

Rhoscrowther | Wind Farm



Environmental Statement
Volume III: Technical Appendices
Appendix 12.1 – TMP

October 2021

P e l l F r i s c h m a n n

Rhoscrowther Wind Farm

Transport Management Plan



September 2021

Revision Record

Document2

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1 Introduction

1.1 Purpose of the Report

Pell Frischmann (PF) has been commissioned by Njord Energy Ltd to refresh the Transport Management Plan (TMP) for the delivery of loads associated with the construction of the proposed Rhoscrowther wind farm development south of Pembroke in Pembrokeshire, South West Wales.

The original plan was submitted as part of the previous planning application by SBA. This report updates that original report and subsequent revisions to cover the proposed new turbines.

A full and detailed TMP will be provided prior to loads moving to the site, once commercial decisions on the site have been finalised, following the granting of planning permission. It is expected that this will be covered by a suitably worded planning condition.

This report has been prepared in accordance with instructions from Njord on the above project details. No liability is accepted for the use of all or part of this report by third parties. No section of this report may be reproduced without prior written approval.

Whilst this report primarily features the requirements of those loads classed as abnormal under current legislation, it also contains elements relevant for the transport of other non-abnormal turbine components and materials.

This TMP is a live document and if the development is approved, will be used as the baseline for the production of the operational TMP and the TMP issued to Abnormal Indivisible Load (AIL) and non-AIL contractors. As such, it is important that continuity is provided in this approach to future proof road safety and to discharge Construction Design and Management (CDM) Regulation requirements to the client team and those authorities that influence the design of traffic management measures.

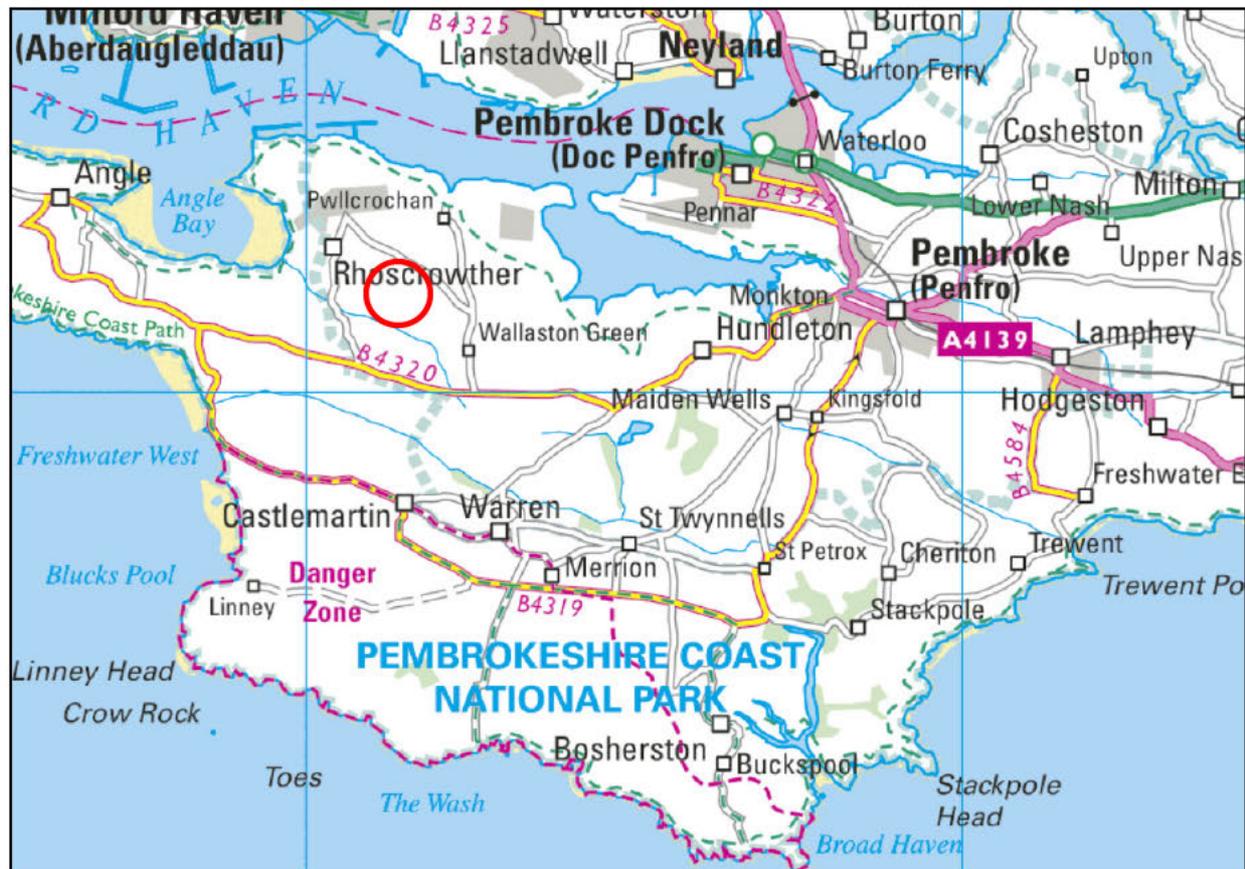
This report was produced to provide an initial overview of access issues. A detailed report would be secured via planning conditions and would be implemented prior to loads being delivered to site.

2 Site Background

The proposed development is for a 5 turbine wind farm at Rhoscrowther Farm, located to the south of Valero Oil Refinery and approximately 10km to the west of Pembroke Dock, approximately 2km west of the A44.

Figure 1 illustrates the general site location.

Figure 1: Site Location Plan



2.1 Legislative Background

The Welsh Government (WG) describes an Abnormal Indivisible Load (AIL) as “any load that cannot be broken down into smaller loads without undue expense or risk of damage”.

There are four main pieces of legislation that cover AIL movements as defined by the WG:

- The Road Vehicles (Construction & Use) Regulation 1986. This covers all aspects of the vehicles setup from the weights and dimensions through to the braking system and environmental standards;
- The Road Vehicles (Authorised Weight) Regulations 1998. This regulation sets the limited maximum weight of the vehicle and axle loading of different vehicle categories;
- The Road Vehicles (Authorisation of Special Types)(General) Order 2003. The STGO is for vehicles not covered by either of the above Regulations and covers wind turbine component

delivery vehicles which are categorised as N3 for the tractor units and O4 for the specifically designed trailers.

It states that the Police, the relevant highway and bridge authorities or the Secretary of State may need to be notified of vehicle movement, dependent on the size of the load. Notifications can be made online through the 'Highway Agency's Electronic Service Delivery for Abnormal Loads (ESDAL) System' or in paper form using the BE16 form for Special Orders; and

- The Road Vehicles Lighting Regulation 1989 (Authorisation of Special Types) (General) Order 2003. This regulation defines whether front, side and rear lamps and reflectors are mandatory and which ones are permitted and which are not permitted.

Applications for a 'Vehicle Special Order' (VSO) should be made to the Vehicle Certification Agency (VCA) and it is recommended that applications are applied for at least 8 weeks prior to planned vehicle movements.

To support the movement of abnormal loads the Police may be required to stop other traffic. In order to bolster existing powers, a Temporary Traffic Regulation Order (TTRO) will be required to cover the delivery period to allow the Police greater powers to stop and redirect where necessary.

2.2 Abnormal Load Component & Transport Details

Njord have indicated that they wish to consider the use of a Vestas V117 3.6MW turbine at a tip height of 135m as the worst case candidate turbine. Tower and hub dimensions have been supplied by Vestas and are indicated below in Table 1.

Table 1: Turbine Dimensions

Section	Length (m)	Width (m)	Height (m)	Weight (t)
Blade	57.300	4.000	3.124	13.800
Nacelle Housing	12.731	4.174	3.180	67.500
Drive Train	12.731	4.174	3.180	81.000
Base Tower	20.300	4.450	4.167	51.500
Mid Tower	23.800	4.167	3.915	40.000
Top Tower	30.000	3.915	3.268	43.500

Swept path models to review the various constraints have been built. These have assumed the following trailer configurations:

- Blade: 3 axle Superwing Carrier trailer; and
- Top Tower: 4+7 Load adaptor.

Examples of the types of trailer are illustrated in Figures 2 and 3 below.

Figure 2: Superwing Carrier Trailer



Figure 3: Tower Trailer



2.3 Abnormal Load Vehicle Detail

All the trailers used in the transport process are specifically designed for the transport of ALL components or feature custom modifications to suit loads. All feature rear wheel steering and the nacelle and tower load adaptor trailers feature hydraulic lift capabilities to adjust ground clearances.

When not transporting components, the trailers are collapsed so that they do not exceed normal HGV dimensions.

The trailers are built to a high standard and the tractor units are designed for heavy haulage. Regular checks are undertaken on the vehicles on a daily basis as outlined in later sections of the report. As such, the mechanical state of vehicles is kept at a very high level and breakdowns or malfunctions are very rare.

Delivery of turbine components is usually the responsibility of the turbine manufacturers under the sales contracts. The manufacturers select specialised hauliers for the transport of these loads and all drivers are reviewed and carry full Abnormal Indivisible Load (AIL) licences.

For the avoidance of doubt, the developer will insist on rear wheel steering controls to be hard wired to tractor cabs or via remote control for health and safety reasons.

2.4 General Construction Traffic

Construction of the scheme is likely to take approximately 10 months. For the purposes of this assessment, the construction work is assumed to start in 2022.

Estimates have been made of the likely number and type of heavy vehicle movements including abnormal loads requiring access to the site to deliver plant, equipment and materials for the various activities and stages of construction (two wheel vehicle access is not included).

Heavy goods vehicles (HGVs) are required during the construction process for:

- Mobilisation – the initial delivery of plant and equipment to the site;
- Daily service and deliveries – for example the delivery of concrete;
- Delivery of components; and
- Demobilisation (the reverse of mobilisation).

The estimated construction traffic generation is provided in the Transport and Access Chapter of the ES. The results conclude that Month 5 is likely to be the peak period for the construction period.

The potential impact of these levels of construction traffic on the network is not considered significant given the link capabilities of surrounding road network.

Traffic generation during the operation of the wind turbine on a daily basis will be on average limited to approximately one vehicle accessing the site every fortnight, based on service engineers attending the site for planned maintenance and inspections throughout the 25 year operational lifetime of the scheme.

At the end of the operational lifetime of the wind turbines, they may be decommissioned and the site reinstated. This would involve similar access requirements as the construction phase. It is unlikely that the cast in-situ turbine foundations would be removed; consequently, the number of HGV movements would be reduced compared to the construction phase. The construction phase is therefore the worst case scenario when considering the potential impact of development trips on the network.

The following measures are recommended in terms of site operation and maintenance during the construction phase:

- All materials delivery lorries (dry materials) should be sheeted to reduce dust and stop spillage on public roads; and
- 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 wash facilities will be established at the site entrance.

At sensitive urban areas, such as close to the site access, bulk delivery traffic will be encouraged to slow down to a maximum speed of 20mph to reduce engine noise and vibration issues. Vehicles may also be fitted with identification numbers to allow the public to identify any vehicles that may be causing specific issues as part of a wider considerate constructor plan.

3 Access Options

3.1 Access Considerations

Government policy suggests that wherever possible abnormal load movements are made by marine modes of transport as close to the development site as possible. In servicing sites in Pembrokeshire, Pembroke docks is considered a suitable port of access as it allows excellent connections on to the wider motorway network.

3.2 Intended Route – Pembroke Docks to Site

It is proposed that all loads will depart Pembroke Docks via Gate 1 onto the A4139.

Figure 4 illustrates the route that the abnormal loads will take from the port to the wind farm site. The total route from Pembroke Docks to site is 12 miles. The proposed abnormal load access route will be as follows:

- Loads would exit onto the docks at Gate 1 and would proceed eastbound on Western Way;
- Loads would continue east on London Road and the A477;
- Near Upper Nash, loads would turn right onto the A4075 and would then proceed southwest, heading towards Pembroke;
- At the Main Street roundabout, loads would proceed across the junction heading south onto Well Hill (A4139);
- Loads will turn left onto the B4319 and will proceed southbound until Kings Fold, where they will proceed westbound on Clay Lane and the B4320;
- Loads will then turn right heading northbound towards the Valero refinery; and
- Loads will then turn left into a new site access junction for the turbine locations opposite the refinery.

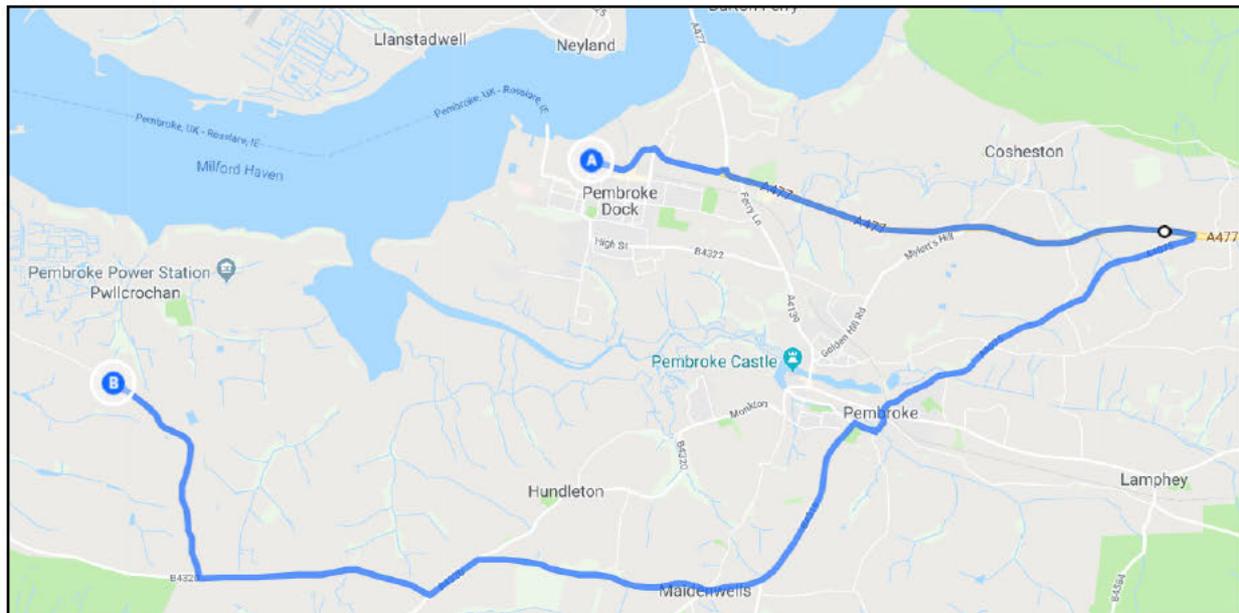
A worst case assessment of likely travel time has been undertaken and is presented below for the main sections. A total journey time of approximately 38 minutes is expected (including steering times, queue management etc) as presented in Table 2. The speed of the convoy is within the legal limits of abnormal load travel and was set to local conditions throughout the route.

Table 2: Estimated Journey Times

Route	Distance (miles)	Speed (mph)	Additional Time (mins)	Time (mins)
Dock to the A477 Waterloo Road Roundabout	1	10	2	8
A477 Waterloo Road Roundabout to A477 / A4075 Junction	3	35	-	5
A477/A4075 Junction to Clay Lane / B4319 Junction	3.5	28	10	18
Clay Lane/ B4319 Junction to Site	5.5	28	-	11

It should be noted that the average speed through Pembroke town centre will be no greater 10mph. The additional time included for this section is to allow for this speed reduction and queue management requirements at the various constraint locations. The estimated worse case journey time through Pembroke from the A4075 (Holyland Road) prior to the rail bridge to the B4319 (approximately 0.4 miles) is approximately just over 10 minutes.

Figure 4: Proposed Access Routes



4 Access Constraints

4.1 Route Description

The route from Pembroke Docks to site has been surveyed and a copy of the associated report is provided in Appendix A for information. The swept path assessments at identified constraint points can be found in Appendix A. The assessment has been based on the following worst-case turbine components.

The composite tower assessed provides a greater kinematic envelope when compared to the selected towers for the 59m hub height. Due to this large kinematic envelope, should the selected hub height change, the tower assessment will still be valid.

Discussions with all relevant authorities have been held regarding the suitability of the delivery route for the components. No adverse structural issues have been noted by to date.

At all points where there is a requirement to 'Straddle the Centreline', escort vehicles are to provide advanced warning to oncoming traffic and are required to make traffic stop and pull over well in advance of the section.

Once off the A477, the convoy would continue ahead with the advance police outrider halting oncoming traffic where and when required at either suitable junction bellmouths or straight sections of the route. The police will ensure that no vehicles encroach onto the verge at any point.

It is recommended that from Pembroke town, the convoy could be operated under rolling road closure as all loads will straddle the centre line at various points. Table 3 identifies potential locations where advanced escorts vehicles should travel ahead and hold traffic so the convoy and travel along sections down the centreline of the road to increase convoy speed and reduce delays to general traffic.

The Velero Oil Refinery is located to the north of Rhoscrowther. Through discussions with Pembrokeshire County Council, they have stated that consideration should be made within the TMP to ensure access to the refinery is always available for emergency vehicles should the need arise.

Should emergency vehicles need access to the Refinery at any point during delivery, the Police will pull the convoy over at safe locations (the wider loads will over-sail the verge) to allow emergency vehicles to pass. The identified potential hold point locations in Table 4.1 could be used to allow following emergency vehicles to pass to convoy safely.

Once the convoy is off the B4320 and heading towards to site, the convoy should take approximately just over 3 minutes to reach the site and clear the approach road to the Refinery.

Table 3: Route Details

POI	Key Constraint	Details
1	<p>Pembroke Dock Gate 1</p> 	<p>Loads would exit the dock at Gate 1 and would enter the public road network, traveling eastbound on Western Way.</p> <p>A swept path assessment of the turn out of the port has been undertaken and indicates that loads will over-sail the pavement to the left of the give way line. One lighting column and one lit road sign should be removed.</p>
2	<p>A4139 Western Way</p> 	<p>The bollards at the crossing island should be lowered or removed for wide load deliveries.</p>
3	<p>A4139 Western Way Bend</p> 	<p>Loads will straddle the centre line of the road on the bend, prior to the London Road roundabout. The lead escorts should hold oncoming traffic back at the roundabout to prevent conflict between the AIL convoy and other road users.</p>

POI	Key Constraint	Details
4	<p>Criterion Corner Roundabout</p> 	<p>Loads will proceed ahead at the roundabout and will take the second exit onto London Road.</p> <p>A swept path assessment at this junction has been undertaken and indicates that the blade tip will over-sail the northern verge on approach to the roundabout, where one lighting column should be removed.</p> <p>Loads will then over-sail and over-run the northern verge of the roundabout island where vegetation should be trimmed, and two lit chevron signs removed. A temporary load bearing surface will be required.</p> <p>On exit from the roundabout, loads will over-sail the splitter island where four bollards and one road sign should be removed.</p>
5	<p>A4139 London Road / Junction to Retail Park</p> 	<p>Loads will proceed ahead at the junction and will continue eastbound on London Road.</p> <p>Traffic in the right turn lane should be cleared prior to loads approaching the junction.</p>
6	<p>Waterloo Roundabout</p> 	<p>Loads will proceed ahead, eastbound on the A477.</p> <p>The optimum solution at the junction is for loads to undertake a contraflow transit of the roundabout. A swept path assessment has been undertaken and indicates that loads will over-sail and over-run the right-hand verge on exit from the roundabout. A load bearing surface should be laid in the over-run area and existing underground utilities protected.</p> <p>Oncoming traffic should be held at POI 7 to ease access for the convoys.</p>

POI	Key Constraint	Details
7	<p>A477 / Ferry Ln Junction</p> 	<p>Loads will proceed ahead, eastbound on the A477.</p> <p>Traffic in the right turn lanes should be cleared prior to loads approaching the junction.</p>
8	<p>A477 Kingswood Trading Estate</p> 	<p>The tree canopy should be trimmed to enable a 5m clear head height at this location.</p> <p>Tree trimming works can be subject to ecological constraints and as such, early engagement with the road authorities is recommended.</p>
9	<p>A477 / A4075 Junction</p> 	<p>Loads will turn right onto the A4075 at this junction.</p> <p>A swept path assessment has been undertaken and indicates that on navigating the turn the blade tip will over-sail the northern verge, where vegetation should be trimmed and two road signs should be removed. Loads will over-sail the central reserve island where two road signs should be removed.</p> <p>Loads will then over-sail the central island on the minor arm where three road signs should be removed. The blade tip will over-sail the eastern splitter island, though no physical mitigation is required.</p> <p>On completing the turn, loads will over-sail the western verge where one road sign should be removed. Loads will also over-run the eastern verge where a load bearing surface should be provided.</p>
10	<p>A4075 East of David Saunders Caravan Park</p> 	<p>The tree canopy should be trimmed to enable a 5m clear head height at this location. This should be undertaken along the whole route.</p> <p>Tree trimming works can be subject to ecological constraints and as such, early engagement with the road authorities is recommended.</p>

POI	Key Constraint	Details
11	A4075 West of David Saunders Caravan Park 	<p>Consultation with overhead utility providers should be undertaken to ensure that all infrastructure over the road has sufficient clearance (including flash-over protection) for the proposed loads.</p>
12	A4075 Green Hill 	<p>Consultation with overhead utility providers should be undertaken to ensure that all infrastructure over the road has sufficient clearance for the proposed loads.</p>
13	A4075 East of Mutton Hill 	<p>Loads will continue ahead on the A4075.</p> <p>A swept path through the bend has been undertaken and indicates that loads will over-sail the northern verge, where vegetation should be trimmed.</p>
14	A4075 Mutton Hill 	<p>A review of the vertical alignment at this location should be undertaken during the test run. Loads should be set on their higher suspension settings to avoid grounding issues.</p>
15	A4075 Penny Bridge 	<p>Loads will continue ahead on the A4075.</p> <p>A swept path through the bend has been undertaken and indicates that no physical mitigation is required.</p>

POI	Key Constraint	Details
16	A4075 West of Penny Bridge 	<p>Loads will continue ahead on the A4075.</p> <p>A swept path through the bend has been undertaken and indicates that no physical mitigation is required.</p>
17	A4075 / Golden Ln Junction 	<p>Consultation with overhead utility providers should be undertaken to ensure that all infrastructure over the road has sufficient clearance for the proposed loads.</p> <p>The tree canopy should be trimmed to enable a 5m clear head height at this location.</p> <p>Tree trimming works can be subject to ecological constraints and as such, early engagement with the road authorities is recommended.</p>
18	A4075 Holyland Hotel 	<p>Loads will continue ahead on the A4075.</p> <p>A swept path through the bend has been undertaken and indicates that no physical mitigation is required.</p>
19	A4075 / Kingsbridge Drive Junction 	<p>Loads will continue into Pembroke.</p> <p>Parking opposite Kingsbridge Drive should be suspended to ease access for the convoys. A Temporary Traffic Regulation Order (TTRO) should be put in place.</p>
20	A4075 / Twopenny Hay Cl Junction 	<p>Consultation with overhead utility providers should be undertaken to ensure that all infrastructure over the road has sufficient clearance for the proposed loads.</p>

POI	Key Constraint	Details
<p>21</p>	<p>A4075 Pembroke Rail Under Bridge</p> 	<p>Loads will proceed around the bend in the road and then under the rail bridge.</p> <p>The rail bridge has a height restriction of 4.5m. A topographical survey of the bridge has been undertaken and indicates that the actual clearances are 4.7m. All loads should be set to be below this restriction.</p> <p>A swept path tracking of the bend and bridge has been undertaken and indicates that the blade tip will over-sail a section of pavement to the north, though no physical mitigation will be required. Loads will also over-sail the footway to the south where multiple bollards should be removed.</p> <p>A vertical clearance assessment has also been undertaken and indicates a minimum clearance of 92mm for the highest section (the base tower section).</p> <p>Parking opposite Kingsbridge Drive should be suspended to ease access for the convoys. A Temporary Traffic Regulation Order (TTRO) should be put in place.</p>
<p>22</p>	<p>Main Street Roundabout</p> 	<p>Loads will proceed ahead at the junction onto Well Hill.</p> <p>A swept path assessment of this junction has been undertaken and indicates that loads will over-sail the footway to the west side on approach to the roundabout.</p> <p>Loads will over-sail the central island and exit splitter island where all street furniture should be removed.</p> <p>On exiting the roundabout, loads will also over-run and over-sail pavement to the west, requiring the laying of a load-bearing surface and the removal of three signs, one lighting column, and multiple bollards. The blade tip will also over-sail pavement to the east</p>

POI	Key Constraint	Details
23	<p>Well Hill / Lower Lamphey Road Merge</p> 	<p>Loads will continue southbound on Well Hill.</p> <p>The wall mounted railings to the west should be removed and the wall at the ramp will need to be lowered. Three minor over-run areas are required at three separate locations on the eastern verge. Two road signs will need to be removed from the southern section.</p>
24	<p>Well Hill / Grove Hill Merge</p> 	<p>Loads will continue to the right and stay on Well Hill / A4139.</p> <p>A swept path assessment has been undertaken and indicates that loads will over-run and over-sail pavement on the inside of the bend, where loads will over-sail the existing wall. A small area of load bearing surfacing is required. On turning, the blade tip will over-sail the eastern pavement. No physical mitigation will be required here.</p> <p>Loads will then over-sail and over-run the southern verge and footway on moving around the bend. A section of pedestrian guardrail, two road signs and two lighting columns should be removed. A load-bearing surface should be laid in the over-run areas and existing underground utilities should be protected.</p>

POI	Key Constraint	Details
25	<p>A4139 / B4319 Junction</p> 	<p>Loads will turn left onto the B4319 at the junction.</p> <p>A swept path assessment has been undertaken and indicates that on turning the blade tip will over-sail the north verge and hedge. Trimming of vegetation will be required on the verge. Loads will also over-sail the inside of the bend where a section of hedge, two road signs, and one lighting column should be removed.</p> <p>Loads will over-run the splitter island, requiring the removal of two bollards and one lit road sign and the laying of a load-bearing surface.</p> <p>A load bearing surface is required on the western verge of the B4319 where two road signs and a junction column should be removed. The emergency lane is unaffected by the proposed works.</p> <p>The tree canopy should be trimmed to enable a 5m clear head height at this location.</p> <p>Tree trimming works can be subject to ecological constraints and as such, early engagement with the road authorities is recommended.</p>
26	<p>B4319 North of Kingsfold</p> 	<p>Consultation with overhead utility providers should be undertaken to ensure that all infrastructure over the road has sufficient clearance for the proposed loads.</p>
27	<p>Unclassified Road Maidenwells Opposite Roch Poultry</p> 	<p>Loads will enter the village of Maidenwells.</p> <p>There are two sets of speed cushions in the road and these should be passed at low speed.</p>

POI	Key Constraint	Details
28	<p>Maidenwells Roundabout</p> 	<p>Loads will proceed around the bend in the road and will then cross the mini-roundabout, taking the second exit.</p> <p>A swept path assessment has been undertaken and indicates that on approach to the roundabout loads will over-sail the northern footway, though no physical mitigation is required.</p> <p>Loads will then contraflow the roundabout, crossing through the centre and over-running and over-sailing the splitter islands on approach and exit. The removal of two bollards will be required.</p>
29	<p>Clay Lane Three Corner Plantation</p> 	<p>Loads will proceed westbound on Clay Lane.</p> <p>Loads will straddle the centre line of the road. The lead escorts should hold oncoming traffic back at least 60m from the bend to prevent conflict between the AIL convoy and other road users.</p>
30	<p>Clay Lane Kennel Wood</p> 	<p>Loads will proceed westbound on Clay Lane.</p> <p>Loads will straddle the centre line of the road. The lead escorts should hold oncoming traffic back at least 60m from the bend to prevent conflict between the AIL convoy and other road users.</p> <p>The tree canopy should be trimmed to enable a 5m clear head height at this location.</p> <p>Tree trimming works can be subject to ecological constraints and as such, early engagement with the road authorities is recommended.</p>
31	<p>Clay Lane / B4320 Junction</p> 	<p>The tree canopy should be trimmed to enable a 5m clear head height at this location.</p> <p>Tree trimming works can be subject to ecological constraints and as such, early engagement with the road authorities is recommended.</p> <p>Loads will straddle the road at the bend near the B4320 junction. Oncoming traffic should be held at least 60m from the junction.</p>

POI	Key Constraint	Details
32	B4320 Seveston 	<p>Consultation with overhead utility providers should be undertaken to ensure that all infrastructure over the road has sufficient clearance for the proposed loads.</p>
33	B4320 Speculation Inn 	<p>Loads will follow the road around to the right.</p> <p>A swept path assessment has been undertaken and indicates that on turning the blade tip will over-sail the southern verge and the inside of the bend, though no physical mitigation will be required at either section.</p>
34	B4320 Lightpipe 	<p>Consultation with overhead utility providers should be undertaken to ensure that all infrastructure over the road has sufficient clearance for the proposed loads.</p>
35	B4320 / Valero Road Junction 	<p>Loads will turn right onto the road leading to the Valero refinery.</p> <p>A swept path assessment has been undertaken and indicates that on approaching the bend loads will over-sail the left-hand verge, where no physical mitigation will be required.</p> <p>Loads will then over-sail the verge on the inside of the bend requiring the removal of a section of hedge and one road sign. A small area of temporary load bearing surfacing will be required.</p> <p>Loads will also over-sail the left-hand verge, though no physical mitigation is required.</p>

POI	Key Constraint	Details
36	<p>Valero Road / Goldborough Rd Junction</p> 	<p>Consultation with overhead utility providers should be undertaken to ensure that all infrastructure over the road has sufficient clearance for the proposed loads.</p>
37	<p>Valero Road Rose Villa</p> 	<p>The tree canopy should be trimmed to enable a 5m clear head height at this location.</p> <p>Tree trimming works can be subject to ecological constraints and as such, early engagement with the road authorities is recommended.</p>
38	<p>Site Access Junctions</p> 	<p>Loads will turn left into the new site access junctions.</p> <p>The access junction will need to comply with Vestas guidelines.</p>

5 Convoy Movement Strategy

The abnormal loads would be transported in a convoy with Police escorts. The convoy would be made up of the following vehicles:

- Up to 4 Police outrider motorcyclists, providing close and advance escort protection;
- 1 police command vehicle, proving a control point for the outriders, located at either the front or rear of the convoy, depending upon movement instructions;
- 1 traffic management vehicle (operating in specific sections such as those in urban areas to provide additional traffic management support to the Police) providing traffic management support to the convoy. Please note that this vehicle would be manned by specifically trained personnel to assist with close convoy traffic management. Other traffic management teams could be stationed along the route to assist at specific points where socket signage, etc are required;
- 2 – 3 abnormal loads. It is expected that the Police will wish to restrict the convoy to no more than two AIL's per convoy, however this is at the discretion of the Police; and
- 1 civilian escort. This vehicle is located behind the last abnormal load and provides steersman support to the AIL drivers.

The convoy is controlled by the Police when on the public highway. All movements are under their instruction.

The Police have indicated that they wish to keep the convoy moving as much as possible and will operate a “rolling roadblock”, by continuing ahead of the convoy and halting oncoming traffic where and when required. To be clear, it is only in constrained sections of the route (as identified) that oncoming traffic will have to be managed in this way.

Due to the relatively short distance and journey time between the docks and the proposed site, subject to agreement with the Police and WG, it may be possible to run multiple convoys per day.

The smooth operation of the TMP relies upon the co-ordination of the Police and AIL drivers. It is important that the outriders do not hold traffic too early as this may cause undue delay.

To further support the Police, a Temporary Traffic Regulation Order (TTRO) will be in place allowing Police further powers to hold traffic and ease movement. The TTRO will be in place throughout the entire delivery period and will be paid for by the developer and promoted by the trunk and local roads agencies.

It is important to note that the operation of the convoy on the public highway is a matter for the Police on the day. Whilst this TMP outlines the preferred strategy, it can be over-ruled or modified by Officers on the day who may need to react to on the spot conditions. With this in mind, the TMP is very much seen as a guidance document and elements within it may change due to operational experience.

The operation of the potential hold point locations would be as follows:

- The advance police outrider would move ahead of the convoy to the hold point location;
- At the hold point, the outrider would stop oncoming traffic under existing Police powers and the TTRO powers;
- The convoy would progress to the hold point where it would either pass or stop, depending upon the need to release following traffic;
- The held oncoming traffic would then be released under Police control;

- If required, oncoming traffic would be held to allow the release of trailing traffic; and
- The convoy would continue.

Traffic conditions on the day may not require the use of all holding points identified in Table 3. The number of hold points provided represents a worst case example and officers on the day would be free to reduce the points using their judgement of traffic flows.

5.1 Timings of Deliveries

The timings of deliveries are generally outwith the control of the wind farm developer and in the control of the Police. It is difficult at this stage to provide advice on at what time of the year the deliveries are likely to occur, but Njord will if possible aim to erect the turbines during the summer months (as the longer daylight hours and generally lighter winds and drier conditions aid construction).

To aid the review of the report, PF has given some general information on load delivery timetables that could be used in this project.

Deliveries would be restricted to weekdays with no weekend working. This will avoid periods where there is a greater chance of tourist traffic on the network. Deliveries will not occur on bank holidays or on Friday afternoons or Monday mornings during the peak school summer holiday period. Where possible and subject to the agreement of the Police, the peak summer holiday period will also be avoided. In addition, deliveries will avoid road works wherever possible.

Convoys will avoid peak traffic periods during the day at sensitive locations such as Pembroke Docks and Pembroke. Convoys will not pass through urban areas during school run times, subject to police escort agreements.

With stoppage time including steering times and queue management of oncoming traffic at various points, the worst case journey time would be in the region of 42 minutes. Due to the short nature of the route, subject to agreement with the Police, it may be possible to operate more than one convoy per day.

The predicted journey time provides more than enough time to traverse the network and avoid school drop off and pick up times the route passes through.

To help managed and reduce the journey time, were manual steer is required (through Pembroke), internal rear wheel steer control will be used. Any street furniture modifications will be undertaken in advance of the convoy approaching the section, whilst it is shut down by the advance police escorts and as such will not add greatly to the journey times.

5.2 Highway Structures

The proposed route contains a number of bridges and highway structures. None of these are currently subject to posted weight limits.

It is worth noting that the vehicles used for turbine delivery have multiple axles, specifically in order to spread the weight over a greater number of wheels. Axle weights therefore remain within normal highway limits.

The only structure encountered on the route that is subject to height restrictions is a rail bridge located on the A4075 Holyland Road in Pembroke (POI 15) where a 4.5m height restriction is

in place. A detailed topographical survey of the structure indicated that the actual clearance from the road to the bridge parapet at its lowest point is 4.73m.

A vertical tracking assessment of the bridge has been undertaken using this topographical information and is attached in Appendix A. The assessment shows there is sufficient space to allow for safe negotiation by all proposed convoy components through the bridge.

A height gauge would be provided within the docks to review vehicle height prior to departure. The height gauge would be topographically set and regularly calibrated with Network Rail invited to review the set up and calibration. Should any change be detected, the air suspension in the trailer would be adjusted to reduce the load height.

Further clearance can also be achieved by carefully releasing the air / oil suspension whilst travelling under the bridge and resetting the suspension on the other side (minor time requirement) for the tower sections.

Please note that a further full structural assessment of the route will be taken through the ESDAL system as part of the BE16 application process prior to deliveries commencing. None of the route has been sign posted as having a weight limit and no signs of edge failure were noted on the site visits. A full before and after condition survey will be undertaken and any defects directly caused by the transport of the components will be secured and the road returned to its original condition.

The maximum axle load will be 12t, distributed to 4 wheels per axle. Given that the trunk road section is constructed and maintained to district / national distributor standards, the likelihood of structural damage caused by AIL movements is not considered significant. A further review of the local roads will be undertaken post consent.

Where specific structures of concern are noted through the ESDAL process prior to transport, these can be passed at low speed to reduce any adverse impact on the structure. An initial ESDAL consultation has been undertaken with the various stakeholder organisations and no concerns with structures have been raised.

5.3 Road Modifications to Accommodate Swept Path

A number of street furniture adjustments and physical mitigation works are required. These are detailed in the Route Survey in Appendix A

The mitigation measures outlined (and illustrated in the swept path assessments drawings found in Appendix A) have a minimal impact on the transport network leading to the proposed wind farm. As such, the overall environmental impact of the proposed mitigation works is considered marginal.

Where temporary over-run areas are required, the widening works can be provided in temporary load bearing plates or in a surfacing to the satisfaction of the road authorities.

Where existing street furniture are over-sailed and over-run, they will be modified to provide socket foundations that will allow easy removal during delivery periods. The load would then be able to move with ease during its transit of the section.

The developer's traffic management agents would remove the affected street furniture during the section occupation by the Police before the convoy arrives. Given that the required works are very minor, a further provision of 2 minutes has been accounted for replacing the street

furniture whilst the road is closed and traffic held by the supporting traffic management team. Access to any crossing / splitter islands or footways subject to over-sail would be halted during the transit in the interests of health & safety.

To allow the removal of the small items of street furniture, the traffic management team will travel in advance of the convoy to remove the items during Police occupation. The convoy would then pass the sections and the traffic management team will then immediately reset the items under yellow light control and whilst the Police have the section under control with no other traffic moving.

When items are being removed, the traffic management teams would provide support to the Police to control side road traffic if required and requested by the officer in charge. Release of side road traffic would be allowed upon reset of the street furniture.

Lookout staff will be provided to ensure road safety for all staff. Traffic management staff will be provided with full PPE to comply with Health & Safety requirements and will be certified for working in live traffic situations.

Installing plates and socket foundations is a relatively simple operation would take place as with any road works protected by signals and traffic management in accordance with the DMRB guidelines. Socket foundations are now a standard detail and their installation is well understood and would be undertaken by an approved sub-contractor.

In these transits, traffic will be held in both directions from entering the section to ensure the vehicles can use the entire width of the section. All street furniture should be restored immediately after loads have transited the section prior to the release of general traffic.

To reduce the need of street furniture removal during deliveries, where possible, the affected street furniture will be relocated outwith the required clearance envelope. The relocation of any street furniture will be agreed with the Council.

5.4 Parking Control

From observations undertaken during route inspections it is noted that parking takes place at the kerbside through Pembroke Docks and Pembroke located along the proposed AIL delivery route, which restricts the road in places. In these locations, care will be required to negotiate the proposed abnormal loads.

5.5 Significant Operational Constraints & Impacts

Sections of the proposed route are sinuous in nature with areas of natural constriction due to the surroundings. This leads to the potential for operational constraints to occur on the network in the present condition.

A number of points of interest have been mentioned in Table 3 to show where the convoy is likely to straddle the centreline of the road on bends. It is not considered necessary or realistic to physically mitigate each of these locations; however, traffic management in the form of advance warnings by the lead escort would be employed to aid transit in a safe and efficient manner.

Delays created by wind farm deliveries on routes such as that proposed are generally not unreasonable and no worse than those incurred by the movement of agricultural or heavy good

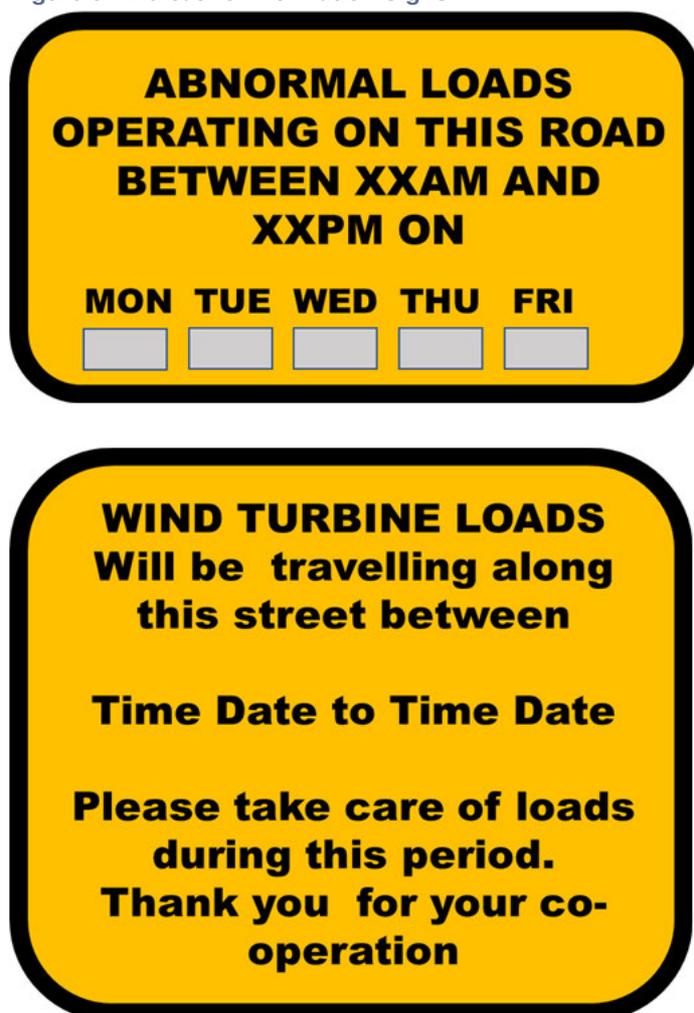
vehicles servicing the Velero Oil Refinery, both of which regularly (indeed frequently) use this route, and neither of which are subject to the restrictions that wind turbine loads are placed under.

The impact of the convoys with all the mitigation measures in place, is considered to be no worse than the imposition of agricultural traffic during moderate to heavy traffic flows. The temporary inconvenience that could be caused by delivery vehicles must be viewed in the context that the delivery period is restricted to no greater than 4 weeks and is a 1 in 25 year event, and of course of the Welsh and UK Governments' policies requiring delivery of nationally significant energy infrastructure projects of this sort.

5.6 Advance Warning Signs

Advance warning signs would be installed on the approaches to the affected roads network. Temporary signage advising drivers that abnormal loads will be operating could be erected on sections of the route and the roads leading from the docks. Signs such as the examples shown in Figure 5 could be installed to help assist drivers and pedestrians.

Figure 5: Indicative Information Signs



A Welsh translation would be agreed with the Welsh Government prior to implementation.

The purpose of this type of the vehicular signage is to help improve driver information and allow drivers of oncoming traffic to consider proceeding to the nearest convenient passing bay (when directed to by the Police or escorts), or breaking their journey until the convoy has moved on.

To further improve driver information, it is suggested that Variable Message Signs (VMS), operated by the trunk roads agencies, are used to warn drivers of abnormal loads operating on the trunk road sections of the route. This would display information warning of possible delays and would allow drivers to consider alternative routes if possible.

The temporary pedestrian warning signs would be erected within urban areas to alert pedestrians of the proposed loads. The time and date section of the sign could be written in marker pen so to allow re-use of the sign during the life of the project. The signs would be fixed by means of cable ties (or similar) to existing street furniture.

5.7 Public Information

Information on the movement of abnormal load convoys should be provided to local media outlets to help assist the public. Information could be provided to local newspapers and radio stations.

Information would relate to expected vehicle movements from Pembroke Docks through to the site access. It is hoped that this level of information will make residents aware of convoy movements and help reduce any potential conflicts.

PF also suggest that the developer may wish to consider producing a local newsletter for distribution to properties along the most affected sections of the proposed access routes, advising of convoy movements and the measures put in place to ensure the safe and efficient operation of the road network.

6 Framework Transport Management Plan

6.1 Framework TMP

The TMP by its definition is a live document and should be updated on a regular basis to reflect changes in road, load and operational conditions. It must not be seen as just a document relating to the transport of abnormal loads, as several sections relating to traffic management and incidents are relevant for both abnormal and standard loads.

The safe and efficient transport of all loads associated with the construction of the wind farm is vital and experience gained on the project must and will be recorded in the report as it develops. As such, following planning consent, this document should be considered a controlled document and updates made and logged as and when required. All those developing this plan and influencing it, may be liable under CDM regulations and as such, it is important to document any changes.

6.2 General Review Issues

Before the abnormal loads traverse the route, it is suggested that a detailed review of the following is undertaken to ensure load and road user safety, given that it may be some time between approval of the plan and the delivery of the first components:

- It is suggested that a further review of maximum axle loading on structures along the access route with the various roads agencies is undertaken prior to the loads being transported;
- A review of clear heights with utility providers and the transport agencies along the route and should pass under any overhead services, however the developer is recommended to ensure with providers that there is sufficient clearance with an appropriate safety factor, especially with respect to power lines.;
- That any vegetation which may foul the loads is trimmed back to allow passage (this is of concern once the load is on the local road network and should be assessed for summer conditions);
- That there are no roadworks or closures that could affect the passage of the loads;
- That there are no new or diverted underground services on the access route that are at risk from the abnormal loads;
- That a condition survey is undertaken to ascertain the extents of any highway defects and that this is agreed in advance of any load movements with the roads agencies to protect the client group from unrelated damage claims; and
- That the various Police constabularies are satisfied with the route being used and that the local roads authorities have been further contacted regarding the proposed loads and suggested route.

At the time of the site visit, no overhead structures or any indications of any underground services that would be of great concern were noted, that have not been discussed in previous sections of this report.

It should be noted that as part of the supply contract, the turbine suppliers will provide the developer with a detailed route review of its own as well as a Traffic Management Plan (TMP) for use by its delivery drivers. The TMP contains a full risk review and instructions on how to reduce potential conflicts with other road users.

6.3 General Convoy Management

The Police have the ultimate authority in deciding convoy composition and escort numbers for all AIL loads. All Police escorted convoys will comprise of a bare minimum of at least one private escort and four police escort vehicles.

The exact composition of the escorts, their deployment and final numbers will be at the discretion of the Police when the BE16 Abnormal Load permissions form is submitted.

A full convoy operation plan will be developed in consultation with the various highways and constabulary agencies along the route and agreed before deliveries commence to the site.

6.4 Daily Initial Checks

Before the convoys depart the POE, the lead convoy driver will check weather and traffic conditions and advise colleagues through a “Tool Box Talk”. The following websites provide relevant weather and traffic updates:

- www.traffic-wales.com
- www.theaa.com/traffic-news/index
- www.transportdirect.com
- www.bbc.co.uk/travelnews
- www.metoffice.gov.uk

6.5 Potential Urban / Built Up Area Conflict Points

The urban areas along the route pose different challenges for the abnormal loads. Whilst the vehicle speeds will be less than those in the rural or motorway sections of the route, there are more potential conflicts with other road users to be aware of. These include:

- Pedestrians and cyclists;
- Local vehicular traffic;
- Parked vehicles;
- Side junctions; and
- Street furniture.

Within the urban / built up areas, the convoy escorts and other loads will need to be aware of all road and footway users at turn sections within the route. At these locations there is potential for load over-sail and over-run and escort drivers must refer to swept path information circulated as part of their briefing packs.

6.6 Daily Management Updates

Daily updates to the general convoy management will be provided at the daily Tool Box Talks, where drivers and escorts will be fully briefed on the specific requirements of the convoys on that day. During these sessions, the following checks will be made:

- That staff are aware of the TMP and have a copy of the latest version of the Driver Information Pack (a condensed version of the TMP) in the cab;
- That all staff have the appropriate licences, safety equipment and clothing;
- That all radios and mobile telephones are fully charged and that the correct channels are known;

- That the convoy is aware of its legal responsibilities for the country of operation;
- That drivers are briefed on welfare issues, including provisions for sleep and rest during the day;
- That the convoy is aware of client, haulier and turbine supplier health and safety requirements and method statements; and
- That all staff have been inducted on site rules before entering the site boundary and that induction is undertaken immediately upon arrival. Details of induction process are to be provided by the main contractor to the haulier before loads commence.

6.7 Communications Strategy

In order to ensure effective communications during transit, all vehicles within the convoy will be fitted with Citizens Band (CB) radio equipment. The CB units on the transporters will be hard-wired to reduce the risk of power failure during transit. All escort vehicles will be fitted with hand held battery powered CB radio sets. Spare sets should be carried to allow communications with the Police during transit, if the Police request it only. In addition to the CB sets, all vehicles will be fitted with hands free mobile phones, to allow contact with third parties without CB devices and that would also act as an alternative form of communication in an emergency. Mobile phones could only be used when stationary.

A communication protocol would also be established with the emergency services so that in the case of a blue light emergency, the convoys would be diverted to the nearest hold point area.

In the case of emergency vehicles that need to pass the convoy en-route to a third party emergency, the escorting police will be informed by radio of the incident and the requirement for vehicles to pass unhindered. At that time, a police escort vehicle, which is likely to comprise a motorbike, will travel ahead of the convoy to the next convenient holding point(s) at which the convoy could be manoeuvred such that clear passage can be afforded to the emergency vehicle. In the unlikely event that such an area is a considerable distance away, the emergency services will be informed of this and a decision taken concerning the necessity to reroute the emergency vehicle(s).

Alternatively, once the wide area has been reached, the police escort will marshal the AIL convoy such that safe and speedy passage is afforded to the emergency vehicle.

This entire process will be controlled by the escorting police officers, in contact with the emergency services control centre.

6.8 Contingency and Incident Plans

Contingency details for incidents such as tyre punctures, breakdowns and accidents are described below and should be observed. In all situations the safety of personnel and the public is paramount and reasonable steps to ensure safety at a site should be undertaken. In the event of an incident, it should be reported to the appropriate person immediately.

In the event of vehicle breakdown or incident the following details from The Highway Code must be observed:

- Try to remove the vehicles off the road if possible. On the motorway / dual carriageway, if possible depart at the nearest exit or service area. If it is not possible to depart the motorway, pull onto the hard shoulder as far left as possible;
- If on a dual carriageway, try to stop near to an emergency telephone;
- When stopped, close the convoy up to reduce the length where possible;

- Warn other traffic by using hazard warning lights if the vehicles are causing an obstruction;
- Drivers should depart using the left hand side door. Unless staff are threatened by their situation, all staff should depart the vehicles;
- Use PPE at all times when outside the vehicle;
- Place a warning triangle on the road at least 100 metres behind the last convoy vehicle on the same side of the road. Use the warning cones and flares carried in the escorts to protect the end of the convoy by creating a diagonal around the back of the last vehicle. Always take great care when placing or retrieving them. The Highway Code indicates that warning triangle should not be used on motorways;
- Consult with the Police escorts to identify what additional warning devices should be deployed;
- Keep sidelights and beacons on;
- No staff should stand between the convoy vehicles and oncoming traffic. Staff should not stand between vehicles in the convoy. Staff should be located at locations where all road users can see them;
- Staff should wait on the verge and where barriers are provided, stay behind them;
- In the event of injuries, do not move injured people unless they are in immediate danger from fire or explosion. Staff must not remove a motorcyclist's helmet unless it is essential to do so and should be prepared to give first aid if appropriately trained;
- In the case of injuries, all staff must stay at the scene until the emergency services arrive;
- In the event if a collision which causes damage or injury to any other person, vehicle, animal or property, the convoy must stop, provide contact details and addresses, provide vehicle registration details to third parties. The police escort should be informed and the incident reported within 24 hours to the local police station;
- In the event of a collision, all staff should obey directions from the escort Police Officers or attending officers;
- In the event of a breakdown, the nature of the breakdown should be reported to the indicated assistance provider. Obtain advice from the haulier Project Manager; and
- In the event of a burst tyre the appropriate repair provider should be contacted to come and replace the damaged item. Staff should not attempt to replace any HGV tyres themselves.

These items are relevant for both abnormal and non-abnormal loads. Where the police are escorting, their instructions will take precedence and the lead Police officer must be informed should an issue on transit occur. To ensure the minimum delay and inconvenience, the developer will have recovery agreements set up with suitable contractors along the route.

6.9 Equipment Requirements

Each of the convoy vehicles must be suitably equipped with hazard warning devices to warn all other road users. All the tractor, trailer and escort vehicles operating on the project must have the following:

- Tractor units to have beacon bars on the roof and 3M reflective markings on both sides;
- All vehicle warning signage to be in English where appropriate;
- Trailer units to have amber beacons on the rear with 3M reflective markings on both sides;
- All escort vehicles will have beacon bars on the roof, with 360 degree motion for all round visibility, and 3M reflective markings; and
- Certified cargo lashing straps are to be used at all times. Certification must be carried and made available for inspection, kept within the cab.

All hazards warning equipment must be checked and cleaned at the start of each day. Additional cleaning of the warning equipment may be required throughout the day and must be undertaken when required.

All escort vehicles will carry the following equipment:

8 x Reflective Road Cones	1 x Flash Light	1 x Spare High-Vis Waistcoat
8 x Flare Alert Beacons	1 x Auxiliary Rechargeable CB Radio	1 x Spare Hard Hat
2 x Warning Triangles	1 x Fire Extinguisher (dry powder)	1 x pack of disposable dust masks
1 x Spill Kit	1 x Van/Truck First Aid Kit	1 x safety spectacles
1 x Emergency Hammer	1 x Roll of Barrier Tape	

All relevant personnel must have the appropriate Personal Protective Equipment (PPE).

All PPE clothing must be 'CE' marked to show it meets the European standards and should be appropriate for use in Motorway situations (i.e. must be full coats with reflective bands on the arms). Drivers must be issued with:

- Hard hat (within certification date);
- High-Vis (jacket / coat and trousers);
- Lace up steel toe capped safety boots; and
- Gloves.

6.10 Third Party Accident/Breakdown on the Route

In the eventuality of a third party accident or breakdown on the delivery route, ahead of the AIL convoy, it may be necessary for the convoy to be slowed or temporarily halted until safe passage can be assured. The police escort would take control of the convoy and monitor manoeuvring of the convoy into a safe location, which would generally comprise of the nearest hold point. The convoy would be held at this location until the highway ahead was judged by the police to be sufficiently clear to enable safe passage of the convoy.

Should it be required for the loads to be temporarily halted, traffic in the vicinity of the convoy will be marshalled by a combination of the police and civilian escorts.

It is assumed for the purpose of this TMP that any road closure is likely to be only temporary. However, in the case of a catastrophic failure of the highway, for example a collapsed culvert, which would lead to longer term closures, alternative nearby routes would be identified as emergency diversions. These would be agreed with appropriate highway authority officers and marshalled by the attending police escort. It is not possible to plan in advance for the implications of such catastrophic failures.

7 Summary

7.1 Summary and Conclusions

This report identifies the key points and issues associated with the route. It is the responsibility of the wind farm supplier (subject to contract) to ensure that the access route from the port of entry to the sites are fit for purpose and that appropriate consideration for all road users has been made in accordance with the relevant health and safety legislation and ruling transport requirements.

The access review has been undertaken from Pembroke Docks through to the site access junction. The route is suitable for the movement of the anticipated loads, although careful manoeuvring will be required through a small number of sections along the route and into the site access.

A series of operational measures have also been detailed to further aid the delivery of equipment and to minimise the impact of convoys on the network. These include the provision of warning signs and incident contingency plans.

The temporary inconvenience that could be caused by delivery vehicles must be viewed in the context that the delivery period is restricted to 1 in 25 year event. Police escorts assisted by civilian escorts, will also ensure road user safety.

A full and detailed TMP will be delivered prior to loads moving to the site, once commercial decisions on the site have been finalised, following the granting of planning permission. It is expected that this will be covered by a suitably worded planning condition.

It is considered that the proposed route described in this report is eminently and clearly feasible and present this TMP to South Wales Trunk Road Agency and Pembrokeshire County Council for their review and consideration.

Appendix A

Route Survey Report

P e l l F r i s c h m a n n

Rhoscrowther Wind Farm

Abnormal Indivisible Load Route Survey



September 2021

Revision Record

Document2

Rev	Description	Date	Originator	Checker	Approver
A	Issue	15/09/2021	G Luford-Jones	T Lockett	G Buchan

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Appendix A - Points of Interest Locations

Appendix B - Swept Path Assessments

1 Introduction

1.1 Purpose of the Report

Pell Frischmann (PF) has been commissioned by Njord Energy to undertake a survey of the Abnormal Indivisible Load (AIL) delivery route for wind turbine loads associated with the construction and development of Rhoscrowther Wind Farm, located to the west of Pembroke.

The Route Survey Review (RSR) has been prepared to help inform Njord on the 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 designs of any remedial works are beyond the agreed scope of works between PF and Njord at this point in time.

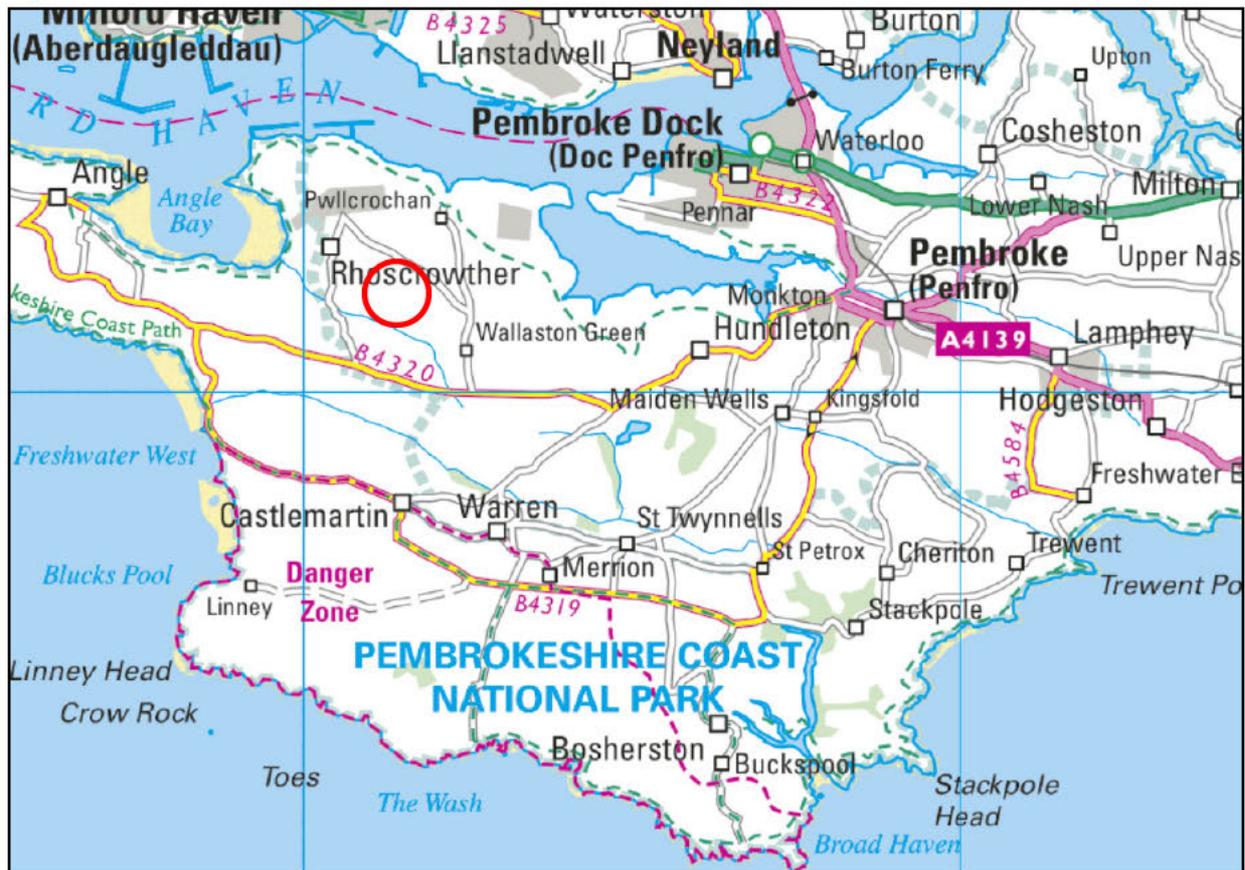
It is the responsibility of the turbine supplier to ensure that the entirety of the proposed access route is suitable and meets with their satisfaction. The supplier will be responsible for ensuring that the finalised proposals meet with the appropriate levels of health and safety consideration for all road users is 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 Pembroke. Figure 1 illustrates the general site location.

Figure 1: Site Location Plan



2.2 Candidate Turbines

Njord have indicated that they wish to consider the use of a Vestas V117 3.6MW turbine at a tip height of 135m as the worst case candidate turbine. Tower and hub dimensions have been supplied by Vestas and are indicated below in Table 1.

Table 1: Turbine Dimensions

Section	Length (m)	Width (m)	Height (m)	Weight (t)
Blade	57.300	4.000	3.124	13.800
Nacelle Housing	12.731	4.174	3.180	67.500
Drive Train	12.731	4.174	3.180	81.000
Base Tower	20.300	4.450	4.167	51.500
Mid Tower	23.800	4.167	3.915	40.000
Top Tower	30.000	3.915	3.268	43.500

Swept path models to review the various constraints have been built. These have assumed the following trailer configurations:

- Blade: 3 axle Superwing Carrier trailer; and
- Top Tower: 4+7 Load adaptor.

Examples of the types of trailer are illustrated in Figures 2 and 3 below.

Figure 2: Superwing Carrier Trailer



Figure 3: Tower Trailer



3 Access Route Review

3.1 Port of Entry

The nearest feasible Port of Entry for the site is Pembroke Dock in Pembroke. Whilst the port has been not had extensive use for onshore turbine deliveries, it has been marketed as a suitable port for offshore renewables projects and has sufficient quay capacity and heavy lift areas required for turbine deliveries.

The port and access route from it has been used for non-turbine abnormal load access in the past for onward deliveries to development sites across southwest Wales.

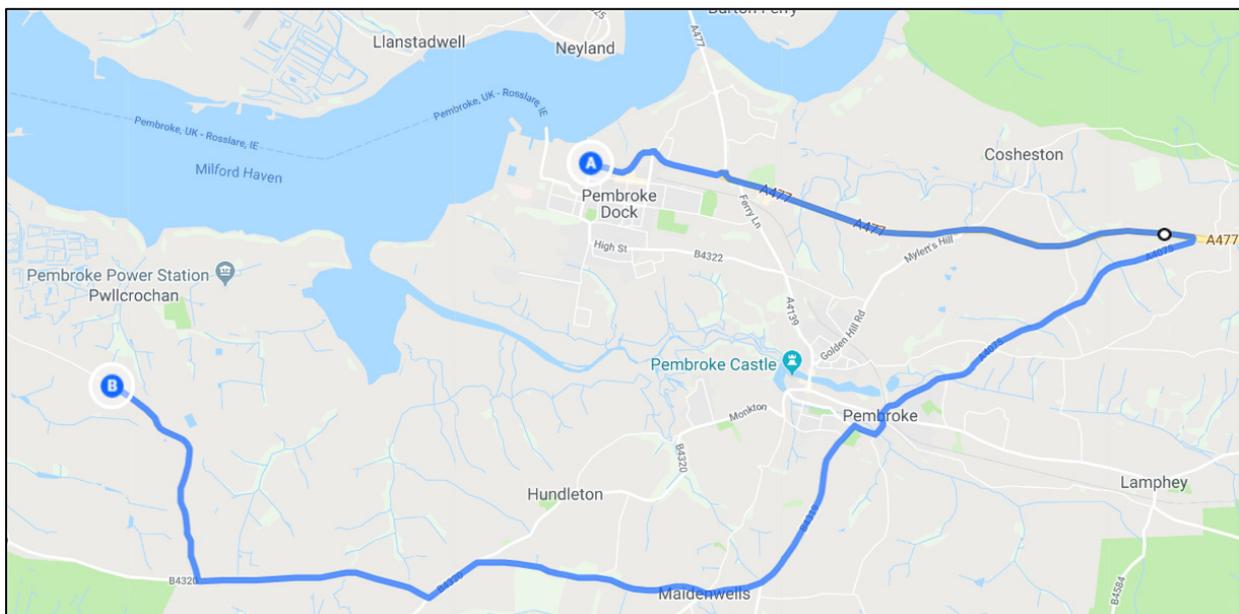
3.2 Access Route

The route from Pembroke Docks to the site has been revised during a site visit. The proposed access route to the site access junction is as follows:

- Loads would exit onto the docks at Gate 1 and would proceed eastbound on Western Way;
- Loads would continue east on London Road and the A477;
- Near Upper Nash, loads would turn right onto the A4075 and would then proceed southwest, heading towards Pembroke;
- At the Main Street roundabout, loads would proceed across the junction heading south onto Well Hill (A4139);
- Loads will turn left onto the B4319 and will proceed southbound until Kings Fold, where they will proceed westbound on Clay Lane and the B4320;
- Loads will then turn right heading northbound towards the Valero refinery; and
- Loads will then turn left into a new site access junction for the turbine locations opposite the refinery.

The proposed access route is illustrated in Figure 4.

Figure 4: Proposed Access Routes



3.3 Route Constraints

The constraints noted in the review of the route from Pembroke Dock are detailed in Table 2.

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

Table 2: Constraint Points and Details

POI	Key Constraint	Details
1	<p>Pembroke Dock Gate 1</p> 	<p>Loads would exit the dock at Gate 1 and would enter the public road network, traveling eastbound on Western Way.</p> <p>A swept path assessment of the turn out of the port has been undertaken and indicates that loads will over-sail the pavement to the left of the give way line. One lighting column and one lit road sign should be removed.</p>
2	<p>A4139 Western Way</p> 	<p>The bollards at the crossing island should be lowered or removed for wide load deliveries.</p>
3	<p>A4139 Western Way Bend</p> 	<p>Loads will straddle the centre line of the road on the bend, prior to the London Road roundabout. The lead escorts should hold oncoming traffic back at the roundabout to prevent conflict between the AIL convoy and other road users.</p>

POI	Key Constraint	Details
4	<p>Criterion Corner Roundabout</p> 	<p>Loads will proceed ahead at the roundabout and will take the second exit onto London Road.</p> <p>A swept path assessment at this junction has been undertaken and indicates that the blade tip will over-sail the northern verge on approach to the roundabout, where one lighting column should be removed.</p> <p>Loads will then over-sail and over-run the northern verge of the roundabout island where vegetation should be trimmed, and two lit chevron signs removed. A temporary load bearing surface will be required.</p> <p>On exit from the roundabout, loads will over-sail the splitter island where four bollards and one road sign should be removed.</p>
5	<p>A4139 London Road / Junction to Retail Park</p> 	<p>Loads will proceed ahead at the junction and will continue eastbound on London Road.</p> <p>Traffic in the right turn lane should be cleared prior to loads approaching the junction.</p>
6	<p>Waterloo Roundabout</p> 	<p>Loads will proceed ahead, eastbound on the A477.</p> <p>The optimum solution at the junction is for loads to undertake a contraflow transit of the roundabout. A swept path assessment has been undertaken and indicates that loads will over-sail and over-run the right-hand verge on exit from the roundabout. A load bearing surface should be laid in the over-run area and existing underground utilities protected.</p> <p>Oncoming traffic should be held at POI 7 to ease access for the convoys.</p>

POI	Key Constraint	Details
7	<p>A477 / Ferry Ln Junction</p> 	<p>Loads will proceed ahead, eastbound on the A477.</p> <p>Traffic in the right turn lanes should be cleared prior to loads approaching the junction.</p>
8	<p>A477 Kingswood Trading Estate</p> 	<p>The tree canopy should be trimmed to enable a 5m clear head height at this location.</p> <p>Tree trimming works can be subject to ecological constraints and as such, early engagement with the road authorities is recommended.</p>
9	<p>A477 / A4075 Junction</p> 	<p>Loads will turn right onto the A4075 at this junction.</p> <p>A swept path assessment has been undertaken and indicates that on navigating the turn the blade tip will over-sail the northern verge, where vegetation should be trimmed and two road signs should be removed. Loads will over-sail the central reserve island where two road signs should be removed.</p> <p>Loads will then over-sail the central island on the minor arm where three road signs should be removed. The blade tip will over-sail the eastern splitter island, though no physical mitigation is required.</p> <p>On completing the turn, loads will over-sail the western verge where one road sign should be removed. Loads will also over-run the eastern verge where a load bearing surface should be provided.</p>
10	<p>A4075 East of David Saunders Caravan Park</p> 	<p>The tree canopy should be trimmed to enable a 5m clear head height at this location. This should be undertaken along the whole route.</p> <p>Tree trimming works can be subject to ecological constraints and as such, early engagement with the road authorities is recommended.</p>

POI	Key Constraint	Details
11	A4075 West of David Saunders Caravan Park 	<p>Consultation with overhead utility providers should be undertaken to ensure that all infrastructure over the road has sufficient clearance (including flash-over protection) for the proposed loads.</p>
12	A4075 Green Hill 	<p>Consultation with overhead utility providers should be undertaken to ensure that all infrastructure over the road has sufficient clearance for the proposed loads.</p>
13	A4075 East of Mutton Hill 	<p>Loads will continue ahead on the A4075.</p> <p>A swept path through the bend has been undertaken and indicates that loads will over-sail the northern verge, where vegetation should be trimmed.</p>
14	A4075 Mutton Hill 	<p>A review of the vertical alignment at this location should be undertaken during the test run. Loads should be set on their higher suspension settings to avoid grounding issues.</p>
15	A4075 Penny Bridge 	<p>Loads will continue ahead on the A4075.</p> <p>A swept path through the bend has been undertaken and indicates that no physical mitigation is required.</p>

POI	Key Constraint	Details
16	A4075 West of Penny Bridge 	<p>Loads will continue ahead on the A4075.</p> <p>A swept path through the bend has been undertaken and indicates that no physical mitigation is required.</p>
17	A4075 / Golden Ln Junction 	<p>Consultation with overhead utility providers should be undertaken to ensure that all infrastructure over the road has sufficient clearance for the proposed loads.</p> <p>The tree canopy should be trimmed to enable a 5m clear head height at this location.</p> <p>Tree trimming works can be subject to ecological constraints and as such, early engagement with the road authorities is recommended.</p>
18	A4075 Holyland Hotel 	<p>Loads will continue ahead on the A4075.</p> <p>A swept path through the bend has been undertaken and indicates that no physical mitigation is required.</p>
19	A4075 / Kingsbridge Drive Junction 	<p>Loads will continue into Pembroke.</p> <p>Parking opposite Kingsbridge Drive should be suspended to ease access for the convoys. A Temporary Traffic Regulation Order (TTRO) should be put in place.</p>
20	A4075 / Twopenny Hay Cl Junction 	<p>Consultation with overhead utility providers should be undertaken to ensure that all infrastructure over the road has sufficient clearance for the proposed loads.</p>

POI	Key Constraint	Details
<p>21</p>	<p>A4075 Pembroke Rail Under Bridge</p> 	<p>Loads will proceed around the bend in the road and then under the rail bridge.</p> <p>The rail bridge has a height restriction of 4.5m. A topographical survey of the bridge has been undertaken and indicates that the actual clearances are 4.7m. All loads should be set to be below this restriction.</p> <p>A swept path tracking of the bend and bridge has been undertaken and indicates that the blade tip will over-sail a section of pavement to the north, though no physical mitigation will be required. Loads will also over-sail the footway to the south where multiple bollards should be removed.</p> <p>A vertical clearance assessment has also been undertaken and indicates a minimum clearance of 92mm for the highest section (the base tower section).</p> <p>Parking opposite Kingsbridge Drive should be suspended to ease access for the convoys. A Temporary Traffic Regulation Order (TTRO) should be put in place.</p>
<p>22</p>	<p>Main Street Roundabout</p> 	<p>Loads will proceed ahead at the junction onto Well Hill. Loads will increase their suspensions settings following the bridge.</p> <p>A swept path assessment of this junction has been undertaken and indicates that loads will over-sail the footway to the west side on approach to the roundabout.</p> <p>Loads will over-sail the central island and exit splitter island where all street furniture should be removed.</p> <p>On exiting the roundabout, loads will also over-run and over-sail pavement to the west, requiring the laying of a load-bearing surface and the removal of three signs, one lighting column, and multiple bollards. The blade tip will also over-sail pavement to the east</p>

POI	Key Constraint	Details
23	<p>Well Hill / Lower Lamphey Road Merge</p> 	<p>Loads will continue southbound on Well Hill.</p> <p>The wall mounted railings to the west should be removed and the wall at the ramp will need to be lowered. Three minor over-run areas are required at three separate locations on the eastern verge. Two road signs will need to be removed from the southern section.</p>
24	<p>Well Hill / Grove Hill Merge</p> 	<p>Loads will continue to the right and stay on Well Hill / A4139.</p> <p>A swept path assessment has been undertaken and indicates that loads will over-run and over-sail pavement on the inside of the bend, where loads will over-sail the existing wall. A small area of load bearing surfacing is required. On turning, the blade tip will over-sail the eastern pavement. No physical mitigation will be required here.</p> <p>Loads will then over-sail and over-run the southern verge and footway on moving around the bend. A section of pedestrian guardrail, two road signs and two lighting columns should be removed. A load-bearing surface should be laid in the over-run areas and existing underground utilities should be protected.</p>

POI	Key Constraint	Details
25	<p>A4139 / B4319 Junction</p> 	<p>Loads will turn left onto the B4319 at the junction.</p> <p>A swept path assessment has been undertaken and indicates that on turning the blade tip will over-sail the north verge and hedge. Trimming of vegetation will be required on the verge. Loads will also over-sail the inside of the bend where a section of hedge, two road signs, and one lighting column should be removed.</p> <p>Loads will over-run the splitter island, requiring the removal of two bollards and one lit road sign and the laying of a load-bearing surface.</p> <p>A load bearing surface is required on the western verge of the B4319 where two road signs and a junction column should be removed. The emergency lane is unaffected by the proposed works.</p> <p>The tree canopy should be trimmed to enable a 5m clear head height at this location.</p> <p>Tree trimming works can be subject to ecological constraints and as such, early engagement with the road authorities is recommended.</p>
26	<p>B4319 North of Kingsfold</p> 	<p>Consultation with overhead utility providers should be undertaken to ensure that all infrastructure over the road has sufficient clearance for the proposed loads.</p>
27	<p>Unclassified Road Maidenwells Opposite Roch Poultry</p> 	<p>Loads will enter the village of Maidenwells.</p> <p>There are two sets of speed cushions in the road and these should be passed at low speed.</p>

POI	Key Constraint	Details
28	<p>Maidenwells Roundabout</p> 	<p>Loads will proceed around the bend in the road and will then cross the mini-roundabout, taking the second exit.</p> <p>A swept path assessment has been undertaken and indicates that on approach to the roundabout loads will over-sail the northern footway, though no physical mitigation is required.</p> <p>Loads will then contraflow the roundabout, crossing through the centre and over-running and over-sailing the splitter islands on approach and exit. The removal of two bollards will be required.</p>
29	<p>Clay Lane Three Corner Plantation</p> 	<p>Loads will proceed westbound on Clay Lane.</p> <p>Loads will straddle the centre line of the road. The lead escorts should hold oncoming traffic back at least 60m from the bend to prevent conflict between the AIL convoy and other road users.</p>
30	<p>Clay Lane Kennel Wood</p> 	<p>Loads will proceed westbound on Clay Lane.</p> <p>Loads will straddle the centre line of the road. The lead escorts should hold oncoming traffic back at least 60m from the bend to prevent conflict between the AIL convoy and other road users.</p> <p>The tree canopy should be trimmed to enable a 5m clear head height at this location.</p> <p>Tree trimming works can be subject to ecological constraints and as such, early engagement with the road authorities is recommended.</p>
31	<p>Clay Lane / B4320 Junction</p> 	<p>The tree canopy should be trimmed to enable a 5m clear head height at this location.</p> <p>Tree trimming works can be subject to ecological constraints and as such, early engagement with the road authorities is recommended.</p> <p>Loads will straddle the road at the bend near the B4320 junction. Oncoming traffic should be held at least 60m from the junction.</p>

POI	Key Constraint	Details
32	<p>B4320 Seveston</p> 	<p>Consultation with overhead utility providers should be undertaken to ensure that all infrastructure over the road has sufficient clearance for the proposed loads.</p>
33	<p>B4320 Speculation Inn</p> 	<p>Loads will follow the road around to the right.</p> <p>A swept path assessment has been undertaken and indicates that on turning the blade tip will over-sail the southern verge and the inside of the bend, though no physical mitigation will be required at either section.</p>
34	<p>B4320 Lightpipe</p> 	<p>Consultation with overhead utility providers should be undertaken to ensure that all infrastructure over the road has sufficient clearance for the proposed loads.</p>
35	<p>B4320 / Valero Road Junction</p> 	<p>Loads will turn right onto the road leading to the Valero refinery.</p> <p>A swept path assessment has been undertaken and indicates that on approaching the bend loads will over-sail the left-hand verge, where no physical mitigation will be required.</p> <p>Loads will then over-sail the verge on the inside of the bend requiring the removal of a section of hedge and one road sign. A small area of temporary load bearing surfacing will be required.</p> <p>Loads will also over-sail the left-hand verge, though no physical mitigation is required.</p>

POI	Key Constraint	Details
36	Valero Road / Goldborough Rd Junction 	<p>Consultation with overhead utility providers should be undertaken to ensure that all infrastructure over the road has sufficient clearance for the proposed loads.</p>
37	Valero Road Rose Villa 	<p>The tree canopy should be trimmed to enable a 5m clear head height at this location.</p> <p>Tree trimming works can be subject to ecological constraints and as such, early engagement with the road authorities is recommended.</p>
38	Site Access Junctions 	<p>Loads will turn left into the two new site access junctions.</p> <p>The access junction has been designed to comply with Vestas guidelines.</p>

3.4 Swept Path Assessment Results and Summary

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

The colours illustrated on the swept paths are:

- Grey / Black – OS / Topographical Base Mapping;
- Green – Vehicle body outline (body swept path);
- Red – Tracked pathway of the wheels (wheel swept path); and
- Purple – The over-sail tracked path of the load where it encroaches out with 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. Please note that PF cannot accept liability for errors on the mapping data source, be that OS base mapping or client supplied data.

3.5 Land Ownership

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

In rural areas the area of adoption can be open to greater interpretation as defined boundaries may not be readily visible. In these locations, the general rule is that the area of adoption is between established fence / 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, the turbine supplier should undertake the following prior to the delivery of the first abnormal loads, to ensure load and road user safety:

- Topographical data is collected and the required assessments repeated;
- A review of axle loading on structures along the entire access route with the various road agencies is undertaken;
- 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.

The developer should undertake the necessary land negotiations and obtain the rights and permits to upgrade the roads as appropriate. The liaison with overhead utility providers and an ecological review of the tree canopy should be undertaken.

4 Summary

4.1 Summary of Access Review

PF has been commissioned by Njord Energy 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 report is presented to Njord Energy for consideration. 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

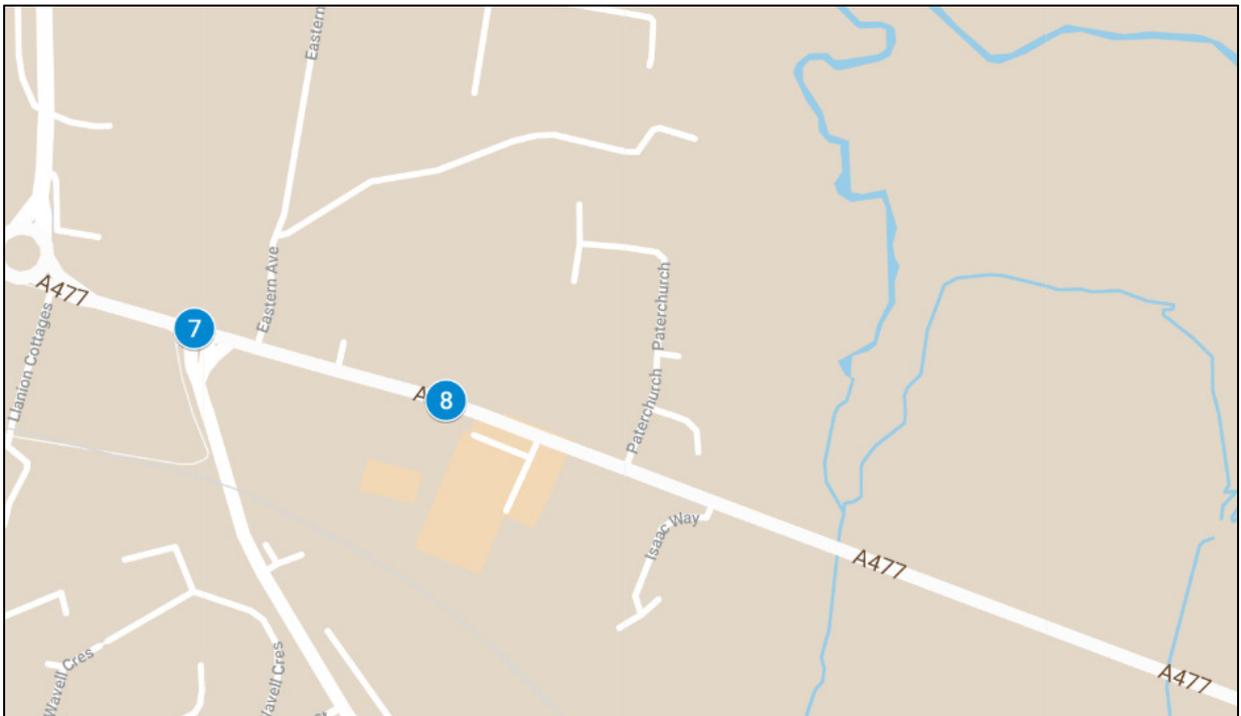
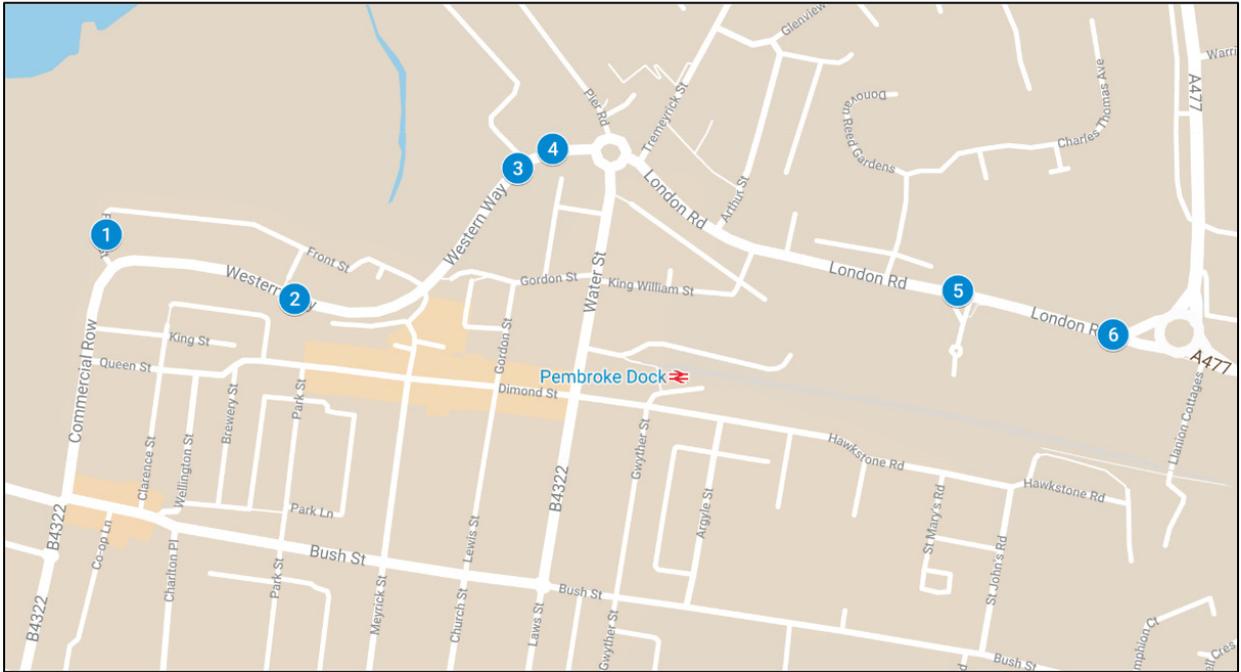
The following actions are recommended to pursue the transport and access issues further:

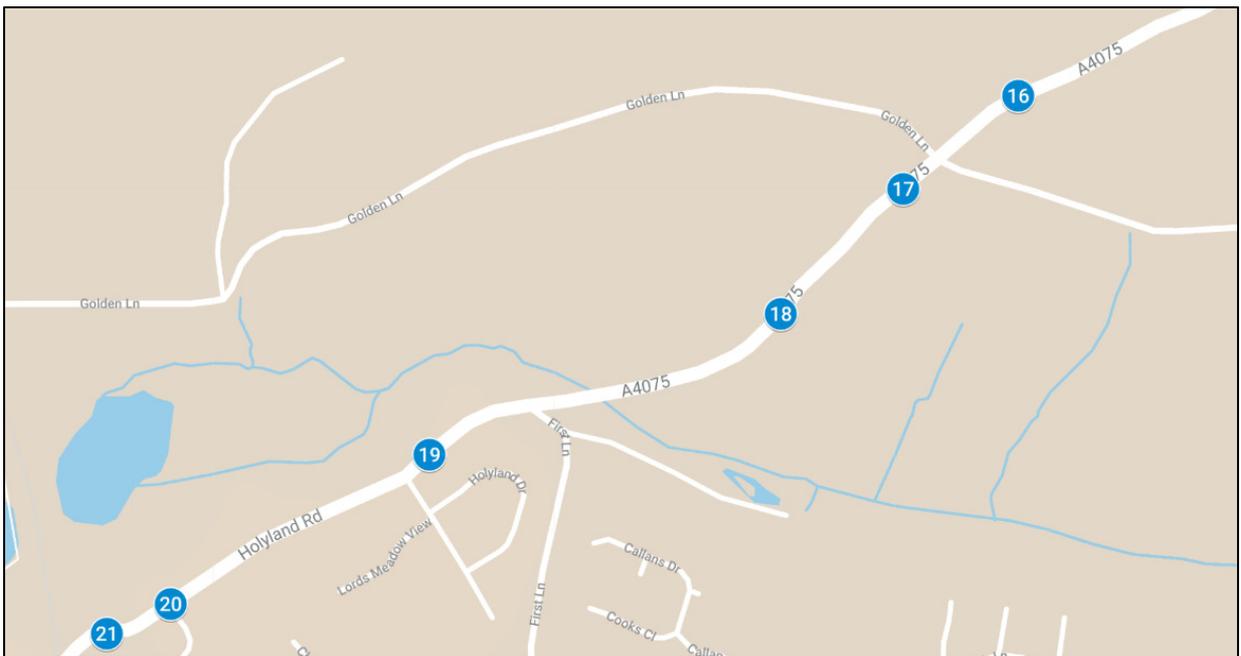
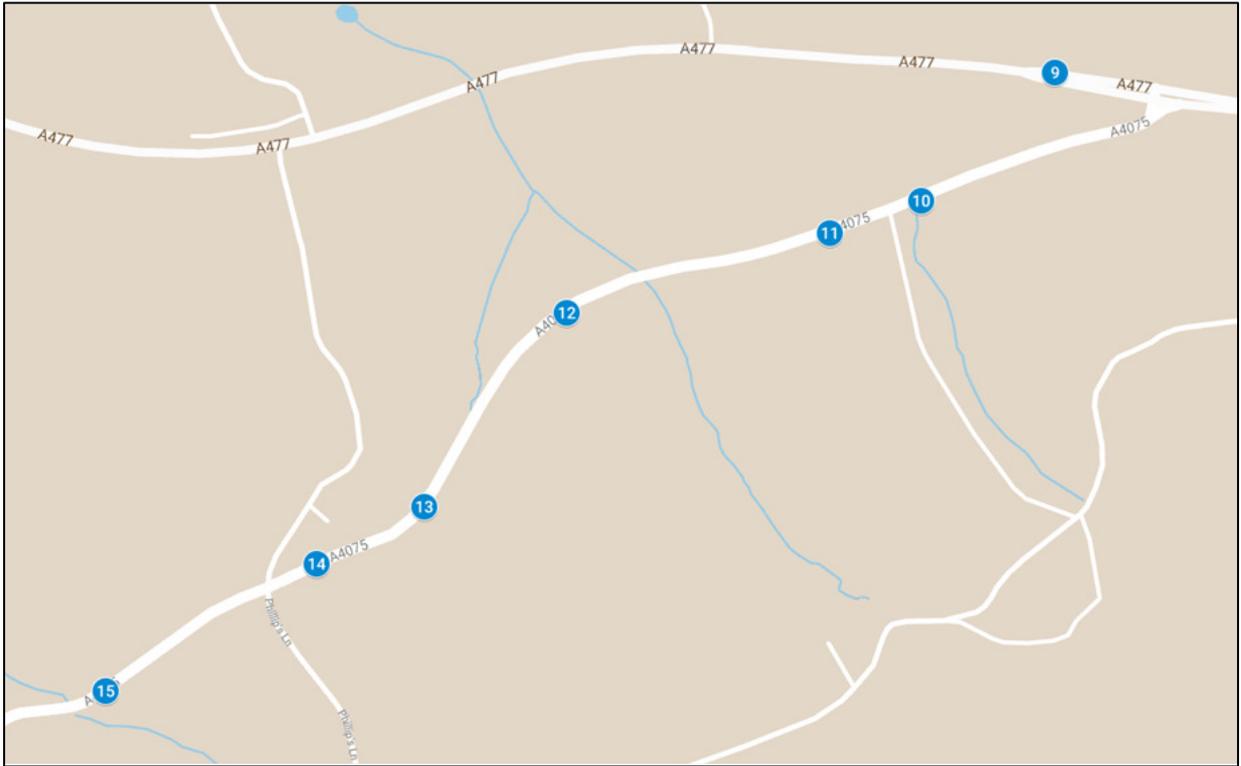
- Obtain the necessary land rights;
- Undertake a weight assessment on the route;
- Prepare detailed mitigation design proposals to help inform consultee / licence discussions;
- Undertake discussions with the affected utility providers and roads agencies;
- Obtain the necessary statutory licences to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

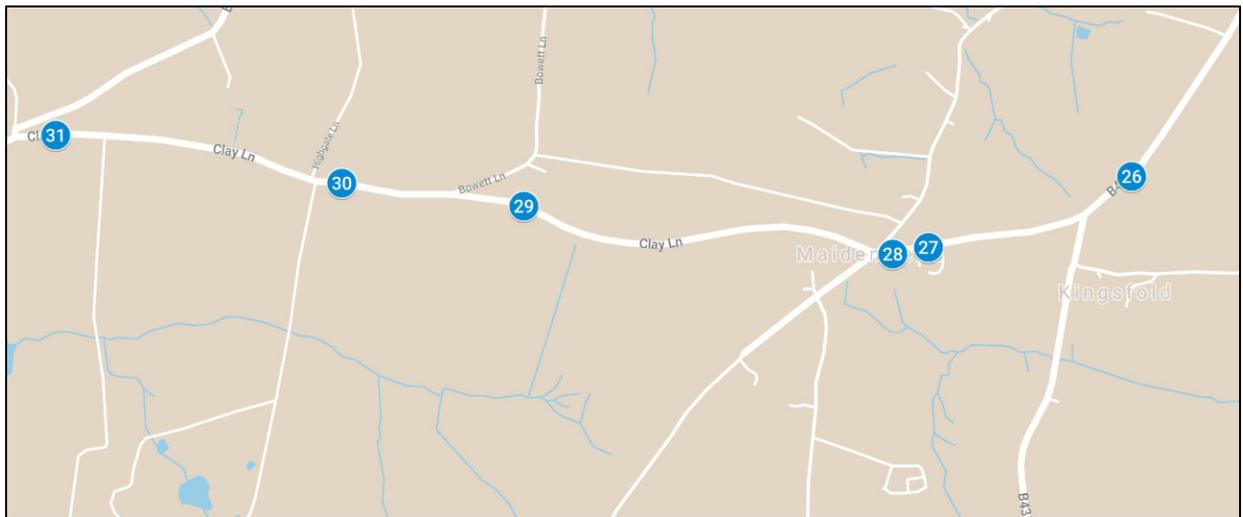
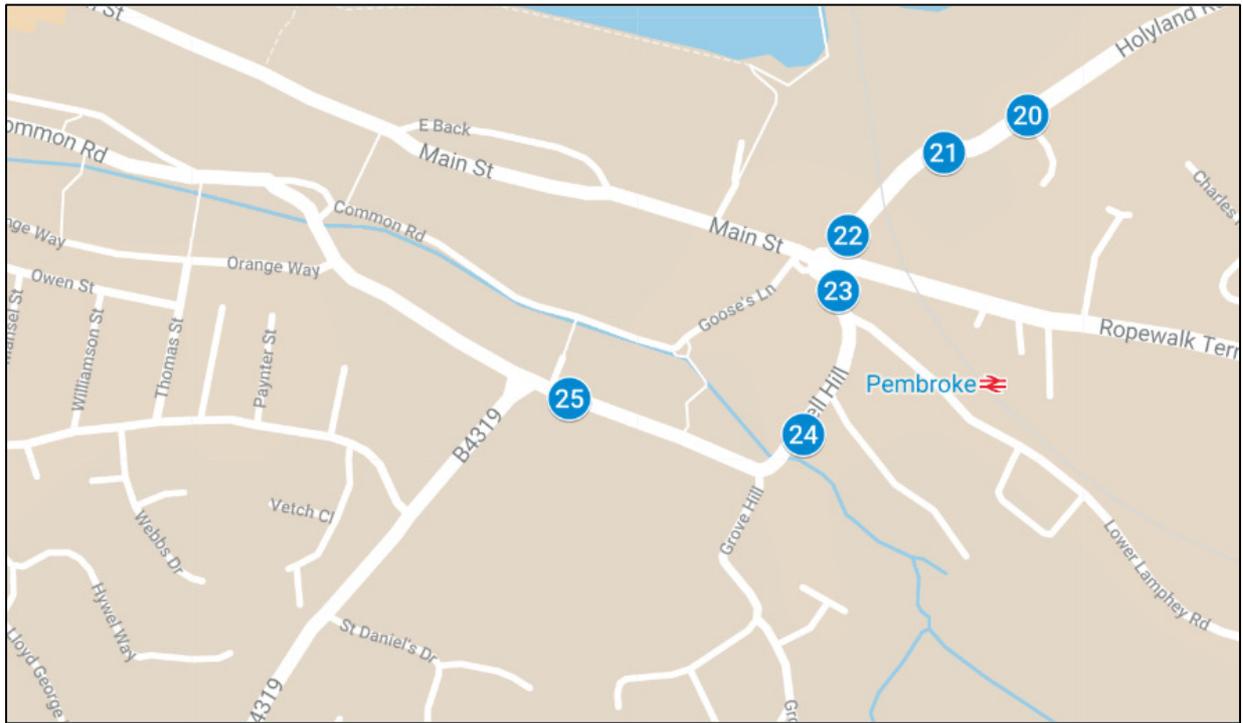
Appendix A

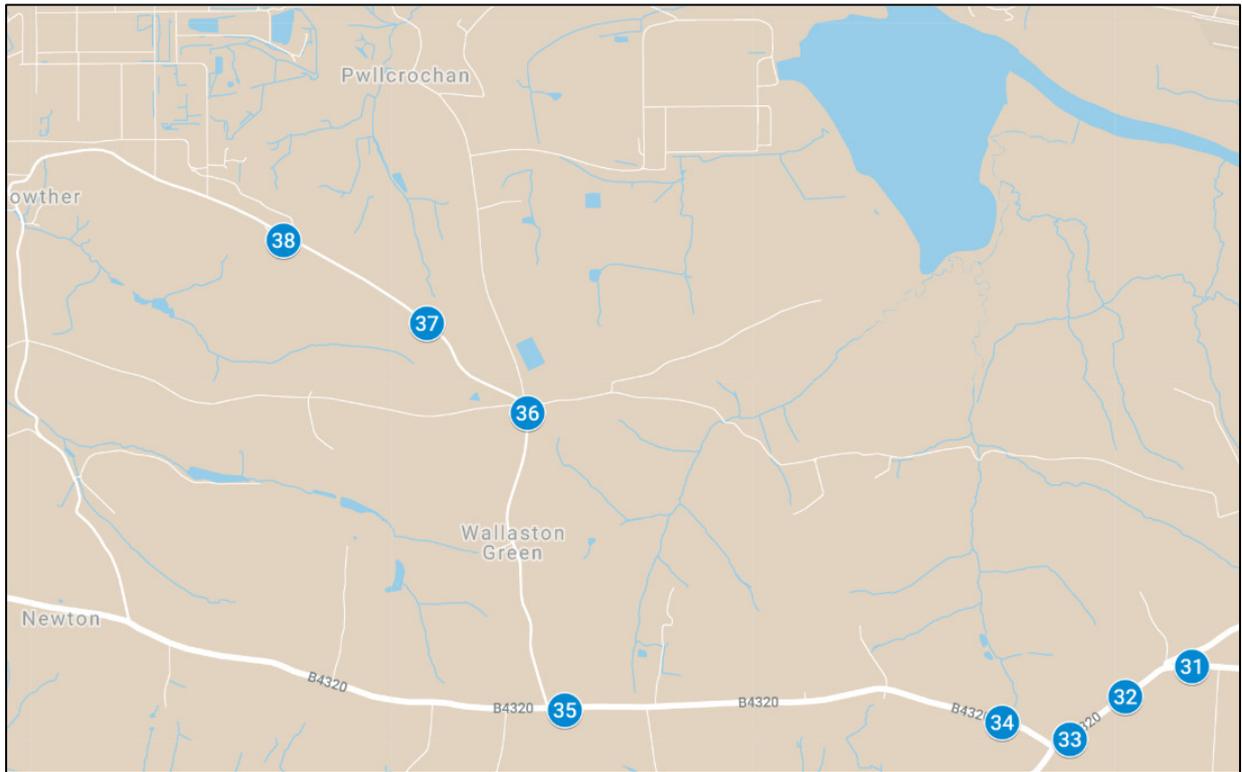
Points of Interest Locations

Rhoscrowther Wind Farm RSR









Appendix B

Swept Path Assessments



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Project	Rhoscrowther Wind Farm
Drawing Title	Vestas V117 Blade and Composite Tower
SPA Location	Pembroke Dock Gate 1

Drawn	GLJ	15/09/2021	Scale 1'-0" = 1'-0" @ A3	
Designed	GLJ	12/09/2021		
Checked	GB	15/09/2021		
Point of Interest			1	File No. 210912 Rhoscrowther Tracking.dwg
Drawing No.			SK01	Drawing Status Draft
Notes:				Revision
1. All mitigation is subject to confirmation through a test run.				1
2. This is not a construction drawing and is intended for illustration purposes only.				

Client	Njord Energy
Key	Wheel SPA Body SPA Load SPA Indicative Over-run Over-sail



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Client: **Njord Energy**

Key

— Wheel SPA	— Body SPA	— Load SPA	— Indicative	 Over-run	 Over-sail
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Project: Rhoscrowther Wind Farm

Drawing Title: Vestas V117 Blade and Composite Tower

SPA Location: Pembroke Dock Gate 1

Drawn	GLJ	15/09/2021	Scale	1:750 @ A3	
Designed	GLJ	12/09/2021	File No.	210912 Rhoscrowther Tracking.dwg	
Checked	GB	15/09/2021	Drawing Status	Draft	
Point of Interest		1	Revision		
Drawing No.	SK01A	Notes:		1	
		1. All mitigation is subject to confirmation through a test run.			
		2. This is not a construction drawing and is intended for illustration purposes only.			

Blade

Tower



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Project

Rhoscrowther Wind Farm

	Name	Date	Scale
Drawn	GLJ	15/09/2021	1:1500 @ A3
Designed	GLJ	12/09/2021	File No. 210912 Rhoscrowther Tracking.dwg
Checked	GB	15/09/2021	
Point of Interest			4
Drawing No.			Drawing Status
SK02			Draft
Notes:			Revision
1. All mitigation is subject to confirmation through a test run. 2. This is not a construction drawing and is intended for illustration purposes only.			1

Client **Njord Energy**

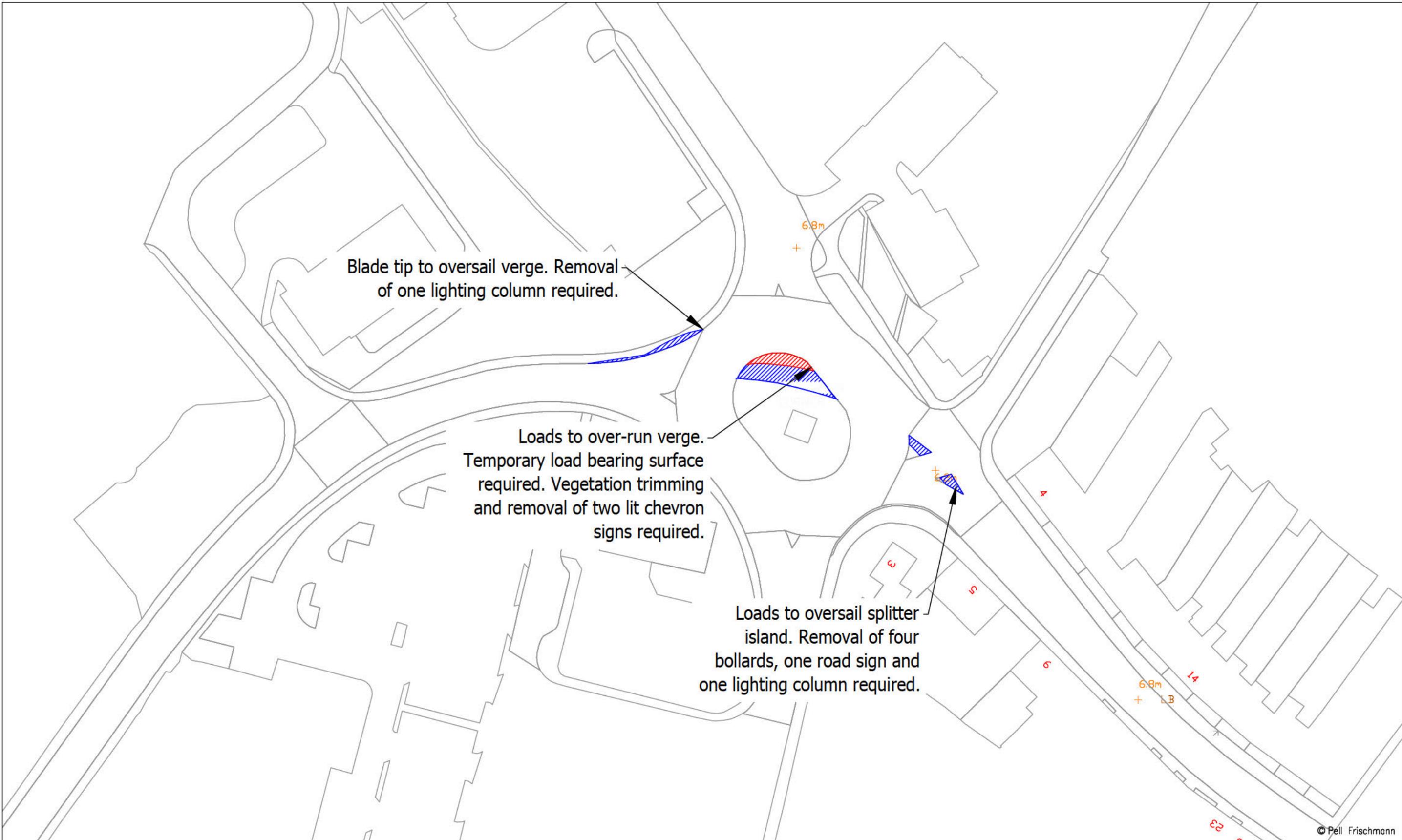
Drawing Title

Vestas V117 Blade and Composite Tower

Key						
	Wheel SPA	Body SPA	Load SPA	Indicative	Over-run	Over-sail

SPA Location

London Road Roundabout



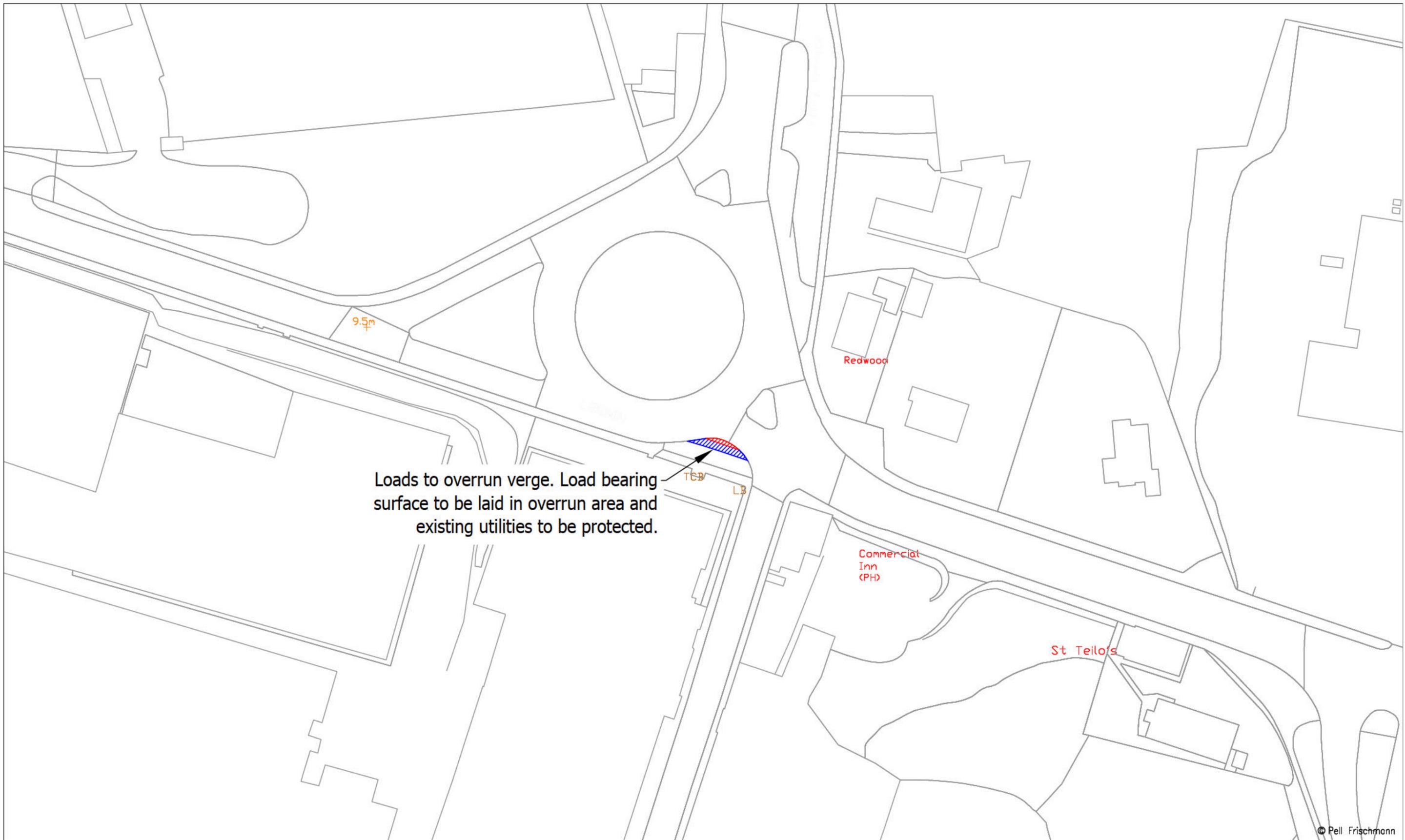
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Pell Frischmann 	Project	Rhoscrowther Wind Farm	Name	GLJ	Date	15/09/2021	Scale	1:750 @ A3
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Key 	Drawing Title	Vestas V117 Blade and Composite Tower	Point of Interest		4	Drawing Status		Draft
	SPA Location	London Road Roundabout	Drawing No.	SK02A	Notes:		Revision	
				1. All mitigation is subject to confirmation through a test run. 2. This is not a construction drawing and is intended for illustration purposes only.		1		



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	Client	Njord Energy	Designed	GLJ	12/09/2021	File No.	210912 Rhoscrowther Tracking.dwg
Key  Wheel SPA  Body SPA  Load SPA  Indicative  Over-run  Over-sail	Drawing Title	Vestas V117 Blade and Composite Tower	Checked	GB	15/09/2021	Drawing Status	Draft
	SPA Location	London Road / A477 Roundabout	Point of Interest	6		Drawing No.	SK03
				Notes: 1. All mitigation is subject to confirmation through a test run. 2. This is not a construction drawing and is intended for illustration purposes only.		Revision	1



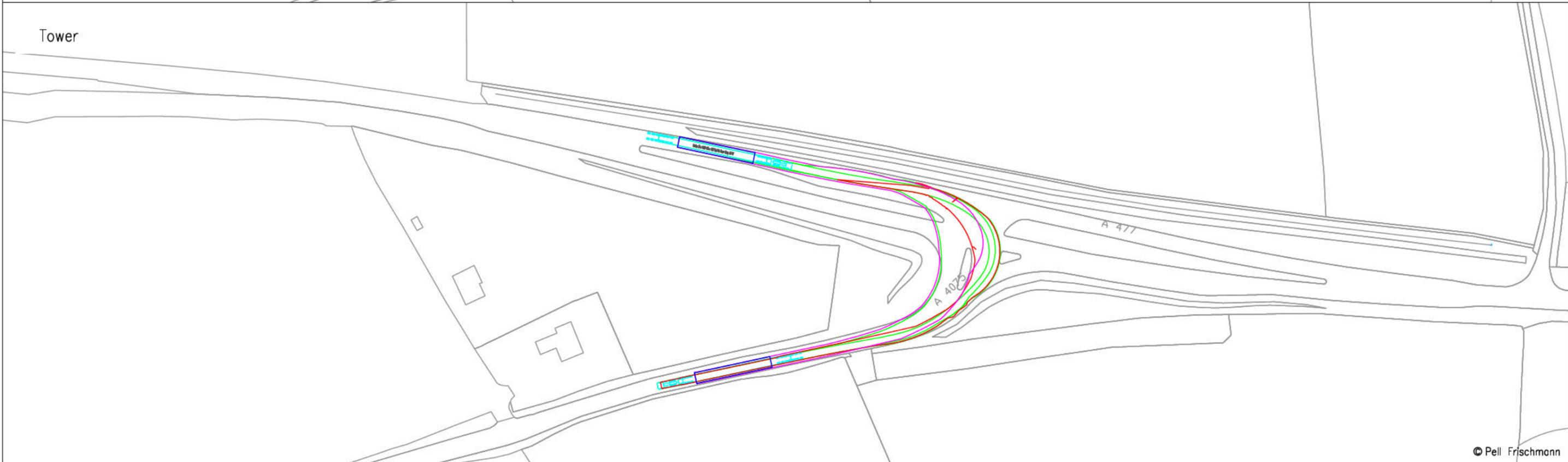
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Pell Frischmann 93 GEORGE STREET EDINBURGH, EH2 3ES 	Project	Rhoscrowther Wind Farm	Name	GLJ	Date	15/09/2021	Scale	1:750 @ A3	
	Client	Njord Energy	Designed	GLJ	Date	12/09/2021	File No.	210912 Rhoscrowther Tracking.dwg	
Key  Wheel SPA  Body SPA  Load SPA  Indicative  Over-run  Over-sail	Drawing Title	Vestas V117 Blade and Composite Tower	Checked	GB	Date	15/09/2021	Drawing Status	Draft	
	SPA Location	London Road / A477 Roundabout	Point of Interest	6		Drawing No.	SK03A	Revision	1
			Notes:		1. All mitigation is subject to confirmation through a test run. 2. This is not a construction drawing and is intended for illustration purposes only.				

Blade



Tower



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Project

Rhoscrowther Wind Farm

	Name	Date	Scale	1:1500 @ A3
Drawn	GLJ	15/09/2021	File No. 210912 Rhoscrowther Tracking.dwg	
Designed	GLJ	12/09/2021		
Checked	GB	15/09/2021		Drawing Status
Point of Interest		9		
Drawing No.	Notes:			Revision
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Client

Njord Energy

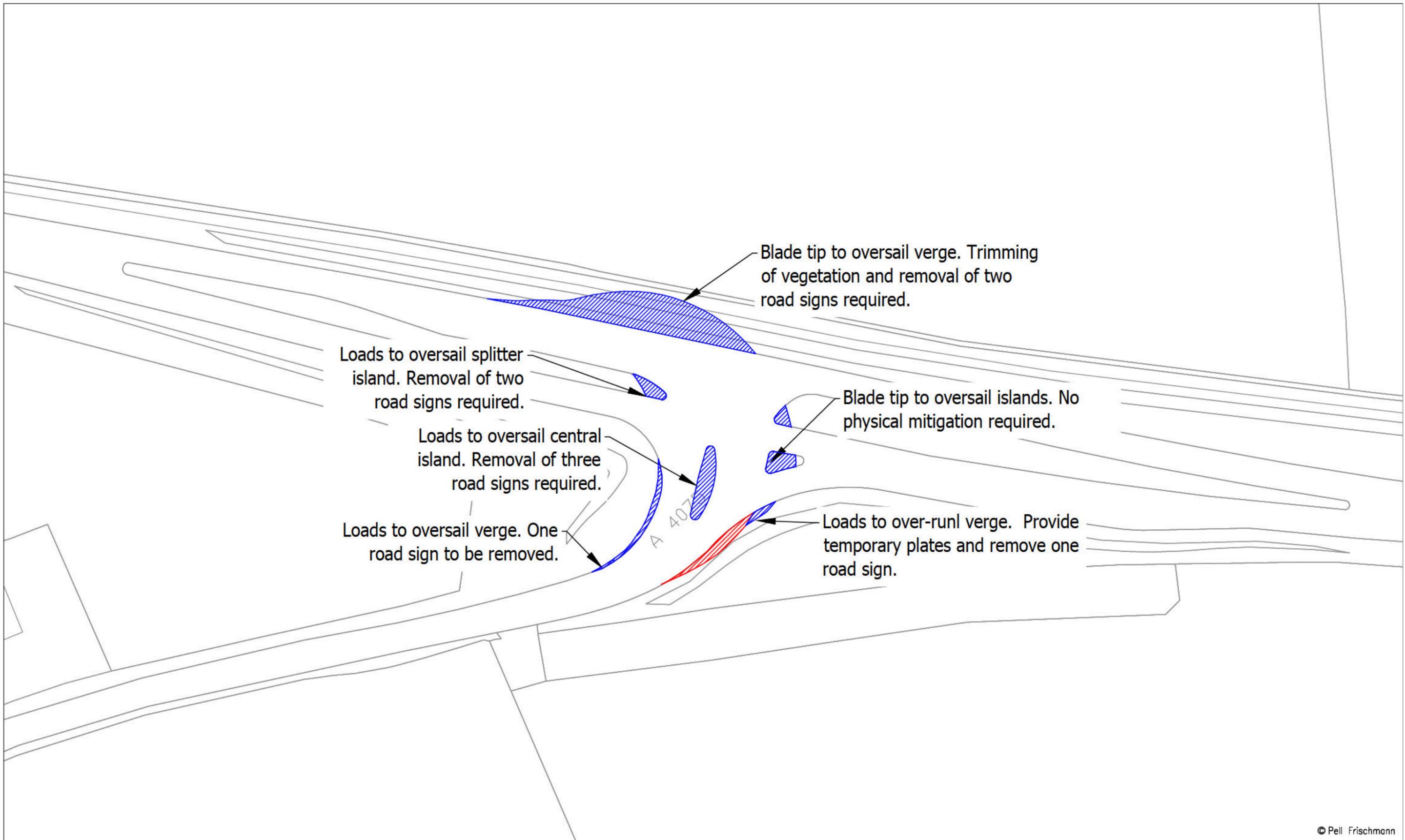
Drawing Title

Vestas V117 Blade and Composite Tower

SPA Location

A477 / A4075 Junction

Key						
	Wheel SPA	Body SPA	Load SPA	Indicative	Over-run	Over-sail

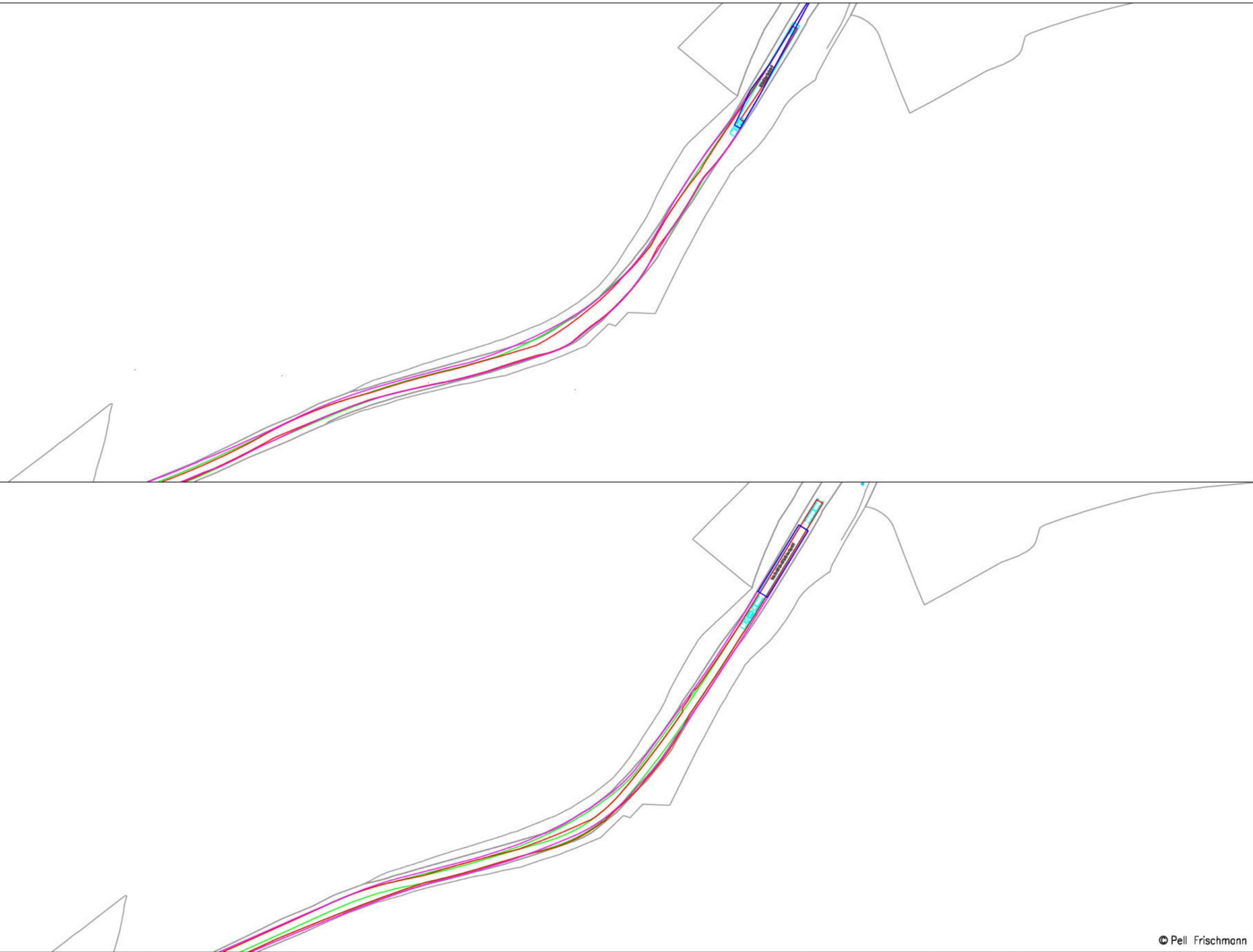


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Njord Energy	Vestas V117 Blade and Composite Tower	9																
Drawing No.	Notes:	Revision																
SK04A	1. All mitigation is subject to confirmation through a test run. 2. This is not a construction drawing and is intended for illustration purposes only.	1																
Key  Wheel SPA  Body SPA  Load SPA  Indicative  Over-run  Over-sail	SPA Location	A477 / A4075 Junction																

Blade

Tower



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Project

Rhoscrowther Wind Farm

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Designed	GLJ	12/09/2021	File No. 210912 Rhoscrowther Tracking.dwg
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Drawing No.	Notes:		Revision
SK05	1. All mitigation is subject to confirmation through a test run. 2. This is not a construction drawing and is intended for illustration purposes only.		1

Client **Njord Energy**

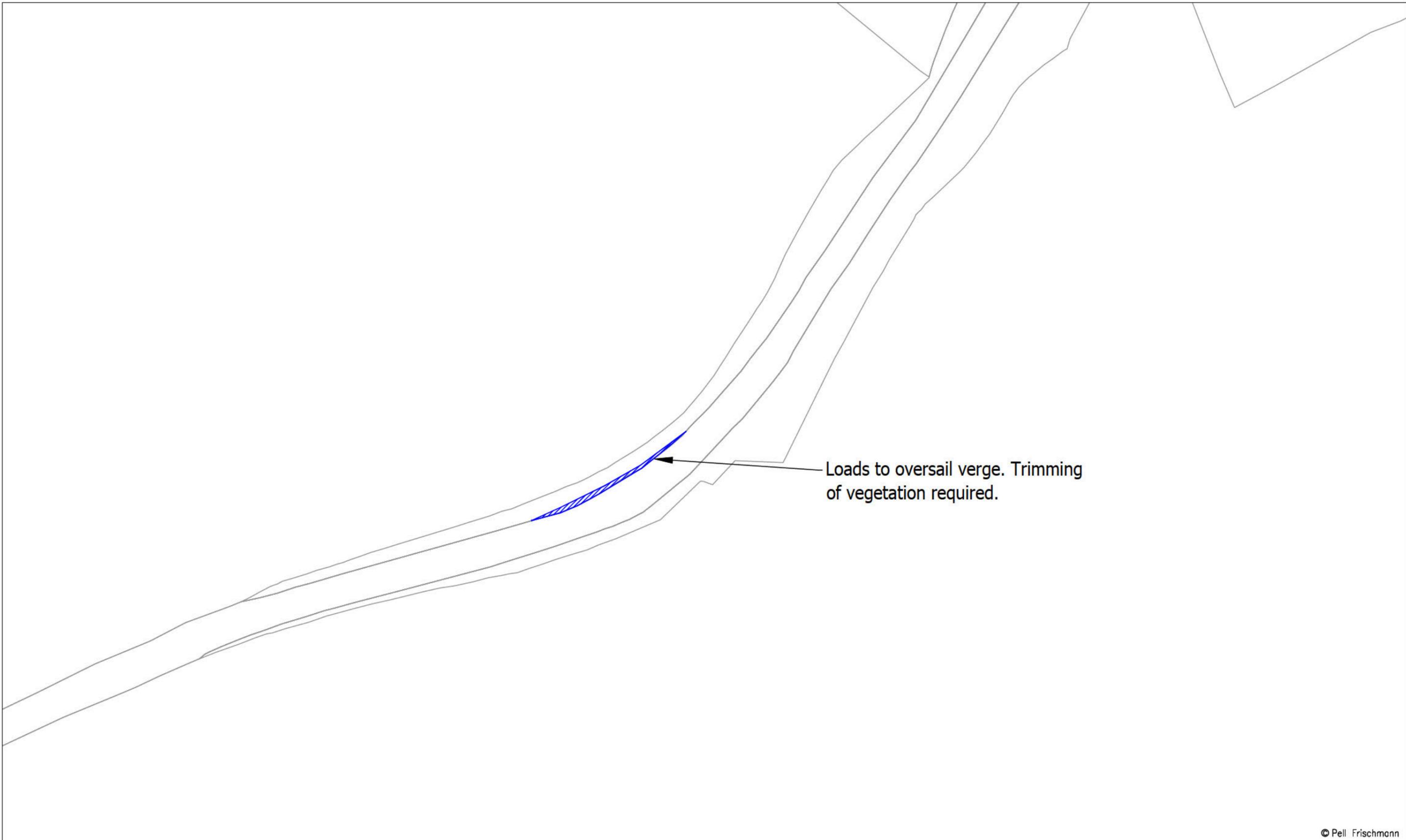
Drawing Title

Vestas V117 Blade and Composite Tower

Key						
	Wheel SPA	Body SPA	Load SPA	Indicative	Over-run	Over-sail

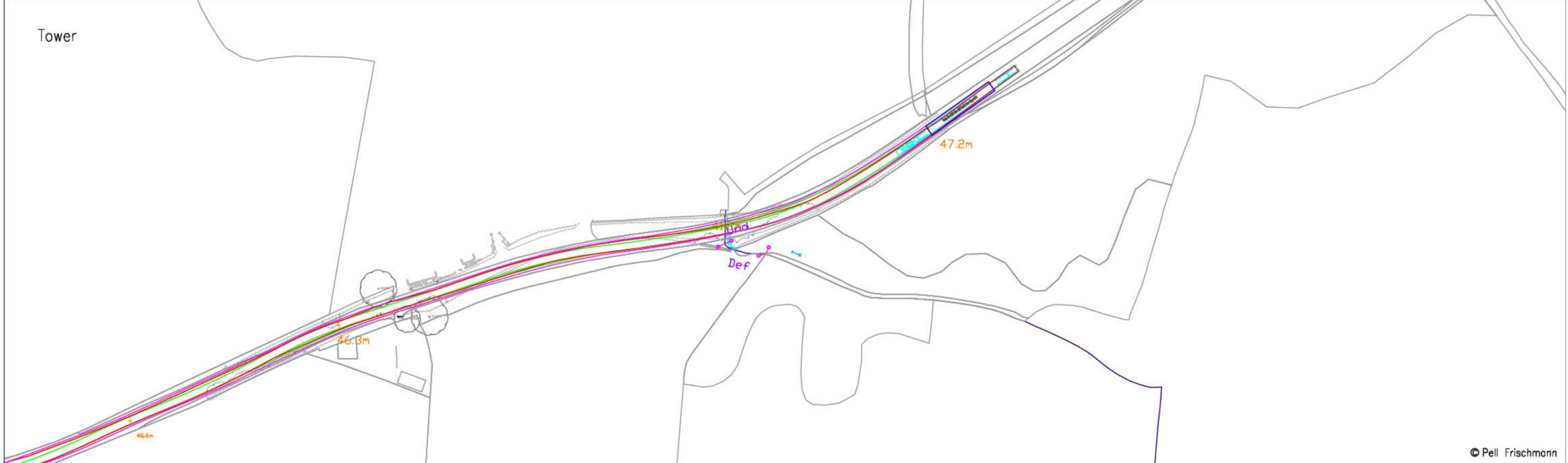
SPA Location

A4075 Mutton Hill



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Pell Frischmann <small>93 GEORGE STREET EDINBURGH, EH2 3ES</small> 	Project	Rhoscrowther Wind Farm	Drawn	GLJ	15/09/2021	Scale	1:750 @ A3	
	Client	Njord Energy	Designed	GLJ	12/09/2021	File No.	210912 Rhoscrowther Tracking.dwg	
Key  Wheel SPA  Body SPA  Load SPA  Indicative  Over-run  Over-sail	Drawing Title	Vestas V117 Blade and Composite Tower	Checked	GB	15/09/2021	Drawing Status	Draft	
	SPA Location	A4075 Mutton Hill	Point of Interest	13		Drawing No.	SK05A	
			Notes:	1. All mitigation is subject to confirmation through a test run. 2. This is not a construction drawing and is intended for illustration purposes only.				Revision



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Pell Frischmann 93 GEORGE STREET EDINBURGH, EH2 3ES 	Project	Rhoscrowther Wind Farm	Drawn	GLJ	15/09/2021	Scale	1:1500 @ A3
	Client	Njord Energy	Designed	GLJ	12/09/2021	File No.	210912 Rhoscrowther Tracking.dwg
Key  Wheel SPA  Body SPA  Load SPA  Indicative  Over-run  Over-sail	Drawing Title	Vestas V117 Blade and Composite Tower	Checked	GB	15/09/2021	Drawing Status	Draft
	SPA Location	A4075 Penny Bridge	Point of Interest	15		Drawing No.	SK06
			NO MITIGATION REQUIRED	Notes:	1. All mitigation is subject to confirmation through a test run. 2. This is not a construction drawing and is intended for illustration purposes only.		Revision

Blade

Tower



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Project
 Rhoscrowther Wind Farm

Drawing Title
 Vestas V117 Blade and Composite Tower

SPA Location
 A4075 West of Penny Bridge

Drawn	GLJ	15/09/2021	Scale	1:1500 @ A3
Designed	GLJ	12/09/2021	File No.	210912 Rhoscrowther Tracking.dwg
Checked	GB	15/09/2021	Drawing Status	Draft
Point of Interest	16		Revision	1
Drawing No.	SK07		Notes: 1. All mitigation is subject to confirmation through a test run. 2. This is not a construction drawing and is intended for illustration purposes only.	

Client
 Njord Energy

Key	—	—	—	—		
	Wheel SPA	Body SPA	Load SPA	Indicative	Over-run	Over-sail

NO MITIGATION REQUIRED



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Pell Frischmann 93 GEORGE STREET EDINBURGH, EH2 3ES 	Project	Rhoscrowther Wind Farm	<table border="1"> <tr> <td>Name</td> <td>Date</td> <td>Scale</td> </tr> <tr> <td>GLJ</td> <td>15/09/2021</td> <td>1:1500 @ A3</td> </tr> </table>	Name	Date	Scale	GLJ	15/09/2021	1:1500 @ A3			
	Name	Date	Scale									
	GLJ	15/09/2021	1:1500 @ A3									
Drawing Title	Vestas V117 Blade and Composite Tower	<table border="1"> <tr> <td>Designed</td> <td>Date</td> <td>File No.</td> </tr> <tr> <td>GLJ</td> <td>12/09/2021</td> <td>210912 Rhoscrowther Tracking.dwg</td> </tr> </table>	Designed	Date	File No.	GLJ	12/09/2021	210912 Rhoscrowther Tracking.dwg				
Designed	Date	File No.										
GLJ	12/09/2021	210912 Rhoscrowther Tracking.dwg										
Client	Njord Energy	<table border="1"> <tr> <td>Checked</td> <td>Date</td> <td>Drawing Status</td> </tr> <tr> <td>GB</td> <td>15/09/2021</td> <td>Draft</td> </tr> </table>	Checked	Date	Drawing Status	GB	15/09/2021	Draft				
Checked	Date	Drawing Status										
GB	15/09/2021	Draft										
Key	SPA Location	<table border="1"> <tr> <td>Point of Interest</td> <td>Revision</td> </tr> <tr> <td>18</td> <td>1</td> </tr> </table>	Point of Interest	Revision	18	1						
Point of Interest	Revision											
18	1											
<table border="1"> <tr> <td>Wheel SPA</td> <td>Body SPA</td> <td>Load SPA</td> <td>Indicative</td> <td>Over-run</td> <td>Over-sail</td> </tr> </table>	Wheel SPA	Body SPA	Load SPA	Indicative	Over-run	Over-sail	A4075 Holyland Hotel	<table border="1"> <tr> <td>Drawing No.</td> <td>Notes:</td> </tr> <tr> <td>SK08</td> <td>1. All mitigation is subject to confirmation through a test run. 2. This is not a construction drawing and is intended for illustration purposes only.</td> </tr> </table>	Drawing No.	Notes:	SK08	1. All mitigation is subject to confirmation through a test run. 2. This is not a construction drawing and is intended for illustration purposes only.
Wheel SPA	Body SPA	Load SPA	Indicative	Over-run	Over-sail							
Drawing No.	Notes:											
SK08	1. All mitigation is subject to confirmation through a test run. 2. This is not a construction drawing and is intended for illustration purposes only.											
		NO MITIGATION REQUIRED										

Blade

Tower



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Project
Rhoscrowther Wind Farm

	Name	Date	Scale
Drawn	GLJ	15/09/2021	1'-0" = 1'-0" @ A3
Designed	GLJ	12/09/2021	File No. 210912 Rhoscrowther Tracking.dwg
Checked	GB	15/09/2021	
Point of Interest			Drawing Status
21			Draft

Client
Njord Energy

Drawing Title
Vestas V117 Blade and Composite Tower

Key						
	Wheel SPA	Body SPA	Load SPA	Indicative	Over-run	Over-sail

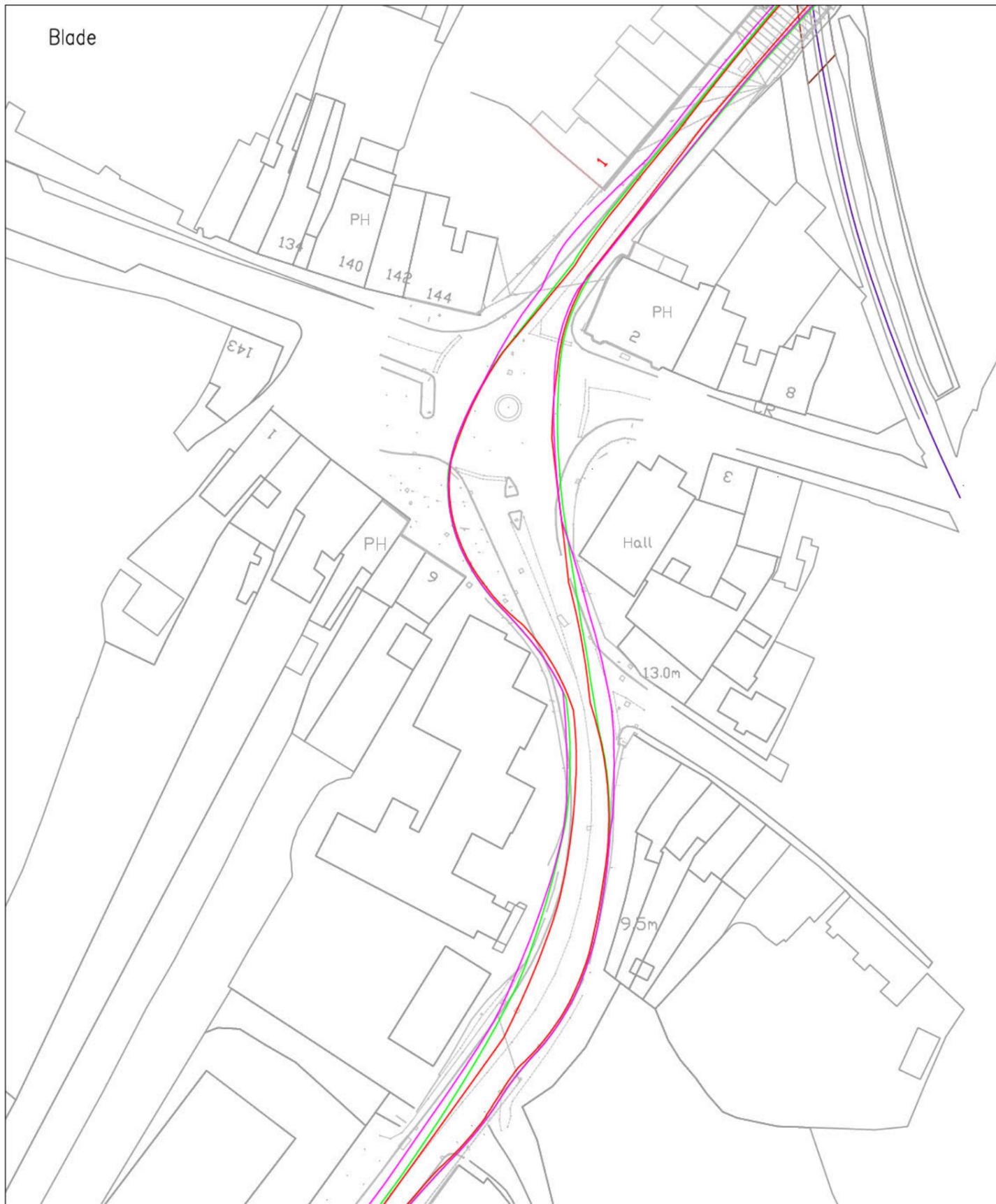
SPA Location
A4075 Pembroke Rail Under Bridge

Drawing No.	Notes	Revision
SK09	1. All mitigation is subject to confirmation through a test run. 2. This is not a construction drawing and is intended for illustration purposes only.	1



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	Client	Njord Energy	Drawing Title	Vestas V117 Blade and Composite Tower	Designed	GLJ	12/09/2021	File No.
Key Wheel SPA Body SPA Load SPA Indicative Over-run Over-sail	SPA Location	A4075 Pembroke Rail Under Bridge	Checked	GB	15/09/2021	Drawing Status	Draft	
			Point of Interest	21		Drawing No.	SK09A	
			Notes:	1. All mitigation is subject to confirmation through a test run. 2. This is not a construction drawing and is intended for illustration purposes only.				Revision



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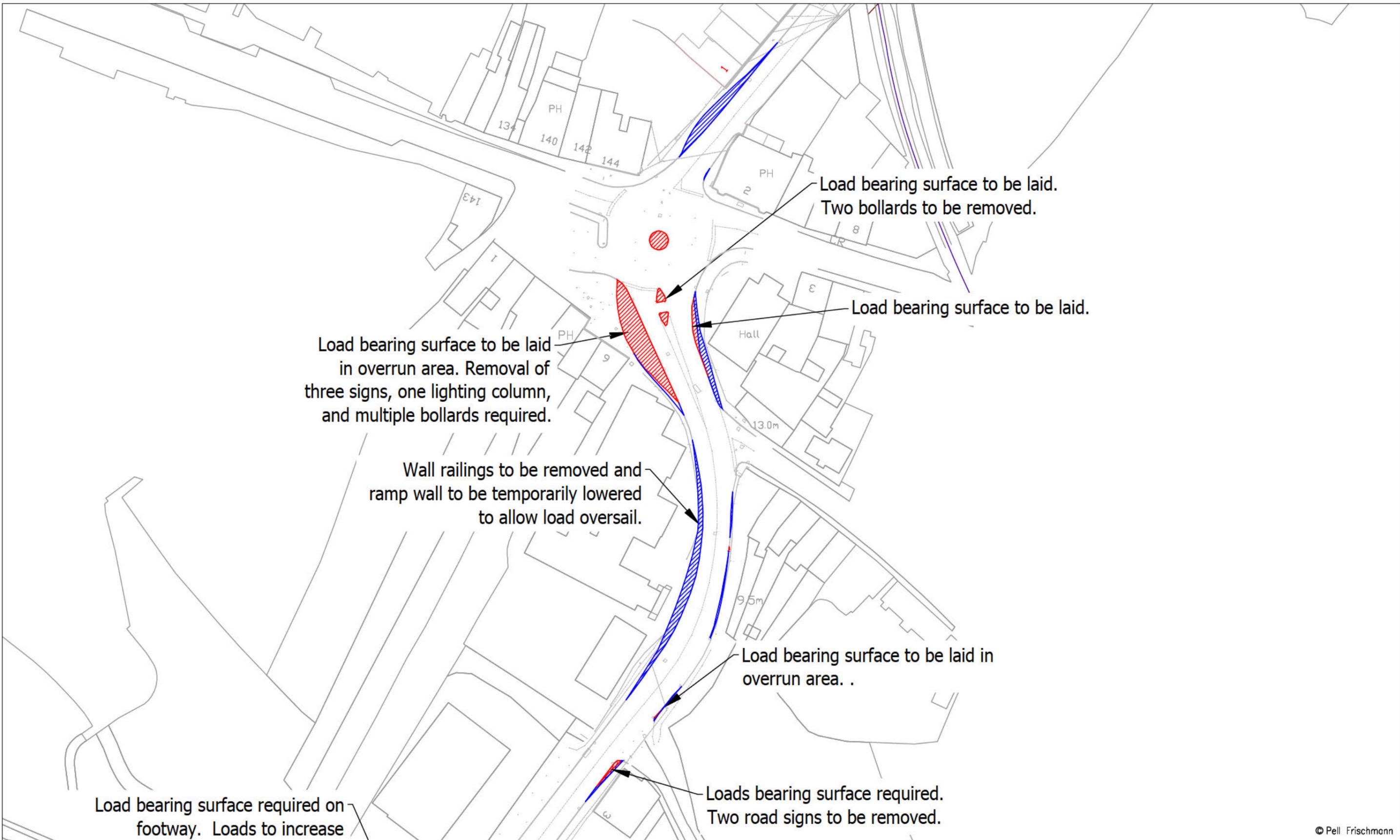
Pell Frischmann
 93 GEORGE STREET EDINBURGH, EH2 3ES

Client: **Njord Energy**

Key:
— Wheel SPA — Body SPA — Load SPA — Indicative
 Over-run Over-sail

Project	Rhoscrowther Wind Farm
Drawing Title	Vestas V117 Blade and Composite Tower
SPA Location	Main Street Roundabout & Well Hill / Lower Lamphey Road Bend

Drawn	GLJ	15/09/2021	Scale	1:750 @ A3
Designed	GLJ	12/09/2021	File No.	210912 Rhoscrowther Tracking.dwg
Checked	GB	15/09/2021	Drawing Status	Draft
Point of Interest	22 & 23		Revision	1
Drawing No.	SK10		Notes:	1. All mitigation is subject to confirmation through a test run. 2. This is not a construction drawing and is intended for illustration purposes only.



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Pell Frischmann 93 GEORGE STREET EDINBURGH, EH2 3ES 	Project	Rhoscrowther Wind Farm	Name	GLJ	Date	15/09/2021	Scale	1:750 @ A3
	Client	Njord Energy	Designed	GLJ	12/09/2021	Checked	GB	15/09/2021
Key  Wheel SPA  Body SPA  Load SPA  Indicative  Over-run  Over-sail	Drawing Title	Vestas V117 Blade and Composite Tower	Point of Interest	22 & 23		Drawing Status	Draft	
	SPA Location	Main Street Roundabout & Well Hill / Lower Lamphey Road Bend	Drawing No.	SK10A		Notes:	Revision	
					1. All mitigation is subject to confirmation through a test run. 2. This is not a construction drawing and is intended for illustration purposes only.		1	



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Project
Rhoscrowther Wind Farm

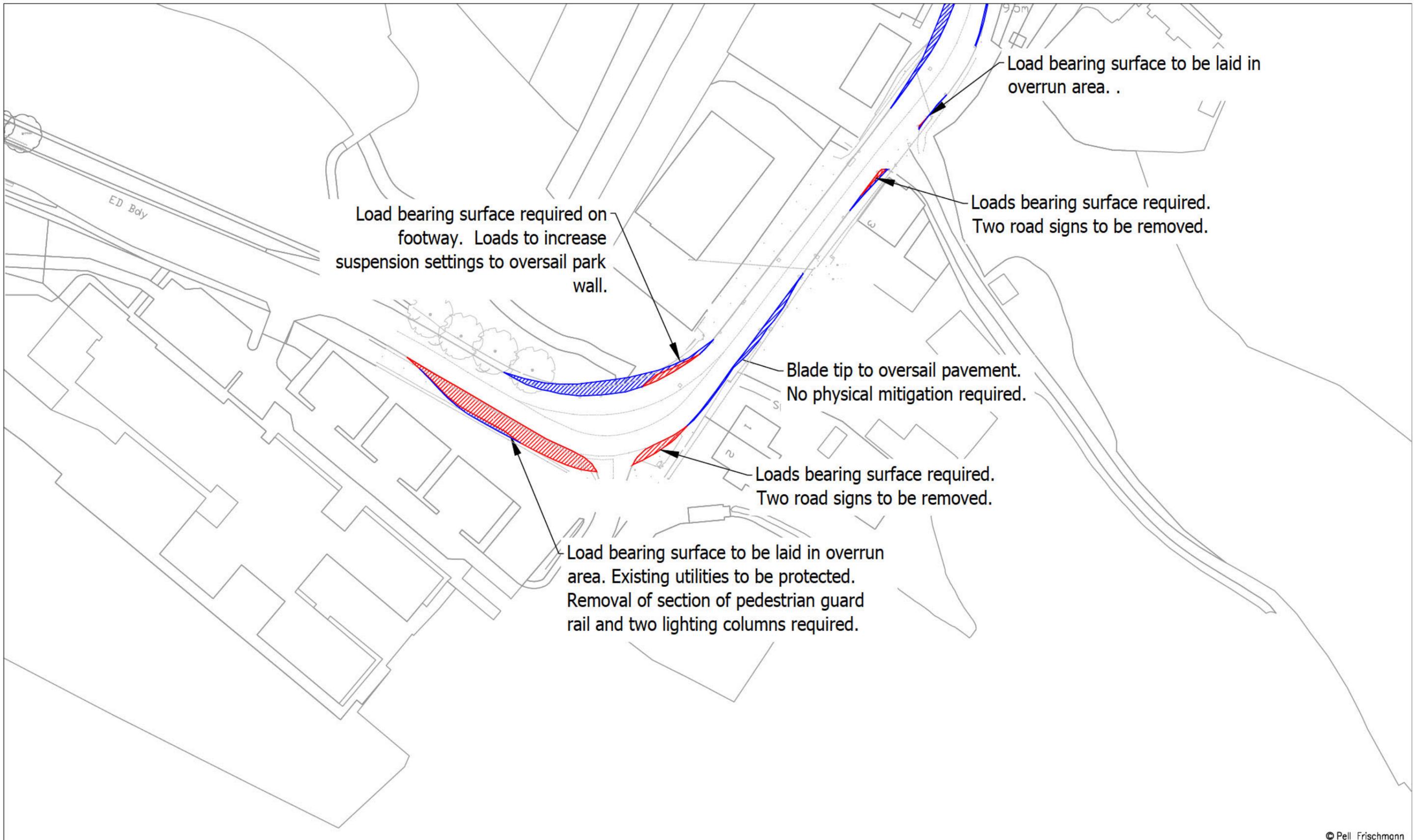
Drawn	GLJ	15/09/2021	Scale 1'-0" = 1'-0" @ A3	
Designed	GLJ	12/09/2021		
Checked	GB	15/09/2021		
Point of Interest			24	Drawing Status Draft
Drawing No.	SK11			Revision 1

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Client	Njord Energy					
Key						
	Wheel SPA	Body SPA	Load SPA	Indicative	Over-run	Over-sail

Drawing Title
Vestas V117 Blade and Composite Tower

SPA Location
Well Hill / Grove Hill Bend



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Client: **Njord Energy**

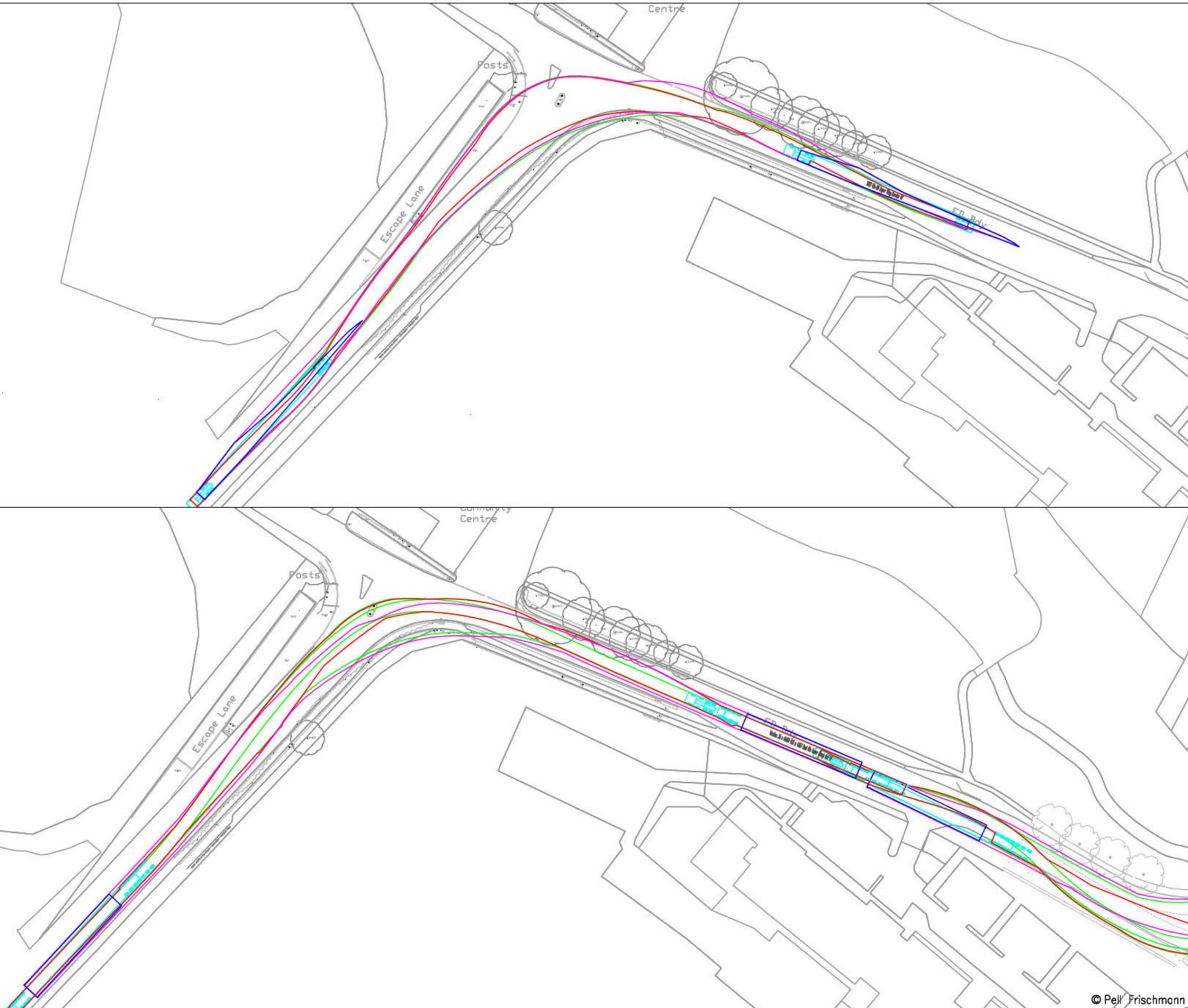
Key:
— Wheel SPA — Body SPA — Load SPA — Indicative Over-run Over-sail

Project	Rhoscrowther Wind Farm
Drawing Title	Vestas V117 Blade and Composite Tower
SPA Location	Well Hill / Grove Hill Bend

Drawn	GLJ	15/09/2021	Scale	1:750 @ A3
Designed	GLJ	12/09/2021	File No.	210912 Rhoscrowther Tracking.dwg
Checked	GB	15/09/2021	Drawing Status	Draft
Point of Interest	24		Drawing No.	SK11A
Notes:				Revision
1. All mitigation is subject to confirmation through a test run. 2. This is not a construction drawing and is intended for illustration purposes only.				1

Blade

Tower



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Project
Rhoscrowther Wind Farm

Drawn	GLJ	15/09/2021	Scale	1'-0" = 1'-0" @ A3
Designed	GLJ	12/09/2021	File No.	210912 Rhoscrowther Tracking.dwg
Checked	GB	15/09/2021	Drawing Status	Draft
Point of Interest	25			
Drawing No.	SK12		Notes:	Revision

Client
Njord Energy

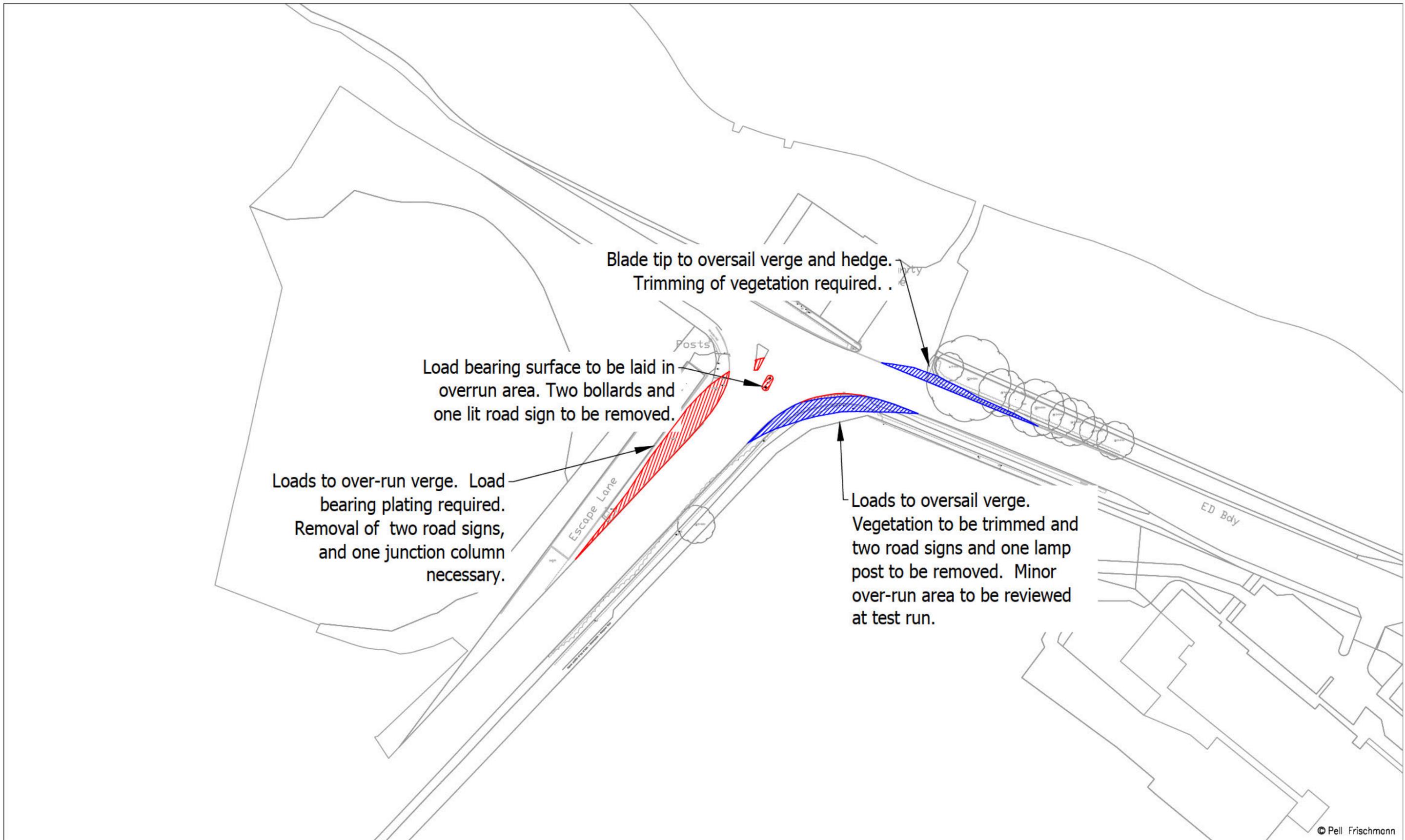
Drawing Title
Vestas V117 Blade and Composite Tower

Key	—	—	—	—	▨	▨
	Wheel SPA	Body SPA	Load SPA	Indicative	Over-run	Over-sail

SPA Location
A4139 / B4319 Junction

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision
1



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Pell Frischmann <small>93 GEORGE STREET EDINBURGH, EH2 3ES</small> 	Project	Rhoscrowther Wind Farm	Name	GLJ	Date	15/09/2021	Scale	1:750 @ A3
	Client	Njord Energy	Designed	GLJ	12/09/2021	File No.	210912 Rhoscrowther Tracking.dwg	
Key Wheel SPA Body SPA Load SPA Indicative Over-run Over-sail	Drawing Title	Vestas V117 Blade and Composite Tower	Checked	GB	15/09/2021	Drawing Status	Draft	
	SPA Location	A4139 / B4319 Junction	Point of Interest	25		Drawing No.	SK12A	
			Notes:	1. All mitigation is subject to confirmation through a test run. 2. This is not a construction drawing and is intended for illustration purposes only.		Revision	1	



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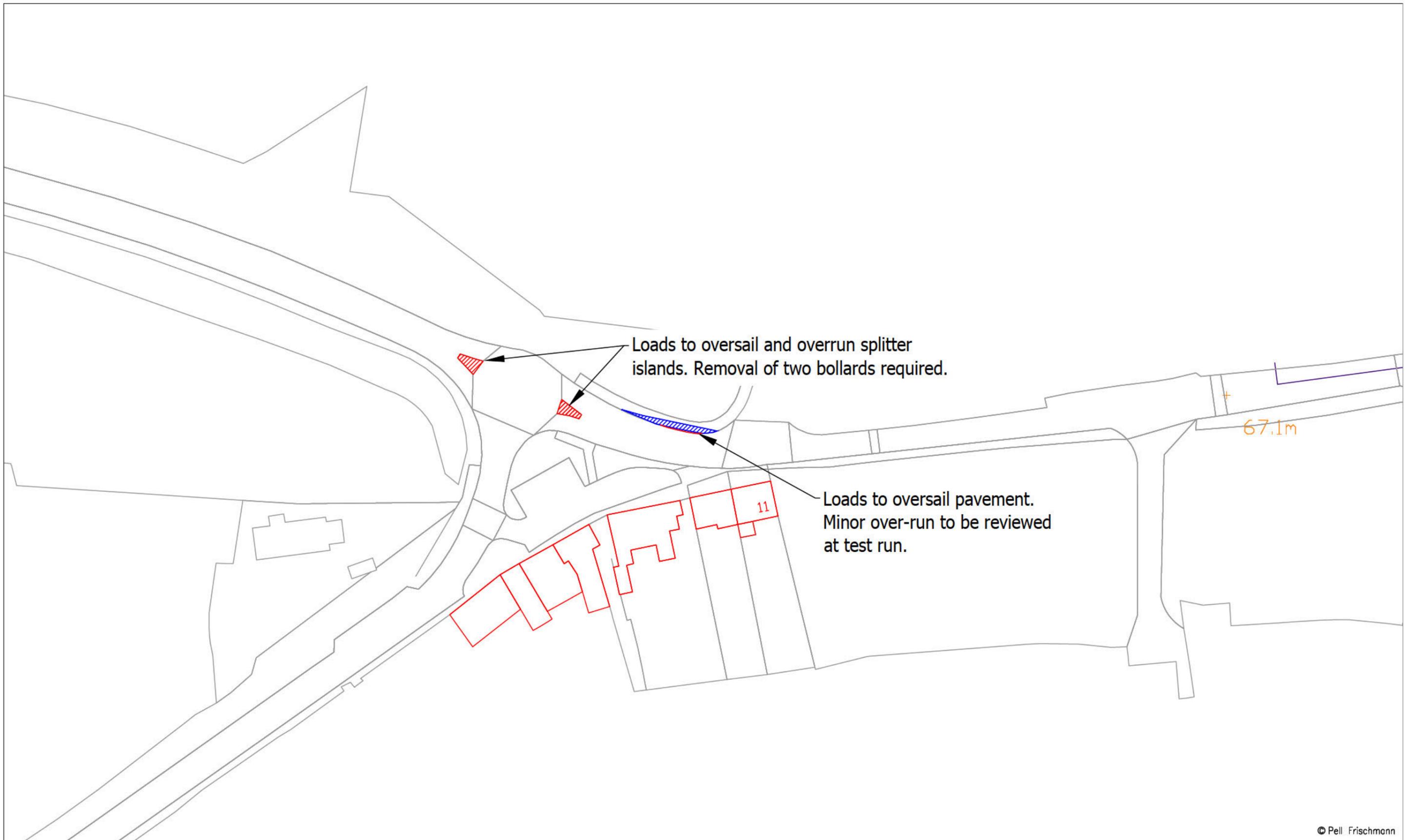
Pell Frischmann
93 GEORGE STREET EDINBURGH, EH2 3ES



Project	Rhoscrowther Wind Farm
Drawing Title	Vestas V117 Blade and Composite Tower
SPA Location	Maiden Wells Roundabout

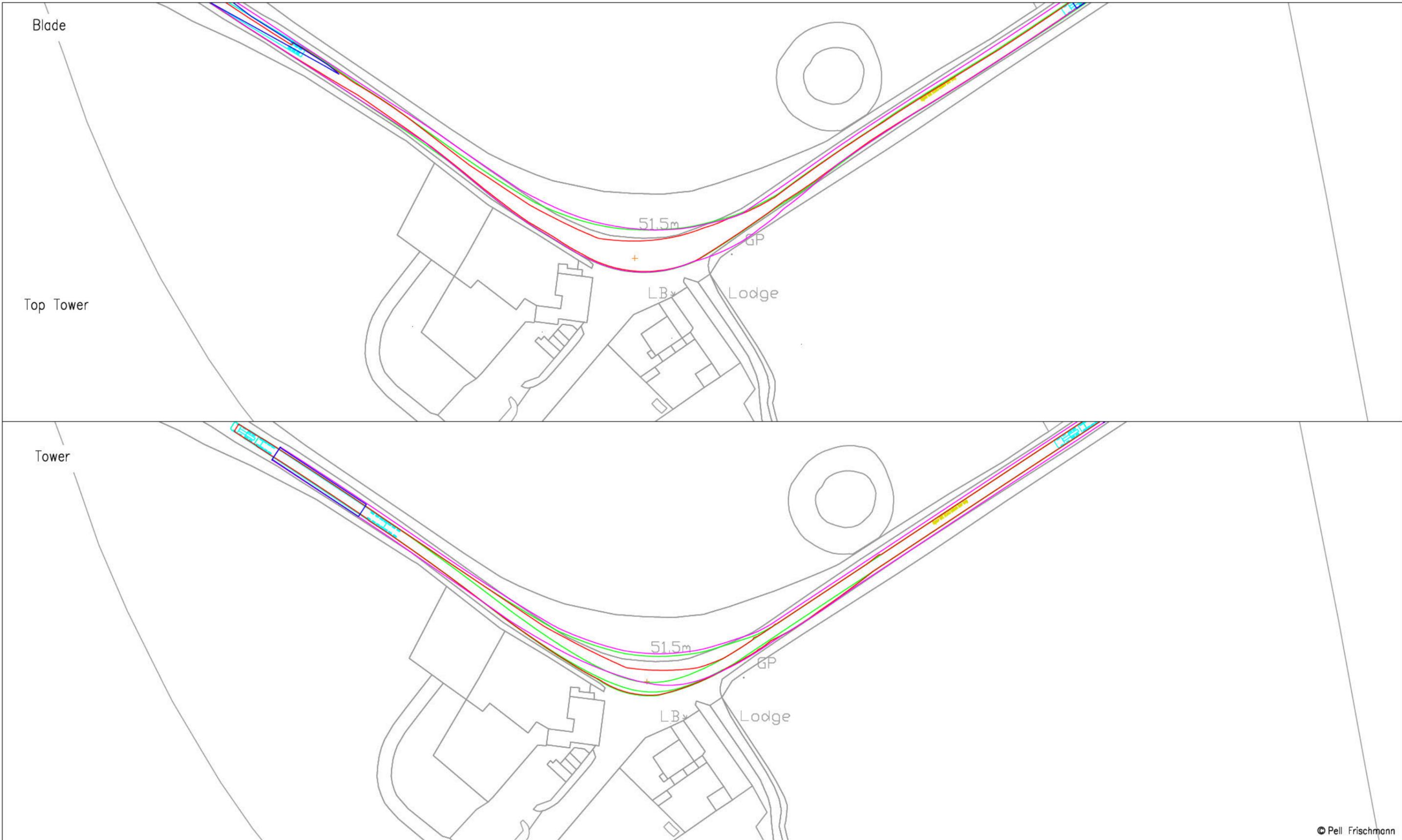
Drawn	GLJ	15/09/2021	Scale	1'-0" = 1'-0" @ A3
Designed	GLJ	12/09/2021	File No.	210912 Rhoscrowther Tracking.dwg
Checked	GB	15/09/2021	Drawing Status	Draft
Point of Interest	28		Drawing No.	SK13
Notes:				Revision
1. All mitigation is subject to confirmation through a test run. 2. This is not a construction drawing and is intended for illustration purposes only.				1

Client	Njord Energy
Key	— Wheel SPA — Body SPA — Load SPA — Indicative Over-run Over-sail



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Pell Frischmann <small>93 GEORGE STREET EDINBURGH, EH2 3ES</small> 	Project	Rhoscrowther Wind Farm	<table border="1"> <tr> <td></td> <td>Name</td> <td>Date</td> <td>Scale</td> </tr> <tr> <td>Drawn</td> <td>GLJ</td> <td>15/09/2021</td> <td>1:750 @ A3</td> </tr> <tr> <td>Designed</td> <td>GLJ</td> <td>12/09/2021</td> <td rowspan="2">File No. 210912 Rhoscrowther Tracking.dwg</td> </tr> <tr> <td>Checked</td> <td>GB</td> <td>15/09/2021</td> </tr> <tr> <td colspan="3">Point of Interest</td> <td>28</td> </tr> <tr> <td colspan="3">Drawing No.</td> <td>Draft</td> </tr> <tr> <td colspan="3">SK13A</td> <td>Revision</td> </tr> <tr> <td colspan="3"></td> <td>1</td> </tr> </table>		Name	Date	Scale	Drawn	GLJ	15/09/2021	1:750 @ A3	Designed	GLJ	12/09/2021	File No. 210912 Rhoscrowther Tracking.dwg	Checked	GB	15/09/2021	Point of Interest			28	Drawing No.			Draft	SK13A			Revision				1
		Name	Date	Scale																														
Drawn	GLJ	15/09/2021	1:750 @ A3																															
Designed	GLJ	12/09/2021	File No. 210912 Rhoscrowther Tracking.dwg																															
Checked	GB	15/09/2021																																
Point of Interest			28																															
Drawing No.			Draft																															
SK13A			Revision																															
			1																															
Client	Drawing Title	Vestas V117 Blade and Composite Tower	Notes:																															
Njord Energy	SPA Location	Maiden Wells Roundabout	1. All mitigation is subject to confirmation through a test run. 2. This is not a construction drawing and is intended for illustration purposes only.																															
Key Wheel SPA Body SPA Load SPA Indicative Over-run Over-sail																																		



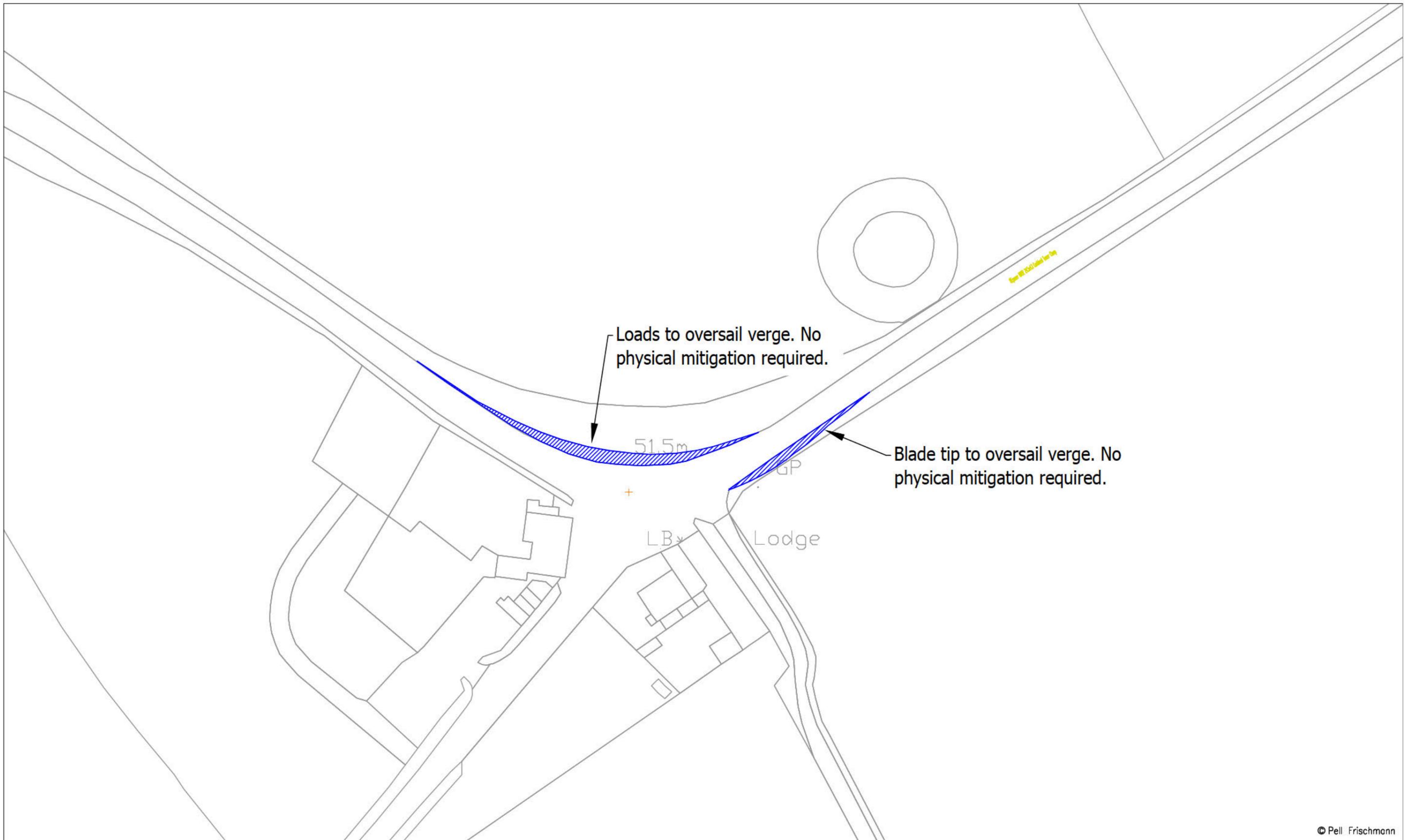
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Project	Rhoscrowther Wind Farm
Drawing Title	Vestas V117 Blade and Composite Tower
SPA Location	B4320 Speculation Inn Bend

Drawn	GLJ	15/09/2021	Scale 1'-0" = 1'-0" © A3	
Designed	GLJ	12/09/2021		
Checked	GB	15/09/2021		
Point of Interest			33	File No. 210912 Rhoscrowther Tracking.dwg
Drawing No.			SK14	Drawing Status Draft
Notes:			Revision	
1. All mitigation is subject to confirmation through a test run.			1	
2. This is not a construction drawing and is intended for illustration purposes only.				

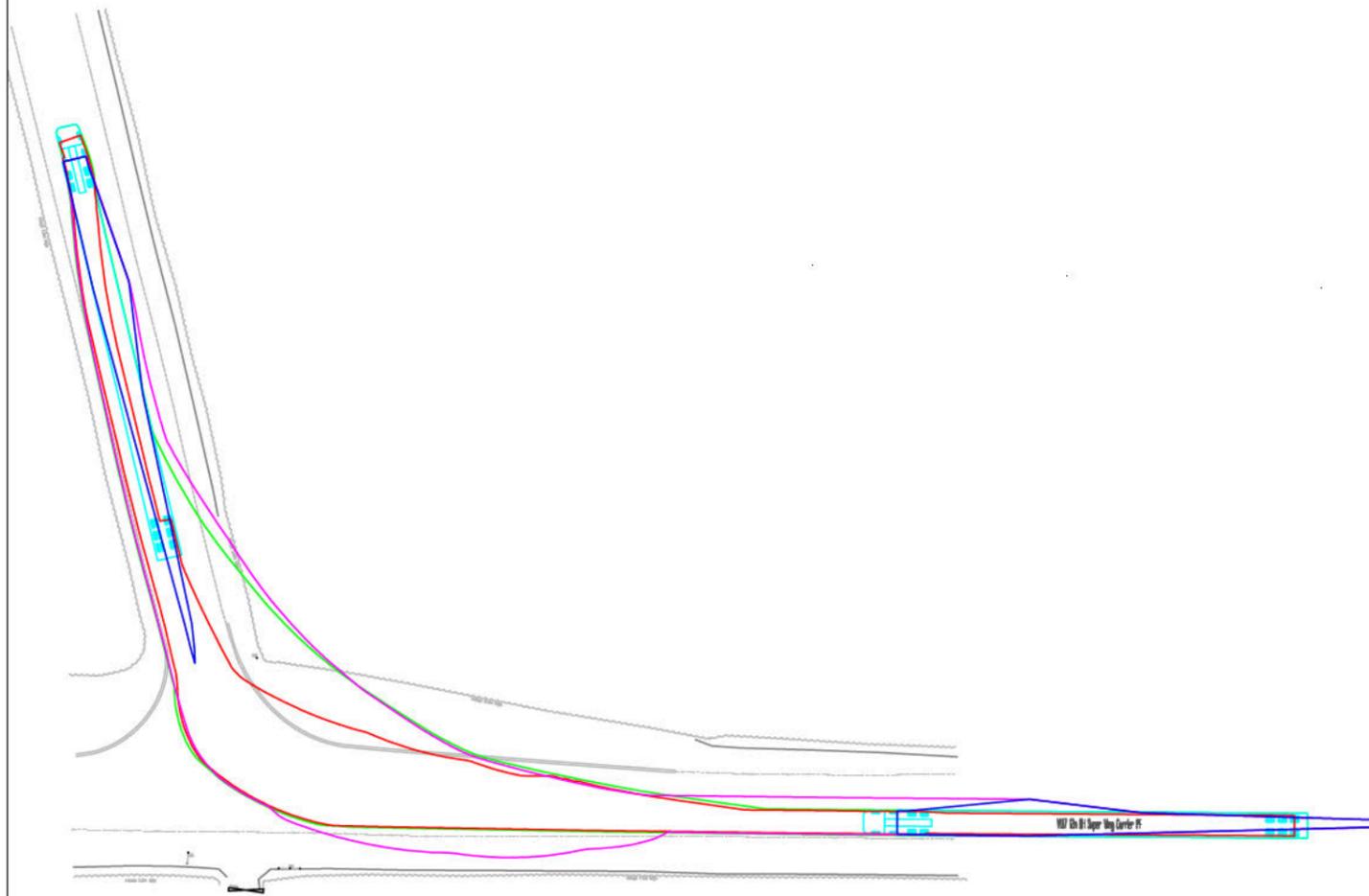
Client	Njord Energy
Key	— Wheel SPA — Body SPA — Load SPA — Indicative Over-run Over-sail



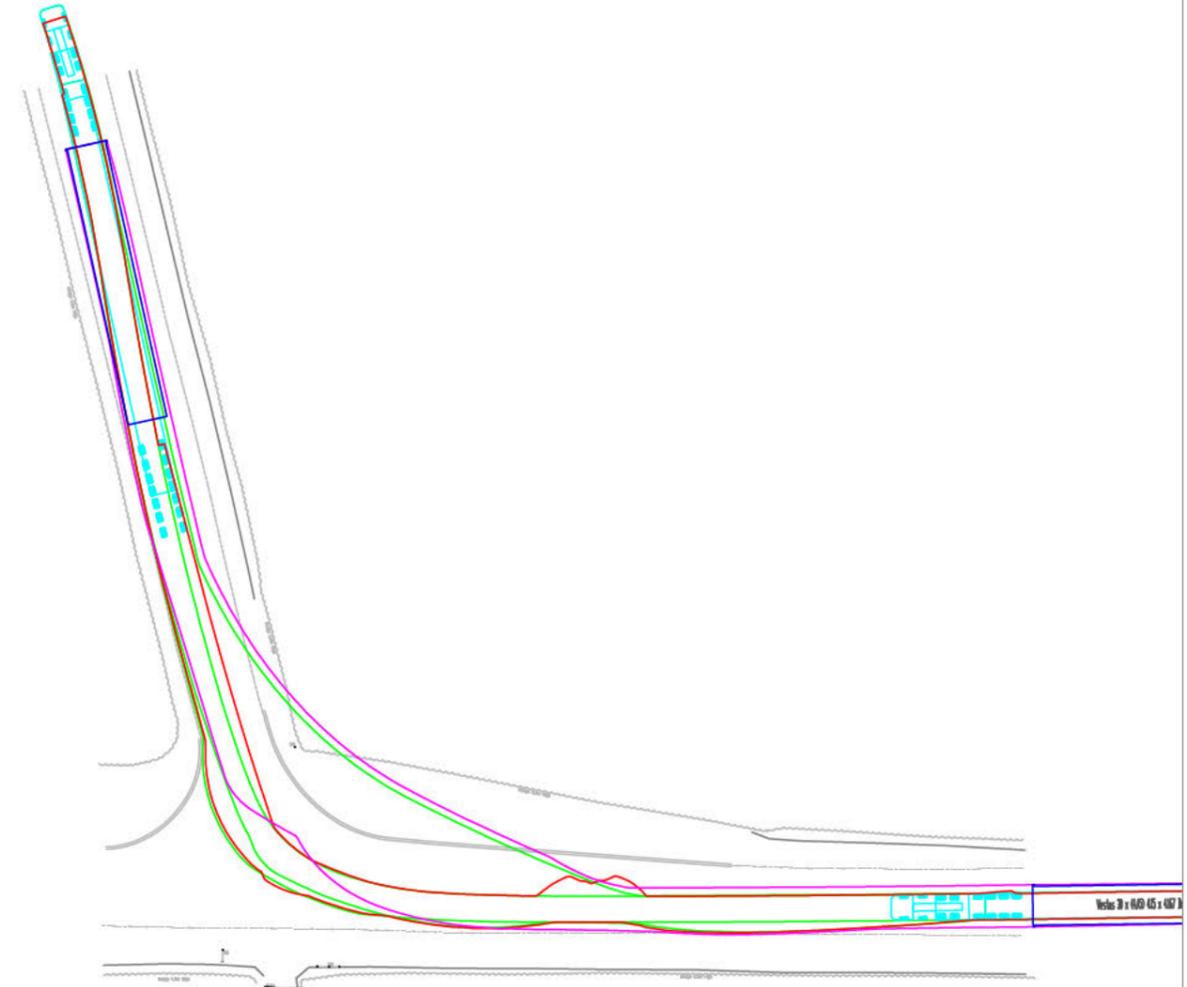
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Pell Frischmann 93 GEORGE STREET EDINBURGH, EH2 3ES 	Project	Rhoscrowther Wind Farm	Drawn	GLJ	15/09/2021	Scale	1:750 @ A3
	Client	Njord Energy	Designed	GLJ	12/09/2021	File No.	210912 Rhoscrowther Tracking.dwg
Key  Wheel SPA  Body SPA  Load SPA  Indicative  Over-run  Over-sail	Drawing Title	Vestas V117 Blade and Composite Tower	Checked	GB	15/09/2021	Drawing Status	Draft
	SPA Location	B4320 Speculation Inn Bend	Point of Interest	33		Drawing No.	SK14A
			Notes:	1. All mitigation is subject to confirmation through a test run. 2. This is not a construction drawing and is intended for illustration purposes only.		Revision	1

Blade

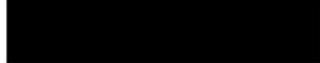


Tower



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Project
Rhoscrowther Wind Farm

	Name	Date	Scale
Drawn	GLJ	15/09/2021	1:750 @ A3
Designed	GLJ	12/09/2021	File No. 210912 Rhoscrowther Tracking.dwg
Checked	GB	15/09/2021	
Point of Interest			Drawing Status
35			Draft

Client
Njord Energy

Drawing Title
Vestas V117 Blade and Composite Tower

Drawing No.	Notes:	Revision
SK15	1. All mitigation is subject to confirmation through a test run. 2. This is not a construction drawing and is intended for illustration purposes only.	1

Key	Wheel SPA	Body SPA	Load SPA	Indicative	Over-run	Over-sail

SPA Location
A4320 / Valero Road Junction

Loads to oversail verge. No physical mitigation required.

Loads to oversail verge and field. Section of hedge and one road sign to be removed.

Loads to oversail verge. No physical mitigation required.

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Project
Rhoscrowther Wind Farm

	Name	Date	Scale
Drawn	GLJ	15/09/2021	1:500 @ A3
Designed	GLJ	12/09/2021	File No. 210912 Rhoscrowther Tracking.dwg
Checked	GB	15/09/2021	
Point of Interest			Drawing Status
35			Draft

Client
Njord Energy

Drawing Title
Vestas V117 Blade and Composite Tower

Drawing No.	Notes:	Revision
SK15A	1. All mitigation is subject to confirmation through a test run. 2. This is not a construction drawing and is intended for illustration purposes only.	1

Key						
	Wheel SPA	Body SPA	Load SPA	Indicative	Over-run	Over-sail

SPA Location
A4320 / Valero Road Junction

