Moorfoot Drive	25	33.8
6 Moorfoot Drive	25	33.8
7 Moorfoot Drive	25	33.8
8 Moorfoot Drive	27.9	36.7
9 Moorfoot Drive	27.8	36.6
10 Moorfoot Drive	27.5	36.3
11 Moorfoot Drive	27.7	36.5
12 Moorfoot Drive	27.5	36.3
13 Moorfoot Drive	24	32.8
14 Moorfoot Drive	22.7	31.5
15 Moorfoot Drive	24	32.8
16 Moorfoot Drive	27.2	36
Moorfoot Primary School	30.1	38.9
Industrial Units	45.7	54.5
Factory	33.9	42.7
Texas Instruments Factory	45.7	54.5
2 Banff Place	24.6	33.4
1 Banff Place	28.7	37.5
3 Banff Place	27.9	36.7
15 Banff Road	21.6	30.4
17 Banff Road	26.1	34.9
19 Banff Road	25.8	34.6
21 Banff Road	25.5	34.3
23 Banff Road	20.8	29.6
25 Banff Road	24.7	33.5
13 Banff Road	31.6	40.4
11 Banff Road	31.6	40.4
9 Banff Road	31.4	40.2
7 Banff Road	31.2	40
5 Banff Road	31.2	40
3 Banff Road	31.4	40.2
1 Banff Road	31.5	40.3
14 Banff Road	27.2	36
3 Caithness Road	25.7	34.5

12 Banff Road	26.9	35.7
10 Banff Road	30.6	39.4
8 Banff Road	30.4	39.2
6 Banff Road	24.5	33.3
4 Banff Road	22.5	31.3
2 Banff Road	23.6	32.4
5 Caithness Road	26.5	35.3
7 Caithness Road	25.5	34.3
9 Caithness Road	22.4	31.2
2 Caithness Road	23.4	32.2
16 Banff Road	21.4	30.2
18 Banff Road	20.3	29.1
20 Banff Road	19.9	28.7
27 Banff Road	23.6	32.4
29 Banff Road	24.3	33.1
31 Banff Road	23	31.8
1 Fife Drive	18.7	27.5
2 Fife Drive	20.8	29.6
3 Fife Drive	18.4	27.2
4 Fife Drive	18.1	26.9
5 Fife Drive	23.2	32
6 Fife Drive	23.5	32.3
4 Caithness Road	24.7	33.5
6 Caithness Road	25.1	33.9
8 Caithness Road	25.6	34.4
10 Caithness Road	23.3	32.1
Inverclyde Taxis	27.2	36
Largefield Industrial Estate	24.5	33.3
1 Caithness Road	26.6	35.4

Inverclyde council

Regeneration & Environment
Corporate Director: Aubrey Fawcett

Municipal Buildings
Clyde Square
Greenock
PA15 1LY
Tel: 01475 712764
Fax: 01475 712731
aubrey.fawcett@inverclyde.gov.uk

Our Ref: 12/0014/screen
Your Ref:
Date: 6th November 2012

Mr Guy Robertson MCIWM
Principal Environmental Consultant
Synergie Environ Ltd
247 Westburn Road
ABERDEEN
AB25 2QH

Dear Mr Robertson,

The Town & Country Planning (Environmemtal Impact Assessment)(Scotland)Regulations 2011
Request For Screening Under Regulation 6
Site at Texas Instruments, Larkfield Industrial Estate, Greenock

I refer to your email of 31st October in connection with the above. I also confirm my advice to you regards the scale and visual impact of your proposal in our telephone conversation this morning.

The information submitted is limited to your email, a location plan and a copy of a "Senna" data sheet on the design of the proposed 80m high wind turbine. Given the scale of the proposal and its potential landscape and visual impact, it would have been helpful for wire frame diagrams and photomontages to have been submitted to assist me in forming my screening opinion. Timescales are such that I must form my screening opinion in the absence of this information.

Category 3(i) Schedule 2 to the above Regulations includes installations for the harnessing of wind power for energy production referring specifically to instances where hub height of the turbine exceeds 15m. The project therefore falls into a qualifying category of development that may require to be the subject of an Environmental Assessment. Reference requires to be made to the selection criteria for screening Schedule 2 development under Schedule 3.

With respect to the characteristics of the development, I note that the 80m high wind turbine is on a prominent hillside within Greenock, in close proximity to housing. There shall be views of the turbine from numerous houses within the built up area and from further afield, within the Inverclyde countryside and from Argyll & Bute on the north side of the Clyde.

Impact upon the landscape, townscape of Greenock and visual amenity are, I consider, all potentially significant, although, on balance, not so significant as to justify a full Environmental Assessment. A rigorous assessment of the impact upon landscape and townscape shall, however, be essential. Wire frame diagrams and photomontages shall be a key component of that assessment and I should be grateful if you would arrange to meet with me to discuss the number and location of the necessary viewpoints.

Healthy Working Lives

Positive About Disabled People

Assessments are also required for impacts from noise and shadow flicker and impacts upon infrastructure (including drainage and access considerations), birds and the adjoining Burneven Hill SINC site. You may also wish to make contact with BAA at Glasgow Airport to determine whether or not there are implications for radar (glasafeguarding@baa.com)

I trust this information proves satisfactory. The Council formally adopts this screening opinion.

Yours Sincerely

Guy Phillips
Senior Town Planner

Enquiries to Mr Phillips 01475 712422

EMAIL DATED 21 JUNE 2015 FROM MR K GOODWIN, TEXAS INSTRUMENTS, IN RELATION TO NEW MATERIAL

Rona McGhee

From: Goodwin, Kenny <Kenny.Goodwin@ti.com>
Sent: 21 June 2015 23:18
To: Rona McGhee
Subject: RE: Review of Decision to Refuse Planning Permission - Erection of 77.8m to Blade Tip Wind Turbine , 36 Earnhill Road, Greenock (14/0392/IC)

Hi Rona,

We have added the supplemental material to highlight the economic importance of this project to the Site. We believe this may have been under estimated and want to show how important it is and also highlight the serious investment and efforts the company already puts in to reduce electrical consumption

The information within the presentation has a commercial sensitivity aspect to it and as such it is not information we readily share, however we feel we need to further highlight the importance of this project to the future ability of the Greenock site to remain financially competitive

Regards

Kenny

Kenny Goodwin
Facilities Engineering Manager
☎: 01475 655213
☎: 07791 442536
Fax: 01475 639336
✉: kenny.goodwin@ti.com

TEXAS INSTRUMENTS
GFab, Larkfield Industrial Estate, Greenock, PA16 0EQ

From: Rona McGhee [mailto:Rona.McGhee@inverclyde.gov.uk]
Sent: 15 June 2015 09:57
To: Goodwin, Kenny
Subject: Review of Decision to Refuse Planning Permission - Erection of 77.8m to Blade Tip Wind Turbine , 36 Earnhill Road, Greenock (14/0392/IC)

Dear Kenny

I refer to Notice of Review that you served on Inverclyde Council's Local Review Body on 5 June 2015.

I acknowledge receipt of the Notice and supporting documentation. As you may be aware, Section 43B of the Town & Country Planning (Scotland) Act 1997 restricts the introduction of material which was not before the planning officer at the time of the determination now under review (or at the time of the expiry of the period of determination). New material will only be permitted where the applicant can demonstrate that it could not have been introduced earlier in the process, or that it arises as a consequence of exceptional circumstances. Having reviewed the material submitted with the Notice of Review, I would advise that the appeal presentation which has been submitted with the Notice of Review is new material.

In the circumstances, I should be obliged if you would either (i) demonstrate that the above material could not have been introduced earlier in the process, or (ii) that it arises as a consequence of exceptional circumstances. In this regard, I should be pleased to hear from you within 14 days of the date of this email.

The Local Review Body is required to notify all those who submitted comment on the planning application, giving 14 days to make any further representation. Should any representations be received I shall write to you providing copy of any correspondence and allow you the opportunity to make comment.

I look forward to hearing from you.

Regards,
Rona

Rona McGhee
Senior Administration Officer
Legal & Property Services
Inverclyde Council
Municipal Buildings
Greenock
PA15 1LX
Tel: 01475 712113
Fax: 01475 712137

NEW MATERIAL (APPEAL PRESENTATION) CONSIDERED BY THE LOCAL REVIEW BODY AT ITS MEETING ON 5 AUGUST 2015

Texas Instruments (UK) Ltd

TEXAS INSTRUMENTS

Global manufacturing

21 factories
in **9 countries**

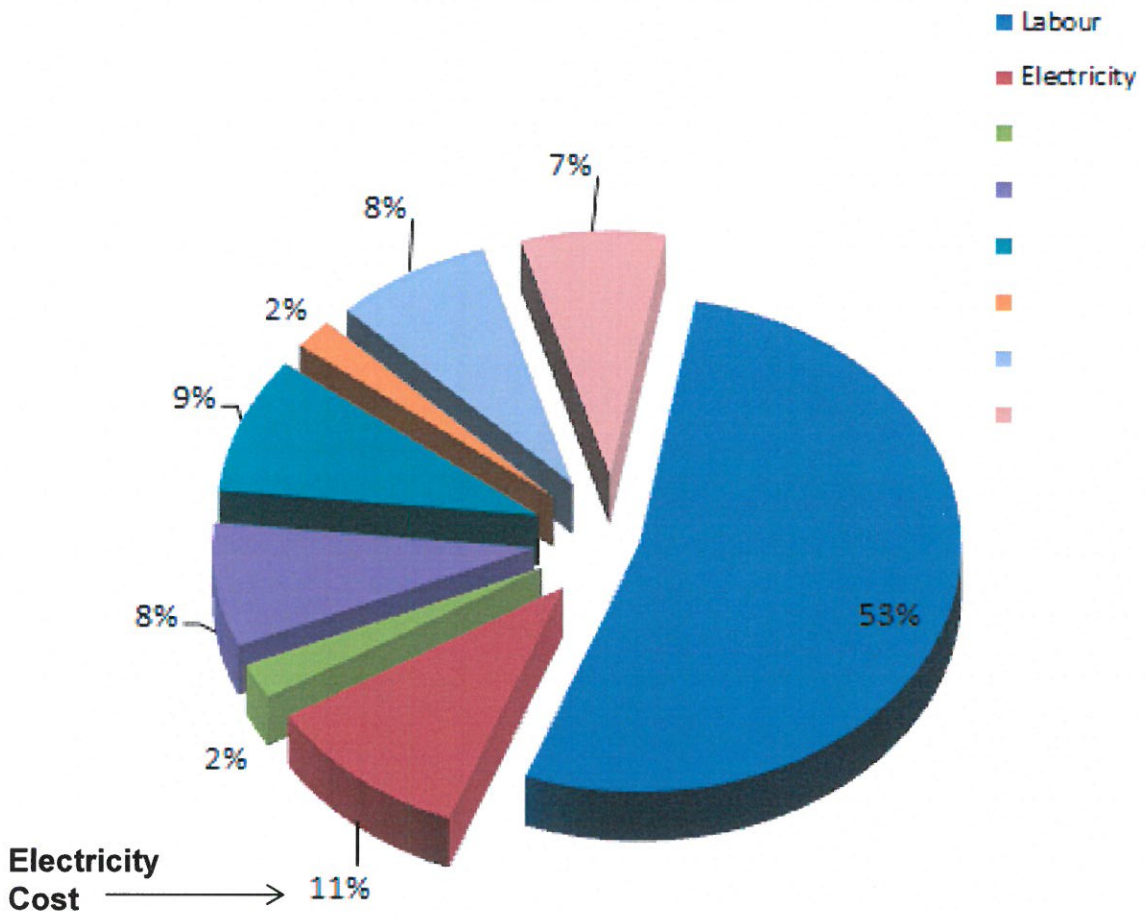
Greenock Site only Manufacturing Site in the UK and one of two in Europe

Texas Instruments (TI) in Greenock

Background

- The site has been in the heart of the Community since 1970
- It currently employs around 350 people of all disciplines
- Around 90% of employees are from the local area
- In addition to being a major local employer, it is a significant contributor directly and indirectly to the local and wider economy
- Like any other manufacturing facility, there is a year-on-year cost reduction expectation
- Site employees work tirelessly to deliver cost reductions whilst at the same time improve delivery and quality
- The wind turbine will save 30% of Greenock's annual savings target and contribute to ensuring that the site remains competitive

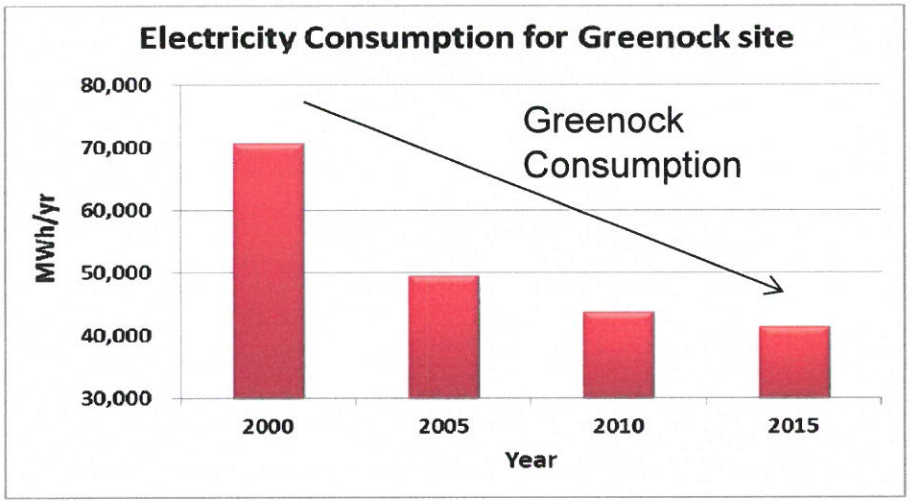
Greenock Site Cost Breakdown

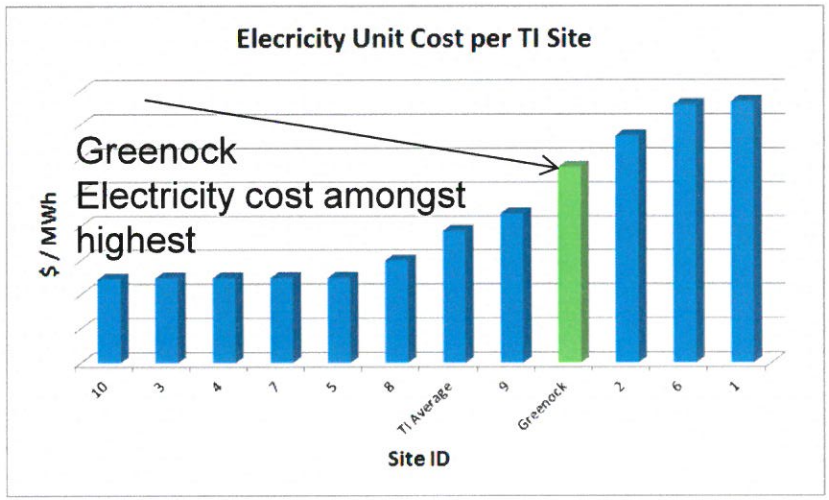


- Electricity is the second largest cost item and the largest non employee cost item
- Up to £0.5million per year saving will be delivered by wind turbine

Greenock Cost Comparison

- The Greenock Site runs much lower volumes than other Sites
- The Greenock Site needs to be more productive in areas of employee and non employee costs to compensate for lower volumes
- Year on year the Greenock site has delivered on electricity usage reduction projects





- However, electricity prices in the UK stand out as amongst the highest across the world where the Company manufactures
- Approval of the wind turbine will reduce this electricity cost gap and also show that Inverclyde region is committed to helping the Site improve its competitiveness

Planning Submission Summary
Response to any items raised

ASPECT	POTENTIAL IMPACT	SUPPORTING INFORMATION
Landscape & Visual Impact	Loss of visual amenity	Planning initial screening response – "*Impact upon the landscape, townscape of Greenock & visual amenity are, I consider, all potentially significant, although on balance, not so significant as to justify a full environmental assessment*" No objection from Gourock Golf Club
Noise	Noise nuisance	Noise assessments undertaken and accepted by Local Authority Environmental Officer. Predicted noise levels at residential properties will be below measured background levels for turbine operating speeds. At no time will night time noise limits be exceeded
Shadow Flicker	Adverse impact on neighbouring properties	Reports indicate a potential for shadow flicker for a small number of hrs per year, however, as necessary conditions are unlikely and potential instances so small, simple mitigation could be put in place to negate likelihood

FURTHER REPRESENTATIONS

keppie

architecture + interior design + planning + landscape + urban design

25th June 2015

Our Ref: LE/P14-151

Rona McGhee
Senior Administration Officer
Legal & Property Services
Inverclyde Council
Municipal Buildings
Greenock
PA15 1LX

****sent via email only to Rona.McGhee@inverclyde.gov.uk****

Dear Rona,

REVIEW OF DECISION TO REFUSE PLANNING PERMISSION - ERECTION OF 77.8M TO BLADE TIP WIND TURBINE, 36 EARNHILL ROAD, GREENOCK (14/0392/IC)

FURTHER REPRESENTATION

Keppie Planning have been instructed by our client Westminster Investments to respond to the recent submission of a Notice of Review in relation to the Council's decision to refuse the above mentioned application. We note that the Notice of Review will be considered by the Local Review Body and that our previous representation (dated 15th January 2015) will also be considered during the assessment process.

We are in receipt of an email dated 15th June 2015 from the Local Review Body and it is noted that we have a period of 14 days from the date of the email to provide further comments in relation to the Notice of Review submission. This letter provides further comments and has been submitted within the 14 day timeframe.

Having reviewed the information submitted by the appellant via the Councils online planning portal, it is submitted that the new additional information provided is not substantial enough to warrant departure from the original case officer assessment and subsequent Council decision to refuse the proposals. The Councils original conclusion that the height, scale and proximity to housing, Gourock Golf Club and hilltop location within the built up area of Inverclyde, determine that the turbine forms an unexpected and dominant feature and is thus contrary to Local Development Plan policy INF1 (criteria b, c and d) should be maintained.

With specific regard to the new economic information submitted with the Notice of Review, it is noted that the justification provided by the appellant is not unusual for businesses of this nature and all businesses look to reduce costs. The proposed turbine has been demonstrated as not suitable in terms of the resultant impact it would create due to its height, scale and location. Sections 25 and 37

Directors: **W Baxter Allan** Dip Tp MRTPI **Gordon MacCallum** Dip Tp MRTPI
160 West Regent Street · Glasgow G2 4RL · Tel +44 (0)141 204 0066
Keppie Design Ltd. Registered in Scotland no 159423.

(2) of the Town & Country Planning (Scotland) Act 1997, require that planning decisions be made in accordance with the Development Plan, unless material considerations indicate otherwise. The economic information provided does not provide sufficient justification to outweigh the need to comply with the Local Development Plan and the Notice of Review should be refused and the recommendation for refusal maintained.

To clarify our earlier comments in relation to the erection of a single wind turbine upto 77.8m in height at this location, the proposals are still considered to:

- Be contrary to Local Development Plan Policy INF1: Renewable Energy Developments where the impact of the proposals in relation to landscape and visual, and residential amenity is deemed to be significant and adverse;
- Have a direct negative and dominant impact upon the residential amenity of neighbouring properties, specifically those of Larkfield, Braeside, Pennyfern, Midton, Trumethill, Levan Estate and Levan Farm;
- Impose a detrimental effect by way of noise and shadow flicker (in addition to amenity) on all properties within 580m of the turbine; this includes Moorfoot Primary School, many residential properties and the whole of Larkfied Industrial Estate.
- Have a direct negative and dominant impact upon the recreational amenity enjoyed by users of Gourock Golf Club;
- Have a direct negative and dominant impact upon the visual amenity of the proposed housing development at Levan Farm, an allocated development opportunity site for 150 executive homes within the Local Development Plan and detailed planning for phase 1 of which was granted by Inverclyde Council in February 2015.
- It is considered that the dominant visual impact of the proposals upon the Levan Farm housing will have a direct negative effect upon the economic benefits of the site to Inverclyde Council by way of a potential loss of Council tax revenue (£260,000 per annum). The first and second phases of the Levan Farm development have succeeded in attracting many new residents to Inverclyde whose capital and revenue spend contribute significantly to the local economy;
- Be contrary to Scottish Planning Policy Guidance in relation to the impacts upon the landscape, residential amenity and resultant shadow flicker impacts of the development;

We also note that the appellant has submitted as evidence the original noise and shadow flicker reports. It should be noted to the Local Review Body that the noise report was discredited by an independent report prepared on behalf of the objectors. This independent report can be made available to the Local Review Body if they wish to review its contents and conclusions.

keppie

The conclusions in the shadow flicker report have still failed to provide evidence regarding how the proposed mitigation will work in practice. As noted in our original representation, if the Council is minded to grant planning permission, a suitably worded condition should be applied to control the impact of shadow flicker. Until such time that the Council are satisfied that the proposed mitigation measures and implementation are satisfactory, the proposals should be considered unacceptable in terms of the resultant impact of shadow flicker.

We trust that the above is clear; however should you require any further clarification on any of the information provided, please do not hesitate to contact me. In the meantime we would be grateful if you could confirm receipt of these further comments prior to the deadline of 29th June 2015.

Yours sincerely,

Laura English
Senior Planner
lenglish@keppiedesign.co.uk

Cc: Westminster Investments c/o Mr Ronnie Gormley (by email only)

Defence
Infrastructure
Organisation

Ministry of Defence
Safeguarding
Kingston Road
Sutton Coldfield
West Midlands B75 7RL
United Kingdom

Telephone [MOD]: +44 (0)121 311 3781
Facsimile [MOD]: +44 (0)121 311 2218
E-mail: DIOODC-IPSSG3@mod.uk

Your Ref. N/A
DIO Ref. DE/C/SUT/43/10/1/21749

Via Email

Inverclyde Council
rona.mcghee@inverclyde.gov.uk

29 June 2015

Dear Ms McGhee,

Local Review Body
Planning Application reference – 14/0392/IC
Proposed wind turbine 77.8m to blade tip at Factory 36, 36 Earnhill Road, Greenock

The Ministry of Defence (MOD) has received notification from Inverclyde Council stating that the above planning application will be reviewed by the Council's Local Review Body.

The MOD submitted a response 19th January 2015 to Inverclyde Council raising no objection to the proposal. The MOD has reviewed this response in light of the Review and I can confirm that the MOD raises no objection to the proposal.

If planning permission is granted, the MOD would like to be advised of the following information;

- The date construction starts and ends;
- The maximum height of construction equipment;
- The latitude and longitude of the turbine erected

I trust that the above will be taken into account during the Review consideration. Should you require any additional information, please do not hesitate to contact me.

Yours faithfully

Marie Neenan
Senior Safeguarding Officer

Tel:
Mobile:

Mr & Mrs R Gormley
Levan Farm
Tantallon Avenue
Gourock PA19 1HA
Scotland.

Rona McGhee
Senior Administrative Officer
Legal& Property Services
Inverclyde Council
Municipal Buildings
Greenock PA15 1LX

25nd June 2015.

Dear Miss McGhee

Review of Decision to Refuse Planning Permission for Erection of 77.8m Wind Turbine at Earnhill Road Greenock (14/0392/IC)

We refer to your recent notification that Texas Instruments UK Ltd has initiated an appeal to the Inverclyde Council Review Board against the refusal of planning permission by Inverclyde Council of the above application.

We would wish to maintain our previous objection (copy attached)and make the following further observations all of which we would wish to be communicated to the Review Board.

We are all in favour of the council helping local employers wherever possible in order to maintain and grow employment in the district. However this should not be at the expense of, or to the detriment of, the interests of the wider community or residents of the district as this application patently is.

Firstly:

In response to the applicants assertions in its "Response to any items raised "we would comment as follows:

Landscape and Visual Amenity: The council position is accurately reflected in the planning officer's report. A formal objection by Gourock Golf Club would have required a full poll of members and the calling of a special general meeting of members. Time did not permit this. Many of the individual objectors, including myself, are members of the Club and object to the proposal on a personal basis.

Noise: The Noise assessment submitted by the applicant has been discredited by eminent consultants RMP of Napier University. The Head of Safer & Inclusive Communities has accepted the findings of this report and concluded that the report submitted by the applicant could not be relied upon.

Shadow Flicker: Although admitting that this is a problem the applicant suggests that this would be for limited periods only and could be controlled. Try telling this to those who will be affected? A business acquaintance, Mr Barral of Barral Sheppard Chartered Accountants, lives on the outskirts of Glasgow.

He has three turbines in view, the closest of which is 975m from his home. His enjoyment of his home has been destroyed due to noise and shadow flicker from the turbine. He would sell up tomorrow if he could but cannot and he reckons the value of his home has dropped by 40% due to the turbines. He is in a rural situation. The proposed turbine is not and will affect hundreds of homes, businesses and schools.

Secondly:

The applicant appears to accept that in planning terms the decision reached by the Council could not be successfully challenged on planning grounds but instead have tried to justify the departure from normally accepted planning principles by making an economic case based on the fact that the company is a major employer in the district and that they could generate £500,000 in power cost reduction by erecting the proposed turbine. The justification appears to be predicated on:

a) The " socio-economic impact" that the cost saving could have for the company for its international competitiveness (due to higher power costs in the UK than in some other parts of the world where TI Group have a presence) and therefore it's continued presence in Greenock.

b) That " Approval of the turbine will reduce this electricity cost gap and also show that Inverclyde region is committed to helping the Site improve its competitiveness ".

We would like to comment on the above as follows:

1. In summary the council is being asked to accept a major intrusion into the landscape which will be viewed from all points north, south ,east and west of the district. From Loch Thom and the Clyde Muirshield National Park, Greenock South West and South east, Gourock and all the way round to the Battery Park, Lyle Hill and Greenock West End. It will dominate the skyline above Gourock and Greenock South, be overtly visible from the River Clyde and from as far away as Dunoon and Kilcreggan.

   It is set, not in a rural location, but in the midst of a densely populated urban residential and industrial area with consequent affect on hundreds of properties in terms of noise, shadow flicker and amenity.

   It will be a significant blight on the landscape when viewed from close up and from distance and form a major intrusion into the local streetscapes of the south western part of Greenock and Gourock in particular.

   It's size and scale is intrusive by reference to any objective assessment and will affect the amenity of thousands of residents of Inverclyde.

   It will blight the landscape and all properties affected by it for the next 25 years (at least).

   The impact on existing residents in terms of amenity, landscape and fall in property values (who wants to buy a house next to a large wind turbine) will be significant.

Is the council or the applicant going to compensate the many householders who will not be able to sell their homes because this huge turbine forms a backdrop to their homes or forms part of the streetscape in which their homes are situated?

For those in closer proximity you can add in the problems with noise and shadow flicker which can make life intolerable and give rise to serious health issues.

The council is being asked to accept all of the above in order that TI Group can save £500,000 in electricity savings as a result of government subsidy which every UK household pays for by way of levy on their electricity bills.

The "socio economic benefit" to TI Group appears to us to be insignificant when compared to the "socio- economic cost" to the existing residents of Inverclyde and in our view the application shows scant regard for the effect that the proposal will have on others within the district.

2. The justification for the departure from good planning principles is further predicated on the basis that electricity in the UK costs more than in other plants where TI Group operates and that therefore Inverclyde Council should dispense with the normal rules and permit them to erect this turbine.

   On this basis every single business that employs people in the UK would be entitled to erect a wind turbine (or a number of them –or why not a wind farm) to help reduce their electricity cost.

   A £2m investment in a turbine to generate £500,000 (by way of public subsidy) is an easy business decision and one that most businesses in the UK would gladly embrace. They too could be reducing their power costs and would do so in an instant if all you had to do was prove to your local council that your company could save £500,000PA by erecting a turbine and that planning rules and regulations were therefore to be set aside.

3. The information submitted by the applicant suggests that electricity cost in the UK is the 4th highest of the countries in which TI Group operates and that this should be a reason for the council to waive normal planning rules and conditions.

   Whereas we do not doubt that third world countries may have a different power cost to the UK it is suggested that other developed countries including Europe, USA, Japan etc will have comparable power costs to the UK and that the cost of power would not be a major reason for TI Group to consider moving the Greenock operation. The graph submitted by the applicant would suggest that the UK falls in the mid range of power costs for all but the lowest cost countries.

   Based on the information provided power costs (11%) are clearly a significant item for the Greenock site, but it is noted that labour accounts for 53% of the plants cost. Given that labour costs in third world countries such as India would likely be in the region of

10% only of UK rates it is suggested that labour cost rather than power cost would be more likely to fashion management thinking on where to base operations.

The Greenock facility has been operating with UK power costs since 1970 and since 2000 has almost halved its electricity consumption.
Alternative sources of energy such as ground source heat pumps, biomass or wood chip boilers or solar panels all generate subsidies and could be used to reduce power costs and would have minimal impact on the landscape or the residents of Greenock and Gourock .

4. All companies have annual targets on costs reductions and TI Group is no different from others in this regard.

5. When TI Group (National Semiconductor) was given planning permission for the Earnhill plant, it was a condition of that planning that the facility be developed and screened in such a way that it was not visible above the hillside when viewed from the west. To this end it was set low into the site and landscape mounding was put in place to screen the buildings and lessen their impact on the hillside.

   Over the years the facility has been expanded and modified at various intervals. During these modifications and alterations Inverclyde Council has been more than accommodating in terms of planning by accepting various structures (such as the large cooling towers and others) that breached the original planning conditions and now are clearly visible from the west and from across the Clyde as shown on the attached photographs. (views 1 and 2)

   There is also considerable "noise" generated from the facility which can be heard at distance from the site.

   All of this has been accepted by the council and the residents of Inverclyde in order to assist site's competitiveness and development.

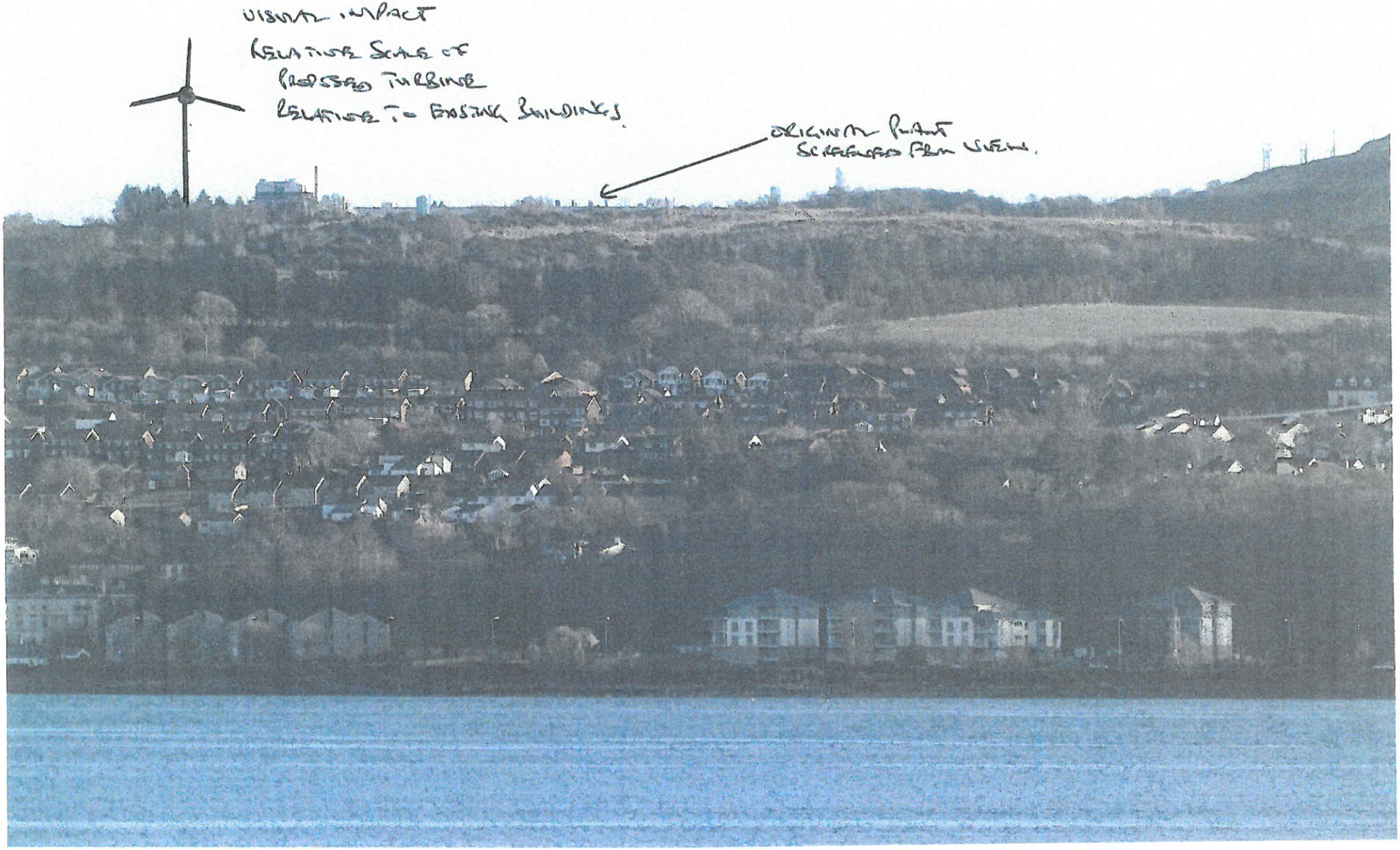
   The current proposal is a step too far as it impinges upon thousands of people within the district, is not acceptable by any objective planning appraisal nor is it justified on any socio-economic or other basis.

   We would respectfully ask that the members of the Review Board uphold the prior decision of the Council's planning officials and reject this appeal.

Yours sincerely,

Mr + Mrs R Gormley

TEXAS INSTRUMENTS PLANT
SARNHILL ROAD GREENOCK



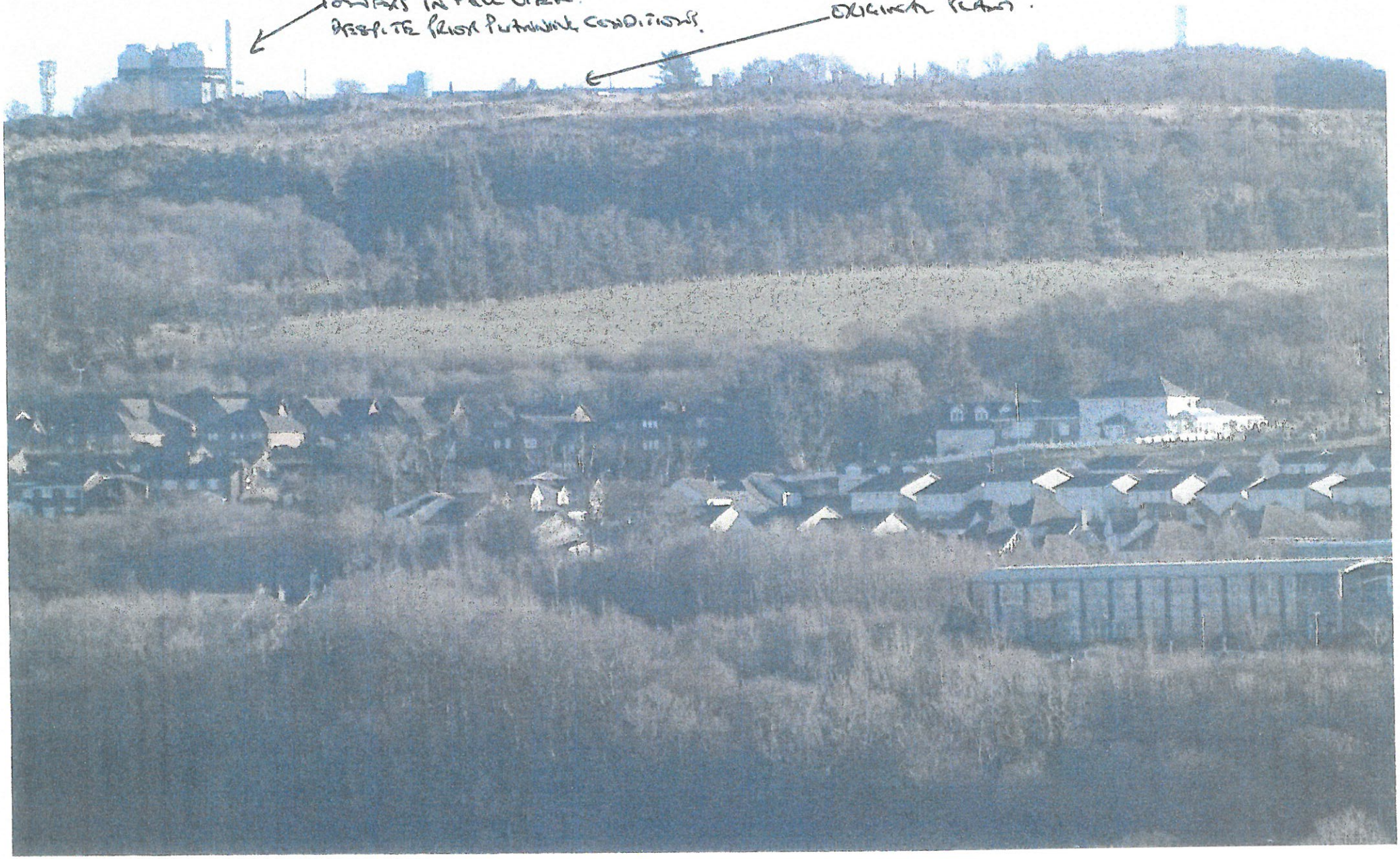
6 of 7

VIEW OF TEXAS INSTRUMENT'S PLANT FROM CAULD PARK GOWROCK WITH LEUAN FARM IN FOREGROUND

LOCATION OF PROPOSED TURBINE.

APPROX 5 x THE HEIGHT OF COOLING TOWERS IN FULL VIEW. DESPITE PRIOR PLANNING CONDITIONS.

EXISTING PLANT.



VIEW 2

Copy of original objection.

Tel:
Mobile:

Mr & Mrs R Gormley
Levan Farm
Tantallon Avenue
Gourock PA19 1HA
Scotland.

The Director of Planning
Inverclyde Council
Municipal Buildings
Clyde Square
Greenock PA15 1LY
F.A.O. Guy Phillips

20th January 2015

Dear Mr Phillips,

Proposed Erection of 77.8m Wind Turbine by Texas Instruments at Earnhill Road Greenock.

Planning Ref: 14/0392/IC

We refer to the above planning application and write to record our strongest possible objection to the proposal.

Not only will the height and scale of this proposal have a major negative impact on the executive housing development taking place at Levan Farm, but, sitting as it does on the very top of Earnhill, will have a very major impact on the landscape setting of much of Gourock and Greenock. At almost 80m tall and with rotor blades some 50m across in diameter, it will dominate the skyline above the towns and have a major impact on thousands of residents, will be seen from as far away as Dunoon and Kilcreggan and dominate the skyline from Loch Thom, Gourock West and all the way round to the Lyle Hill and the Battery Park. (all as evidenced by the photo montages submitted by the applicant).

It will have a major impact on the residential communities of Larkfield, Braeside, Pennyfern, Midton,Trumpet Hill, Gourock Golf Course, Levan Estate and Levan Farm, (as can be seen from the photo montages submitted by applicant) where apart from the visual impact and loss of amenity, it will give rise to incessant noise and shadow flicker, (a strobe type effect of sun light being interrupted by rotor blades) both of which have major health issues, destroy quality of life, and have a major impact on property values. **(see Appendix 2)**

It also sits directly above Moorfoot Primary School which will be severely affected by noise and shadow flicker, affecting concentration and learning and likely to have medical implications such as headaches and nausea as is well documented and evidenced on the internet and worldwide. St Ninian's Primary School, St Columba's High and Inverclyde Academy are also close by and likely to be affected.

Please **see appendix 1** for additional comment on Shadow Flicker.

Our grounds for objection include:

1. Visibility –

The size and scale of the proposal will mean it is highly visible from far and wide within the district and from across the river(Dunoon and Kilcreggan). It will dominate many of the residential streets in the western and south western parts of Inverclyde as can be seen from the enclosed map, **(appendix 2)** with properties in Levan, Trumpethill, Midton, Larkfield and Braeside particularly affected due to proximity of the proposal. However it will also affect many other areas given the size and visibility of the Turbine given its location on top of Earnhill.

2. Landscape Intrusion.

Breaches existing and strongly held and applied principle of no development above the skyline. This principle was applied when the original factory was built but subsequently breached by the two large Cooling Towers to the north west of the original building and can be seen from as far away as Dunoon. To give you some idea of the scale involved this proposal is approx 6 times the height of the existing cooling towers.

The turbine would appear as a dominant feature in the surrounding landscape, particularly to those residential properties in the surrounding area.

3. Proximity to Housing. There are numerous residential estates in close proximity and affected by the proposal as mentioned above. The amenity of these houses will be badly affected by visual intrusion of the turbine into their streetscape and from noise and shadow flicker as mentioned below. (see appendix 2)

4. Proximity to Schools. Moorfoot Primary lies directly below the proposal and even by admission of the developer will be affected by it in terms of visual amenity, noise and shadow flicker. Others such as St Ninians, St Columbas and Inverclyde Academy are also likely to be affected to varying degrees.

5. Noise. (see residential properties and schools within 500m and 1000m of Turbine on attached map likely to be affected) .

Hum and swish from turbine blades, generator and gearing mechanism. Depending on wind direction this can affect properties up to 1000m and beyond. There is already a problem with noise from the cooling towers affecting properties within the above ranges and this proposal will add to the existing problem.

6.Shadow Flicker. The strobe effect of sunlight being constantly interrupted by rotor blades. This will be a particular problem on the Gourock side of the proposal and can affect properties up to 1000m and beyond.**(Please refer appendix 1)**

7. Loss of capital Value. Detrimental effect on house prices and marketability of properties within sight of the proposal or affected by its noise or flicker. Please refer to **"savecowal.org"** website and press **"Links"** for example of Shadow Flicker.

We have a colleague in Eaglesham on the south side of Glasgow who has three turbines close by, the nearest of which is 975m away from his house. He is driven mad by the noise (that he describes as like having an aircraft constantly overhead) and shadow flicker which washes over his house for 3-4 hours a day during which he cannot occupy four rooms in his house. He would sell his house tomorrow but is unable to do so. He reckons his house has lost approx 40% in value.

Although loss of value and marketability may not be considered a planning issue, it will be a major consideration for anyone who is trying to sell a house in close proximity to the proposal or overshadowed or overlooked by it. This is particularly the case for the residential communities mentioned above. There will be thousands of people negatively affected by this proposal and we would hope that officials and the elected members will take this into consideration when reaching any decision.

8. **Major loss of amenity** for the thousands of residents that will have to live with the proposal.

9. Danger to health from falling debris or ice from rotor blades. This is a real danger given proximity to existing properties.

10. The proposal is contrary to the Local Plan policies particularly INF1.

11.Leisure and Tourism. The proposal will have a significant and dominant affect on Gourock Golf Club as it sits directly above the course. Not only is it obtrusive and highly visible which detracts from the visual amenity of the course but will generate noise and shadow flicker which will wash over areas of the course to the detriment and perhaps health of those who are playing. It is likely to lead to loss of membership which could have major financial implications for the club.

The Clyde estuary is one of the most scenic stretches of water anywhere in the world. It is created in large part by the rising scenic landscape either side of the river. It is an attraction for yachting enthusiasts and cruise ships from all over the world all of whom acknowledge its beauty.

This proposal, unless it is refused, may well set a precedent and result in further applications for more Turbines at this location and along our hill tops, (a common ploy we are led to believe) which together with other proposals across the Clyde, like the **"Bachan Burn"** proposal of 20 x 135m Turbines on top of the hills above Dunoon (which is soon to be lodged by a German developer) will result in desecration of our hillsides on both sides of the river, destroying one of the best river approaches and visual landscapes in the world, leaving residents on both sides of the river and future generations wondering how and why this could have been allowed to happen and **who** allowed it to happen.

We trust that the council's planning officials and elected members will see fit to refuse this unwelcome proposal and creeping destruction of our landscape.

Yours faithfully

R. Gormley

Marion Gormley

Effect of Shadow Flicker **Appendix 1**

From: Bill
Sent: 08 January 2015 12:20
To: Ronnie Gormley
Subject: Wind Turbine

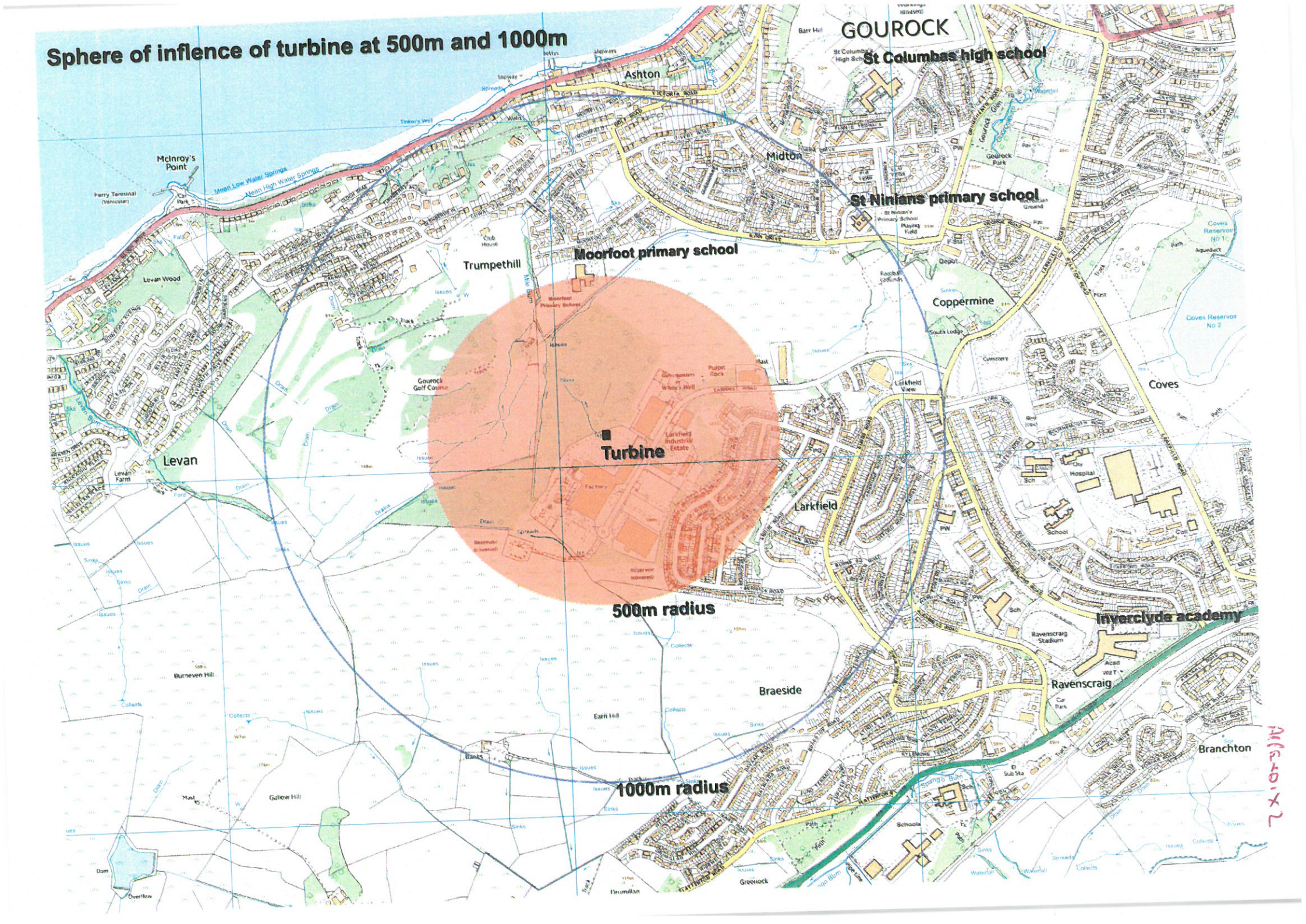
Hi Ronnie,
Happen to be on contraption when your mail came through. The one aspect I am familiar with is the strobe effect. As the erection is more or less due south of a populated area, for several hours every day, that area would be subjected to the strobe effect, which from my professional experience can induce an epileptic type reaction, at the best, inability to react to your surroundings, at the worst unconsciousness. I have seen the unconsciousness happen at first hand.
There was a motorway in England where there were a series of accidents which happened at the same time of day, at the same time of year, along the same stretch. For no apparent reason cars would suddenly veer off into another lane or cross the central reservation. There was a paling fence higher than road level, through which the sun shone at a certain time of day, and depending the speed of the vehicle, the strobe effect caused susceptible persons to lose control, and perpetrated many fatal accidents. It took a while for the penny to drop, and the fence was removed. I believe this scenario is now recognised in roads and their landscaping, thus preventing recurrence.

Cheers
Bi

From: Bill
Sent: 10 January 2015 17:05
To: Ronnie Gormley
Subject: Wind Turbine

Hi Ronnie,
Yes you can use this information. My first- hand experience of someone being rendered unconscious by flicker was when I was in my final year in Optics in 1963. We were doing projects, and one of my colleagues was experimenting with "flicker". We used first year students as guinea pigs. , my colleague, was adjusting the flicker frequency, when suddenly , the subject, took an epileptic fit, and became unconscious. I am in touch with frequently, lives in , but unfortunately , who became subsequently, is no longer with us.
Can you imagine someone driving along a road in Midton in the middle of a sunny day, susceptible to the flicker coming from the south situated turbine, losing control of their car *~~~/@*********. It does not bear thinking about, particularly if it is the school lunchtime!!!

Cheers Bill


Sphere of inflence of turbine at 500m and 1000m
GOUROCK
St Columbas high school
Ashton
Midton
St Ninians primary school
McInroy's Point
Ferry Terminal (Vehicular)
Mean Low Water Springs
Mean High Water Springs
Moorfoot primary school
Trumpethill
Levan Wood
Coppermine
Coves
Coves Reservoir No 1
Coves Reservoir No 2
Gourock Golf Course
Turbine
Levan
Larkfield
500m radius
Inverclyde academy
Ravenscraig
Braeside
Branchton
Burneven Hill
Gallow Hill
1000m radius

VIEW 3

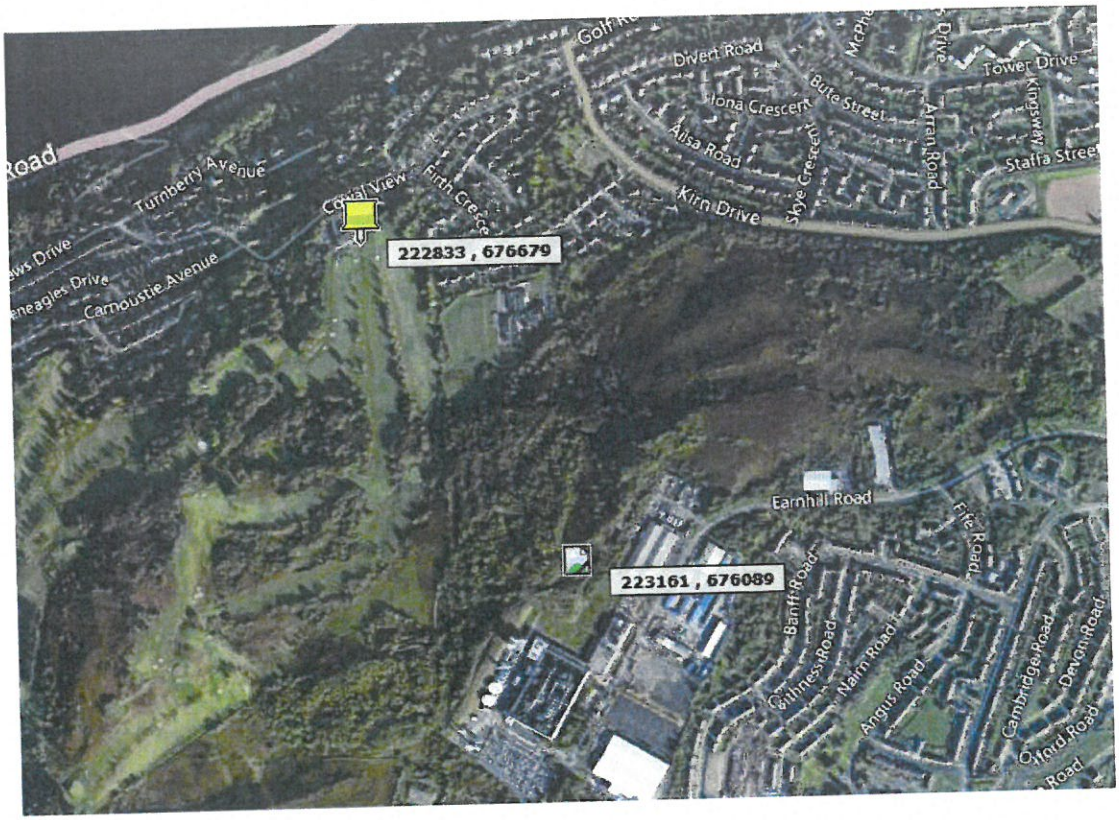


Figure 13a Viewpoint 9 was taken from this location within Gourock Golf Club

distance 400mm. Camera: Canon EOS 5D Mark II. Lens: Canon Compact Macro Lens EF 50mm 1:2.5

VIEW 4

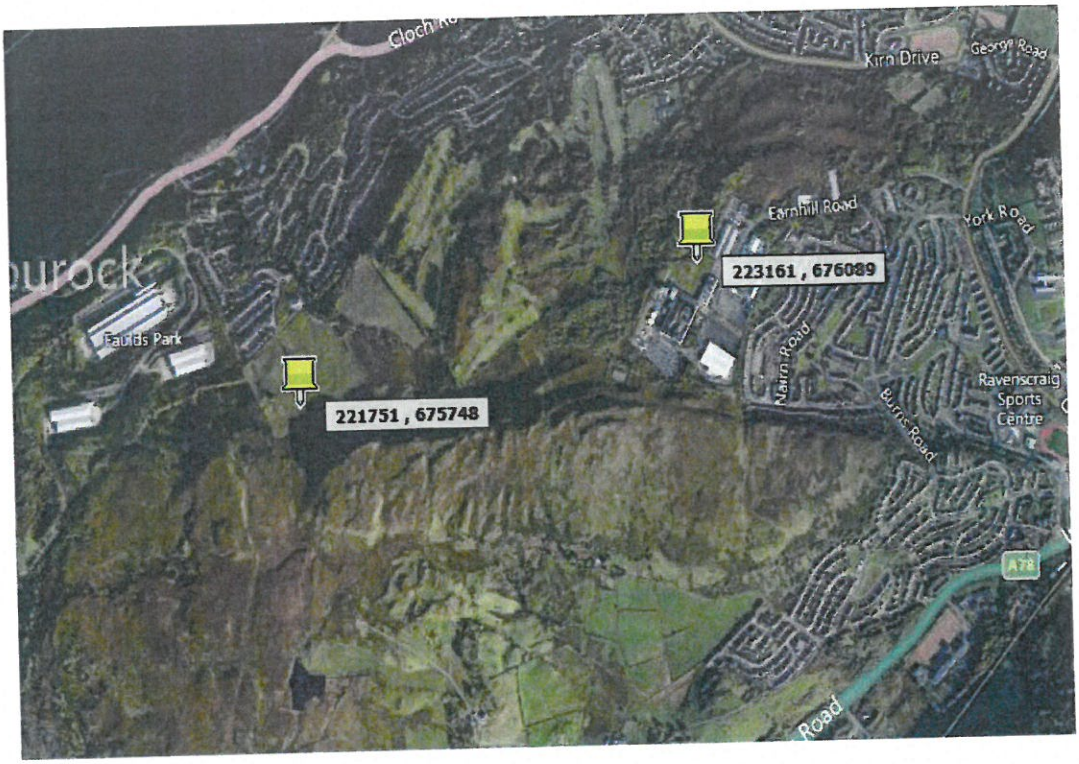
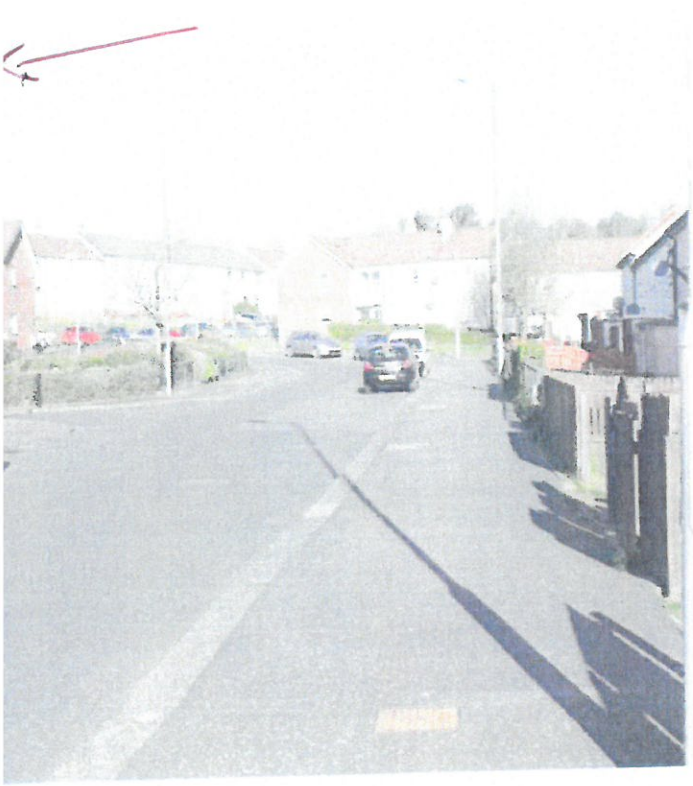


Figure 14b Viewpoint 10 was taken from land at Levan Farm

n. Camera: Canon EOS 5D Mark II, Lens: Canon Compact Macro Lens EF 50mm 1:2.5

VIEWS

Figure 19a Viewpoint 15 was taken from this location on Banff View (near no. 51/54)



nm. Camera: Canon EOS 5D Mark II, Lens: Canon Compact Macro Lens EF 50mm 1:2.5

VIEW 6

Figure 8a Viewpoint 4 was taken from this location on Berwick Road/Burns Road

amera: Canon EOS 5D Mark II. Lens: Canon Compact Macro Lens EF 50mm 1:2.5

OIRW7

Figure 7a Viewpoint 3 was taken from this location on Inverkip Road (A78)

ce 400mm. Camera: Canon EOS 5D Mark II, Lens: Canon Compact Macro Lens EF 50mm 1:2.5

VIEW 8

Figure 9a Viewpoint was taken from this location opposite no. 7 Cowal View

mm. Camera: Canon EOS 5D Mark II. Lens: Canon Compact Macro Lens EF 50mm 1:2.5

SUGGESTED CONDITIONS SHOULD PLANNING PERMISSION BE GRANTED ON REVIEW

ERECTION OF 77.8M TO BLADE TIP WIND TURBINE, 36 EARNHILL ROAD, GREENOCK (14/0392/IC)

Suggested condition should planning permission be granted on review

Conditions:-

1. The developer shall secure the implementation of a programme of archaeological investigation which is to be carried out by an archaeological organisation acceptable to the Planning Authority. A method statement will be submitted by the applicant and approved by the Planning Authority prior to the commencement of the works.

2 That prior to the start of development, details of a survey for the presence of Japanese Knotweed shall be submitted to and approved in writing by the Planning Authority and that, for the avoidance of doubt, this shall contain a methodology and treatment statement where any is found. Development shall not proceed until treatment is completed as per the methodology and treatment statement. Any variation to the treatment methodologies will require subsequent approval by the Planning Authority prior to development starting on site.

3 That the development shall not commence until an environmental investigation and risk assessment, including any necessary remediation strategy with timescale for implementation, of all pollutant linkages has been submitted to and approved, in writing by the Planning Authority. The investigations and assessment shall be site-specific and completed in accordance with acceptable codes of practice. The remediation strategy shall include verification/validation methodologies. This may be incorporated as part of a ground condition report and should include an appraisal of options.

4. That on completion of remediation and verification/validation works and prior to the site being occupied, the developer shall submit a Completion Report for approval, in writing by the Planning Authority, confirming that the works have been carried out in accordance with the remediation strategy. This report shall demonstrate that no pollutant linkages remain or are likely to occur and include (but not be limited to) a collation of verification/validation certificates, analysis information, remediation lifespan, maintenance/aftercare information and details of imported/disposed/reused materials relevant to the site.

5. That the presence of any previously unrecorded contamination or variation to reported ground conditions that becomes evident during site works shall be brought to the attention of the Planning Authority within one week. Consequential amendments to the remediation strategy shall not be implemented unless it has been submitted to and approved, in writing by the Planning Authority.

6. The use of the development shall not commence until the applicant has submitted a completion report for approval, in writing by the Planning Authority, detailing all fill or landscaping material imported onto the site. This report shall contain information of the material's source, volume, intended use and verification of chemical quality (including soil-leachate and organic content etc) with plans delineating placement and thickness.

7. The level of noise emissions from the wind turbine when measured at any dwelling (with the exception of the dwellings to the North of the site (Moorfoot Drive area)), lawfully existing at the date of permission shall not exceed:

    a. between the hours of 23:00 and 07:00 the greater of 43dB L_A90 (10 min) or 5dB(A) above the Night Hours Background Noise level at that property; or
    b. between the hours of 07:00 and 23:00 the greater of 40dB L_A90 (10 min) or 5dB(A) above the quiet Waking Hours Day Time Background Noise Level at that property.

8. The level of noise emissions from the wind turbine when measured at any dwelling to the North of the site (Moorfoot Drive area), lawfully existing at the date of permission shall not exceed:

    a. between the hours of 23:00 and 07:00 43dB L_A90 (10 min)
    b. between the hours of 07:00 and 23:00 40dB L_A90 (10 min)

9. The permission hereby granted shall endure for a period of 25 years from the commencement of development. At the end of the 25 year period, unless with the express approval in writing of the Planning Authority, the equipment shall be dismantled and removed from the site, and the ground fully reinstated to its former condition to a depth of no less than one metre below ground surface level or such other means of restoration shall be carried out as may be agreed in writing by the Planning Authority.

10. In the event that the turbine fails to produce any electricity supplied to the grid for a continuous period of twelve months then it shall be deemed to have ceased to be required and, unless agreed in writing with the Planning Authority, the wind turbine and the ancillary equipment directly associated with that wind turbine shall be dismantled and removed from the site, and the ground fully reinstated to the written satisfaction of the Planning Authority, to the specification set out in condition 1.

11. Confirmation of the details of the finish and colour of the control kiosk, shall be submitted to and agreed in writing by the Planning Authority prior to the commencement of development.

Reasons:-

1. To safeguard archaeological assets in proximity to the site.

2. To help arrest the spread of Japanese Knotweed in the interests of environmental protection.

3. To satisfactorily address potential contamination issues in the interests of environmental safety.

4. To provide verification that remediation has been carried out to the Authority's satisfaction.

5. To ensure that all contamination issues are recorded and dealt with appropriately.

6. To protect receptors from the harmful effects of imported contamination.

7. To protect the amenities of occupiers of premises from unreasonable noise and vibration levels.

8. To protect the amenities of occupiers of premises from unreasonable noise and vibration levels.

9. In recognition of the expected lifespan of the development and in the interests of safety and visual amenity once the plant is redundant.

10. In recognition of the expected lifespan of the development and in the interests of safety and visual amenity once the plant is redundant.

11. In the interests of visual amenity and landscape protection.