ROAD DESIGN PROCEDURES AND STANDARDS

The Moray Council Transportation Service Requirements for Wind Turbine Developments

	Reviewed by	Approved by
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Introduction

1. This publication is intended to provide information relating to the Transportation requirements for wind turbine developments. There are three categories of Wind Turbine considered within this publication. These categories are as follows:

   - Micro Wind Turbines are generally used for domestic purposes. They have a maximum output of up to 13.5 kilowatts (kW) per hour and a maximum rotor diameter of 4 metres. Micro wind turbines can be either erected in an open exposed location or, occasionally, mounted on a building.

   - Small Wind Turbines are slightly larger and generally are used in rural locations or for small industrial / commercial units. These turbines have a maximum output of up to 50kW per hour and a rotor diameter of up to 16 metres Small wind turbines are usually mounted on a mast in an open exposed location.

   - Commercial Wind Turbines, which are usually grouped together to form wind farms tend to have a maximum output of at least 300kW per hour and a rotor diameter of over 30 metres. Many large scale commercial developments have turbines with a maximum output of 1.8 megawatts per hour using rotor diameters of 70 metres or more.

General

2. Static wind turbines require explicit planning permission. Prospective applicants are advised to consult with Transportation at an early stage. This is particulary important whenever it is proposed to site wind turbines close to the public road network or where they are visible from the public road (contact details are shown later in this document).

3. Throughout this document the term applicant is used, however the information is equally relevant to developers and agents.

4. This publication forms part of a series of documents that make up the Moray Council Road Design Procedures and Standards that provide the framework for meeting the requirements of managing and maintaining the road network in accordance with the Roads (Scotland) Act 1984.

5. The key aims of this document include the following:

Safety	Prevent injury and damage from collapse or thrown objects: structural failure and ice
	Prevent injury due to potential for driver distraction: known accident problem; complex bends or junctions
	Avoid collisions and injury arising from the movement of vehicles to and from the site: passing places; provision of appropriate visibility splay
Construction, Abnormal Load, Operation, and Tourist Traffic	Avoid damage to the surrounding road network and impact on the neighbouring community: structural condition; drainage infrastructure; traffic calming; preferred routes; abnormal loads (heavy and long)
	Manage the traffic impact for major component replacement and decommission
	Ensure tourist traffic is managed: preferred routes and parking facilities

6. There is a need to ensure the relevant policies of the Moray Local Plan are satisfied and that the safety of road users and operatives moving to and from the wind turbine development is not compromised. The applicant must submit documentation to show how Moray Local Plan policies are being achieved. In particular the following policies concerning transportation and accessibility:

Policy T2: provision of a safe and suitable road access;
Policy IMP1 (c): adequate roads, public transport etc.
Policy ER1 (d): renewable energy proposals traffic generation.

7. All applicants are recommended to seek professional advice to assist with the preparation and submission of a planning application for the wind turbine or wind farm development proposal.

8. A checklist is presented at the end of this document to assist all those involved with the preparation of a planning application for wind farm/wind turbine developments to meet all of the transportation requirements. The completed checklist should be enclosed with the planning application for the attention of Transportation Officers.

9. The completion of the checklist will help in a number of ways:

a) highlight any potential problems for the transportation requirements of the proposed wind farm/wind turbine development;
b) assist with the processing of the planning consultation;
c) identify if there is a need for further information or consultation.

For general enquiries and specific development proposals contact.
Transportation
Council Offices,
Academy Street,
Elgin,
IV30 1LL
Email: roadsdevelopmentcontrol@moray.gov.uk

Safety (Fall over, blade loss, and Icing) and Set-back Distances

10. It is important to consider the potential consequences in the event that debris from a wind turbine should fall onto a public road. The consequences of a projectile hitting a road user could be severe. In certain circumstances there could be a risk of a multi-vehicle collision.

11. Experience indicates that properly designed and maintained wind turbines in accordance with best engineering practice should be a stable structure. However, a number of guidance documents acknowledge that it may be advisable to achieve a set-back from roads and railways of at least fall over distance (height measured to blade tip). This approach only deals with a fall over event.

12. Another possible risk to road users would be the loss of a piece of the blade or, in most exceptional circumstances, of the whole blade. Wind turbine blades are normally composite structures with no bolts or other separate components. Blade failure is a rare event but the risk can be reduced by ensuring an appropriate separation distance from the public road.

13. A further factor that must be considered is the phenomenon of ice being thrown from the turbine blades ('icing'). In certain meteorological conditions, significant accretions of ice can build up on wind turbine blades. Large fragments may be thrown a considerable distance by the rotating blades.

14. Most modern wind turbines will have vibration and/or climate sensitive technology that will shut down the turbine if there is the potential for icing. Evidence of this technology on the proposed turbines should be provided.

15. An additional allowance for debris scatter is necessary in order to maximise safety for users of the nearby public road.

16. The minimum set-back distances adopted by Moray Council (Roads Authority) are set out in the table below. The distances are measured from the back of the road verge, which in many cases is defined by a fence or boundary. In cases where there is no fence/boundary, the set-back distance is measured from a point which is 2.0 metres from the edge of the carriageway.

Scale of Wind Turbine Development	Set-back Distance
Commercial turbines	Height measured to blade tip + 50 metres
Micro and small turbines	Height measured to blade tip + 10%

Location

17. Many onshore wind farms will be sited in areas served by the local road network. In Moray this may involve additional traffic impact on small rural communities. It is essential that the impact of the development traffic is mitigated.

18. The applicant should assess whether the access roads are suitable for the transportation of components which will include whether they are sufficiently wide for rotor blades, or bridges sufficiently strong for heavier components to be transported to the site. Any sections of the route which will require modification to allow transportation of components to site should be identified and potential effects assessed.

19. The applicant must demonstrate that abnormal loads can be safely transported in such a way that minimises inconvenience to other road users and that the environmental effects of this and other construction traffic, after mitigation, are acceptable.

Visual Distraction

20. Any potential for visual distraction should be minimised, not by screening but rather by the provision of a clear, continuous view of the wind farm that develops over the maximum possible length of approach carriageway. The potential for distraction may be greater than with other roadside features (advertisements, etc., do not generally rotate) but a clear view from distance will considerably reduce the temptation for drivers to turn their heads when passing the towers.

21. Sites where topography, vegetation or buildings might conceal the view of the turbines until the last minute should be avoided as drivers may be distracted suddenly and take their attention from the road and other traffic.

22. Furthermore, wind farms should not be located where motorists need to pay particular attention to the driving task, such as the immediate vicinity of road junctions, sharp or unexpected bends and crossings for pedestrians and cyclists. Therefore, the associated road network must be reviewed with particular attention being paid to the complexity of junctions, traffic flows and the possible presence of short headways between vehicles.

23. The existing accident record and type of accidents occurring near the proposed wind turbine(s) may also need to be analysed. Applicants should note that locations with a history of rear end shunt accidents will be treated with particular caution.

Access

24. For micro and small scale wind turbines, access to the site for construction, maintenance and de-commissioning must be clearly indicated within the documents supporting the planning application, along with the maximum size of vehicle used to deliver the wind turbine components and the size of crane used to erect the turbine(s). Information on the number and size of other construction vehicles associated with the development may also be required.

25. For commercial scale wind turbines and farms, the applicant will be asked to prepare a Transport Assessment (TA) covering the construction, operation and de-commissioning stages of the development for consideration at the pre-application stage. The TA, which will normally be part of the Environmental Impact Assessment (EIA), should demonstrate the likely impacts of the development on the road network and on road users and clearly define the access routes to the wind farm development. From this, the acceptability of the proposal should be determined and any mitigating measures should be identified.

26. Access to a wind farm/turbine is required at all times for maintenance. However, this will generally be infrequent and will not generate a large amount of traffic on the surrounding road network. Account should be taken of the need to replace major components in the event of failure.

27. Therefore, the main period of disruption to the road network usually will occur during the construction and decommissioning stages of a wind farm development. A wind farm will have a life span in the region of between 20 to 25 years (10 years for a micro wind turbine) and a plan should be put in place for its decommissioning or replacement.

28. The construction period for a wind farm development will be several months. The single largest components that must be transported to the site are likely to be the rotor blades as they are normally prefabricated in one piece, whereas the towers are built in sections.

29. Many onshore wind farms will be sited in areas served by a minor road network. Commercial wind turbines are large structures and some components, notably the rotor blades, can currently only be transported to sites as complete structures. Blades currently range from between 30m and 45m in length, although this could change as technology develops. The construction of a wind farm will therefore require sufficient access for long and wide load items. Furthermore, some individual components of the wind

turbines can weigh in excess of 100 tonnes and it is important that all sections of roads and bridges on the proposed delivery route can accommodate the weight of the loads.

30. The applicant must assess the various potential routes to the site for delivery of materials and components where the source of the materials is known at the time of the application, and select the route which is considered to be most appropriate route. It is possible that the exact location of the source of construction materials, such as crushed stone or concrete, will not be known at the time of the application. In these circumstances, the impact of additional vehicles on all of the likely potential routes should be assessed.

31. The applicant should assess also whether the access roads are suitable for the transportation of components which will include whether they are sufficiently wide for rotor blades, or bridges sufficiently strong for heavier components to be transported to the site. Any sections of the route which will require modification to allow transportation of components to site should be identified and potential effects assessed.

32. The applicant must demonstrate that abnormal loads can be safely transported in such a way that minimises inconvenience to other road users and that the environmental effects of this and other construction traffic, after mitigation, are acceptable. Swept path analyses should be provided by the developer for the abnormal load deliveries to the site.

33. In some instances, it may be necessary for the applicant to undertake modifications to the road to facilitate delivery of components and/or minimise disruption to other road users. Furthermore, the applicant may be required to undertake a “dry-run” of the delivery of the largest components to ensure delivery is possible in a way that minimises disruption. Requirements for strengthening bridges may also be requested.

34. In some cases, controls on the number of vehicle movements to and from the wind farm site in a specified period during its construction and possibly, on the routing of such movements, particularly by heavy vehicles may be requested.

35. It may also be appropriate for the roads authority to set limits for and coordinate the delivery of components through active management of the delivery schedules through the abnormal load approval process.

36. As part of the TA and EIA, the applicant will be required to provide a comparison of the future baseline traffic numbers with and without construction traffic that would be generated by the project.

37. There may be a number of wind farms proposed that use a common port and/or access route and pass through the same towns. Where a cumulative impact is likely then a cumulative transport assessment should form part of the EIA to consider the impacts of abnormal traffic movements relating to the

project in question in combination with those from any other relevant development.

38. Depending on the scale of the proposal, the EIA may also need to include an assessment of the traffic that is likely to be generated during the operational phase of the wind farm.

Tourist Facilities

39. It is possible that tourists may wish to visit the site during construction and once it has become operational. Some sites have been provided with visitor centres in anticipation of this. Therefore, any likely tourist trips should be incorporated into the TA, which should also identify the facilities (e.g. parking area) required to accommodate them.

Wind Turbine/Farm Development Transportation Checklist

Category	Item	Description
Safety	1	Has a separation distance between turbines of the height measured to blade tip + 50m (or height measured to blade tip + 10% for smaller turbines) been provided?
	2	Will the wind turbine be visible from the nearest Public Road?
	3	Will the turbines appear suddenly or be a gradual view on the horizon for some time before passing the site?
	4	Are the turbines likely to distract drivers?
	5	Does the surrounding Public Road network have a known accident problem?
	6	Does the operation of the Public Road require particular attention to the driving task?
	7	Are there particularly complex bends or junctions in direct line of sight of the turbines?
	8	Is the wind farm/turbine sited within an icing area?
	9	Will a new access from the Public Road to the site be necessary?
	10	Are the appropriate visibility splays provided?
Construction, Abnormal Load, Operation, and Tourist Traffic	11	Will there be a significant increase in traffic to the Public Road?
	12	Are the roads surrounding the development suitable?
	13	For Small and Micro turbines has the maximum size of vehicle used to deliver the turbine been identified?
	14	For Commercial turbines has a Transport Assessment or Transportation section of an Environemntal Impact Assessment been submitted?
	15	Will modifications to the Public Road network be necessary to accommodate abnormal loads?
	16	Have provisions been made for major component replacement during operation and decommission?
	17	Is the wind farm/turbine likely to generate tourists?
	18	What facilties are proposed for tourist traffic?