

Appendix 12.1: Transport Assessment

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An Càrr Dubh Wind Farm

Transport Assessment

March 2023

104565

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Transport Assessment

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Annex A Indicative Junction Design

Annex B Route Survey Report

- A permanent compound containing the control building, substation and energy storage facility;
- A temporary area for the batching of concrete; and
- A habitat and landscape restoration management plan.

In addition to the above components of the operational Proposed Development, construction of the Proposed Development will also require the following components:

- One temporary construction compound;
- The creation of one temporary borrow pit for the extraction of stone, and the reopening/use of two existing borrow pits;
- Junction widening and upgrades at the A83 and the A819; and
- Felling of approximately 3.77 hectares (ha) of forestry to facilitate access during construction.

The operational life of the Proposed Development is anticipated to be for a period of up to 40 years.

2.3 Candidate Turbines

Statkraft has indicated that they wish to consider the maximum case components for a Siemens Gamesa SG155 at a tip height of 180m for use at the site and this has been used as part of this assessment.

The details of the components have been provided by Siemens and are detailed in Table 1 below.

Table 1 Turbine Size Summary (Worst Case Scenario)

| Component | Length (m) | Width (m) | Height (m) | Weight (m) |
|-------------|------------|-----------|------------|------------|
| SG155 Blade | 76.571 | 4.424 | 3.000 | 25.600 |
| Nacelle | 14.620 | 4.200 | 3.500 | 84.000 |
| Drive Train | 7.000 | 3.600 | 3.400 | 83.000 |
| Hub | 4.800 | 4.500 | 4.200 | 50.000 |
| Base Tower | 16.464 | 4.700 | 4.433 | 79.355 |
| Mid Tower 1 | 22.680 | 4.433 | 4.427 | 76.299 |
| Mid Tower 2 | 27.160 | 4.427 | 3.557 | 68.693 |
| Top Tower | 33.610 | 3.557 | 3.574 | 66.933 |

The sections outlined in Table 1 were used for the swept path assessment of the proposed loads along the access route which are presented in the Abnormal Indivisible Loads (AIL) Route Survey Report (RSR) in Annex B.

Assessments undertaken in the RSR have assumed that all blades would be carried on a hybrid trailer to reduce the need for mitigation in constrained sections of the route. Where constraints are significant, the RSR notes that it is possible to raise the scissor lift to a maximum of 10m above the trailer deck which allows loads to be either lifted over height constraints or to be slightly shortened in plan view.

Instances where constraints are extreme, loads would be transferred onto a Goldhofer blade lifting trailer. This trailer has the ability to lift blades up to a maximum angle of 60 degrees, lifting blades over potential constraints and shortening the length plan view. It is planned that blades will be carried on this trailer from south of Tarbert to north of Lochgilphead.

Towers would be carried in a 4+7 clamp adaptor style trailer, whereas loads such as the hub, nacelle housing and top towers would be carried on a six axle step frame trailer.

The selection of the final turbine model and specification will be subject to a commercial procurement process following consent of the application. The assumed dimensions may therefore vary slightly from those assumed as part of this assessment.

Examples of the vehicles and trailers that are likely to transport the loads are shown in Figure 2, 3 and 4.



Figure 2 Hybrid Carrier Trailer



Figure 3 Blade Lifting Trailer



Figure 4 Tower Trailer

3 Transport Policy Review

3.1 Introduction

This chapter of the report provides an overview of relevant national and local transport planning policy.

3.2 National Policy

3.2.1 National Planning Framework 4 (2023)

The Revised Draft National Planning Framework 4 (RDNPF4) was laid in Parliament on 08 November 2022. The National Planning Framework 4 (NPF4) was approved by Scottish Parliament on 11 January 2023 and has been passed to Scottish Ministers to be adopted.

Policy 11: Energy within the RDNPF4 notes that:

“Development proposals for all forms of renewable, low-carbon and zero emissions technologies will be supported. These include:

- *wind farms including repowering, extending, expanding and extending the life of existing wind farms;*
- *energy storage, such as battery storage and pumped storage hydro.*

In addition, project design and mitigation will demonstrate how the following impacts are addressed:

- *impacts on communities and individual dwellings, including, residential amenity, visual impact, noise and shadow flicker;*
- *public access, including impact on long distance walking and cycling routes and scenic routes;*
- *impacts on road traffic and on adjacent trunk roads, including during construction; and*
- *cumulative impacts.*

The NPF4 was approved by Scottish Parliament and is expected to be adopted on 13 February 2023.

3.2.2 Planning Advice Note 75 (PAN75) – Planning for Transport

Planning Advice Note (PAN) 75: Planning for Transport provides advice on the requirements for Transport Assessments. The document notes that:

“... transport assessment to be produced for significant travel generating developments. Transport Assessment is a tool that enables delivery of policy aiming to integrate transport and land use planning.”

“All planning applications that involve the generation of person trips should provide information which covers the transport implications of the development. The level of detail will be proportionate to the complexity and scale of the impact of the proposal...For smaller developments the information on transport implications will enable local authorities to monitor potential cumulative impact and for larger developments it will form part of a scoping exercise for a full transport assessment. Development applications will therefore be assessed by relevant parties at levels of detail corresponding to their potential impact.”

3.2.3 Transport Assessment Guidance (TAG)

Transport Scotland's (TS) Transport Assessment Guidance was published in 2012. It aims to assist in the preparation of Transport Assessments (TA) for development proposals in Scotland such that the likely transport impacts can be identified and dealt with as early as possible in the planning process. The document sets out requirements according to the scale of development being proposed.

The document notes that a TA will be required where a development is likely to have significant transport impacts but that the specific scope and contents of a TA will vary for developments, depending on location, scale and type of development.

3.3 Local Policy

3.3.1 Argyll and Bute Local Development Plan (2015)

Argyll and Bute Local Development (LDP) was adopted in 2015 and is established planning policy for Argyll and Bute.

Policy LDP 6 – Supporting the Sustainable Growth of Renewables outlines that:

“The Council will support renewable energy developments where these are consistent with the principles of sustainable development and it can be adequately demonstrated that there would be no unacceptable significant adverse effects, whether individual or cumulative, including on local communities, natural and historic environments, landscape character and visual amenity, and that the proposals would be compatible with adjacent land uses. A spatial framework for wind farms and wind turbine developments over 50 metres high in line with Scottish Planning Policy will be prepared as Supplementary Guidance.”

Policy LDP 11 – Improving our Connectivity and Infrastructure states that:

“Argyll and Bute Council will support all development proposals that seek to maintain and improve our internal and external connectivity and make best use of our existing infrastructure”

4 Study Methodology

4.1 Introduction

There are three phases of the life of the Proposed Development. All three phases have been considered in this assessment and are as follows:

- The Construction Phase;
- The Operational Phase; and
- The Decommissioning Phase.

4.2 Project Phases – Transport Overview

The construction effects are short lived and transitory in nature, whilst the operational phase assessment has been assumed to be based on a typical operation day following commissioning of the Proposed Development.

The operational phase is restricted to occasional maintenance operation which generate significantly lower volumes of traffic that are not considered to be in excess of daily traffic variation levels on the road network. It should be noted that an assessment of the operational phase has not been undertaken in the Environmental Impact Assessment (EIA) Report.

The decommissioning phase involves fewer trips on the network than the construction phase, as minor elements of infrastructure are likely to be left in place, adding to local infrastructure that can potentially be used for further agricultural or leisure uses in the future. It should be noted that an assessment of the decommissioning phase has not been undertaken in the EIA Report.

4.3 Scoping Discussion

The Applicant submitted a scoping report to Argyll and Bute Council and Transport Scotland in respect of the EIA which included a section considering traffic and transport.

A full review of that scoping opinion is provided in the Access, Traffic and Transport Chapter of the EIA Report (Chapter 12).

5 Baseline Conditions

5.1 Access Arrangement

The Proposed Development will be accessed via the A83 (T), south of Inveraray. The access will follow the proposed Inveraray bypass before joining the A819 for a short section, approximately 1.2km long, before accessing the site, south of Electric Cottage. The Inveraray bypass will connect the A83 (T), to the south of Inveraray to Upper Avenue and subsequently to the A819 to the north-west of Inveraray. Once opened, the Inveraray bypass will only be used by abnormal load vehicles travelling from the south. All other construction vehicles will access the site via the A83 (T) and the site entrance on the A819.

Copies of the indicative Site access junction layout and layout of the Inveraray bypass are provided in Annex A.

A detailed RSR supports this application and is provided in Annex B and identifies the necessary access improvements that will be required to enable loads to access the Site.

Loads will then proceed to the proposed turbine locations via a combination of upgraded existing forestry tracks and newly constructed access tracks.

5.2 Study Area Determination

Scoping with ABC and TS centred around data collection count sites, likely points of origin for materials to assist in developing a suitable study network.

Where feasible, local materials will be sourced which will avoid traffic impacting on local communities as much as possible. It is anticipated that access for construction materials would be predominantly via the A83 (T), to the south of the Site.

It is anticipated that the Port of Entry (PoE) will be the Campbeltown Harbour and AIL deliveries will subsequently to the Site via the A83 (T).

The study area for this assessment is as follows:

- A819, between Inveraray and Cladich;
- A83 (T), between Cairndow and Inveraray;
- A83 (T), between Inveraray and Lochgilphead; and
- A83 (T), between Lochgilphead and Ardrishaig.

The study area network is presented in Figure 5.

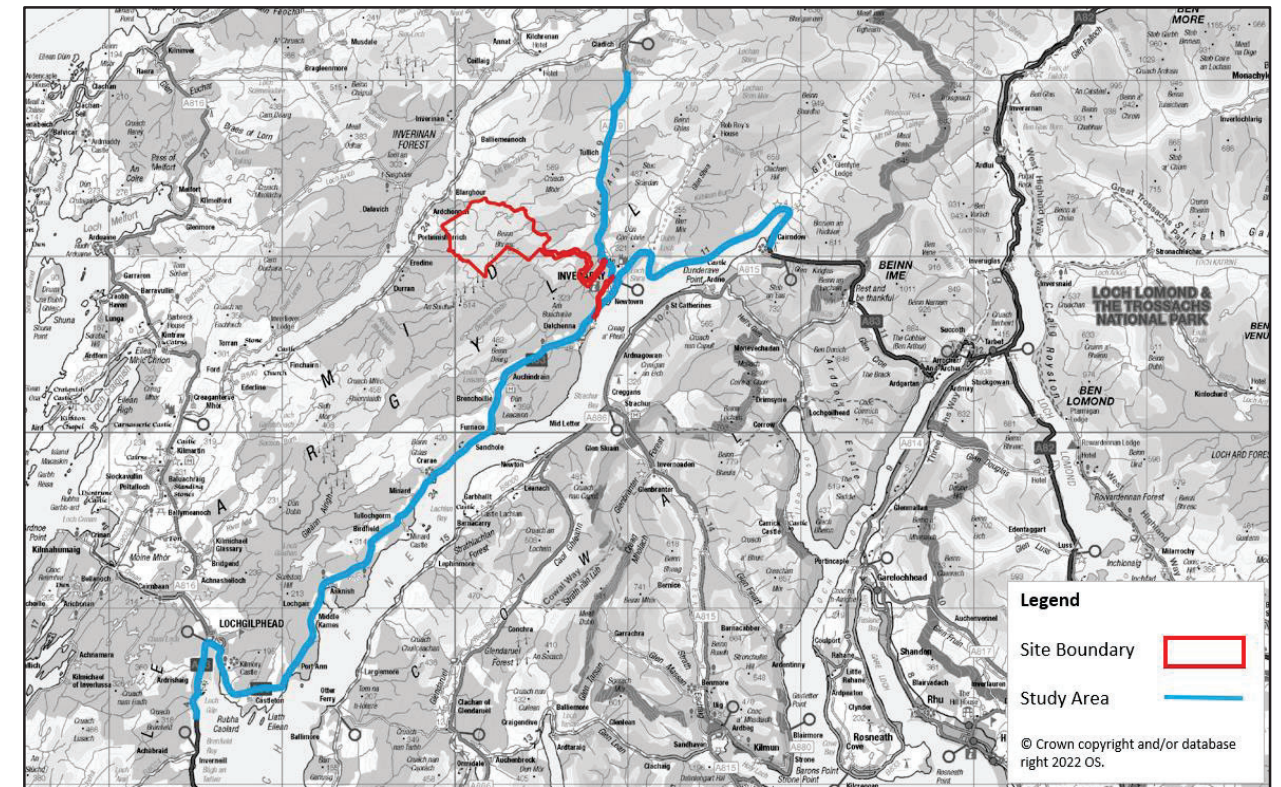


Figure 5 Assessment Study Area

5.3 Pedestrian and Cyclist Networks

A review of Argyll and Bute Paths Map (<https://argyll-bute.maps.arcgis.com/apps/webappviewer/>) indicates that the following core paths are located within the Site boundary:

- Core Path C200(a) – Coille Bhraghaid – Queens Drive – Inveraray which is 1.2km in length and comprises a stone track. Information on the Core Path notes that it is not waymarked.
- Core Path C200(b) – Coille Bhraghaid – Queens Drive – Inveraray which is 4.7km long and comprises a stone track and is not waymarked.

There are a number of Core Paths in the vicinity of the Site which include:

- Core Path C203 – Bealach an Fhuarain, Inveraray (circular) which is approximately 3.7km in length and constructed of a stone track and is not waymarked.
- Core Path C201 – Dun Na Cuaiche, Inveraray which is 3.1km in length and comprises stone track and is not waymarked.
- Core Path C199(e) - Furnace to Inveraray via Kenmore which is 1.5km in length and comprises a path / stone track and is not waymarked.

A review of the Sustrans cycle network plan of the United Kingdom indicates that there are no National Cycle Routes (NCR) in the vicinity of the Site, however, there are a couple of sections of the A83 (T), along the AIL delivery route, which are designated as “On-road route not on the national Cycle Network”.

5.4 Road Access

Access to the Site will be taken from A819 via an upgraded priority junction which will be accommodate the larger components. The junction would be surfaced and constructed so that the junction bell-mouth would be to adoptable standards. The remaining access tracks within the Site would remain privately-owned.

The access junction would have the first 10 m surfaced in a bituminous macadam and appropriate junction markings and reflective junction markers would be provided at the access bell-mouth. The throat of the junction would be widened to a minimum of 5.5 m to ensure that opposing vehicles can pass safely.

Visibility splays of 215 m in both directions with a set-back distance of 4.5 m from the centre of the junction would be provided. The layout of the junction is provided in Annex A.

The A83 (T) forms part of the trunk road network which runs from Campbeltown to Arrochar. The road is maintained by BEAR Scotland, on behalf of Transport Scotland. The A83 (T) is mainly subject to the national speed limit, which reduces when travelling through towns and villages.

The A819 is a two-way single carriageway which links the A83 (T), to the south, to the A85, to the north. The A85 forms part of the trunk road network which links Oban to Perth. Outside of Inveraray, the A819 is mainly subject to the national speed limit and is maintained by ABC.

5.5 Existing Traffic Conditions

In order to assess the impact of traffic on the study area, traffic information was obtained from Department for Transport (DfT) and Transport Scotland (TS) website count sites at the following locations:

1. A819, north of the Site Access (DfT Count Point 30927)¹;
2. A83 (T), Ardgenavan (DfT Count Point 507771);
3. A83 (T), south of Inveraray (DfT Count Point 10765);
4. A83 (T), Minard (DfT Count Point 40768);
5. A83 (T), Lochgilphead (DfT Count Point 20772); and
6. A83 (T), south of Ardrishaig (TS Count Point JCT08339).

Available 2019 flow information was obtained for all locations, as these flows would be unaffected by Covid-related travel restrictions. Traffic flow data was obtained for the A83 (T), near Ardrishaig, from the TS traffic database as there was no suitable DfT count point at this location. Although a full years' worth of data was not available from the TS traffic database at this location, as flow information for the majority of June, all of July and half of August were not available, the extent of the coverage is considered sufficient to estimate Annual Average Daily Flows (AADF).

National Road Traffic Forecast (NRTF) low growth factors were used to factor 2019 flows to 2022 flows. The NRTF low growth factor from 2019 to 2022 is 1.022. The traffic counters allowed the traffic flows to be split into vehicle classes and the data has been summarised into cars / light good vehicles (LGVs) and heavy goods vehicles (HGVs) (buses and all goods vehicles >3.5 tonnes gross maximum weight).

The locations of the traffic count sites are illustrated in Figure 6.

¹ For the purpose of this assessment it is assumed that this count point is located at the Site Access in order to capture construction traffic arriving to the Site from both the north and south along the A819.



Figure 6 Traffic Count Locations

The 24-hour two-way average traffic flows for each of the traffic count locations are presented in Table 2.

Table 2 24-hour Two-way Average Traffic Data (2022)

| No. | Survey Location | Data Source | Cars & Lights | HGV | Total |
|-----|------------------------------|-------------|---------------|-----|-------|
| 1 | A819, Site Access | DfT | 1,312 | 141 | 1,453 |
| 2 | A83 (T), Ardgenavan | DfT | 5,518 | 646 | 6,164 |
| 3 | A83 (T), south of Inveraray | DfT | 2,883 | 317 | 3,200 |
| 4 | A83 (T), Minard | DfT | 2,576 | 317 | 2,893 |
| 5 | A83 (T), Lochgilphead | DfT | 7,047 | 495 | 7,541 |
| 6 | A83 (T), south of Ardrishaig | TS | 1,990 | 205 | 2,195 |

Please note minor variances due to rounding may occur.

5.6 Accident Review

Road traffic accident data for the period commencing 01 January 2018 through to 30 June 2021 was obtained from the online resource CrashMap (crashmap.co.uk) which uses data collected by police about road traffic crashes occurring on British roads. It should be noted that at the time of writing, provisional data for 2021, which is until June, is available from CrashMap.

The statistics are categorised into three categories which include “slight” for damage only incidents, “serious” for injury accidents and “fatal” for accidents that result in death. Accident information which occurred along road links within the study area was analysed.

A summary of analysis of the incidents indicates that:

- A total of 31 incidents within the study area over the analysed period. Of those, 17 were classified as slight, 12 as serious and two as fatal.
- A total of four of these accidents occurred along the A819 road link, within the study area, which were all classified as serious. Two of these incidents were recorded as single vehicle accidents involving motorcycles while HGVs were involved in the two remaining incidents.

- Eighteen accidents were recorded along the A83 (T), to the south of Inveraray. Two of these incidents were recorded as single vehicle accidents involving motorcycles, one of which resulted in fatal injuries. A total of six incidents, along this link, were recorded to involve HGVs, of which, one was recorded as fatal and also involved a car. The two fatal incidents occurred in Middle Kames.
- Nine accidents occurred along the A83 (T), to the north of Inveraray. A total of four of these incidents involved motorcycles and one incident involved an HGV.
- With regards to accidents trends, a review of the above accidents indicates that:
 - To the north of Furnace, three accidents occurred within approximately 500m of each other.
 - In Middle Kames, three incidents occurred within approximately 250m of each other.
 - To the north of Achnaba, four accidents occur within 450m of each other.
 - A review of the above accident locations shows that the topography of the A83 (T) road is winding in nature where the accidents occurred.
- No pedal cycles or buses were recorded to be involved in any incidents within the study area.

The accident locations are presented in Figure 7 below.

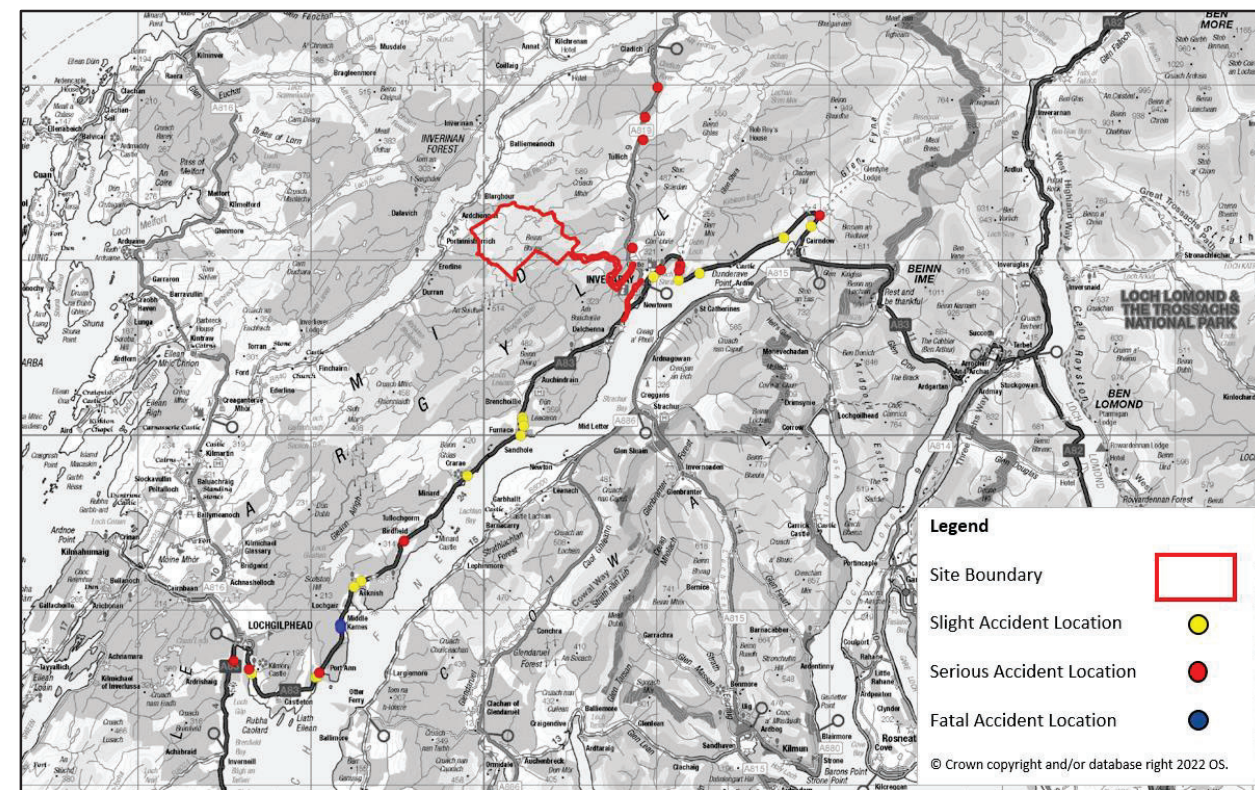


Figure 7 Accident Locations

5.7 Future Baseline Traffic Conditions

Construction of the project is expected to commence in 2027 if consent is granted and it is expected to take up to 18 months.

To assess the likely effects during the construction phase, base year traffic flows were determined by applying a NRTF low growth to the obtained traffic flows. The NRTF low growth factor for 2022 to 2027 is 1.026.

These factors were applied to the DfT traffic flows to estimate the 2027 traffic flows in Table 3.

Table 3 24-hour Two-way Average Traffic Data (2027)

| No. | Survey Location | Data Source | Cars & Lights | HGV | Total |
|-----|------------------------------|-------------|---------------|-----|-------|
| 1 | A819, Site Entrance | DfT | 1,346 | 145 | 1,491 |
| 2 | A83 (T), Ardgenavan | DfT | 5,661 | 663 | 6,324 |
| 3 | A83 (T), south of Inveraray | DfT | 2,958 | 325 | 3,283 |
| 4 | A83 (T), Minard | DfT | 2,643 | 325 | 2,969 |
| 5 | A83 (T), Lochgilphead | DfT | 7,230 | 508 | 7,737 |
| 6 | A83 (T), south of Ardrishaig | TS | 2,042 | 211 | 2,252 |

Please note minor variances due to rounding may occur.

6 Trip Generation and Distribution

6.1 Construction Phase

6.1.1 Trip Derivation

During the 18 month construction period, the following traffic will require access to the Site:

- Staff transport, in either cars or minibuses;
- Construction equipment and materials, deliveries of machinery and supplies such as concrete and crushed rock; and
- Abnormal loads comprising wind turbine sections and also heavy lift crane(s).

Average monthly traffic flow data were used to establish the construction trips associated with the Site based on the assumptions detailed in the following sections.

6.1.2 Construction Staff

Staff would arrive in non-HGV vehicles and where possible will be encouraged to car share. The workforce onsite will depend on the activities undertaken, but, based on previous wind farm construction site experience for a project of this scale which suggests the maximum number of staff expected onsite could be around 35 per day.

For the purposes of estimating traffic movements, it was assumed that 40% of staff would be transported by minibus and 60% would arrive by car (single car occupancy was assumed as the worst case at this stage with potentially fewer movements through car sharing).

Based on these assumptions, staff transport cars and light vehicles would account for a maximum of 48 vehicle trips (24 inbound and 24 outbound) per day during the peak period of construction.

6.1.3 Abnormal Indivisible Load Deliveries

The turbines are broken down into components for transport to the Site. The nacelle, blade and tower sections are classified as Abnormal Indivisible Loads (AIL) due to their weight, length, width and height when loaded. For the purposes of the report, the 'worst case' numbers of components requiring transport are illustrated in Table 4.

Table 4 Turbine Components

| Component | Number of Components per Turbine |
|----------------|----------------------------------|
| Rotor Blades | 3 |
| Tower Sections | 4 |
| Nacelle | 1 |
| Hub | 1 |
| Drive Train | 1 |
| Nose Cone | 1 |
| Transformer | 1 |
| Ancillary | 1 |
| Site Parts | 0.2 |

In addition to the turbine deliveries, two high capacity erection cranes would be needed to offload a number of components and erect the turbines. The cranes are likely to be mobile cranes with a capacity up to 1,000 tonnes that are escorted by boom and ballast trucks to allow full mobilisation onsite. Smaller erector cranes would also be present to allow the assembly of the main cranes and to ease the overall erection of the turbines.

Escort vehicles would accompany the AIL convoys to support the traffic management measures. Up to three vehicles would be deployed and it is assumed that three turbine components would be delivered per convoy.

6.1.4 General Deliveries

Throughout the construction phase, general deliveries will be made to the Site by means of HGV. These would include fuel, site office and staff welfare. At the height of construction, it is assumed that up to 40 journeys to site are made (20 inbound trips and 20 outbound trips) per month.

6.1.5 Material Deliveries

Various materials will need to be delivered to Site to form the site-based infrastructure. At the outset, HGV deliveries will deliver plant and initial material deliveries to the Site to enable the formation of the site compound and to delivery construction machinery.

The Site is large enough to warrant on-site batching of concrete and given its location and length of access, on-site batching will be undertaken. As such, a concrete batching plant will be located within the site boundary. All turbine and substation foundation concrete will be mixed on-site, with deliveries of cement powder and water being delivered by HGV tankers. Sand and aggregate will be delivered by tipper HGV and is expected to originate at quarries located to the south of the Site.

Individual deliveries associated with the raw materials required for onsite batching have been estimated and result in inbound trips of 29 cement tankers, 415 sand & aggregate tippers and 166 water tankers.

Reinforcement required in the foundations across the site are detailed in Table 5 below.

Table 5 Steel Reinforcement Deliveries

| Element | Weight / Installation (t) | Total Weight (t) | Lorry Capacity (t) | Inbound Trips | Total Journeys |
|--|---------------------------|------------------|--------------------|---------------|----------------|
| Turbine Foundation | 133 | 1729 | 30 | 58 | 116 |
| Substation / Control Building Foundation | 20 | 20 | 30 | 1 | 2 |

The on-site access tracks will be constructed from crushed rock and material won from the Site via the borrow pits. This material would also be used to help create the crane pads and has already been assessed as being suitable for use on the Site. To provide a robust assessment however, it is assumed that 50% of the required onsite infrastructure material will be imported to site from quarries located to south of Inverary. Details of the proposed traffic movements are set out in Table 6.

Table 6 Onsite Infrastructure Crushed Stone Estimate

| Element | Volume / Installation (m3) | Lorry Capacity (t) | Inbound Trips | Total Journeys |
|---------------------------|----------------------------|--------------------|---------------|----------------|
| Crushed Stone / Aggregate | 43,682 | 20 | 4806 | 9612 |

The access tracks would generally be 6 m in width and would be designed to accommodate 13 tonne axle loads. In addition to the roads, crane pads will be constructed to enable the turbine erection process. The tracks, crane pads and compounds will require geotextile in the foundations.

To allow abnormal load access through Inveraray, it is proposed to bypass the town using an upgraded access track connecting the A83 (T) to the A819. This track follows the route of an existing forest track that will require upgrading. It is proposed that only AIL traffic will use this bypass and that all stone required for its improvement and widening is sourced from quarries located to the south of Inverary. Table 7 details the crushed stone / aggregate requirements for this bypass track.

Table 7 Inverary Bypass Track Crushed Stone Estimate

| Element | Volume / Installation (m3) | Lorry Capacity (t) | Inbound Trips | Total Journeys |
|---------------------------|----------------------------|--------------------|---------------|----------------|
| Crushed Stone / Aggregate | 6415 | 20 | 706 | 1412 |

Geotextile will be delivered to Site in rolls. A total of 360 large rolls may be required at the Site and would be delivered by HGV.

Cables will connect each turbine to the internal substation and control building. Trip estimates for the cable materials are provided below in Tables 8 and 9.

Three cables are to be provided within each cable trench and would be backfilled with cable sand. The cables and ducting would be likely sourced from sites from the Central Belt, accessing via the A83 (T) from the southeast. Cable sand is assumed to be delivered via from quarry locations to the southwest of Inveraray.

Table 8 Cable Trip Estimate

| Element | Total Cable Length (m) | Length per Drum (m) | Number of Drums | Inbound Trips | Total Journeys |
|---------|------------------------|---------------------|-----------------|---------------|----------------|
| Cables | 54,626 | 500 | 109 | 13 | 26 |

Table 9 Cable Sand Trip Estimate

| Element | Volume / Installation (m3) | Lorry Capacity (t) | Inbound Trips | Total Journeys |
|------------|----------------------------|--------------------|---------------|----------------|
| Cable Sand | 6,145 | 20 | 492 | 984 |

A substation and control building will be constructed on the site. This will require deliveries of building materials and structural elements and would result in 82 journeys.

Batteries will be delivered to the Site and it is assumed that this would result in 84 journeys.

The resulting traffic generation estimates have been plotted onto the indicative construction programme to illustrate the peak journeys on the network. Table 10 illustrates the trip generation throughout the construction programme.

Table 10 Construction Traffic Profile

| Activity | Month | | | | | | | | |
|------------------------------|-------|------|------|------|------|------|------|------|------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Inveraray Bypass | | | | | | 353 | 353 | 353 | 353 |
| Site Establishment | 50 | 50 | | | | | | | |
| General Site Deliveries | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| Imported Stone | 1602 | 1602 | 1602 | 1602 | 1602 | 1602 | | | |
| Reinforcement | | | | 30 | 30 | | 30 | 30 | |
| Concrete Deliveries | | | | 174 | 174 | 174 | 174 | 174 | 174 |
| Cable and Ducting Deliveries | | | | | | | | 12 | |
| Cabling Sand | | | | | | | | 164 | 164 |
| Geotextile Deliveries | | | | 13 | | 13 | | 13 | |
| Substation Building | | | | | | | 21 | 21 | 21 |
| Cranes | | | | | | | | | |
| Batteries Deliveries | | | | | | | | | |
| Forestry Extraction | 39 | 39 | | | | | | | |
| Turbine Deliveries | | | | | | | | | |
| AIL Escorts | | | | | | | | | |
| Commissioning | | | | | | | | | |
| Staff | 1056 | 1056 | 1056 | 1056 | 1056 | 1056 | 1056 | 1056 | 1056 |
| Total HGV | 1731 | 1731 | 1642 | 1858 | 1846 | 2182 | 617 | 806 | 752 |
| Total Cars / LGV | 1056 | 1056 | 1056 | 1056 | 1056 | 1056 | 1056 | 1056 | 1056 |
| Total Movements | 2787 | 2787 | 2698 | 2914 | 2902 | 3238 | 1673 | 1862 | 1808 |
| Total HGV per Day | 79 | 79 | 75 | 84 | 84 | 99 | 28 | 37 | 34 |
| Total Cars / LGV per Day | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 |
| Total per Day | 127 | 127 | 123 | 132 | 132 | 147 | 76 | 85 | 82 |

Continued overleaf

| Activity | Month | | | | | | | | |
|------------------------------|-------|------|------|------|------|------|------|-----|-----|
| | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| Inveraray Bypass | | | | | | | | | |
| Site Establishment | | | | | | | | 50 | 50 |
| General Site Deliveries | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| Imported Stone | | | | | | | | | |
| Reinforcement | | | | | | | | | |
| Concrete Deliveries | 174 | | | | | | | | |
| Cable and Ducting Deliveries | 12 | | 12 | | | | | | |
| Cabling Sand | 164 | 164 | 164 | 164 | | | | | |
| Geotextile Deliveries | | | | | | | | | |
| Substation Building | 21 | | | | | | | | |
| Cranes | | 10 | | | 10 | | | | |
| Batteries Deliveries | | | | | | 42 | 42 | | |
| Forestry Extraction | | | | | | | | | |
| Turbine Deliveries | | 86 | 86 | 86 | 86 | | | | |
| AIL Escorts | | 66 | 66 | 66 | 66 | | | | |
| Commissioning | | | | | | | 60 | 50 | 50 |
| Staff | 1056 | 1056 | 1056 | 1056 | 1056 | 1056 | 1056 | 572 | 572 |
| Total HGV | 411 | 300 | 302 | 290 | 136 | 82 | 82 | 90 | 90 |
| Total Cars / LGV | 1056 | 1122 | 1122 | 1122 | 1122 | 1056 | 1116 | 622 | 622 |
| Total Movements | 1467 | 1422 | 1424 | 1412 | 1258 | 1138 | 1198 | 712 | 712 |
| Total HGV per Day | 19 | 14 | 14 | 13 | 6 | 4 | 4 | 4 | 4 |
| Total Cars / LGV per Day | 48 | 51 | 51 | 51 | 51 | 48 | 51 | 28 | 28 |
| Total per Day | 67 | 65 | 65 | 64 | 57 | 52 | 54 | 32 | 32 |

The peak of construction occurs in Month 6 with 147 journeys (48 Car / Lights and 99 HGV journeys).

6.1.6 Distribution of Construction Trips

The distribution of development traffic on the network would vary depending on the types of loads being transported. The assumptions for the distribution of construction traffic during the peak months would be as follows:

All construction traffic enters the site via the upgraded site access junction leading from the A819.

- In order to provide a robust assessment it is assumed that 50% of the aggregate materials for tracks and hardstandings will be imported to the Site and 100% of aggregate material will be delivered to construct the Inveraray bypass. It is assumed that the aggregate material will be delivered from a quarry to the southwest of Inveraray at Furness;
- Deliveries associated with the batching of concrete on site will arrive via the A83 (T) from the southwest;
- Sand and aggregate for use in the on-site batching plant will be sourced from the A83 (T) to the south. For the purposes of the assessment, it is assumed that all material will be taken from the quarries in Furness. The Balance of Plant (BoP) contractor will confirm final quarry and material sourcing with Argyll and Bute Council in the Construction Traffic Management Plan (CTMP);
- HGV deliveries associated with the HV electrical installation, control buildings, batteries, etc will arrive via the A83 (T) from the Central Belt;
- Staff working at the site are likely to be based locally with 50% travelling from the south of Inveraray, 20% from Inveraray, 20% from the north-east of Inveraray and 10% from the north of the Site; and

- General site deliveries will be from the south via the A83 (T). These are generally smaller rigid HGV vehicles.

Loads relating to the turbine components would be delivered from the proposed PoE for the Site is the Campbeltown Harbour. The port is the closest, suitable port to site and as such is in line with the Government's "Water Preferred" policy towards AIL movements.

The access route from the PoE to site would therefore be as follows:

- Loads will depart the Campbeltown Harbour and continue north on the A83 (T);
- Loads would continue through Tarbert on the A83 (T);
- Loads would continue through Lochgilphead towards Inveraray on the A83 (T);
- Loads will turn left onto the Inveraray bypass and continue along Upper Avenue;
- Loads will then turn left onto the A819; and
- Access to the site entrance would be taken directly from the A819.

To allow access through highly constrained sections between Tarbert and Lochgilphead, blade loads will be transferred onto a blade lifting trailer for this section of the route. Two transfer areas are proposed on the A83 (T) to enable this transfer to occur.

Loads are unable to turn left from the A83 (T) onto the A819. A bypass of Inveraray is proposed based upon the upgrading of an existing forestry track. The bypass access junctions on the A83 (T) and joining the A819 are provided in Annex A.

Details of the transfer stations and bypass route are provided in the Route Survey Report, located in Annex B of this report.

Following the distribution and assignment of traffic flows to the study area network, the resultant daily traffic flows during the peak of construction are summarised in Table 11.

Table 11 Peak Construction Traffic

| No. | Survey Location | Cars & Lights | HGV | Total |
|-----|------------------------------|---------------|-----|-------|
| 1 | A819, Site Entrance | 48 | 99 | 147 |
| 2 | A83 (T), Ardgenavan | 10 | 1 | 10 |
| 3 | A83 (T), south of Inveraray | 48 | 99 | 147 |
| 4 | A83 (T), Minard | 24 | 2 | 26 |
| 5 | A83 (T), Lochgilphead | 24 | 2 | 26 |
| 6 | A83 (T), south of Ardrishaig | 24 | 2 | 26 |

Please note minor variances due to rounding may occur.

6.2 Committed Developments

A review of surrounding developments has been undertaken and noted several consented (i.e., committed developments) in the surrounding area. These are noted in Table 12.

Should other developments located close to the Proposed Development be consented (over and above those in Table 12), any crossover of traffic with the Proposed Development flows could be addressed via a traffic management plan. The inclusion of further traffic flows in the base line (i.e., including non-consented traffic) will dilute the potential impact that the development proposals will have. As such, the approach taken is considered to be an overly robust assessment.

Table 12 Committed Development Traffic Flows

| Development | Included as Committed Development | Cars & Lights | HGV | Total |
|--|---|---------------|-----|-------|
| Blarghour Wind Farm | Yes | 0 | 111 | 111 |
| An Suidhe Substation Extension | No – no traffic generation details available in the public planning record. | | | |
| Ladyfield Forest Meteorological Mast | No – minor traffic generating development. Traffic accounted for in the use of Low NRTF growth factors. | | | |
| Proposed Agricultural Shed | No – minor traffic generating development. Traffic accounted for in the use of Low NRTF growth factors. | | | |
| A819 Land Opposite Kilchurn Castle Viewpoint Dalmally Argyll and Bute | No – retrospective application as substantiate works have been undertaken. | | | |
| Formation of forest access track. Kenachreachan Forest | No – no traffic generation details available in the public planning record. | | | |
| Erection of telecommunications equipment compound with 25 m high lattice tower and associated works East of Keeper's Cottage | No – minor traffic generating development. Traffic accounted for in the use of Low NRTF growth factors. | | | |
| Telecommunications Masts at Tom Breac & Glen Aray | No – minor traffic generating development. Traffic accounted for in the use of Low NRTF growth factors. | | | |

A review of Blarghour Wind Farm EIA Report was undertaken to understand the proposed traffic generation levels associated with this committed scheme. The EIA Report chapter only considered HGV traffic and no provision was made for staff and LGV movements. A total of 111 HGV movements were noted on the A819, with a 50/50 split of traffic to the north and south of Inveraray.

Whilst consented, a new application for a total of 14 larger turbines has been recently submitted². Given the new application, it is considered likely that the development will proceed and may do so within the timescale of the Proposed Development. As such, the traffic generation has been included as committed in the assessment and forms part of the Future Baseline (Baseline + Committed Development) presented in Table 13. These flows will be used in the Construction Peak Traffic Impact Assessment.

Table 13 24-hour Two-way Average Traffic Data (2027) Baseline + Committed Development

| No. | Survey Location | Cars & Lights | HGV | Total |
|-----|------------------------------|---------------|-----|-------|
| 1 | A819, Site Entrance | 1,346 | 256 | 1,602 |
| 2 | A83 (T), Ardgenavan | 5,661 | 718 | 6,379 |
| 3 | A83 (T), south of Inveraray | 2,958 | 436 | 3,394 |
| 4 | A83 (T), Minard | 2,643 | 381 | 3,025 |
| 5 | A83 (T), Lochgilphead | 7,230 | 564 | 7,793 |
| 6 | A83 (T), south of Ardrishaig | 2,042 | 267 | 2,308 |

Please note minor variances due to rounding may occur.

6.3 Decommissioning Phase

Prior to decommissioning of the site, a traffic assessment would be undertaken and appropriate traffic management procedures followed.

The decommissioning phase would result in fewer trips on the road network than the construction or operational phases as it is considered likely that elements of infrastructure such as access tracks would be left in place and structures may be broken up onsite to allow transport by a reduced number of HGV.

² A review of the planning application documents associated with the Blarghour Wind Farm Section 36C Variation Application shows a slight reduction in the peak construction traffic with a total of 108 HGV movements noted on the A819, and the same proposed distribution as the consented scheme. As such, there would be no discernible difference in the traffic impacts associated with Blarghour Wind Farm Section 36C Variation Application.

7 Traffic Impact Assessment

7.1 Construction Impact

The peak month traffic data was combined with the future year (2027) traffic data to allow a comparison between the baseline results to be made. The increase in traffic volumes is illustrated in percentage increases for each class of vehicle. This is illustrated in Table 14.

Table 14 Peak Construction Traffic (Baseline + Committed Development + Development)

| No. | Location | Cars & Lights | HGV | Total | Cars & Lights % Increase | HGV % Increase | Total Traffic % Increase |
|-----|------------------------------|---------------|-----|-------|--------------------------|----------------|--------------------------|
| 1 | A819, Site Entrance | 1,394 | 355 | 1,749 | 3.57% | 38.79% | 9.19% |
| 2 | A83 (T), Ardgenavan | 5,671 | 719 | 6,390 | 0.17% | 0.08% | 0.16% |
| 3 | A83 (T), south of Inveraray | 3,006 | 535 | 3,541 | 1.62% | 22.74% | 4.34% |
| 4 | A83 (T), Minard | 2,667 | 383 | 3,050 | 0.91% | 0.48% | 0.85% |
| 5 | A83 (T), Lochgilphead | 7,254 | 565 | 7,819 | 0.33% | 0.32% | 0.33% |
| 6 | A83 (T), south of Ardrishaig | 2,066 | 269 | 2,334 | 1.18% | 0.68% | 1.12% |

Please note minor variances due to rounding may occur.

The total traffic movements are not predicted to increase by more than 30% on all of the study network. It should also be noted the construction phase is transitory in nature and the peak of construction activities is short-lived.

A review of existing road capacity has been undertaken using the Design Manual for Roads and Bridges, Volume 15, Part 5 "The NESMA Manual". The theoretical road capacity has been estimated for each of the road links for a 12-hour period that makes up the study area. The results are summarised in Table 15.

Table 15 2027 Daily Traffic (12hr) Capacity Review Summary (including Committed Development Flows)

| No. | Location | 2027 Baseline Flow | 2027 Base + Development Flows | Theoretical Road Capacity (12 hr) | Spare Road Capacity % |
|-----|------------------------------|--------------------|-------------------------------|-----------------------------------|-----------------------|
| 1 | A819, site access | 1,602 | 1,749 | 21,600 | 91.9% |
| 2 | A83 (T), Ardgenavan | 6,379 | 6,390 | 21,600 | 70.4% |
| 3 | A83 (T), south of Inveraray | 3,394 | 3,541 | 19,200 | 81.6% |
| 4 | A83 (T), Minard | 3,025 | 3,050 | 21,600 | 85.9% |
| 5 | A83 (T), Lochgilphead | 7,793 | 7,819 | 19,200 | 59.3% |
| 6 | A83 (T), south of Ardrishaig | 2,308 | 2,334 | 19,200 | 87.8% |

Please note minor variances due to rounding may occur.

The results indicate there are no road capacity issues with the Proposed Development and ample spare capacity exists within the trunk and local road network to accommodate construction phase traffic.

8 Proposed Traffic Mitigation Measures

8.1 Construction Phase

The following measures would be implemented through a Construction Traffic Management Plan (CTMP) during the construction phase. The CTMP would be agreed with Argyll and Bute Council prior to construction works commencing:

- Agree AIL route modifications and improvements with Argyll and Bute Council and Transport Scotland and other relevant stakeholders.
- Where possible the detailed design process would minimise the volume of material to be imported to site to help reduce HGV numbers;
- A site worker transport and travel arrangement plan, including transport modes to and from the worksite (including pick up and drop off times);
- An Abnormal Load Transport Management Plan;
- All materials delivery lorries (dry materials) should be sheeted to reduce dust and stop spillage on public roads;
- Specific training and disciplinary measures should be established to ensure the highest standards are maintained to prevent construction vehicles from carrying mud and debris onto the carriageway;
- Wheel cleaning facilities may be established at the site entrance, depending the views of Argyll and Bute Council and Transport Scotland (for the Inveraray bypass);
- Normal site working hours would be limited to between 0700 and 1900 (Monday to Friday) and 0700 and 1300 (Saturday) though component delivery and turbine erection may take place outside these hours;
- Appropriate traffic management measures would be put in place on the A83 (T) at the access to the Inveraray bypass and along the A819 at the access to the Inveraray bypass in the vicinity of the Site access junction to avoid conflict with general traffic, subject to the agreement of the roads authority. Typical measures would include HGV turning and crossing signs and / or banksmen at the site access and warning signs;
- Provide construction updates on the project website and or a newsletter to be distributed to residents within an agreed distance of the site.
- Adoption of a voluntary speed limit of 15 mph for all HGV construction vehicles through Ardrishaig, Lochgilphead, Lochgair, Furnace and Inveraray;
- All drivers would be required to attend an induction to include:
 - A tool box talk safety briefing;
 - The need for appropriate care and speed control;
 - A briefing on driver speed reduction agreements (to slow site traffic at sensitive locations through the villages); and
 - Identification of the required access routes and the controls to ensure no departure from these routes.

Argyll and Bute Council and Transport Scotland are highly likely to require an agreement to cover the cost of abnormal wear and tear on the A83 (T).

Video footage of the pre-construction phase condition of the abnormal loads access route and the construction vehicles route would be recorded to provide a baseline of the state of the road prior to any construction work commencing. This baseline would inform any change in the road condition during the construction stage of the proposed development. Any necessary repairs would be coordinated with the Roads Authority. Any damage

caused by traffic associated with the proposed development, during the construction period that would be hazardous to public traffic, would be repaired immediately.

Any damage to road infrastructure caused directly by construction traffic would be made good, and street furniture that is removed on a temporary basis would be fully reinstated.

There would be a regular road edge review and any debris and mud would be removed from the public carriageway to keep the road clean and safe during the initial months of construction activity, until the construction junction and immediate access track works are complete.

8.1.1 AIL Mitigation Works

An AIL RSR highlights a number of constraint points which have been assessed within the report using swept path assessment software. The locations of the constraint points and the swept path drawings are included in Annex B.

Annex B identifies key points and issues associated with the route that requires:

- Site access junction upgrade;
- Temporary removal of obstacles such as traffic lights, light columns, road signs, bollards and guardrails;
- Vegetation to be cleared or trimmed;
- Overhead utilities and obstructions to be temporarily removed and protection provided to underground utilities;
- Laying of load bearing surfaces;
- Introducing contraflow and parking restriction measures;
- Reprofiting of land in the verge; and
- Placing a culvert at drainage ditch at A83 (T), South Craleckan.

The existing site access junction is to be upgraded to accommodate the delivery of AILs. The general arrangement of the proposed road junctions (site access and Inveraray bypass junctions) are provided in Annex A.

AIL mitigation works can be designed to be temporary in nature to enable the restoration to their original condition (if required by Argyll and Bute Council and Transport Scotland).

8.1.2 Abnormal Load Management Plan

There are a number of traffic management measures that could help reduce the effect of abnormal load convoys.

All abnormal load deliveries would be undertaken at appropriate times (to be discussed and agreed with the relevant roads authorities and police) with the aim to minimise the effect on the local road network. It is likely that the abnormal load convoys would travel in the early morning periods, before peak times while general construction traffic would generally avoid the morning and evening peak periods.

The majority of potential conflicts between construction traffic and other road users will occur with abnormal load traffic. General construction traffic is not likely to come into conflict with other road users as the vehicles are smaller and road users are generally more accustomed to them.

Advance warning signs would be installed on the approaches to the affected road network. Information signage could be installed to help assist drivers and an example is illustrated in Figure 8. Flip up panels (shown in grey) would be used to mask over days where convoys would not be operating. When no convoys are moving, the sign would be bagged over by the Traffic Management contractor.

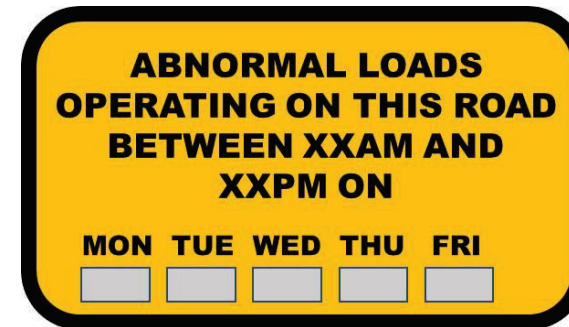


Figure 8 Example Information Sign

This signage will assist in helping improve driver information and allow other road users to consider alternative routes or times for their journey (where such options exist).

The location and numbers of signs would be agreed post consent and would form part of the wider Traffic Management Proposal for the project.

The Abnormal Load Transport Management Plan would also include:

- Procedures for liaising with the emergency services to ensure that police, fire and ambulance vehicles are not impeded by the loads. This is normally undertaken by informing the emergency services of delivery times and dates and agreeing communication protocols and lay over areas to allow overtaking;
- A diary of proposed delivery movements to liaise with the communities to avoid key dates;
- A protocol for working with local businesses to ensure the construction traffic does not interfere with deliveries or normal business traffic; and
- Proposals to establish a construction liaison committee to ensure the smooth management of the project / public interface with the applicant, the construction contractors, the local community, and if appropriate, the police forming the committee. This committee would form a means of communicating and updating on forthcoming activities and dealing with any potential issues arising.

8.1.3 Public Information

During the construction period, a project website would be regularly updated with project news to provide the latest information to the community. In relation to traffic movements associated with the AIL /turbine component delivery, the website will be kept up to date, and other methods, as such as a text messaging service will be investigated. Convoy System

A police escort would be required to facilitate the delivery of the predicted loads. The police escort would be further supplemented by a civilian pilot car to assist with the escort duty. It is proposed that an advance escort would warn oncoming vehicles ahead of the convoy, with one escort staying with the convoy at all times. The escorts and convoy would remain in radio contact at all times where possible.

The abnormal loads convoys would be no more than three AILs long, or as advised by the police, to permit safe transit along the delivery route and to allow limited overtaking opportunities for following traffic where it is safe to do so.

The times in which the convoys would travel will need to be agreed with Police Scotland who have sole discretion on when loads can be moved.

8.1.4 Access Management Plan

Within the Site and on the Inveraray bypass, consideration has been given to pedestrians and cyclists alike due to potential interactions between construction traffic and users of the paths. A Path Planning Study will be conducted post consent and will be secured through a planning condition. Findings from the study will be used to formulate a set of measures into an Access Management Plan (AMP). An outline AMP is provided as Appendix 13.1 of the EIA Report.

Users of the Rights of Way will be separated from construction traffic through the use of barriers, and this will ensure that safe access to the site for recreational purposes will be maintained. Crossing points will be provided where required, with path users having right of way. Appropriate Traffic Signs Manual Chapter 8 compliant temporary road signage would be provided to assist at these crossings for the benefit of all users.

The principal contractor will ensure that speed limits are always adhered to by their drivers and associated subcontractors. This is particularly important within close proximity to the Rights of Way and at crossing points. Advisory speed limit signage will also be installed on approaches to areas where path users may interact with construction traffic.

Signage will be installed on the Site exits that makes drivers aware of local speed limits and reminding drivers of the potential presence of pedestrians and cyclists in the area. This will also be emphasised in the weekly tool box talks.

8.2 Operational Phase Mitigation

Site entrance roads will be well maintained and monitored during the operational life of the development. Regular maintenance will be undertaken to keep the site access track drainage systems fully operation and to ensure there are no run-off issues onto the public road network.

9 Summary and Conclusions

Pell Frischmann (PF) has been commissioned by LUC to undertake a Transport Assessment (TA) for the proposed An Càrr Dubh Wind Farm, on behalf of Car Duibh Wind Farm Limited .

Existing traffic data established a base point for determining the impact during the construction phase and was factored to future levels to help determine the effect of construction traffic on the local road network.

The construction traffic would result in a temporary increase in traffic flows on the road network surrounding the Proposed Development. The maximum traffic effect associated with construction of the Proposed Development is predicted to occur in Month 6 of the construction programme. During this month, an average of 99 HGV movements is predicted per day and it is estimated that there would be a further 48 car and light van movements per day to transport construction workers to and from the Site.

A series of mitigation measures and management plans have been proposed to help mitigate and offset the impacts of both the construction and operational phase traffic flows.

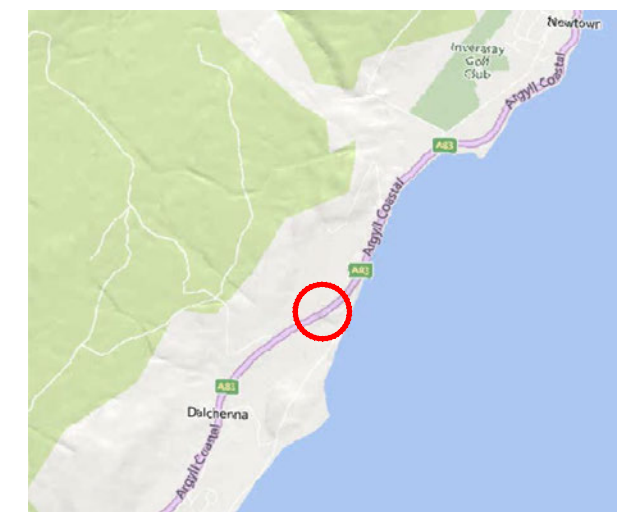
No link capacity issues are expected on any of the roads assessed due to the additional movements associated with the Proposed Development. The effects of construction traffic are temporary in nature and are transitory.

Annex A Indicative Junction Design

Figure 4.12: Indicative Junction Design on A83

KEY:

 Proposed Junction



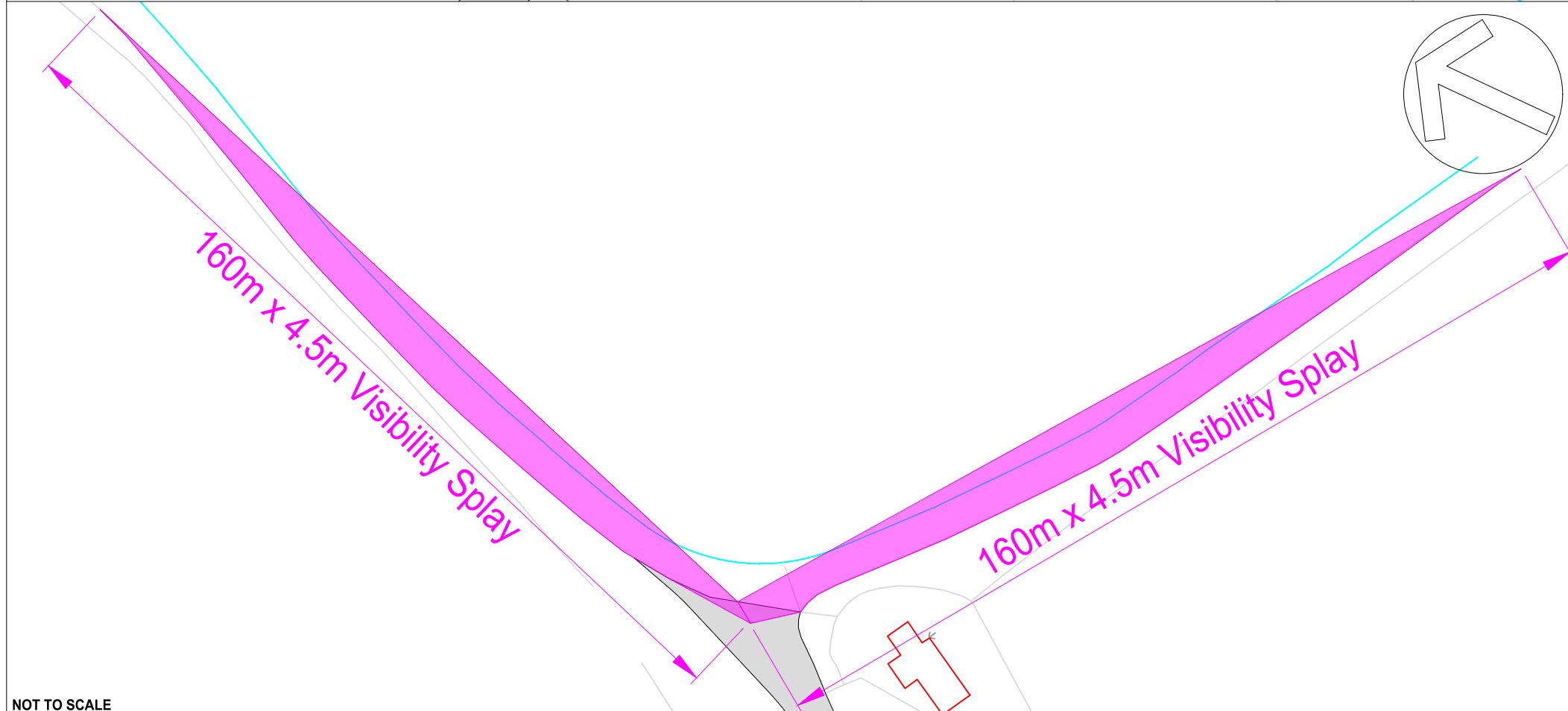
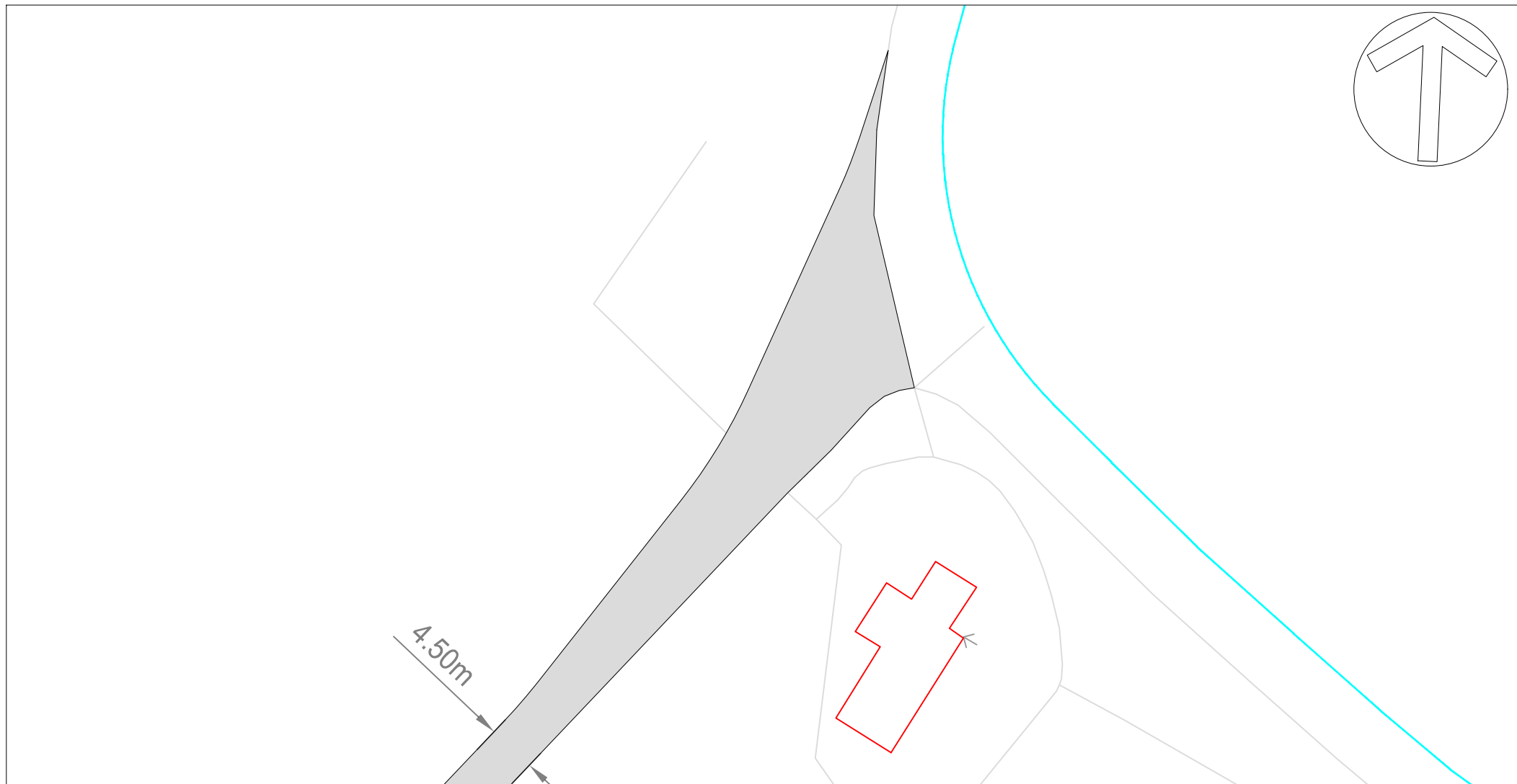
NOT TO SCALE

THIS DRAWING HAS BEEN PRODUCED FOR DISCUSSION / DESIGN DEVELOPMENT PURPOSES ONLY
Drawing Reference: 104565

Figure 4.13: Indicative Junction Design on Upper Ave / A819

KEY:

- Proposed Junction
- 160m x 4.5m Visibility Splay



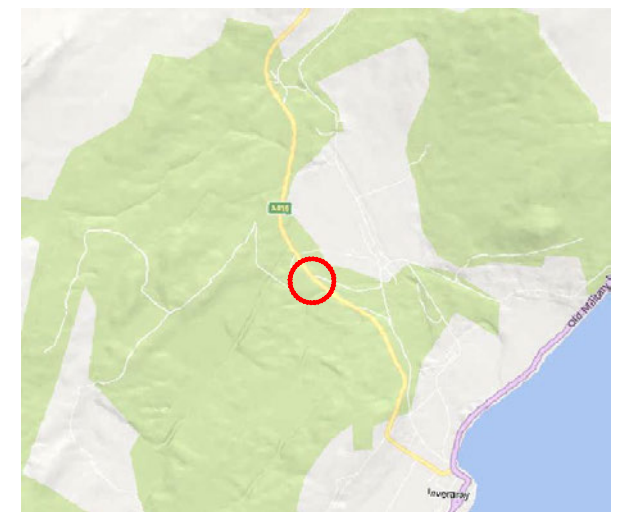
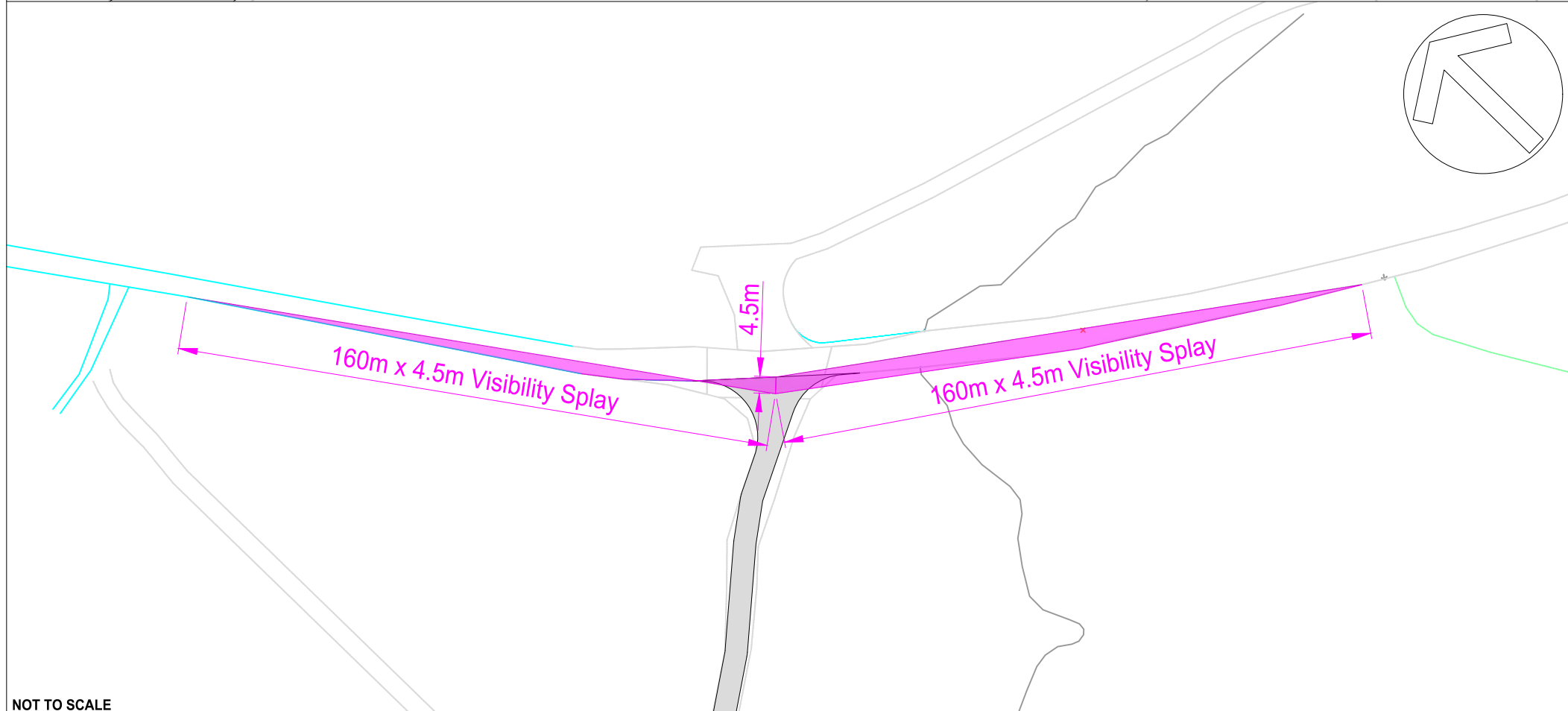
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Figure 4.14: Indicative Junction Design on A819

KEY:

- Proposed Junction
- 160m x 4.5m Visibility Splay



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Pell Frischmann

Car Duibh Wind Farm

Abnormal Indivisible Load Route Survey



November 2020
104639

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- Appendix A - Points of Interest Locations**
- Appendix B - Swept Path Assessments**
- Appendix C - ESDAL Consultation**

1 Introduction

1.1 Purpose of the Report

Pell Frischmann (PF) has been commissioned by Statkraft to undertake a desktop access review of potential delivery routes for wind turbine Abnormal Indivisible Loads (AIL) associated with the construction and development of Car Duibh Wind Farm, located to the west of Inveraray, Argyll and Bute.

The Route Survey Report (RSR) has been prepared to help inform Statkraft on the likely issues associated with the development of the site with regards to off-site transport and access for AIL traffic. The report identifies the key issues associated with AIL deliveries and notes that remedial works, either in 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 between PF and Statkraft at this point in time.

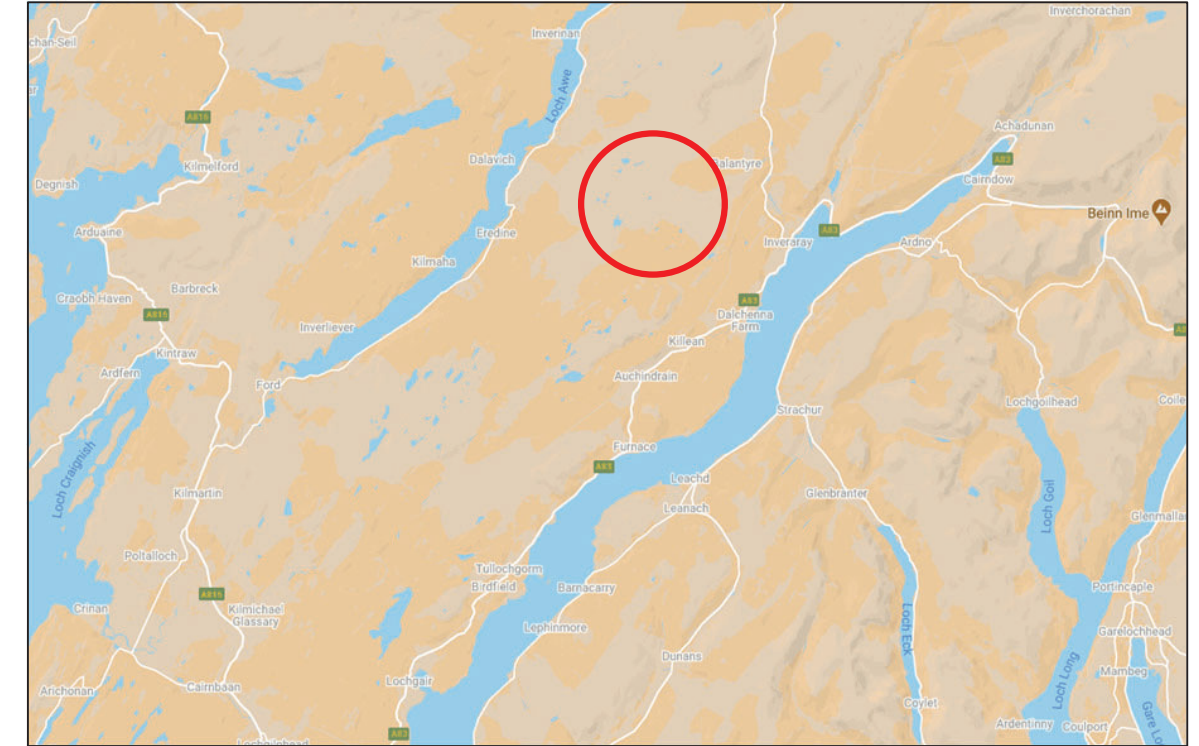
It is the responsibility of the wind turbine supplier to ensure that the entirety of the proposed access route is suitable and meets with their satisfaction. The turbine supplier will be responsible for ensuring that the finalised proposals meet with the appropriate levels of health and safety consideration for all road users has been made in accordance, in line with the relevant legislation at the time of delivery.

2 Site Background

2.1 Site Location

The development site is located to the west of Inveraray, Argyll and Bute. Figure 1 illustrates the general site location.

Figure 1: Site Location Plan



2.2 Candidate Turbines

Statkraft have indicated that they wish to consider the use of Siemens Gamesa SGRE155 turbines at 180m tip heights. The details of the components are summarised in Table 2-1.

Table 2.1: Turbine Size Summary

| Component | Length (m) | Width (m) | Height / Min Diameter (m) | Weight (t) |
|-------------|------------|-----------|---------------------------|------------|
| SG155 Blade | 76.571 | 4.424 | 3.000 | 25.600 |
| Nacelle | 14.620 | 4.200 | 3.500 | 84.000 |
| Drive Train | 7.000 | 3.600 | 3.400 | 83.000 |
| Hub | 4.800 | 4.500 | 4.200 | 50.000 |
| Base Tower | 16.464 | 4.700 | 4.433 | 79.355 |
| Mid Tower 1 | 22.680 | 4.433 | 4.427 | 76.299 |
| Mid Tower 2 | 27.160 | 4.427 | 3.557 | 68.693 |
| Top Tower | 33.610 | 3.557 | 3.574 | 66.933 |

The assessment has been based on the Blade and Mid Tower 2.

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 hybrid trailer 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.

Where constraints are extreme, loads would be transferred onto a Goldhofer blade lifting trailer. This trailer has the ability to lift blades up to a maximum angle of 60 degrees, lifting blades over potential constraints and shortening the length plan view. It is planned that blades will be carried on this trailer from south of Tarbert to north of Lochgilphead.

Overhead utilities and obstructions should be removed at any locations that the blade is raised on the scissor lift.

Towers would be carried in a 4+7 clamp adaptor style trailer, whereas loads such as the hub, nacelle housing and top towers would be carried on a six axle step frame trailer.

Figure 2: Hybrid Carrier Trailer



Figure 3: Blade Lifting Trailer



Figure 4: Tower Trailer



3 Access Route Review

3.1 Access Route

The nearest Port of Entry for the site is Campbeltown Harbour. This is the only feasible port due to restrictions on wider A83 at Inveraray, Tarbert, and Arrochar. The port has been previously used by turbine imports in the past, having been used for Beinn an Turic, Allt Dearg, Tangy, A'Chruach, and Carraig Gheal Wind Farms.

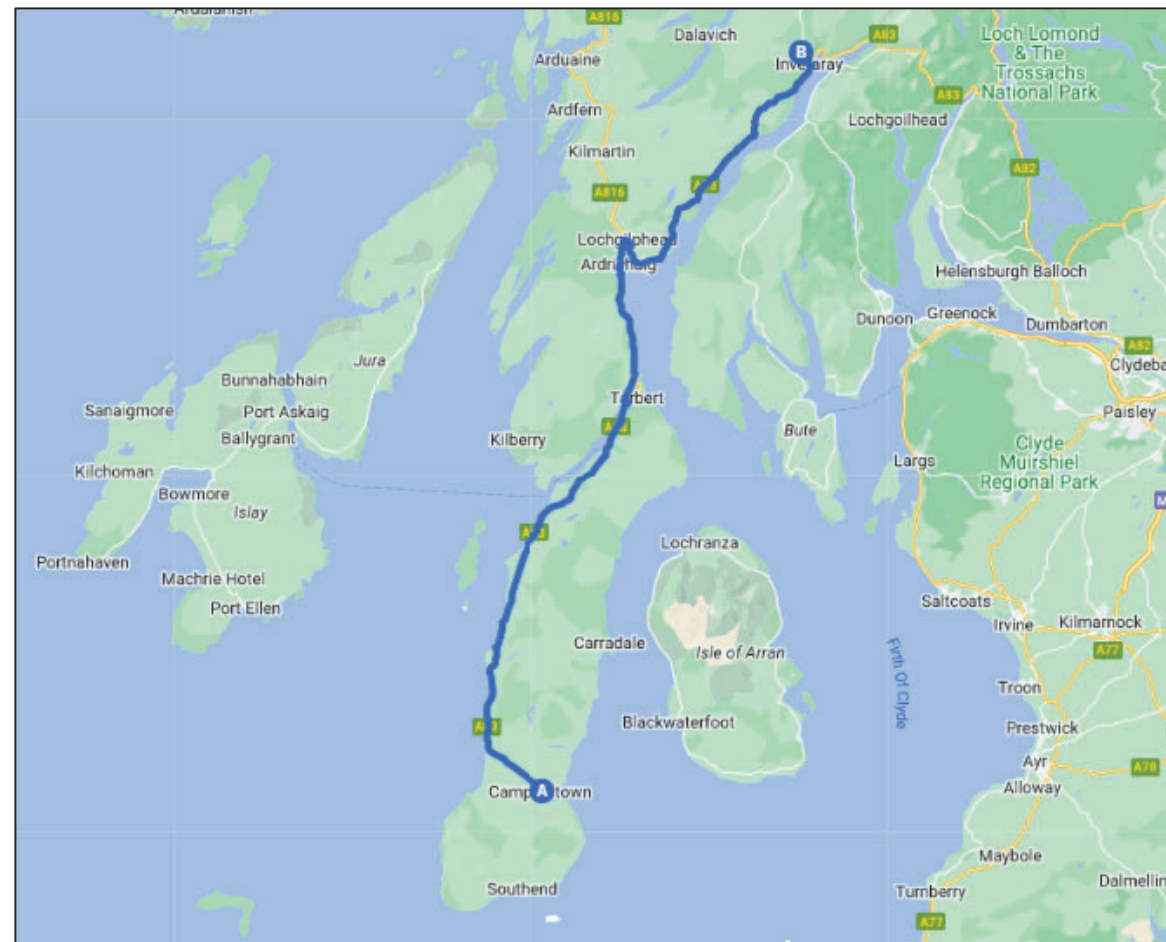
Loads can be offloaded by geared vessels, onshore mobile cranes or using the redundant ferry service RO/RO ramps (subject to suitable vessel / ramp interface). The quay at Campbeltown has been upgraded to accommodate heavier offshore tower sections and the access road to and from the quay is well proven.

The proposed access route to the location where the routes would branch off from is as follows:

- Loads would exit Campbeltown Harbour and continue north on the A83;
- Loads would continue through Tarbert on the A83;
- Loads would continue through Lochgilphead towards Inveraray on the A83;
- Loads would bypass Inveraray before joining the A819; and
- Loads would turn left into the site access junction and would then continue to the turbine locations using new and upgraded access tracks.

The proposed access route is illustrated in Figure 5.

Figure 5: Proposed Access Route



3.2 Route Constraints




The constraints noted in the review are detailed in Table 3-1. These cover all constraints from the port access gates through to the site access junction. No consideration of the transport issues within the port or within the development site have been undertaken and this includes the design of the site access junction.





Where the blade loads are raised using the scissor lift or blade lifting trailers, all overhead obstacles and utilities should be removed. Loads should be returned to the horizontal position as soon as the constraint point is negotiated.




Plans illustrating the location of the constraints and a detailed list of POI are provided in Appendix A.




Table 3.1: Constraint Points and Details




| POI | Key Constraint | Details |
|-----|------------------------------------|---|
| 1 | Egress from Campbeltown Port | <p>Loads will depart Campbeltown Port and turn right onto the Hall Street. Loads will contraflow the section and parking should be suspended.</p> <p>The blade tip oversail of the fence and gate subject to confirmation during the test run (to avoid the need to use the scissor lift at the port).</p> <p>Loads will overrun and oversail the inside of the right turn from the port where the existing overrun area should be utilised. One light column, one road sign and a section of guardrail should be removed.</p> <p>The existing overrun area in the central reserve should be extended with a load bearing surface and two trees and a flower bed should be removed.</p> <p>Swept path assessment SK01 is included in Appendix B.</p> |
| 2 | Hall Street / Quay Head Roundabout | <p>Loads will contraflow through the roundabout.</p> <p>Loads will oversail the central reserve on approach to the roundabout where bollards will be oversailed. Loads will oversail the eastern footway on approach however no physical mitigation is required. Parking should be suspended.</p> <p>Loads will oversail the eastern edge of the roundabout island and the western footway on exit from the roundabout. No physical mitigation is required.</p> <p>Swept path assessment SK02 is included in Appendix B.</p> |





| POI | Key Constraint | Details |
|-----|--|---|
| 3 | Aqualibrium Avenue Left Bend  | <p>Loads will continue through the left turn onto Aqualibrium Avenue. It is proposed that the blade will be raised on the scissor lift to allow the tip to oversail trees within the eastern verge. All overhead utilities and obstacles should be removed.</p> <p>Loads will overrun and oversail the north eastern footway and verge of the left bend where a load bearing surface should be laid and one lighting column should be removed. Three trees should be trimmed to allow oversail. It is recommended that a land search is completed to confirm the extent of adopted boundary.</p> <p>Loads will oversail the footway on the inside of the left bend. Loads will overrun and oversail the northern footway on exiting the bend where a load bearing surface should be laid and existing utilities should be protected.</p> <p>Swept path assessment SK03 is included in Appendix B.</p> |
| 4 | Aqualibrium Avenue Right Bend  | <p>Loads will continue through the right bend. The blade will be raised on the scissor lift through this section. It should be lowered once the bend has been negotiated.</p> <p>Loads will oversail the southern footway and verge on entry to the bend where one lighting column should be removed. It is recommended that a land search is completed to confirm the extent of the adopted boundary.</p> <p>Loads will overrun and oversail the western footway through the bend where load bearing surfaces should be laid and existing utilities should be protected.</p> <p>Loads will oversail the footways on the inside of the bend where one sign post and one lighting column should be removed.</p> <p>Swept path assessment SK04 is included in Appendix B.</p> |
| 5 | A83 Mill Knowe  | <p>Loads will continue north on the A83.</p> <p>Loads will oversail the footway on the inside of the right bend. Parking should be banned through the section to allow loads to utilise the entire road width.</p> |






| POI | Key Constraint | Details |
|-----|--|--|
| 6 | A83 Millknowe Road  | <p>Loads will overrun and oversail the eastern verge where a load bearing surface should be laid and two lighting columns and four road signs should be removed.</p> <p>Loads will oversail the footway on the inside of the bend however no physical mitigation is required.</p> <p>Swept path assessment SK05 is included in Appendix B.</p> |
| 7 | A83 Balegreggan  | <p>Loads will continue north on the A83.</p> <p>Loads will oversail the footway on the inside of the right bend. No physical mitigation is required.</p> |
| 8 | A83 Lagnagarach  | <p>Loads will continue north west on the A83.</p> <p>Loads will oversail both sides of the road through the section. Vegetation should be trimmed in the north eastern verge and one lighting column should be removed from the south western.</p> <p>Swept path assessment SK06 is included in Appendix B.</p> |
| 9 | A83 Kilmaho  | <p>Loads will continue north on the A83.</p> <p>Loads will straddle the centreline through the section. Vegetation should be trimmed to allow loads to oversail the inside of the bend.</p> |






| POI | Key Constraint | Details |
|-----|---|--|
| 10 | <p>A83 south of Kilchenzie</p>  | <p>Loads will continue north through the section.</p> <p><i>The OS base mapping does not identify the road edge through the section. An indicative road edge is provided for illustration only and should be confirmed during the test run.</i></p> <p>Loads will overrun the western verge and oversail into third party land. Load bearing surfaces should be laid and all traffic bollards removed. The blade tip will oversail the stone wall.</p> <p>Vegetation should be trimmed throughout.</p> <p>Swept path assessment SK07 is included in Appendix B.</p> |
| 11 | <p>A83 Kilchenzie</p>  | <p>Loads will oversail into third party land on the inside and outside of the bend where a section of fence and gate should be removed from the western verge.</p> <p>The blade tip will oversail the stone wall in the eastern verge.</p> <p>The clearances to overhead power lines at this location should be reviewed with the utility provider prior to loads moving to ensure that there is sufficient head height and flashover protection for all temperature ranges.</p> <p>Swept path assessment SK08 is included in Appendix B.</p> |
| 12 | <p>A83 Drum</p>  | <p>Loads will oversail the verge on the inside of the left bend where vegetation should be trimmed.</p> <p>Oncoming vehicles should be held in advance of the bend.</p> |





| POI | Key Constraint | Details |
|-----|--|--|
| 13 | <p>A83 Low Ballevain</p>  | <p>Loads will continue north through the right bend.</p> <p><i>The OS base mapping does not identify the road edge through the section. An indicative road edge is provided for illustration only and should be confirmed during the test run.</i></p> <p>Loads will overrun the western verge and oversail into third party land where one chevron sign should be removed. A load bearing surface should be laid and one chevron sign and several bollards should be removed. Detailed design is required to confirm whether verge strengthening is required.</p> <p>A topographical survey is required at this location.</p> <p>The clearances to overhead power lines at this location should be reviewed with the utility provider prior to loads moving to ensure that there is sufficient head height and flashover protection for all temperature ranges.</p> <p>Swept path assessment SK09 is included in Appendix B.</p> |
| 14 | <p>A83 Rosehill</p>  | <p>Loads will oversail the verge on the inside of the bend where vegetation should be trimmed.</p> <p>Oncoming vehicles should be held in advance of the bend.</p> |
| 15 | <p>A83 northwest of Glencreggan</p>  | <p>Loads will oversail the verge on the inside of the bend where vegetation should be trimmed.</p> <p>Oncoming vehicles should be held in advance of the bend.</p> |






| POI | Key Constraint | Details |
|-----|--|--|
| 16 | <p>A83 Druim an Rathaid</p>  | <p>Loads will continue through the bends near Musadale.</p> <p>A historic topographical survey of the section has been utilised.</p> <p>Loads will oversail into third party land on the outside of the two right bends where the blade tip will oversail the safety barrier and vegetation / trees should be removed. All street furniture should be removed.</p> <p>Loads will oversail into third party land on the inside of the initial right bend where a section of fence and several bollards should be removed. The land should be reprofiled to allow oversail.</p> <p>Loads will oversail the inside of the second right bend where traffic bollards should be removed.</p> <p>Loads will oversail into third party land on both side of the road through the following left bend where a section of fence and one road sign should be removed. Vegetation should be cleared.</p> <p>Swept path assessment SK10 is included in Appendix B.</p> |
| 17 | <p>A83 North Muasdale</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> |
| 18 | <p>A83 Beachmenach</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> |



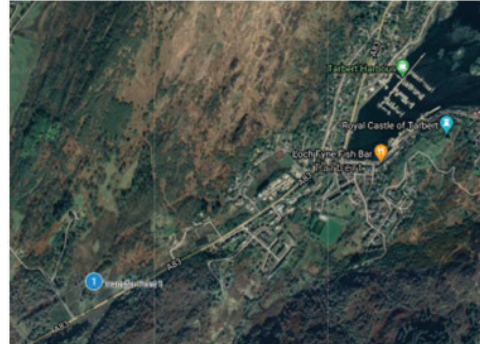
| POI | Key Constraint | Details |
|-----|--|---|
| 19 | <p>A83 Killean</p>  | <p>The vertical profile of the road at this location is pronounced and should be reviewed during the test run stage to ascertain if tar wedges will be required to prevent grounding.</p> |
| 20 | <p>A83 south of Tayinloan</p>  | <p>Loads will straddle the verge on the inside of the bend where vegetation should be trimmed.</p> <p>Throughout the route, the tree canopy needs to be trimmed to provide a clear 5m head height. Trimming of the tree canopy can be subject to ecological constraints and it is suggested that early consultation with Transport Scotland is undertaken to agree cutting times and permits.</p> |
| 21 | <p>A83 Achanadriane</p>  | <p>Loads will continue north on the A83 through Achanadriane.</p> <p><i>The OS base mapping does not identify the road edge through the section. An indicative road edge is provided for illustration only and should be confirmed during the test run.</i></p> <p>A topographical survey should be completed due to the constrained nature of the section. Loads will oversail the western bridge parapet into potential third party land. The ground clearance for oversail should be confirmed during the test run. Vegetation should be cleared.</p> <p>Throughout the route, the tree canopy needs to be trimmed to provide a clear 5m head height. Trimming of the tree canopy can be subject to ecological constraints and it is suggested that early consultation with Transport Scotland is undertaken to agree cutting times and permits.</p> <p>Swept path assessment SK11 is included in Appendix B.</p> |
| 22 | <p>A83 Achnafad</p>  | <p>Loads will oversail the verge on the inside of the bend where vegetation should be trimmed.</p> <p>Oncoming vehicles should be held in advance of the bend.</p> |




| POI | Key Constraint | Details |
|-----|---|---|
| 23 | A83 south of Ballochroy  | Loads will oversail the verge on the inside of the bend where vegetation should be trimmed. Oncoming vehicles should be held in advance of the bend. |
| 24 | A83 north of Ballochroy  | Loads will oversail the verge on the inside of the bend where vegetation should be trimmed. Oncoming vehicles should be held in advance of the bend. |
| 25 | A83 Correchrevie  | Loads will oversail both verges through the bends section. Vegetation should be cleared and one bollard should be removed. Swept path assessment SK12 is included in Appendix B. |
| 26 | A83 Ronachan  | Throughout the route, the tree canopy needs to be trimmed to provide a clear 5m head height. Trimming of the tree canopy can be subject to ecological constraints and it is suggested that early consultation with Transport Scotland is undertaken to agree cutting times and permits. |
| 27 | A83 Clachan  | Loads will oversail the verge on the inside of the right bend where vegetation should be trimmed. |





| POI | Key Constraint | Details |
|-----|--|---|
| 28 | A83 Monyliadh  | Loads will oversail both verges through the bends section and the blade tip will oversail the bollards on the outside of the final right bend. Swept path assessment SK13 is included in Appendix B. |
| 29 | A83 Creag na h-Inghean  | Loads will oversail the verge on the inside of the bend where vegetation should be trimmed. Oncoming vehicles should be held in advance of the bend. |
| 30 | A83 Gartnagrenach  | Loads will oversail the verge on the inside of the bend where vegetation should be trimmed. Oncoming vehicles should be held in advance of the bend. |
| 31 | A83 Achnaclaud  | Loads will oversail the verge on the inside of the bend where vegetation should be trimmed and one bollard should be removed. Oncoming vehicles should be held in advance of the bend. |
| 32 | A83 Millbrae Plantations  | Loads will continue through a sinuous section. Loads will oversail the inside verge of the right / left / right bends where vegetation should be trimmed back. |




| POI | Key Constraint | Details |
|-----|--|--|
| 33 | A83 Redhouse  | <p>Loads will oversail both verges through the section where vegetation should be trimmed.</p> <p>The blade tip will oversail the traffic bollards on the outside of the left bend.</p> <p>Swept path assessment SK14 is included in Appendix B.</p> |
| 34 | A83 Kennacraig  | <p>Loads will continue through the left / right bends near Kennacraig.</p> <p>Loads will oversail both verges through both bends. The blade tip will oversail traffic bollards on the outside of the left bend and four road signs should be removed. One bollard should be removed from the inside of the bend.</p> <p>The blade tip will oversail the traffic bollards on the outside of the right bend where three chevron signs should be removed and vegetation should be trimmed. Vegetation should also be trimmed from the inside of the bend.</p> <p>Throughout the route, the tree canopy needs to be trimmed to provide a clear 5m head height. Trimming of the tree canopy can be subject to ecological constraints and it is suggested that early consultation with Transport Scotland is undertaken to agree cutting times and permits.</p> <p>Swept path assessment SK15 is included in Appendix B.</p> |
| 35 | A83 southwest of Achnacarnan  | <p>Loads will continue north through the bends section.</p> <p>Loads will oversail the inside of each of the bends where vegetation should be trimmed back.</p> |
| 36 | A83 Achnacraig  | <p>Loads will continue north through the left bend.</p> <p>Loads will oversail the inside of the bend where vegetation should be trimmed back.</p> <p>The clearances to overhead power lines at this location should be reviewed with the utility provider prior to loads moving to ensure that there is sufficient head height and flashover protection for all temperature ranges.</p> |




| POI | Key Constraint | Details |
|-----|---|---|
| 37 | A83 north of Achadacaie  | <p>Loads will oversail the verge on the inside of the right bend followed by the left. Vegetation should be trimmed back and oncoming vehicles should be held in advance of the bend.</p> |
| 38 | A83 southwest of Eilean da Ghallagain  | <p>Loads will oversail both verges through the bend. Vegetation should be trimmed back and oncoming vehicles should be held in advance of the bend.</p> |
| 39 | A83 Corranbuie  | <p>Loads will oversail both verges through the bend. Vegetation should be trimmed back and oncoming vehicles should be held in advance of the bend.</p> |
| 40 | A83 southwest of Escart Farm  | <p>Loads will oversail the verge on the inside of the bend. Vegetation should be trimmed back and oncoming vehicles should be held in advance of the bend.</p> |
| 41 | A83 south of West Tarbert  | <p>Loads will oversail the verge on the inside of the left bend. Vegetation / trees should be trimmed back and oncoming vehicles should be held in advance of the bend.</p> |




| POI | Key Constraint | Details |
|-----|--|--|
| 42 | A83 north of West Tarbert  | Loads will oversail the verge on the inside of the right bend. Vegetation should be trimmed back and oncoming vehicles should be held in advance of the bend. |
| TP1 | Potential Blade Transfer Point   | <p>A suitable location for a blade transfer point is required to the west of Tarbert to allow the blades to be transferred from the Superwing carrier trailers to blade lifting trailers.</p> <p>The area of land required will need to be circa 150m x 40m and will need to include an access junction and two crane pads. Storage for up to three blades should also be available, with all infrastructure designed in accordance with turbine manufacturer standards.</p> <p>The location of the transfer point is dependent upon Statkraft agreeing a land option. A potential area is illustrated opposite and is considered suitable, subject to the design of the required infrastructure.</p> <p>Once loaded onto the tilting trailers, the loads will proceed through Tarbert and north on the A83 to the second transfer zone located east of Lochgilphead.</p> <p>All overhead utilities and obstructions such as trees would need to be removed to accommodate the raised blade between the transfer zones. It is assumed that the blade will be carried in the raised position for all POI locations between the transfer zones.</p> <p>A possible bypass of Tarbert has been considered, but discounted. Details are provided in Appendix E.</p> |





| POI | Key Constraint | Details |
|-----|---|--|
| 43 | A83 Tarbert  | <p>A historic topographical survey of the section has been utilised.</p> <p>Loads will continue north through the constrained left bend in Tarbert town centre. The blade will be carried in the raised position from this point to the proposed blade transfer point to the east of Lochgilphead.</p> <p>Loads will overrun and oversail the southern footway and oversail the northern footway on approach to the bend. Load bearing surfaces should be laid and existing utilities protected. Five bollards should be removed along with all overhead utilities and obstacles.</p> <p>Loads will overrun and oversail the eastern footpath and seawall when negotiating the bend where a load bearing surface should be laid. Testing should be completed to ensure that the seawall is suitable for the proposed loads. The stone wall, eleven bollards, three posts and the placemaking features should be removed.</p> <p>Parking should be suspended through the section as loads will required the entire road width.</p> <p>Swept path assessment SK16 is included in Appendix B.</p> |
| 44 | A83 southwest of Barfad  | <p>Loads will oversail the western footway on exiting Tarbert. The road width narrows and oncoming traffic should be held in advance of the section.</p> <p>All overhead utilities and obstructions should be cleared as the blade is carried in the raised position.</p> <p>Swept path assessment SK17 is included in Appendix B.</p> |
| 45 | A83 northwest of Barfad  | <p>All overhead utilities and obstructions should be removed as the blade will be carried in the vertical position.</p> <p>Loads will oversail both verges through the bend section where vegetation / trees should be trimmed back and oncoming vehicles held to allow load to access the entire road width.</p> |





| POI | Key Constraint | Details |
|-----|--|---|
| 46 | A83 South Lodge  | <p>All overhead utilities and obstructions should be removed as the blade will be carried in the vertical position.</p> <p>Loads will oversail the verge on the inside of the bend where vegetation / trees should be trimmed back and oncoming vehicles held to allow load to access the entire road width.</p> |
| 47 | A83 south of Barmore  | <p>All overhead utilities and obstructions should be removed as the blade will be carried in the vertical position.</p> <p>Loads will oversail the verge on the inside of the bends where vegetation / trees should be trimmed back and oncoming vehicles held to allow load to access the entire road width.</p> <p>Loads will travel down a steep gradient with a tight right bend at the bottom. Care should be taken to engage low gears through the section.</p> |
| 48 | A83 Stonefield Castle Hotel  | <p>All overhead utilities and obstructions should be removed as the blade will be carried in the vertical position.</p> <p>Loads will oversail both verges through the bend section where vegetation / trees should be trimmed back and oncoming vehicles held to allow load to access the entire road width.</p> |
| 49 | A83 Upper Ashens  | <p>Loads will oversail the verge on the inside of the bend where vegetation / trees should be trimmed back and oncoming vehicles held to allow load to access the entire road width.</p> <p>All overhead utilities and obstructions should be removed as the blade will be carried in the vertical position.</p> <p>Throughout the route, the tree canopy needs to be trimmed to provide a clear 5m head height. Trimming of the tree canopy can be subject to ecological constraints and it is suggested that early consultation with Transport Scotland is undertaken to agree cutting times and permits.</p> |




| POI | Key Constraint | Details |
|-----|---|--|
| 50 | A83 Mid Lodge  | <p>Loads will oversail the verge on the inside of each of the bends through the section where vegetation / trees should be trimmed back and oncoming vehicles held to allow load to access the entire road width.</p> <p>All overhead utilities and obstructions should be removed as the blade will be carried in the vertical position.</p> |
| 51 | A83 Oakdean  | <p>Loads will continue north through the section.</p> <p><i>OS mapping does not show the road edge through the section. An indicative road edge has been provided for illustration only and should be confirmed through a test run or topographical survey base.</i></p> <p>Loads will oversail the western verge through the section where trees should be trimmed.</p> <p>Loads will oversail into third party land to the east of the road where the vertical clearance over the bridge parapet should be confirmed during the test run. Potential third party land will be required.</p> <p>All overhead utilities and obstacles should be removed.</p> <p>Swept path assessment SK18 is included in Appendix B.</p> |
| 52 | A83 North Lodge  | <p>The route narrows as loads continue northbound.</p> <p>Loads will oversail both verges through the section with the blade in the raised position. Vegetation should be cleared and all overhead utilities and obstacles should be removed.</p> <p>All oncoming vehicles should be held in advance of the section.</p> |



| POI | Key Constraint | Details |
|-----|--|---|
| 53 | <p>A83 Southeast of Erines</p>  | <p>Loads will continue through the narrow section with a rock outcrop to the west of the road.</p> <p>Due to the limited detail available on the OS mapping, it is recommended that a topographical survey is completed and the swept path assessment repeated to confirm the required mitigation.</p> <p>Loads will oversail the safety barrier into potential third party land to the east of the road.</p> <p>Loads will oversail the inside of the left bend with limited clearance to the rock face.</p> <p>All overhead utilities and obstacles should be removed.</p> <p>Swept path assessment SK18c is included in Appendix B.</p> |
| 54 | <p>A83 Erines</p>  | <p>Loads will continue north through the section where loads will oversail the inside of each of the bends. Vegetation should be cleared and oncoming vehicles should be held.</p> <p>All overhead utilities and obstacles should be removed.</p> |
| 55 | <p>A83 Artilligan Cottage</p>  | <p>Loads will oversail the verge on the inside of the right bend where vegetation should be trimmed back and oncoming vehicles should be held in advance of the bend.</p> <p>All overhead utilities and obstacles should be removed.</p> |





| POI | Key Constraint | Details |
|-----|---|--|
| 56 | <p>A83 north of Artilligan Cottage</p>  | <p>Loads will oversail both verges through the initial left / right bend where the blade tip will oversail the eastern safety barrier. Vegetation / trees should be trimmed.</p> <p>All overhead utilities and obstacles should be removed.</p> <p>Loads will continue to oversail both verges through the following bends section.</p> <p>Throughout the route, the tree canopy needs to be trimmed to provide a clear 5m head height. Trimming of the tree canopy can be subject to ecological constraints and it is suggested that early consultation with Transport Scotland is undertaken to agree cutting times and permits.</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>The road surface was noted to be in a poor state of repair at this location. It is recommended that discussions are held with Transport Scotland to ensure repairs are completed prior to deliveries.</p> <p>Swept path assessment SK19 is included in Appendix B.</p> |
| 57 | <p>A83 Nead an Fhithich</p>  | <p>Loads will oversail the inside of the bends through the section where vegetation should be trimmed back and oncoming vehicles should be held in advance.</p> <p>All overhead utilities and obstacles should be removed.</p> |
| 58 | <p>A83 northwest of Nead an Fhithich</p>  | <p>Loads will oversail the inside of the bend where vegetation / trees should be trimmed back and oncoming vehicles should be held in advance.</p> <p>All overhead utilities and obstacles should be removed.</p> |





| POI | Key Constraint | Details |
|-----|--|---|
| 59 | A83 south of Rubh' a' Mhinidhe Mor  | Throughout the route, the tree canopy needs to be trimmed to provide a clear 5m head height. Trimming of the tree canopy can be subject to ecological constraints and it is suggested that early consultation with Argyll and Bute Council is undertaken to agree cutting times and permits. |
| 60 | A83 Rubh' a' Mhinidhe Mor  | <p>Loads will continue north west through the section.</p> <p>Loads will overrun and oversail into the parking layby on the outside of the left bend where a load bearing surface should be laid. Traffic bollards and three traffic signs should be removed. The land should be reprofiled and vegetation should be trimmed. Parking should be suspended.</p> <p>Loads will oversail both verges following the left / right bend where one road sign should be removed and vegetation should be cleared.</p> <p>All overhead utilities and obstacles should be removed.</p> <p>Swept path assessment SK20 is included in Appendix B.</p> |
| 61 | A83 northeast of Srondoire  | <p>Loads will continue on the A83 northwest of Srondoire.</p> <p>Loads will oversail both verges through the section where vegetation should be trimmed back.</p> |
| 62 | A83 Stronachullin Farm  | Loads will oversail the verge on the inside of the bend. Oncoming vehicles should be held in advance. |



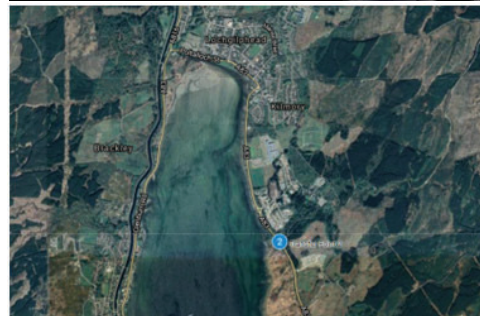


| POI | Key Constraint | Details |
|-----|--|---|
| 63 | A83 Stronachullin Lodge  | <p>Loads will continue north on the A83 passing Stronachullin Lodge.</p> <p>Loads will oversail the verge on the inside of the initial left bend. All overhead utilities and obstructions should be removed. Loads will oversail and overrun the verge on the outside of the bend where a load bearing surface should be laid and four bollards and three chevron signs should be removed. The blade tip will oversail the remaining bollards. Vegetation / trees should be trimmed.</p> <p>Loads will oversail both verges through the following right bend where the blade tip will oversail the bollards in the western verge. Two chevron signs should be removed and vegetation should be cleared. It is recommended that a land search is completed to confirm the extent of adopted boundary.</p> <p>Swept path assessment SK21 is included in Appendix B.</p> |
| 64 | A83 south of Churchill House  | <p>Loads will continue through the right bend at Churchill House.</p> <p>Loads will oversail the verge on the inside of the right bend taking care to avoid the utility pole stay wire.</p> <p>All overhead utilities and obstructions should be removed.</p> |
| 65 | A83 Brenfield Point  | <p>Loads will oversail the inside of the left bend where two bollards should be removed.</p> <p>The road surface was noted to be in a poor state of repair at this location. It is recommended that discussions are held with Transport Scotland to ensure repairs are completed prior to deliveries.</p> <p>All overhead utilities and obstructions should be removed.</p> |
| 66 | A83 northwest of Brenfield Point  | <p>Loads will oversail the verge on the inside of the right bend where vegetation should be trimmed back.</p> <p>Oncoming vehicles should be held in advance of the bend.</p> <p>All overhead utilities and obstructions should be removed.</p> |





| POI | Key Constraint | Details |
|-----|--|--|
| 67 | <p>A83 southeast of Upper Brenfield</p>  | <p>Loads will continue north through the right / left bend section.</p> <p>Loads will oversail the verges on the inside of each of the bends. The vegetation should be cleared from the inside of the left bend.</p> <p>All overhead utilities and obstructions should be removed.</p> |
| 68 | <p>A83 Creag a' Ghuail</p>  | <p>Loads will continue north passing Creag a'Ghuail.</p> <p>Loads will oversail both verges through the initial left / right bend where vegetation should be trimmed and the blade tip will oversail bollards in the eastern verge and two chevron signs should be removed. One utility pole should be removed.</p> <p>All overhead utilities and obstacles should be removed.</p> <p>Loads will oversail the eastern verge on the outside of the following left bend where the blade tip will oversail the bollards and one road sign should be removed.</p> <p>Swept path assessment SK22 is included in Appendix B.</p> |
| 69 | <p>A83 northeast of Upper Brenfield</p>  | <p>Loads will oversail the inside of the bends on approach to Ardrishaig. No physical mitigation is required however oncoming vehicles should be held in advance of the bends.</p> |






| POI | Key Constraint | Details |
|-----|--|--|
| 70 | <p>A83 Ardrishaig Basin</p>  | <p>A historic topographical survey of the bridge area has been utilised.</p> <p>Loads will oversail the south eastern footway on approach to the canal bridge.</p> <p>Loads will oversail both sides of the canal bridge crossing where third party land will be required. The blade tip will oversail one lighting column and one lit road sign to the south east of the canal.</p> <p>Loads will overrun and oversail the western footway on exiting the bridge where a load bearing surface should be laid and the entrance / exit barriers and one traffic light should be removed.</p> <p>The vertical clearance of loads over the parapets and stone wall should be confirmed during the test run.</p> <p>Loads will need to overrun the sea wall on the west of the road when exiting the bend where a load bearing surface should be laid and a section of pedestrian guardrail should be removed. One lighting column and one lit road sign should be removed. Ground assessments should be completed to confirm the suitability of the sea wall for overrun.</p> <p>A test run is essential to confirm the viability of load movements through the section. Confirmation should be sought as to any load restrictions across the canal bridge.</p> <p>All overhead utilities and obstructions should be removed.</p> <p>Swept path assessment SK23 is included in Appendix B.</p> |
| 71 | <p>A83 west of Ardrishaig Slipway</p>  | <p>It is recommended that a traffic management plan is developed to control the movement of loads through Ardrishaig town.</p> <p>Loads will oversail the footway on the inside of the right bend.</p> |





| POI | Key Constraint | Details |
|-----|--|---|
| 72 | <p>A83 southeast of Kildusland</p>  | <p>Loads will oversail the footway on the outside of the bend however no physical mitigation is required.</p> <p>All overhead utilities and obstacles should be removed.</p> <p>Swept path assessment SK24 is included in Appendix B.</p> |
| 73 | <p>A83 / A816 Roundabout</p>   | <p>Loads will turn right at the roundabout onto the A816.</p> <p>Loads will oversail the inside of the right bend on approach to the roundabout.</p> <p>Throughout the route, the tree canopy needs to be trimmed to provide a clear 5m head height. Trimming of the tree canopy can be subject to ecological constraints and it is suggested that early consultation with Transport Scotland is undertaken to agree cutting times and permits.</p> <p>Loads will oversail the western verge on approach to the junction. All overhead utilities and obstructions should be removed.</p> <p>Loads will overrun the splitter islands on approach to and exit from the roundabout. Load bearing surfaces should be laid and one bollard should be removed from each of the islands.</p> <p>Loads will overrun and oversail the footway and verge on the inside of the right bend where a load bearing surface should be laid and one lit road sign should be removed. Existing underground utilities should be protected.</p> <p>All overhead utilities and obstacles should be removed.</p> <p>Swept path assessment SK25 is included in Appendix B.</p> |
| 74 | <p>A83 / Argyll St Roundabout</p>  | <p>Loads will continue straight through the junction where loads will overrun and oversail the exit arm splitter island. A load bearing surface should be laid.</p> <p>All overhead utilities and obstacles should be removed.</p> <p>Swept path assessment SK26 is included in Appendix B.</p> |






| POI | Key Constraint | Details |
|---------|--|--|
| 75 & 76 | <p>A83 / Cossack St Roundabout</p>    | <p>Loads will continue through right turn at the roundabout and then south on the A83.</p> <p>Loads will overrun and oversail the eastern footway on approach to the roundabout where a load bearing surface should be laid. Loads will overrun the approach road splitter island where a load bearing surface should be laid and two traffic bollards should be removed.</p> <p>Loads will overrun and oversail the footway on the inside of the right bend where a load bearing surface should be laid and one lighting column and one lit road sign should be removed. All overhead utilities and obstacles should be removed.</p> <p>Loads will overrun and oversail the exit road splitter island where a load bearing surface should be laid and two bollards should be removed.</p> <p>Loads will overrun and oversail the southern footway on exit from the roundabout where a load bearing surface should be laid.</p> <p>Loads will overrun and oversail the western footway through the following left bend. A load bearing surface should be laid and existing utilities should be protected.</p> <p>Swept path assessment SK27 is included in Appendix B.</p> |
| 77 | <p>A83 Ardrishaig Industrial Estate Roundabout</p>  | <p>Loads will continue south through the roundabout at Ardrishaig Industrial Estate.</p> <p>It is proposed that loads will contraflow through the roundabout where a load bearing surface will be needed in the western edge of the island and one lit chevron sign should be removed.</p> <p>Loads will oversail both the approach and exit arm splitter islands where one bollard should be removed from each.</p> <p>All overhead utilities and obstacles should be removed.</p> <p>Swept path assessment SK28 is included in Appendix B.</p> |



| POI | Key Constraint | Details |
|-----|--|--|
| 78 | A83 Dun Cholgain  | The clearances to overhead power lines at this location should be reviewed with the utility provider prior to loads moving to ensure that there is sufficient head height and flashover protection for all temperature ranges. |
| TP2 | Potential Blade Transfer Point   | <p>A suitable location for a blade transfer point is required to the east of Lochgilphead to allow the blades to be transferred from the blade lifting trailers to the scissor lift superwing carriers.</p> <p>The area of land required will need to be circa 150m x 40m and will need to include an access junction and two crane pads. Storage for up to three blades should also be available, with all infrastructure designed in accordance with turbine manufacturer standards.</p> <p>The location of the transfer point is dependent upon Statkraft agreeing a land option. A potential area is illustrated opposite and is considered suitable, subject to the design of the required infrastructure.</p> <p>Loads will then continue to the site on the scissor lift fitted superwing carrier trailers.</p> |
| 79 | A83 Ballimore  | <p>Loads will oversail the verge on the inside of the left bend however no physical mitigation is required.</p> <p>Swept path assessment SK29 is included in Appendix B.</p> |
| 80 | A83 Druim Fuar  | Loads will oversail the verge on the inside of the left bend where vegetation should be trimmed back. |






| POI | Key Constraint | Details |
|-----|--|---|
| 81 | A83 Achnaba  | <p>Loads will continue north on the A83.</p> <p>Loads will oversail both verges through the left bend where trees should be trimmed within the western verge.</p> <p>Swept path assessment SK30 is included in Appendix B.</p> |
| 82 | A83 north of Achnaba Cottage  | <p>Loads will continue north through the right / left bends.</p> <p>Loads will overrun and oversail the verge on the outside of the initial right bend where a load bearing surface should be laid. Traffic bollards and three chevron signs to be removed. The trees and vegetation should be trimmed and a land search should be completed to confirm the extent of adopted boundary available.</p> <p>Loads will oversail the inside of the right bend where traffic bollards should be removed.</p> <p>Loads will oversail both verges through the following left bend where vegetation should be trimmed.</p> <p>Swept path assessment SK31 is included in Appendix B.</p> |
| 83 | A83 east of Cnoc Odhar  | Loads will oversail the verge on the inside of the left bend where vegetation should be trimmed and oncoming vehicles should be held in advance of the bend. |
| 84 | A83 south of Middle Kames  | <p>Loads will continue north through the bend section.</p> <p>Loads will oversail both verges through the left / right bend section. The blade tip will oversail the traffic bollards on the outside of each of the bends however the chevron signs should be removed. Vegetation should be trimmed.</p> <p>Swept path assessment SK32 is included in Appendix B.</p> |


| POI | Key Constraint | Details |
|-----|--|---|
| 85 | A83 Middle Kames  | <p>Loads will oversail both verges through the initial left bend where the blade tip will oversail the crash barrier into third party land. The trees should be trimmed. The proximity to the rock face on the inside of the bend should be confirmed during the test run.</p> <p>Loads will oversail both verges through the following right bend where the blade tip will oversail traffic bollards but the chevron signs should be removed and the vegetation trimmed.</p> <p>Swept path assessment SK33 is included in Appendix B.</p> |
| 86 | A83 Newhouse  | <p>Loads will oversail the outside of the left bend however no physical mitigation is required.</p> <p>Loads will overrun and oversail the inside of the left bend where a load bearing surface should be laid and vegetation cleared. The land will need to be reprofiled to carriageway level.</p> <p>Swept path assessment SK34 is included in Appendix B.</p> |
| 87 | A83 Lochgair Hotel  | <p>Loads will straddle the centre line through the section.</p> <p>Oncoming vehicles should be held in advance of the section.</p> |
| 88 | A83 Lochgair Power Station  | <p>Loads will overrun and oversail both verges through the left / right bends where load bearing surfaces should be laid and vegetation should be cleared. Several traffic bollards and three road signs should be removed.</p> <p>Swept path assessment SK35 is included in Appendix B.</p> |
| 89 | A83 southeast of Creag Fheargach  | <p>Loads will oversail the verge on the inside of the bend where vegetation should be removed.</p> |

| POI | Key Constraint | Details |
|---------|--|---|
| 90 | A83 Kilmichael Beg  | <p>Loads will continue north through the left / right bends.</p> <p>Loads will oversail both verges through the section. The blade tip will oversail the western verge through the right bend where four chevron signs should be removed and it is recommended that a land search is completed to confirm the extent of adopted boundary available.</p> <p>Swept path assessment SK36 is included in Appendix B.</p> |
| 91 | A83 Bar-liath  | <p>Loads will oversail the verge on the inside of the bend where vegetation should be trimmed.</p> |
| 92 | A83 Tullochgorm  | <p>Loads will oversail both verges through the initial left bend where the blade tip will oversail several traffic bollards on the outside of the bend and three chevron signs should be removed.</p> <p>Loads will overrun the verge on the outside of the following right bend where a load bearing surface should be laid and one grit bin, one road sign and several traffic bollards should be removed. Vegetation / trees to be trimmed.</p> <p>Swept path assessment SK37 is included in Appendix B.</p> |
| 93 & 94 | A83 Minard  | <p>The road narrows through this location. All oncoming traffic will need to be held in advance of load movements.</p> <p>Loads will oversail both verges through the section and all parking should be banned to ensure that the entire carriageway width is available to loads.</p> <p>Swept path assessment SK38 is included in Appendix B.</p> |

| POI | Key Constraint | Details |
|-----|--|--|
| 95 | A83 Crarae  | Loads will continue north east on the A83. Loads will oversail both verges through the section where vegetation should be trimmed. Swept path assessment SK39 is included in Appendix B. |
| 96 | A83 south of Cumloddan Cottage  | Loads will continue north on the A83. Loads will oversail the footway on the inside of the bend. |
| 97 | A83 Cumloddan Cottage  | Loads will continue north past Cumloddan Cottage. Loads will oversail both verges where vegetation should be trimmed. Swept path assessment SK40 is included in Appendix B. |
| 98 | A83 south of Drinliath House  | Loads will continue north on the A83 towards Drinliath House. Loads will oversail the footway on the inside of the bend however no physical mitigation is required. |
| 99 | A83 Sandhole  | Loads will oversail the south eastern verge through the bend section where vegetation should be trimmed. Swept path assessment SK41 is included in Appendix B. |

| POI | Key Constraint | Details |
|-----|---|--|
| 100 | A83 Furnace  | Loads will travel north through a left bend followed by a sinuous section. It is recommended that a topographical survey of the section is completed and the swept path assessment repeated to confirm the proposed mitigation. Loads will overrun and oversail the eastern verge of the initial left bend into third party land . Load bearing surfaces should be laid and trees and vegetation cleared. One utility pole, two bollards, one road sign and a section of safety barrier should be removed. The land will need to be reprofiled to carriageway level. Loads will oversail the verge on the inside of the bend. Loads will overrun the western verge on the outside of the following right bend where a load bearing surface should be laid. Loads will oversail both verges through the section where eight chevron signs and several bollards should be removed from the section. The proximity to the rock face and the ground clearance for oversail of the safety barriers should be confirmed during the test run. Swept path assessment SK42 is included in Appendix B. |
| 101 | A83 South Craleckan  | Loads will overrun and oversail the western verge through the initial right bend where a load bearing surface should be laid and two chevron signs should be removed. The drainage ditch should be culverted and trees / vegetation should be cleared. The vertical ground clearance for oversail of the crash barrier on the inside of the bend should be confirmed during the test run. Loads will oversail both verges through the following left bend with third party land required on both sides of the road. The blade tip will oversail the eastern bridge parapet whilst the vertical ground clearance for oversail of the parapet and safety barrier on the western side of the road should be confirmed during the test run. Trees to be trimmed. Swept path assessment SK43 is included in Appendix B. |

| POI | Key Constraint | Details |
|-----|--|--|
| 102 | A83 North Craleckan  | Loads will oversail both verges through the right / left bend section where vegetation should be trimmed and chevron signs should be removed from the eastern verge. Swept path assessment SK44 is included in Appendix B. |
| 103 | Inverary Bypass Access  | Loads would depart the A83 and turn left into the bypass of Inverary. The existing junction would need to be upgraded to meet manufacturer and DMRB standards. The proposed access junction is illustrated in the Transport Assessment. Loads would then continue on the bypass route to the A819 junction. |
| 104 | A819 / Upper Avenue Junction  | Loads would rejoin the public road at the junction of Upper Avenue and the A819. The existing junction would need to be upgraded to meet manufacturer and DMRB standards. The proposed access junction is illustrated in the Transport Assessment. Loads would then continue on the A819, proceeding northbound to the site access junction. |
| 105 | A819 Cherrypark  | Loads will oversail both sides of the road through the left bend. The land on the inside will need to be reprofiled to allow oversail and vegetation cleared. The blade tip will oversail the bollards on the outside of the bend where the trees should be trimmed. |
| 106 | A819 northwest of Cherrypark  | Loads will oversail the verge on the inside of the left bend where the ground clearance to the verge should be confirmed during the test run. Vegetation should be cleared and one road sign should be removed. |

| POI | Key Constraint | Details |
|-----|---|--|
| 107 | A819 Site Access Junction  | Loads would turn left into the existing junction from the A819. The existing junction will need to be substantially upgraded to meet manufacturer and Argyll and Bute standards and an indicative access junction layout is provided in the Transport Assessment. Third party land will be required to the west of the road. |

3.3 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.

3.4 Weight Review

A weight review is undertaken via the ESDAL (Electronic Service Delivery for Abnormal Loads) contacts database using the Highways Agency website www.esdal.com.

All of the relevant ESDAL contacts are noted in Table 3-2 and all have been contacted to ascertain if there are any relevant constraints that should be noted.

Table 3.2: ESDAL Contacts

| Organisation | Email Address |
|-------------------------|---|
| Police Scotland | OSDAbnormalLoadsScotland@scotland.pnn.police.uk |
| Network Rail | abnormalloads@networkrail.co.uk |
| Historic Rail Estate | rsgbrb@jacobs.com |
| Scottish Canals | SCAbnormal.Loads@scottishcanals.co.uk |
| Argyll and Bute Council | abnormalloads@argyll-bute.gov.uk |

| Organisation | Email Address |
|--------------------|--|
| Transport Scotland | Paul.winn@transport.gov.scot |
| Bear North West | NWAbnormalload@bearsotland.co.uk |
| Scottish Power | Customer.resolution@spenergynetworks.co.uk |

Any responses received to date can be found in Appendix C of this report.

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 / hedges 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, Statkraft should undertake the following prior to the delivery of the first abnormal loads, to ensure load and road user safety:

- A revised 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

PF has been commissioned by Statkraft to prepare a Route Survey Report to examine the issues associated with the transport of AIL turbine components to the development site.

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

The access review has been based upon a worst case of SGRE155 turbine sections and has been undertaken on the basis of a hybrid blade trailer and a blade lifting trailer for part of the route (south of Tarbert to north of Lochgilphead).

The report is presented for consideration to Statkraft. Various road modifications and interventions are required to successfully access the site. If these are assessed, approved, and 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;
- Identify a land option to construct the transfer point on;
- 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 Locations

