

Pell Frischmann

Balmeanach Wind Farm

Abnormal Indivisible Load Route Survey

May 2023

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Report Ref.	230214 Balmeanach Wf Rsr					
File Path	https://pellf.sharepoint.com/sites/EdinburghOfficeTeam/Shared Documents/General/Bids/Vestas/230214 Balmeanach WF RSR.docx					
Rev	Suit	Description	Date	Originator	Checker	Approver
01		Draft	14/02/2023	G Ludford-Jones	T Lockett	G Buchan
02		Issue	25/05/2023	G Ludford-Jones	T Lockett	G Buchan
Ref. reference. Rev revision. Suit suitability.						

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1 Introduction

1.1 Purpose of the Report

Pell Frischmann (PF) has been commissioned to undertake a study of the proposed delivery route for wind turbine Abnormal Indivisible Loads (AIL) associated with the construction and development of Balmeanach Wind Farm, located approximately 3km to the south of Edinbane and 8km to the east of Dunvegan, on the Isle of Skye.

The Route Survey Report (RSR) has been prepared to help inform on the likely issues associated with the development of the site with regards to off-site transport and access for AIL traffic. This report is based upon a site visit review and identifies the key issues associated with AIL deliveries and notes that remedial works, either in the form of physical works or as traffic management interventions will be required to accommodate the predicted loads.

The detailed assessment and subsequent designs of any remedial works are beyond the agreed scope of works at this point in time.

The developer will be responsible for ensuring that the finalised proposals meet with the appropriate levels of health and safety provision for all road users has been made in accordance with the relevant legislation, at the time of delivery.

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PF has been commissioned to prepare this abnormal load route assessment report as a source of guidance. The report identifies the key points and issues associated with the route that may require remedial works to accommodate the predicted loads.

2 Site Background

2.1 Site Location

The development site is located approximately 3km to the south of Edinbane and 8km to the east of Dunvegan on the Isle of Skye. Figure 2-1 illustrates the general site location.

Figure 2-1: Site Location Plan



2.2 Candidate Turbine

The applicant has indicated that they wish to consider the worst case components from a Vestas V136 turbine at a hub height of 82m.

The details of the components have been provided by Vestas and are detailed in Table 2-1.

Table 2-1: Turbine Components Summary

Component	Length (m)	Width (m)	Height / Min Diameter (m)	Weight (t)
Blade	66.770	4.040	2.750	15.701
Nacelle Housing	12.940	3.981	3.387	67.566
Top Tower	29.000	3.350	3.268	41.500
Mid Tower	28.840	3.650	3.350	58.500
Base Tower	21.726	(4.010) 3.650	3.650	73.500

2.3 Proposed Delivery Equipment

To provide a robust assessment scenario based upon the known issues along the access route, it has been assumed that all blades would be carried on a Superwing Carrier trailer to reduce the need for mitigation in constrained sections of the route.

The access from the port of Kyle of Lochalsh is highly constrained and a blade lifting trailer would be required to exit the port. This trailer would only be used between the port and the airfield at Broadford.

To provide a robust assessment scenario based upon the known issues along the remainder of the access route, it has been assumed that all blades would be carried on a hybrid trailer from Broadford to reduce the need for mitigation in constrained sections of the route. Where constraints are significant, it is possible to raise the scissor lift to a maximum of 10m above the trailer deck. This allows loads to be either lifted over height constraints or to be slightly shortened in plan view.

The base towers would be carried on a 4+7 clamp trailer for the majority of the route. Due to access constraints at Kyle of Lochalsh harbour, it will be necessary to transport the base towers on a seven axle step frame trailer through to Broadford Airport, where loads would be transferred to the 4+7 clamp trailers. Mid and top tower sections will be carried using a step trailer.

Figure 2-2: Superwing Carrier Trailer



Figure 2-3: Blade Lifting Trailer



Figure 2-4: Tower Trailer



3 Access Route Review

3.1 Port of Entry

There Ports of Entry (PoE) for the project is Kyle of Lochalsh Harbour, located on the mainland to the southeast of the proposed development site. Table 3-1 summarises the physical characteristics of the port.

Table 3-1: Port Facility Summary

	Kyle of Lochalsh Railway Pier (West)
Max Length (m)	80.0
Min Draft (m) (mlws)	4.0
Max Draft (m) (mlws)	9.5
Beam Restrictions	None

Loads can be offloaded by geared vessels or onshore mobile cranes. The harbour has been used for delivery of components for a number of windfarms, including Stronelaig – the largest turbine being a Vestas V117 – and Millennium 1 and 2 – the largest turbine being a Senvion MM92. Figure 3-1 illustrates the Stronelaig discharge operation, which would be similar to that required for the proposed deliveries.

Figure 3-1: Stronelaig Deliveries at Kyle of Lochalsh



Source: <https://heavywhalley.files.wordpress.com/2018/04/p1040023.jpg>

3.2 Proposed Access Routes

This study has been undertaken following a detailed site visit undertaken in January 2022.

The proposed access route to site is detailed below and is illustrated in Figure 3-2:

- Loads would depart the port and turn left onto the A87;
- Loads would cross onto the Isle of Skye via the Skye Bridge;
- Loads would continue north of the A87 before turning left onto the A850 at Borve; and
- Loads would continue west on the A850 and proceed to the junction for Ben Aketil Wind Farm (owned by Falck).

Figure 3-2: Proposed Access Route




3.3 Route Constraints





The constraints noted on the access route are detailed in Table 3-2. These cover all constraints from the port access gates through to the site access junction. No consideration of the transport issues within the proposed development site or on private access roads and tracks have been undertaken.

Plans illustrating the location of the constraints are provided in Appendix A.





Table 3-2: Constraint Points and Details





POI	Key Constraint	Details
<p>1 & 2</p>	<p>Kyle of Lochalsh Port Exit & A87 Junction</p> 	<p>Loads will turn left exiting the west pier onto the adjacent access road before turning left onto the A87 westbound.</p> <p>To exit the port, blade loads will need to be placed in a lifting trailer. This will need to be raised to 60 degrees to exit the port and should remain in the upright position through to Broadford Airfield (the blade can be lowered on straight sections if required).</p> <p>Towers will need to be in a step frame trailer which will result in the load being above 5.5m in height.</p> <p>A swept path assessment has been undertaken and indicates that loads will over-sail the fence and railway line where all obstacles should be removed. A token system is run by Network Rail for temporary occupations and will need to be agreed prior to deliveries. Third party rights will be required.</p> <p>The blade tip will over-sail one lighting column and one road sign on the turning out of the dock. Loads will over-run the verge on the outside of the turn where a load bearing surface should be laid. Loads will over-sail the inside verge, though no physical mitigation measures will be required.</p> <p>Loads will over-sail both verges through the right-hand bend. Parking should be suspended through the section.</p> <p>When turning left to join the A87 the blade tip will over-sail the wall, railing, one traffic signal, pedestrian guardrail, and street furniture on the eastern verge. Third party land will be required. Loads will over-run and over-sail the inside of the turn where a load bearing surface should be laid, and the pedestrian guardrail and two traffic signals should be removed.</p> <p>The blade will continue in the raised position onto the Skye bridge, where it should be lowered to reduce wind effects on the bridge. The blade should then be raised prior to Kyleakin.</p> <p>Where the blade is in the raised position, all overhead utility lines will need to be relocated or placed underground.</p> <p>Swept path assessment SK01 is included in Appendix B.</p>
<p>3</p>	<p>A87 Kyleakin Roundabout</p> 	<p>Loads will take the third exit at the roundabout and continue on the A87 westbound, undertaking and contraflow manoeuvre.</p> <p>A swept path assessment has been undertaken and indicates that the blade tip will over-sail two bollards on the entry splitter island.</p> <p>The blade tip will over-sail the north-western verge of the central island, though no physical mitigation measures will be required.</p> <p>Loads will over-sail the inside verge of the turn on exit, though no physical mitigation measures will be required.</p> <p>Swept path assessment SK02 is included in Appendix B.</p>





POI	Key Constraint	Details
4	<p>A87 Old Kyle Farm</p> 	<p>Loads will continue on the A87 westbound.</p> <p>The blades could be lowered under the overhead cables at this location. Alternatively, to help reduce transit times the cables could be placed under the road.</p>
5	<p>A87 Broadford Airport</p> 	<p>Blade and tower loads will turn right into the Skye Aerodrome and, following storage, will turn right in the direction of the site access.</p> <p>Blades @ 60 Degree and Tower – Inbound</p> <p>A swept path assessment has been undertaken and indicates that the blade tip will over-sail the safety barrier and bollards on the south-eastern verge of the A87.</p> <p>Loads will over-run and over-sail the inside verge of the turn where a load bearing surface should be laid, and the bollards should be removed. The vegetation should be cleared. Third party land will be required.</p> <p>When at the Airport, loads will be discharged, and a temporary crane pad will be required along with a storage area and welfare facility. The developer would be responsible for securing the necessary land option at the airport.</p> <p>Superwing Carrier Blade and Clamp Tower - Outbound</p> <p>A swept path assessment has been undertaken and indicates that the blade tip will over-sail the north-eastern verge of the airport road. Third party land will be required.</p> <p>Loads will over-run and over-sail the inside verge of the turn where a load bearing surface should be laid, and one utility pole, one road sign, two poles, and several bollards should be removed. The vegetation should be cleared. Third party land will be required.</p> <p>Swept path assessment SK03 is included in Appendix B.</p>
6	<p>A87 Breakish</p> 	<p>Loads will continue on the A87 westbound.</p> <p>A swept path assessment has been undertaken and indicates that loads will over-sail both verges through the section, though no physical mitigation measures will be required.</p> <p>Swept path assessment SK04 is included in Appendix B.</p>





POI	Key Constraint	Details
7	A87 northeast of Ostaig 	<p>Loads will continue on the A87 westbound</p> <p>A topographical survey is required to allow for a vertical assessment of this pinch point.</p>
8	A87 Ostaig 	<p>Loads will continue on the A87 westbound.</p> <p>A topographical survey is required to allow for a vertical assessment of this pinch point.</p>
9 & 10	A87 north of Skulamus 	<p>Loads will continue on the A87 westbound.</p> <p>A swept path assessment has been undertaken and indicates that the blade tip will over-sail the outside verge of the right-hand bend, though no physical mitigation measures will be required. Loads will over-sail the inside verge where four road signs should be removed.</p> <p>The blade tip will over-sail one bollard on the outside verge of the following left-hand bend. Loads will over-sail the inside verge, though no physical mitigation measures will be required.</p> <p>Swept path assessment SK05 is included in Appendix B.</p>
11	A87 Moorlands 	<p>Loads will continue on the A87 westbound.</p> <p>A swept path assessment has been undertaken and indicates that loads will over-run and over-sail the outside verge of the right-hand bend where load bearing surfaces should be laid, and two lighting columns, one road sign, and one private sign should be removed. The vegetation should be cleared. Loads will over-sail the inside verge, though no physical mitigation measures will be required.</p> <p>Loads will over-sail both verges through the following left-hand bend, though no physical mitigation measures will be required.</p> <p>Swept path assessment SK06 is included in Appendix B.</p>




POI	Key Constraint	Details
12	<p>A87 Lower Harrapool</p> 	<p>Loads will continue on the A87 westbound.</p> <p>A swept path assessment has been undertaken and indicates that the blade tip will over-sail the outside verge of the bend, though no physical mitigation measures will be required. Loads will over-sail the inside verge where the trees should be trimmed.</p> <p>Swept path assessment SK07 is included in Appendix B.</p>
13	<p>A87 Broadford Fire Station</p> 	<p>Loads will continue on the A87 westbound.</p> <p>Loads will over-sail both footways through this bend, though no physical mitigation measures will be required.</p>
14	<p>A87 Corran House</p> 	<p>Loads will continue on the A87 northbound.</p> <p>A swept path assessment has been undertaken and indicates that the blade tip will over-sail the bollards on the outside verge of the first left-hand bend.</p> <p>Loads will over-sail the inside verge of the following right-hand bend where the trees should be trimmed.</p> <p>Loads will over-sail both verges of the second right-hand bend. The trees should be trimmed on the inside verge.</p> <p>Swept path assessment SK08 is included in Appendix B.</p>
15	<p>A87 Strollamus</p> 	<p>Loads will continue on the A87 northbound.</p> <p>A swept path assessment has been undertaken and indicates that loads will over-sail the inside verge of the right-hand bend, though no physical mitigation measures will be required.</p> <p>Swept path assessment SK09 is included in Appendix B.</p>
16	<p>A87 Ard Dorch</p> 	<p>Loads will continue on the A87 northbound.</p> <p>Loads will over-sail both sides of the road through the bends, though no physical mitigation measures will be required.</p>




POI	Key Constraint	Details
17	<p>A87 Eas a Bhradain</p> 	<p>Loads will continue on the A87 northbound.</p> <p>A swept path assessment has been undertaken and indicates that loads will slightly over-sail the inside verge through the bend, though no physical mitigation measures will be required. The blade tip will over-sail the bollards on the outside verge.</p> <p>Swept path assessment SK10 is included in Appendix B.</p>
18 & 19	<p>A87 Kinloch Ainort</p> 	<p>Loads will continue on the A87 northbound.</p> <p>A swept path assessment has been undertaken and indicates that the blade tip will slightly over-sail the outside verge of the left-hand bend, though no physical mitigation measures will be required.</p> <p>Loads will over-sail the inside verge of the following right-hand bend where the rock face should be re-graded, and the safety barrier should be removed. The blade tip will over-sail the bollards and safety barrier on the outside verge where the rock face should be re-graded, and three chevron signs should be removed.</p> <p>To reduce physical works at this location, the use of a scissor lift / shear lift adaptor on the Superwing trailer could be used to raise the blade tip and reduce the extents of any works.</p> <p>Swept path assessment SK11 is included in Appendix B.</p>
20	<p>A87 / A836 Junction</p> 	<p>Loads will continue north on the A87.</p> <p>A swept path assessment has been undertaken and indicates that loads will over-sail the inside verge of the bend, though no physical mitigation measures will be required.</p> <p>Swept path assessment SK25 is included in Appendix B.</p>
43	<p>A87 north of Sligachan</p> 	<p>Loads will continue on the A87 northbound.</p> <p>A swept path assessment has been undertaken and indicates that loads will over-sail both verges through the first left-hand bend, though no physical mitigation measures will be required.</p> <p>The blade tip will over-sail the bollards on the outside verge of the following right-hand bend. Loads will over-sail the inside verge where the vegetation should be trimmed, and a land search is recommended to confirm the extent of the adopted land boundary.</p> <p>Swept path assessment SK26 is included in Appendix B.</p>





POI	Key Constraint	Details
44	A87 Caiplach 	<p>Loads will continue on the A87 northbound.</p> <p>The vertical profile of the road at this location is pronounced and should be reviewed during the test run stage to ascertain if tar wedges will be required to prevent grounding.</p>
45	A87 west of Meall Odhar Mor 	<p>Loads will continue on the A87 northbound.</p> <p>A swept path assessment has been undertaken and indicates that the blade tip will over-sail the bollards on the outside verge of the left-hand bend where four chevron signs should be removed, and the vegetation should be trimmed. Loads will over-sail the inside verge, though no physical mitigation measures will be required.</p> <p>Loads will over-sail the inside verge of the following right-hand bend where the vegetation should be trimmed. The blade tip will over-sail the bollards on the outside verge where two chevron signs should be removed, and a land search is recommended to confirm the extent of the adopted land boundary.</p> <p>Swept path assessment SK27 is included in Appendix B.</p>
46	A87 east of Doir a Bhuilg 	<p>Loads will continue on the A87 northbound.</p> <p>A swept path assessment has been undertaken and indicates that loads will over-sail the eastern verge prior to the bend, though no physical mitigation measures will be required.</p> <p>The blade tip will over-sail the bollards on the outside verge of the bend. Loads will over-sail the inside verge where the trees and vegetation should be trimmed.</p> <p>Swept path assessment SK28 is included in Appendix B.</p>
47	A87 Glen Varragill Forest 	<p>Loads will continue on the A87 northbound.</p> <p>A swept path assessment has been undertaken and indicates that the blade tip will over-sail the bollards on the outside verge of the left-hand bend. Loads will over-sail the inside verge, though no physical mitigation measures will be required.</p> <p>The blade tip will over-sail the bollards on the outside verge of the following right-hand bend. Loads will over-sail the inside verge, though no physical mitigation measures will be required.</p> <p>Swept path assessment SK29 is included in Appendix B.</p>

POI	Key Constraint	Details
48	<p>A87 south of Varragill</p> 	<p>Loads will continue on the A87 northbound.</p> <p>A swept path assessment has been undertaken and indicates that the blade tip will over-sail the bollards on the outside verge of the right-hand bend where one chevron sign should be removed. Loads will over-sail the inside verge, though no physical mitigation measures will be required.</p> <p>The blade tip will over-sail the bollards on the outside verge of the following left-hand bend where one chevron sign should be removed. Loads will over-sail the safety barrier on the inside verge.</p> <p>Swept path assessment SK30 is included in Appendix B.</p>
49	<p>A87 Varragill</p> 	<p>Loads will continue on the A87 northbound.</p> <p>A swept path assessment has been undertaken and indicates that the blade tip will over-sail the safety barrier on the outside verge of the right-hand bend where one chevron sign should be removed. Loads will over-sail the inside verge, though no physical mitigation measures will be required.</p> <p>Loads will over-sail the inside verge of the following left-hand bend where the vegetation should be trimmed.</p> <p>The blade tip will over-sail the bollards on the outside verge of the second right-hand bend. Loads will over-sail the inside verge where the bollards should be removed.</p> <p>Swept path assessment SK31 is included in Appendix B.</p>
50	<p>A87 east of Ben Gaskin</p> 	<p>Loads will continue on the A87 northbound.</p> <p>A swept path assessment has been undertaken and indicates that the blade tip will over-sail the bollards on the outside verge of the left-hand bend where four chevron signs should be removed, and the vegetation should be trimmed. Loads will over-sail the inside verge, though no physical mitigation measures will be required.</p> <p>Swept path assessment SK32 is included in Appendix B.</p>
51	<p>A87 Glenvarragill House</p> 	<p>Loads will continue on the A87 northbound.</p> <p>A swept path assessment has been undertaken and indicates that loads will over-sail both verges prior to the bends, though no physical mitigation measures will be required.</p> <p>The blade tip will over-sail the bollards on the outside verge of the left-hand bend. Loads will over-sail the inside verge, though no physical mitigation measures will be required.</p> <p>The blade tip will over-sail the bollards on the outside verge of the following right-hand bend where the trees should be trimmed. Loads will over-sail the inside verge, though no physical mitigation measures will be required.</p> <p>Swept path assessment SK33 is included in Appendix B.</p>

POI	Key Constraint	Details
52	<p>A87 Eilean Chaluim-chille</p> 	<p>Loads will continue on the A87 northbound.</p> <p>A swept path assessment has been undertaken and indicates that the blade tip will over-sail the bollards on the outside verge of the left-hand bend. Loads will over-sail the inside verge, though no physical mitigation measures will be required.</p> <p>The blade tip will over-sail the bollards on the outside verge of the following right-hand bend where one road sign should be removed. Loads will over-sail the inside verge, though no physical mitigation measures will be required.</p> <p>Swept path assessment SK34 is included in Appendix B.</p>
53	<p>A87 Shullishadder</p> 	<p>Loads will continue on the A87 northbound.</p> <p>A swept path assessment has been undertaken and indicates that the blade tip will over-sail the outside verge of the bend, though no physical mitigation measures will be required.</p> <p>The tree canopy should be trimmed to ensure that there is a 5m clear head height. Trimming works can be subject to ecological time constraints and early engagement with the relevant authority is recommended.</p> <p>Swept path assessment SK35 is included in Appendix B.</p>
54 & 55	<p>A87 / A855 Junction</p> 	<p>Loads will continue on the A87 northbound.</p> <p>A swept path assessment has been undertaken and indicates that the blade tip will over-sail the eastern verge prior to the junction, though no physical mitigation measures will be required.</p> <p>Loads will over-run and over-sail the splitter island where a load bearing surface should be laid, and one lighting column, one road sign, one lit road sign, and one bollard should be removed. Loads will over-run and over-sail the western verge where a load bearing surface should be laid, and the pedestrian guardrail and one lit road sign should be removed. The vegetation should be cleared. Loads should be raised on their suspension settings to over-sail the wall and embankment.</p> <p>Loads will over-sail the north-eastern verge following the junction, though no physical mitigation measures will be required.</p> <p>The tree canopy should be trimmed to ensure that there is a 5m clear head height. Trimming works can be subject to ecological time constraints and early engagement with the relevant authority is recommended.</p> <p>Swept path assessment SK36 is included in Appendix B.</p>
56	<p>A87 northeast of Sulaisiadar Mor</p> 	<p>Loads will continue on the A87 northbound.</p> <p>A swept path assessment has been undertaken and indicates that loads will over-sail both verges through the bend, though no physical mitigation measures will be required.</p> <p>Swept path assessment SK37 is included in Appendix B.</p>

POI	Key Constraint	Details
57	A87 / Woodpark Road Roundabout 	<p>Loads will take the second exit at the roundabout to continue on the A87 northbound.</p> <p>A swept path assessment has been undertaken and indicates that loads will over-sail the north-eastern verge prior to the roundabout, though no physical mitigation measures will be required.</p> <p>Loads will over-sail the south-western verge on entry to the roundabout where one bollard should be removed.</p> <p>Loads will over-sail the exit splitter island where one bollard should be removed.</p> <p>Swept path assessment SK38 is included in Appendix B.</p>
58	A87 Achtalean 	<p>Loads will continue on the A87 northbound.</p> <p>A swept path assessment has been undertaken and indicates that the blade tip will over-sail the bollards on the outside verge of the first left-hand bend where two chevron signs should be removed, and the vegetation should be trimmed. Loads will over-sail the inside verge where the vegetation should be trimmed.</p> <p>The vertical profile of the road at this location is pronounced and should be reviewed during the test run stage to ascertain if tar wedges will be required to prevent grounding.</p> <p>Swept path assessment SK39 is included in Appendix B.</p>
59	A87 northeast of Drumuie 	<p>Loads will continue on the A87 northbound.</p> <p>A swept path assessment has been undertaken and indicates that no physical mitigation measures will be required.</p> <p>The vertical profile of the road at this location is pronounced and should be reviewed during the test run stage to ascertain if tar wedges will be required to prevent grounding.</p> <p>Swept path assessment SK40 is included in Appendix B.</p>

POI	Key Constraint	Details
<p>60 & 61</p>	<p>A87 Drumuie</p> 	<p>Loads will continue on the A87 northbound.</p> <p>A swept path assessment has been undertaken and indicates that the blade tip will over-sail the bollards and safety barrier on the outside verge of the bend where four chevron signs should be removed. Loads will over-sail the inside verge where the vegetation should be trimmed.</p> <p>The vertical profile of the road at this location is pronounced and should be reviewed during the test run stage to ascertain if tar wedges will be required to prevent grounding.</p> <p>Swept path assessment SK41 is included in Appendix B.</p>
<p>62</p>	<p>A87 / A850 Junction</p> 	<p>Loads will turn left at the junction to exit the A87 and join the A850 westbound.</p> <p>A swept path assessment has been undertaken and indicates that loads will over-sail both verges through the bend. One road sign should be removed from each verge.</p> <p>Swept path assessment SK42 is included in Appendix B.</p>
<p>63</p>	<p>A850 Peinmore</p> 	<p>Loads will continue on the A850 westbound.</p> <p>A swept path assessment has been undertaken and indicates that loads will over-sail the inside verge of the second right-hand bend, though no physical mitigation measures will be required.</p> <p>The tree canopy should be trimmed to ensure that there is a 5m clear head height. Trimming works can be subject to ecological time constraints and early engagement with the relevant authority is recommended.</p> <p>Swept path assessment SK43 is included in Appendix B.</p>

POI	Key Constraint	Details
<p>64 & 65</p>	<p>A850 Suledale</p> 	<p>Loads will continue on the A850 westbound.</p> <p>A swept path assessment has been undertaken and indicates that the blade tip will over-sail the outside verge of the right-hand bend where the vegetation should be trimmed. Loads will over-sail the inside verge, though no physical mitigation measures will be required.</p> <p>Swept path assessment SK44 is included in Appendix B.</p>
<p>67</p>	<p>A850 Flashader</p> 	<p>Loads will continue on the A850 westbound.</p> <p>A swept path assessment has been undertaken and indicates that no physical mitigation measures will be required.</p> <p>Swept path assessment SK45 is included in Appendix B.</p>
<p>68</p>	<p>A850 Edinbane</p> 	<p>Loads will continue on the A850 westbound.</p> <p>A swept path assessment has been undertaken and indicates that loads will over-sail both verges through the bend, though no physical mitigation measures will be required.</p> <p>Swept path assessment SK46 is included in Appendix B.</p>
<p>69</p>	<p>A850 Ben Aketil Access Junction</p> 	<p>Loads would turn left into the upgraded access junction for the operational Ben Aketil Wind Farm. The junction would need to be widened in accordance with Vestas guidelines and the requirements of The Highland Council.</p> <p>An extension to the existing load bearing area is required and two road signs should be relocated. Swept path assessment SK48 is included in Appendix B.</p> <p>Loads would then proceed to the turbine locations using an upgraded track as Ben Aketil was designed for Enercon E70 machines. The track would need to be upgraded to meet the V136 track specifications along its whole length.</p>

3.4 Swept Path Assessment Results and Summary

The detailed swept path drawings for the locations assessed are provided in Appendix B for review. The drawings in Appendix B illustrate tracking undertaken for the worst case loads at each location.

The colours illustrated on the swept paths are:

- Grey / Black – OS / Topographical Base Mapping;
- Green – Vehicle body outline (body swept path);
- Red – Tracked pathway of the wheels (wheel swept path); and
- Purple – The over-sail tracked path of the load where it encroaches outwith the trailer (load swept path).

Where mitigation works are required, the extents of over-run and over-sail areas are illustrated on the swept path drawings.

Please note that where assessments have been undertaken using Ordnance Survey (OS) base mapping, there can be errors in this data source.

Where provided by the client, topographical data has been utilised. Please note that PF cannot accept liability for errors on the data source, be that OS base mapping or client supplied data.

3.5 Land Ownership

The limits of road adoption can vary depending upon the location of the site and the history of the road agencies involved. The adopted area is generally defined as land contained within a defined boundary where the road agency holds the maintenance rights for the land. In urban areas, this usually defined as the area from the edge of the footway across the road to the opposing footway back edge.

In rural areas the area of adoption can be open to greater interpretation as defined boundaries may not be readily visible. In these locations, the general rule is that the area of adoption is between established fence / hedge lines or a maximum 2m from the road edge. This can vary between areas and location.

3.6 Summary Issues

It is strongly suggested that following a review of the RSR, the developer should undertake the following prior to the delivery of the first abnormal loads, to ensure load and road user safety:

- That any necessary topographical surveys are undertaken, and the swept path results completed;
- A review of axle loading on structures along the entire access route with the various road agencies is undertaken immediately prior to the loads being transported in case of last minute changes to structures;
- A review of clear heights with utility providers and the transport agencies along the route to ensure that there is sufficient space to allow for loads plus sufficient flashover protection (to electrical installations);
- That any verge vegetation and tree canopies which may foul loads is trimmed prior to loads moving;
- That a review of potential roadworks and or closures is undertaken once the delivery schedule is established in draft form;
- That a test run is completed to confirm the route and review any vertical clearance issues; and
- That a condition survey is undertaken to ascertain the extents of road defects prior to loads commencing to protect the developer from spurious damage claims.

4 Summary

4.1 Summary of Access Review

Pell Frischmann has been commissioned to prepare a Route Survey Report to examine the issues associated with the transport of AIL turbine components to the proposed Balmeanach Wind Farm.

This report identifies the key points and issues associated with the proposed route to site and outlines the issues that will need to be considered for successful delivery of components.

This report has been based upon a worst case of Vestas V136 turbine sections and has been undertaken on the basis of a Superwing Carrier blade trailer.

Various assessment reviews, road modifications, structural reviews, and interventions are required to successfully access the site. If these are undertaken, access to the consented wind farm site is considered feasible.

4.2 Further Actions

The following actions are recommended to pursue the transport and access issues further:

- Prepare detailed mitigation design proposals to help inform the land option / consultee discussions;
- Obtain the necessary land options;
- Undertake discussion with the affected utility providers and roads agencies;
- Obtain the necessary statutory licences to enable the mitigation measures; and
- Develop a detailed operational Transport Management Plan to assist in transporting the proposed loads.

Appendix A Points of Interest

