Appendix 13.3 Turbine component delivery route assessment

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1. INTRODUCTION

Background

1.1 Pencloe Wind Energy Ltd (PWEL) received consent to construct a 19-turbine wind farm on land in the Carsphairn Forest to the south of New Cumnock in East Ayrshire Council's (EAC's) area. PWEL intend submitting an application to vary the consent to allow the installation of turbines with a higher hub height and longer blade. This report considers the delivery of these larger turbine components along the public road network.

Report content

1.2 Chapter 2 describes the available transport routes and assesses the feasibility of delivering the turbine components along the available routes and Chapter 3 presents our conclusions.

2. ASSESSMENT OF DELIVERY ROUTES

Introduction

2.1 This part of the report identifies the potential routes from the nearest ports to the proposed development and considers the feasibility of delivering the turbine components along these routes.

Overview of available routes

2.2 The turbine components will be delivered by sea to the United Kingdom. The port at which they would be offloaded has yet to be decided but would likely be Ayr or King George V dock in Glasgow. The components would then be transported by road to the entrance to the proposed development on Afton Road in New Cumnock. We have considered the following routes from these ports to the site:

- Route 1a: from Ayr port then via Waggon Road (the port exit), Allison Street, A719, A77, A76, B741, Afton Road and the proposed development access.
- Route 1b: from King George V dock, then via Kings Inch Drive, M8, Helen Street, Edmiston Drive, Broomloan Road, Drumbeck Road, M77, A77 then as Route 1a. An alternative to part of Route 1b would involve vehicles staying on the M8, then using the M74 and the M73 to rejoin the M8 heading westwards to allow access to the M77.
- Route 2: from King George V dock, then via Kings Inch Drive, M8, M74, A701, A75, A76 then as per Route 1a (this route would involve approaching New Cumnock from the east, whereas the others would involve approaching New Cumnock from the west).

2.3 These routes are shown in Figure 1 in Annex A

Swept path assessments

2.4 Swept path assessments for each of the pinch points on the above routes were undertaken based on turbine blades of 67m length. Assessments were also made of Afton Road with a vehicle carrying the most onerous tower section; details of the tower sections of the proposed turbine are provided in Annex B.

Route 1a

2.5 Annex C shows drawings showing the swept path of the vehicle carrying the turbine blade from Ayr port to the entrance to the proposed development from Afton Road. The drawings in Annex C show the following:

- Drawing 212 shows the vehicle exiting Ayr port onto Waggon Road. Works would be required to alter the wall forming the eastern boundary of the port in this area to allow the blade to oversail the area occupied by the wall. There is a grassed area between the wall and York Street and control of that area would be required by the applicant.

Exit from Ayr port onto Waggon Road

- Drawing 213 shows the vehicle turning right from Waggon Road into Allison Street. This manoeuvre appears feasible subject to the temporary removal of street furniture.

- Drawing 214 shows the vehicle turning left from Allison Street onto the A719. This manoeuvre appears feasible subject to the temporary removal of street furniture.

- Drawing 215 shows the vehicle travelling northbound through the Sandyford Toll roundabout on the A77. This manoeuvre appears feasible subject to the temporary removal of street furniture.

- Drawing 216 shows the vehicle turning right to continue along the A77 at the Dutch House roundabout. This manoeuvre appears feasible subject to the temporary removal of street furniture.

- Drawing 217 shows the vehicle turning right from the A77 onto the A76 at Bellfield interchange. This manoeuvre appears feasible subject to the temporary removal of street furniture. The drawing shows that the swept path of the vehicle would oversail the A77 carriageway below the interchange. Temporary traffic management (perhaps in the form of a rolling road block) would be required to control the traffic on the A77 while the vehicles passed through the interchange.

- Drawing 228 shows the vehicle continuing along the A76 at the Crossroads roundabout with the A719. This manoeuvre appears feasible subject to the temporary removal of street furniture.

- Drawing 229 shows the vehicle continuing along the A76 at the Dettingen roundabout with the A70. This manoeuvre appears feasible subject to the temporary removal of street furniture.

- Drawing 202 shows the vehicle continuing along the A76 at the Skerrington roundabout with the B7083. This manoeuvre appears feasible subject to the temporary removal of street furniture.

2.6 Analysis of the swept path of the vehicle passing through New Cumnock showed two constraints. The first was where the A76 crosses the railway line at New Cumnock railway station. The swept path drawing for this location is shown in drawing 204 and shows that the rear of the blade would oversail the railway line. We consulted with Network Rail on this issue and they advised (see email in Annex D) that a possession of the railway line would be required to allow the passage of the vehicle carrying the turbine blades.

2.7 The second constraint in New Cumnock would be the section of the route from the junction of the A76 and B741 to the junction of the B741 and Afton Road. Drawing 205 shows that third-party land would be required on both sides of the B741 to accommodate the passage of the vehicle.

2.8 To mitigate the above constraints the applicant intends using a vehicle with the ability to raise the turbine blade to deliver the blades from New Cumnock to the proposed development. An example of such a vehicle is the Goldhofer FTV300/500 and details of that vehicle are provided in Annex E.

2.9 The applicant intends delivering the turbine blades by conventional vehicles to a laydown area around New Cumnock that is yet to be identified. The blades would be unloaded and temporarily stored before being loaded singly onto the FTV300/500 for transport to the proposed development site.

2.10 We have undertaken swept path assessments of the FTV300/500 routeing from an optional unloading area named Crowbandsgate coal loading terminal, along the A76, B741 and Afton Road to reach the access to the proposed development. The FTV300/500 has the ability to raise the turbine blade by up to 60 degrees and we have modelled it with the 67m long blade raised to 59 degrees. That equates to a blade length in plan of 35m and a height of 57m. The blade need only be raised when required and could lay flat for most of the route. Further investigations would be required to see exactly where on the route the blade would need to be raised, to what angle and what implications that may have for anything above the road, such as trees or cables. It should be noted that the Crowbandsgate coal loading terminal has been identified as an example area only. There are other land options around New Cumnock and the Applicant is currently working towards securing an appropriate site.

2.11 The swept path drawings in Annex C show the following:

- Drawing 225 shows the turbine blade being carried on a conventional vehicle leaving the A76 to enter Crowbandsgate coal loading terminal and then leaving Crowbandsgate to join the A76 on the FTV300/500 vehicle. These manoeuvres appear feasible subject to the temporary removal of street furniture.

- Drawing 204G shows the turbine blade on the FTV300/500 vehicle crossing the railway line on the A76. The drawing shows that the swept path would not oversail the railway lines.

- Drawing 205C shows the turbine blade on the FTV300/500 vehicle routeing between the junction of the A76 and the B741 and the junction of the B741 and Afton Road. The drawing shows that the swept path would not oversail third party land. Works may be required to the footway on the southern side of the B741 and on the eastern side of Afton Road to provide a suitable surface to accommodate the vehicle.

- Drawings 301 to 305 show the turbine blade on the FTV300/500 vehicle routeing along Afton Road from its junction with the B741 to the access to the proposed development. The drawings include the improvements proposed to Afton Road agreed during the consideration of the consented Pencloe wind farm and the assumed extent of the adopted road, based on obvious boundaries such as fencelines or walls. The drawings show that the passage of the FTV300/500 along Afton Road appears feasible, although works may be required to widen the Afton Road carriageway westwards at around chainage 3450m as shown on drawing 305.

2.12 We also assessed the swept path of the vehicle carrying the 35m tower section, which would be the longest of the three sections, along Afton Road. Drawings showing the swept path of the vehicle carrying this section are shown in Annex F. The drawings show that some widening of Afton Road would likely be required around chainage 2800m to 3000m and again around chainage 3450m.

Route 1b

2.13 Route 1b would see the vehicles leaving from King George V dock, then via Kings Inch Drive, M8, Helen Street, Edmiston Drive, Broomloan Road, Drumbeck Road, M77 to the A77 and then the same route as Route 1a. Annex G has the following drawings showing the swept path of the vehicle carrying the 67m long blade:

- Drawing 601 shows the vehicle exiting King George V Dock onto King's Inch Drive. This manoeuvre appears feasible and could be made easier if the vehicle can overrun the central island of the roundabout, as appears possible from the photograph below.

Exit from King George V dock onto Kings Inch Drive

- Drawing 602 shows the vehicle heading westwards along Kings Inch Drive and passing through the easternmost roundabout at the retail park. This manoeuvre appears feasible subject to the temporary removal of street furniture.

- Drawing 603 shows the vehicle heading westwards along Kings Inch Drive and passing through the westernmost roundabout at the retail park. This manoeuvre appears feasible.

- Drawing 604 shows the vehicle turning left from Kings Inch Drive to join the slip road to the M8 at Junction 25A. This manoeuvre appears feasible subject to the temporary removal of street furniture.

- Drawing 605 shows the vehicle leaving the M8 at Junction 24 and turning north onto Helen Street. The drawing shows that the swept path of the vehicle may interfere with the parapet of the bridge carrying Helen Street over the railway line.

- Drawing 606 shows the vehicle turning right from Helen Street into Edmiston Drive. This manoeuvre appears feasible subject to the removal of some street furniture.

- Drawing 607 shows the vehicle turning right from Edmiston Drive to Broomloan Road. This manoeuvre appears feasible subject to the removal of some street furniture and maybe lowering of the level of the central island of the roundabout.

- Drawing 608 shows the vehicle turning left from Dumbreck Road onto the southbound M77 at Junction 1. This manoeuvre appears feasible subject to the removal of some street furniture and foliage on the southern side of the slip road to the M77.

2.14 It may be possible to avoid the route via Helen Street and Edmiston Drive by turning right from Junction 24 onto Helen Street, then left onto Paisley Road West, then right onto Drumbeck Road. It would be possible to avoid this section of the road network entirely by

staying on the eastbound M8, then joining the eastbound M74, then the northbound M73 to join the westbound M8 and then the southbound M77.

Route 2

2.15 Route 2 would involve the same route as Route 1b from King George V dock to the M8 but use the M74, A701, A75 and A76 then as per Route 1a. We investigated the feasibility of the vehicle transporting the turbine blade through constraints in Sanquhar and Kirkconnel. Swept paths of the vehicle negotiating these locations are shown in Annex H and show that the vehicle would conflict with the Tollbooth building in Sanquhar and at a church and cemetery in Kirkconnel. Given these constraints, this route was not considered any further.

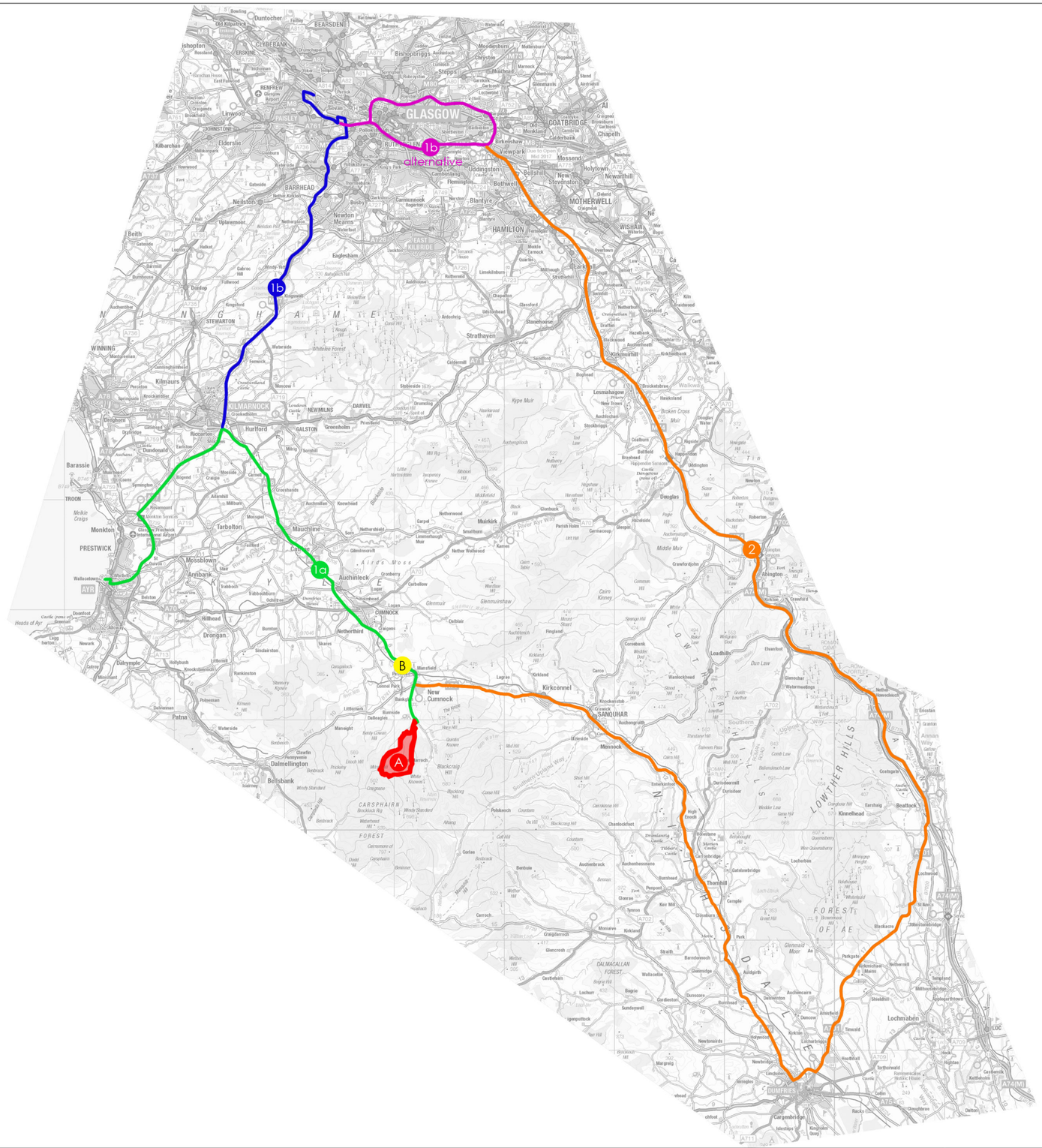
3. CONCLUSION

3.1 This report has assessed the feasibility of delivering turbine blade components to the proposed Pencloe Wind Farm in New Cumnock. It is concluded that:

- A feasible route exists to deliver the turbine blades from either Ayr port or King George V dock to the western edge of New Cumnock.
- The turbine blade would oversail the railway line where it is crossed by the A76 in New Cumnock and would require third party land around the junctions of the A76 and B741 and of the B741 and Afton Road unless a blade lifting vehicle was used.
- The turbine blades could instead be delivered by conventional vehicle to a suitable site, for example the former Crowbandsgate coal loading terminal on the western edge of New Cumnock, from where they could be transferred to the proposed development by a vehicle like the Goldhofer FTV300/500, which can raise blades vertically.
- Works would be required along Afton Road to accommodate the FTV300/500 and the vehicle carrying the turbine tower components.

ANNEX A

FIGURE



N	Pencloe Wind Farm	Pencloe Wind Energy Ltd	
	Delivery Routes of Turbine Components	Drawing Number: TP442 Figure 1	Scale: NTS @ A3
		Drawn by: NW / Date: May 2019	Checked by: IL

TRANSPORT PLANNING

ANNNEX B

TURBINE TOWER DETAILS

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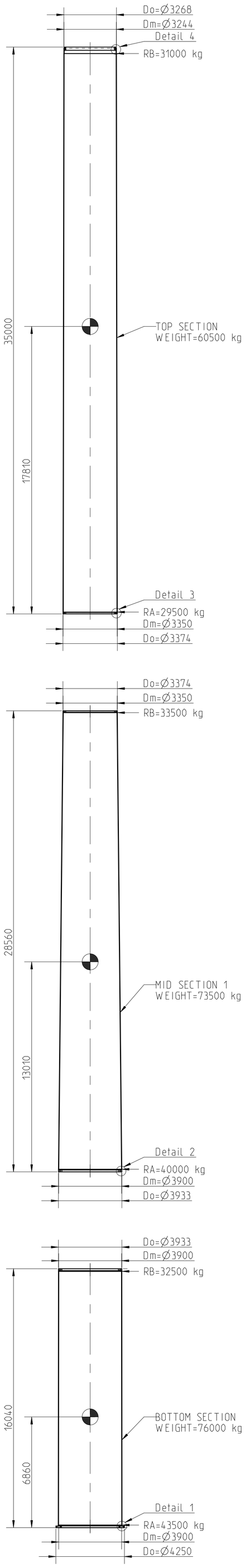
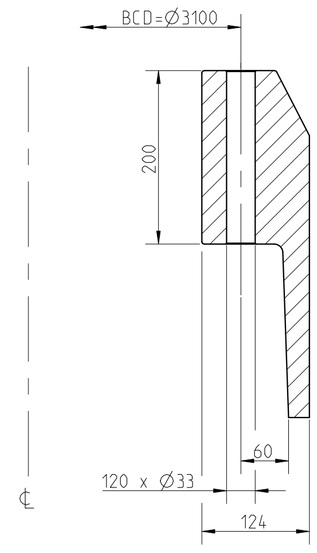
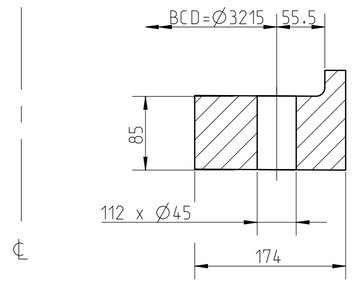


NOTES:
1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE
2. SHELL DIAMETERS INDICATED TO CENTER LINE OF STEEL PLATE SEGMENTS
3. Dm: SHELL MEAN DIA.
4. Do: FLANGE OUTER DIA.
5. RA: REACTION FORCE @ BOTTOM
6. RB: REACTION FORCE @ TOP
7. ⊕ : CENTER OF GRAVITY (COG)
8. SECTION WEIGHT AND REACTION FORCES INCLUDED THE MASS OF INTERNALS.
9. SECTION WEIGHT AND REACTION FORCES INCLUDE A SAFETY 'BUFFER' TO ACCOUNT FOR TOLERANCES.
10. SECTION WEIGHT AND REACTION FORCES DO NOT INCLUDE TOWER FEET.

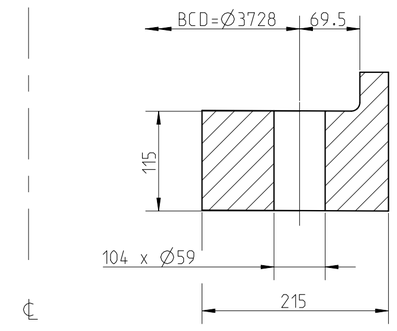
Detail 4 - Top Flange



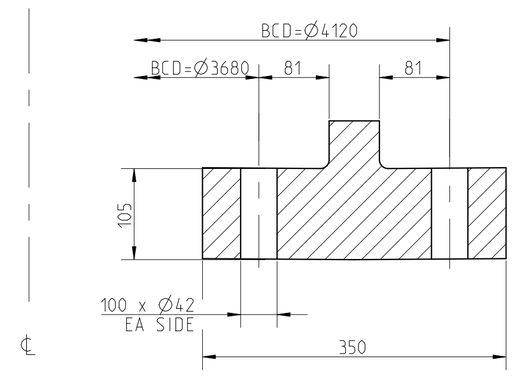
Detail 3 - Middle Flange 2



Detail 2 - Middle Flange 1



Detail 1 - Bottom Flange



Critical Wind Speed & Eigen Frequency table				
Sections installed	Lower Critical Wind Speed limit (m/s)	Upper Critical Wind Speed limit (m/s)	Lower Eigen Frequency (Hz)	Higher Eigen Frequency (Hz)
Top section /3	14.0	14.7	0.771	0.812
Middle section 1/2	43.0	48.0	2.28	2.56
Bottom section /1	267.0	369.0	12.2	16.9

Item no. 0077-3543	Mass (kg) –	Certificate –	Format A1	Status Approved	Revised by –	Created date 2018-09-07 / Created by GUBAS
Material specification – –			Scale 1:150	Change no. 463057	PDM ver. 0.0	Reviewed date 19.09.2018 / Reviewed by RAKDB
Vestas. vestas.com			Proj. Pro/E	Item description T885207 –		
			Metric Dimensions shown in mm unless otherwise specified	Replaces / Copy of –	Drawing no. 0077-3543	Ver. 0 / Sheet 1 of 1

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T07 0077-3543 Ver 00 - Approved- Exported from DMS: 2019-03-21 by DATAO

ANNEX C

BLADE SWEPT PATH DRAWINGS ROUTE 1A

KEY

Line of Wheels

Line of Trailer

Line of Turbine Blade

Pencloe Wind Farm

Swept Path Analysis - Wind Turbine Component Transporter with 67m Blade at Dock

Pencloe Wind Energy Ltd

Drawing Number:		Scale:
TP442/SK/212A		1:500 @ A3
Drawn by: NW	Date: Apr 2019	Checked by: IL

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KEY

- Line of Wheels
- Line of Trailer
- Line of Turbine Blade

Pencloe Wind Farm

Swept Path Analysis - Wind Turbine Component Transporter with 67m Blade at Waggon Road/Allison Street Junction

Pencloe Wind Energy Ltd

Drawing Number:		Scale:
TP442/SK/213		1:1000 @ A3
Drawn by: NW	Date: Mar 2019	Checked by: IL

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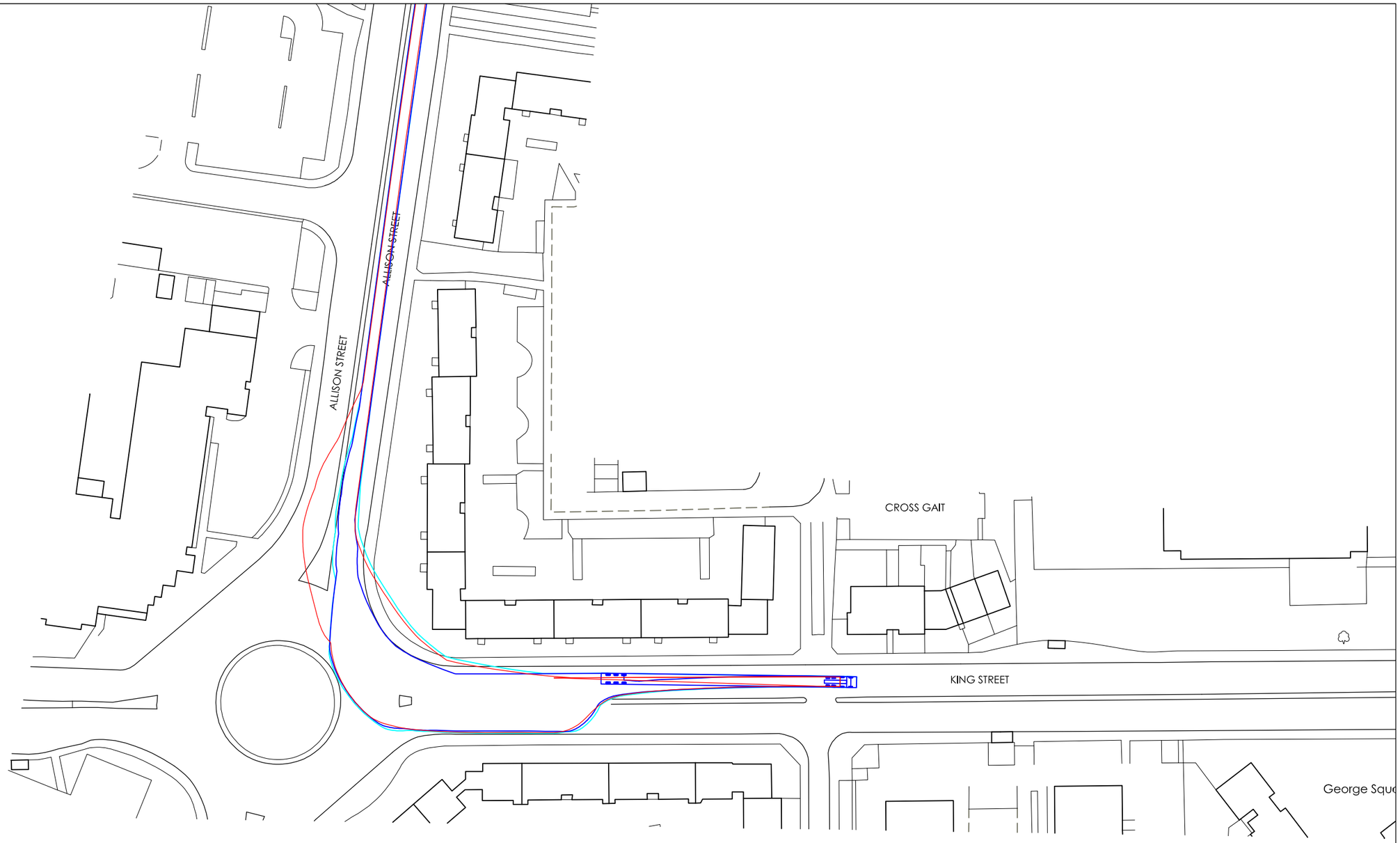

N

KEY

Line of Wheels

Line of Trailer

Line of Turbine Blade

Pencloe Wind Farm

Swept Path Analysis - Wind Turbine Component Transporter with 67m Blade at Allison St / King St Roundabout Junction

Pencloe Wind Energy Ltd

Drawing Number:	Scale:	
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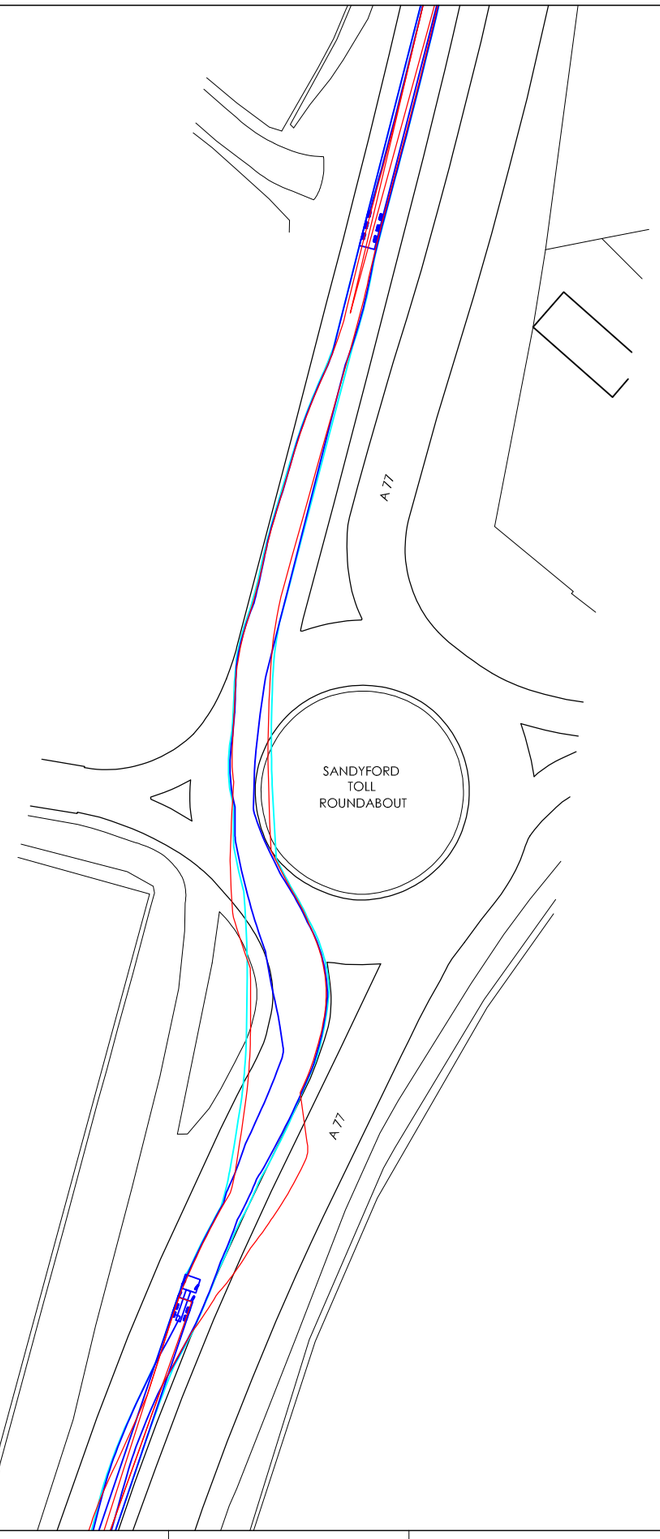

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Pencloe Wind Farm

Swept Path Analysis - Wind Turbine Component Transporter with 67m Blade at A77 Sandyford Toll Roundabout Junction

Pencloe Wind Energy Ltd

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Drawn by: NW	Date: Mar 2019	Checked by: IL

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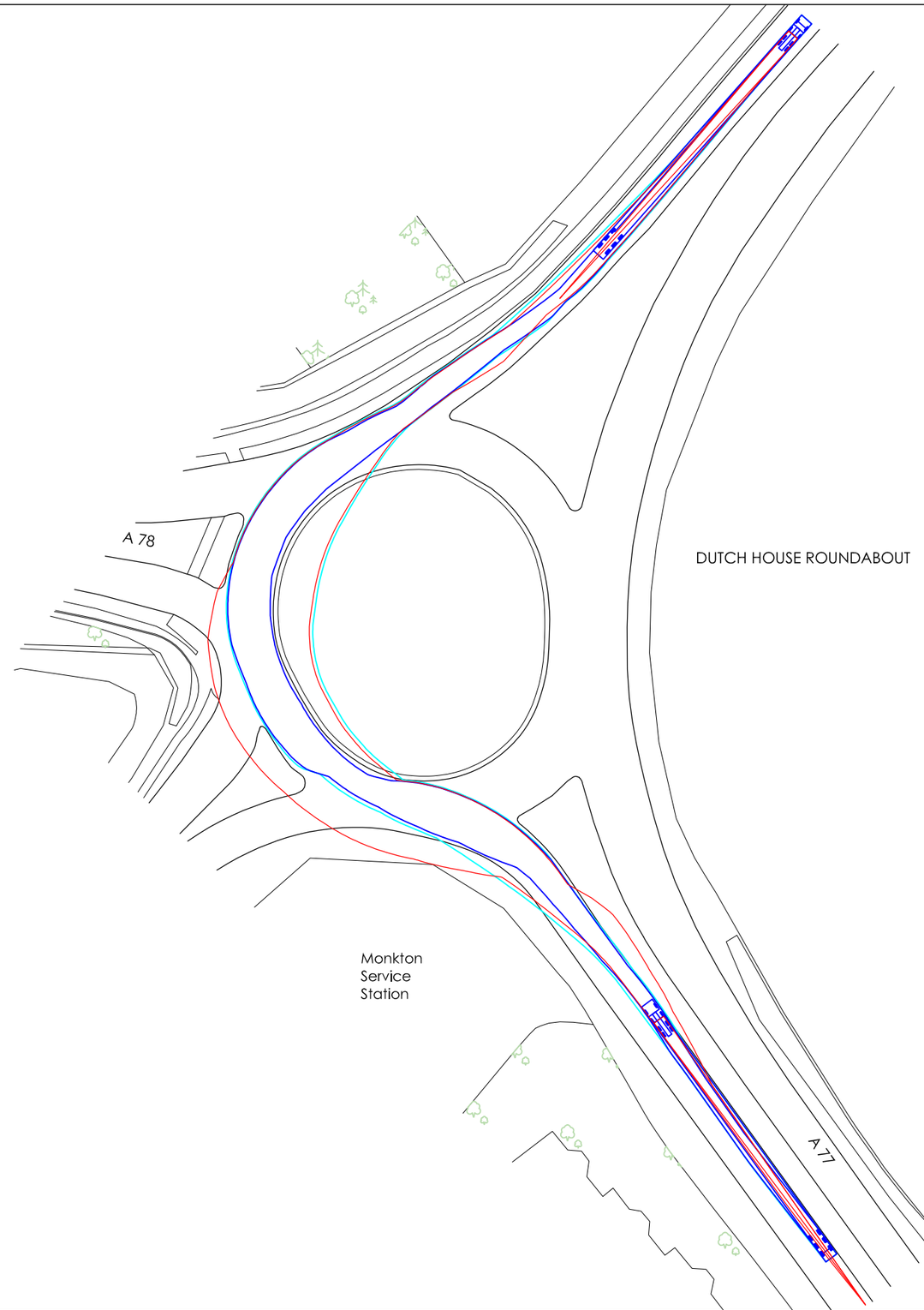

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Pencloe Wind Farm

Swept Path Analysis - Wind Turbine Component Transporter with 67m Blade at A77 Dutch House Roundabout Junction

Pencloe Wind Energy Ltd

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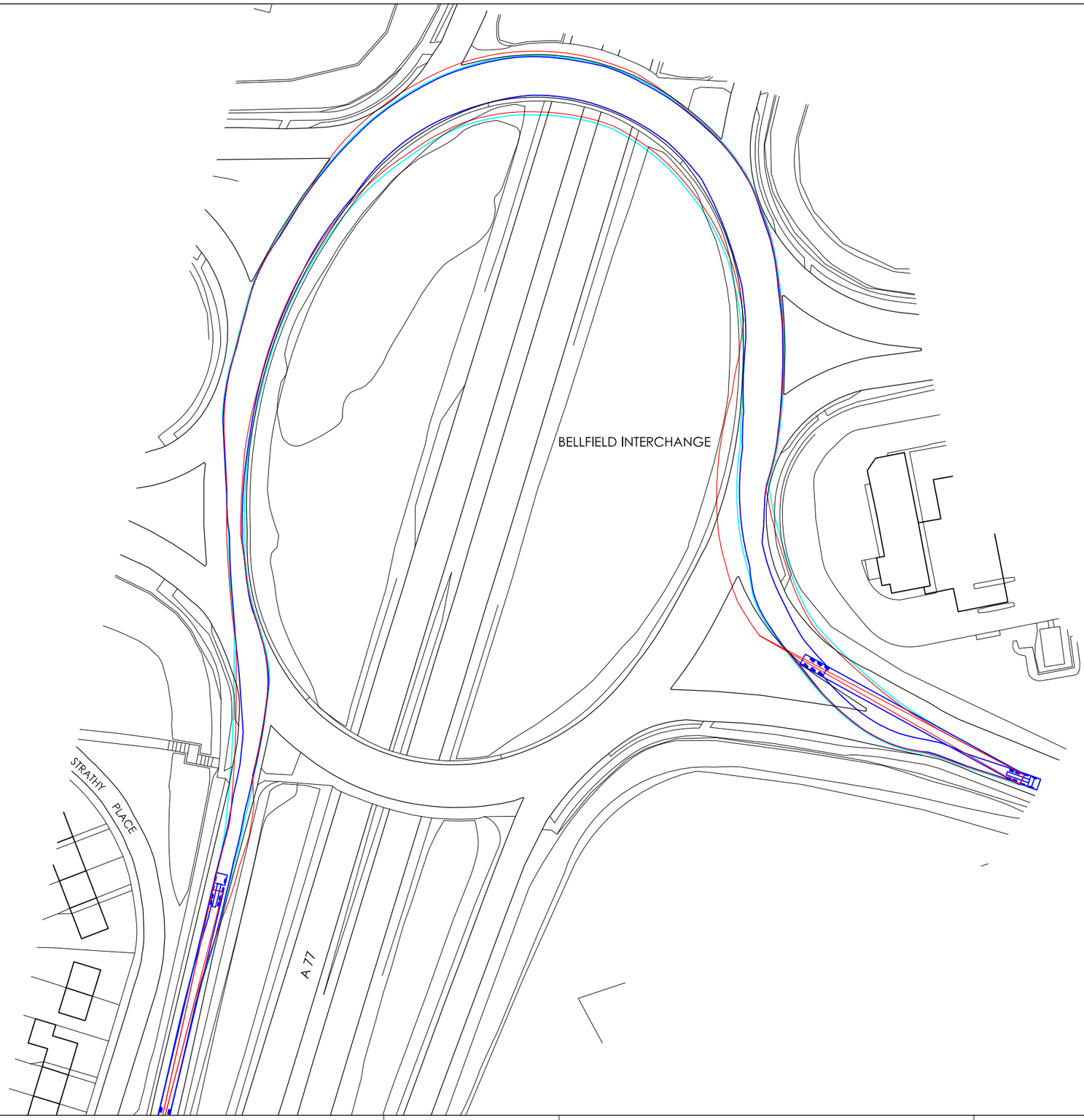

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Pencloe Wind Farm

Swept Path Analysis - Wind Turbine Component Transporter with 67m Blade at A77/A76 Bellfield Interchange

Pencloe Wind Energy Ltd

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Drawn by: NW	Date: Apr 2019	Checked by: IL

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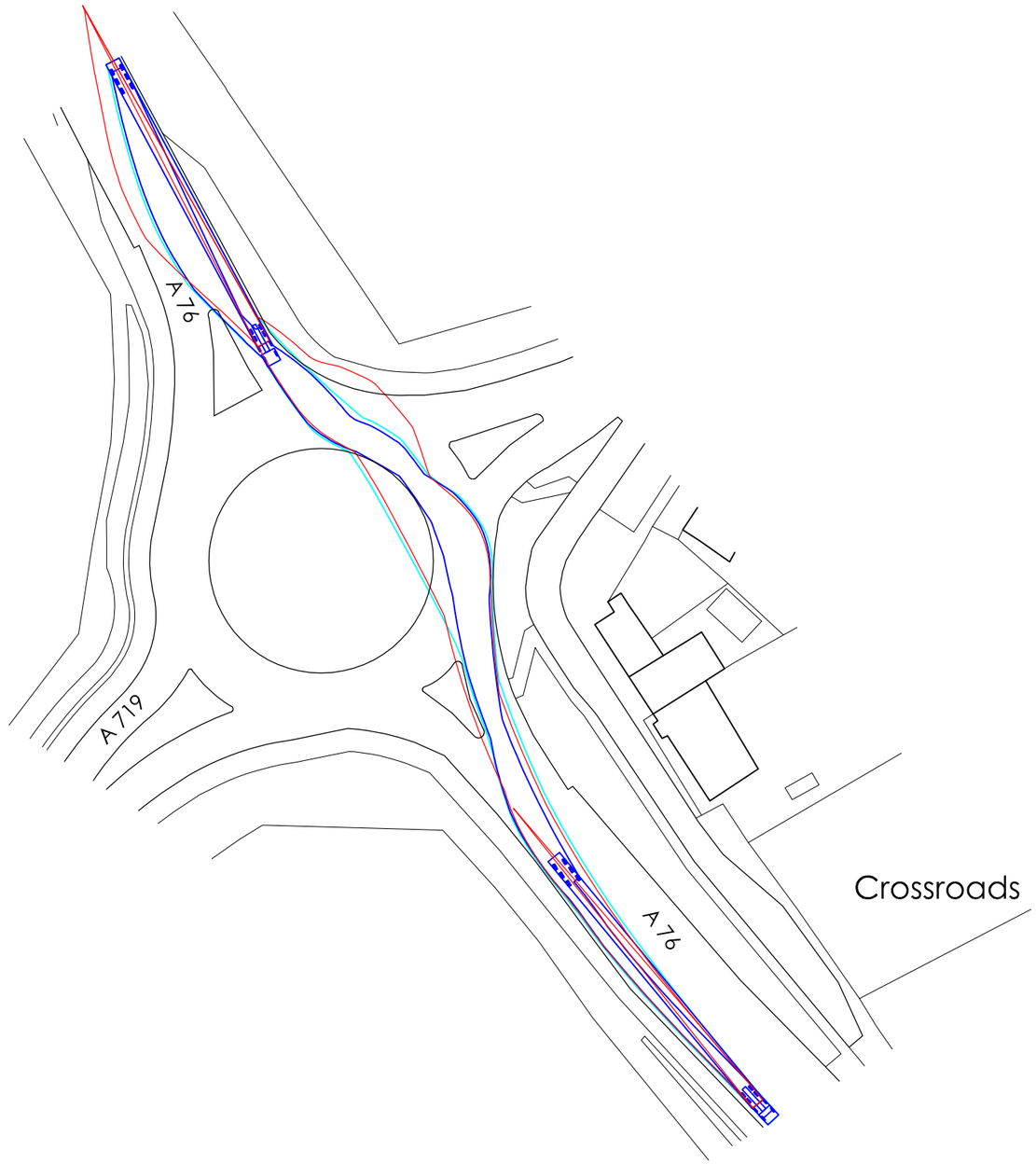

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Pencloe Wind Farm

Swept Path Analysis - Wind Turbine Component Transporter with 67m Blade at A76/A719 Roundabout

Pencloe Wind Energy Ltd

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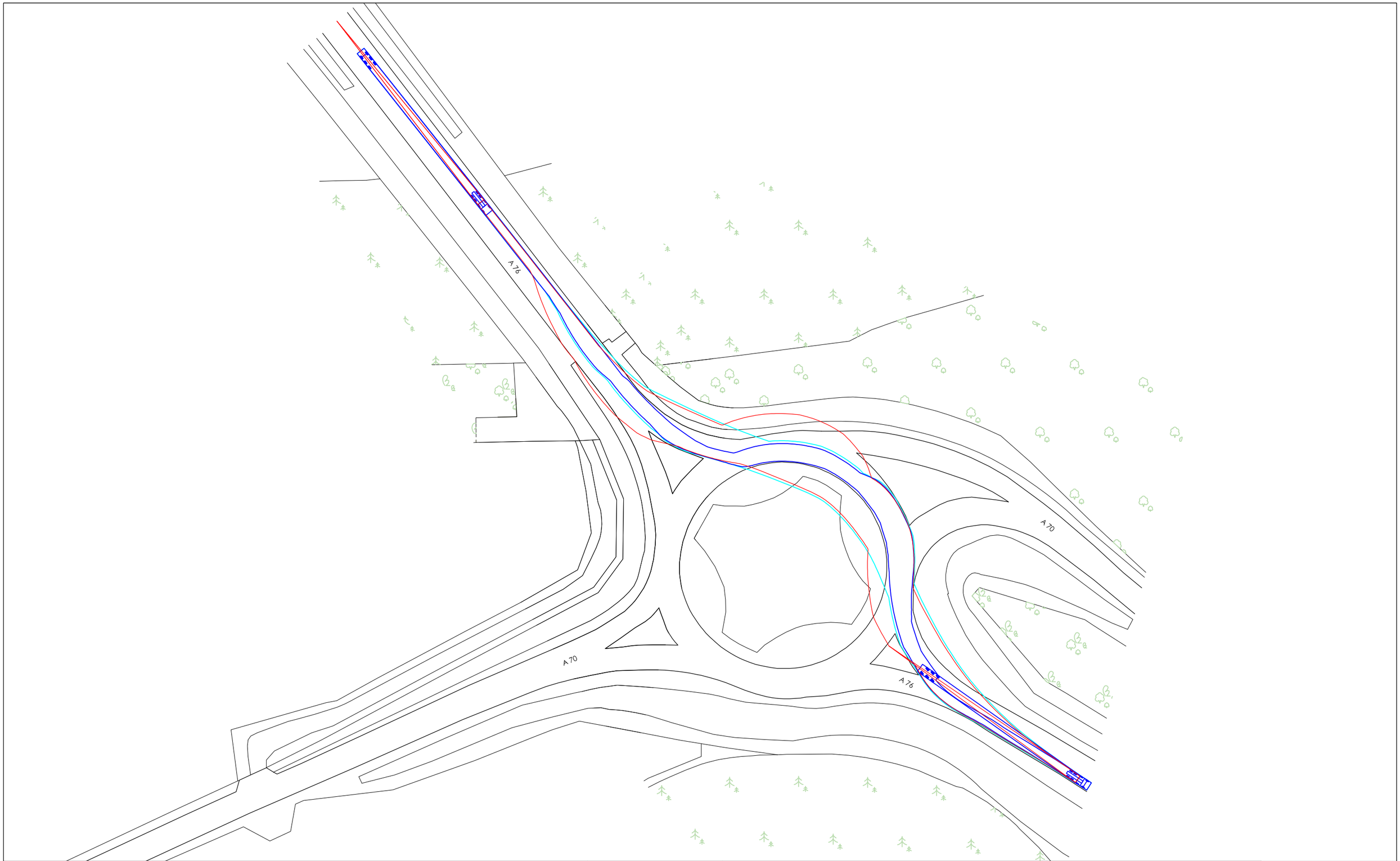

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Pencloe Wind Farm

Swept Path Analysis - Wind Turbine Component Transporter with 67m Blade at A76 / A70 Roundabout

Pencloe Wind Energy Ltd

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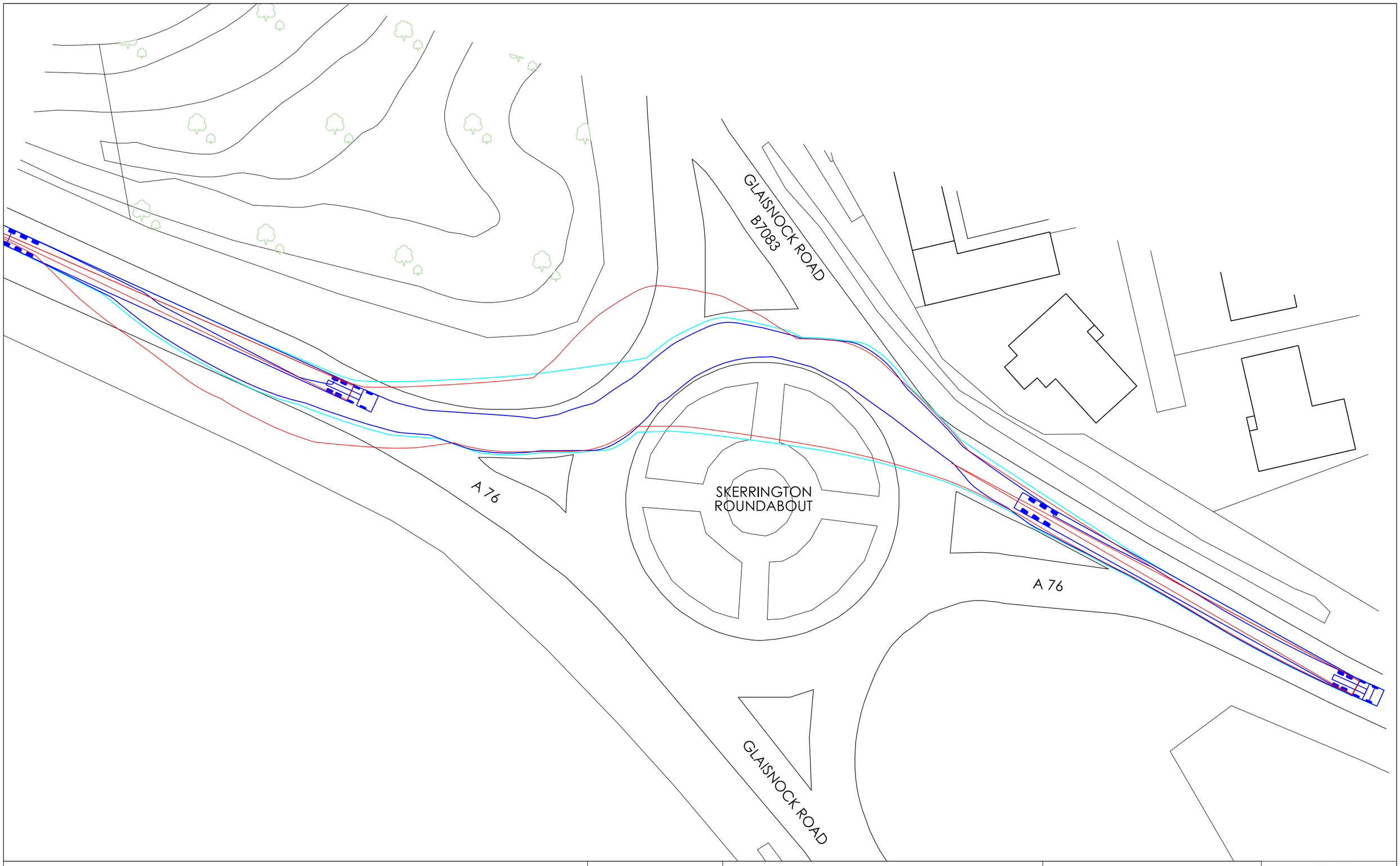

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- Line of Turbine Blade

Pencloe Wind Farm

Swept Path Analysis - Wind Turbine Component Transporter with 67m Blade at A76 / Glaisnock Road Roundabout

Pencloe Wind Energy Ltd

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KEY

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- Line of Turbine Blade

Pencloe Wind Farm

Swept Path Analysis - Wind Turbine Component Transporter with 67m Blade in Pathhead

Pencloe Wind Energy Ltd

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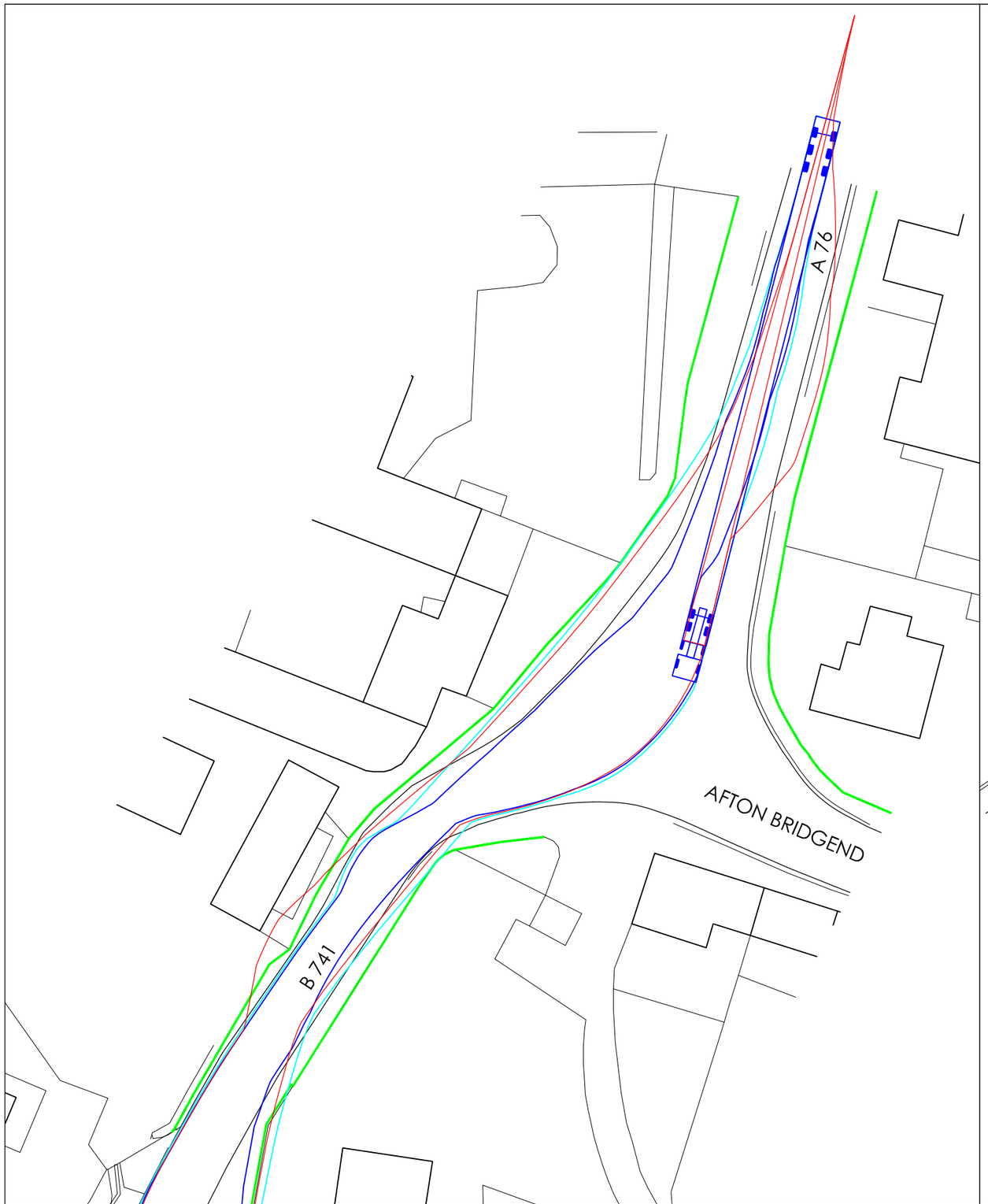

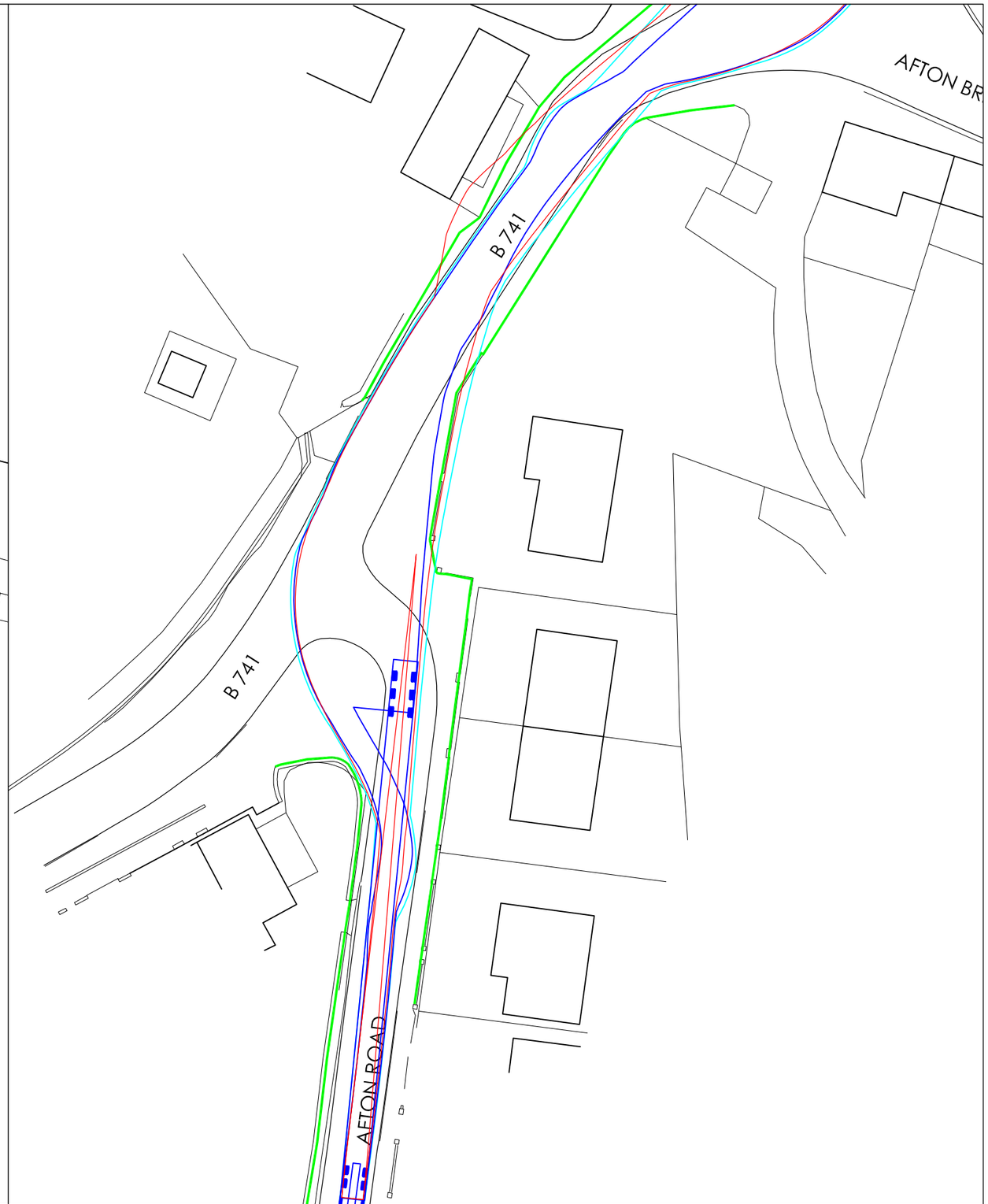

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KEY

- Line of Wheels
- Line of Trailer
- Line of Turbine Blade
- Extent of Adopted Road

Pencloe Wind Farm

Swept Path Analysis - Wind Turbine Component Transporter with 67m Blade at Afton Bridge / B741 / Afton Road

Pencloe Wind Energy Ltd

Drawing Number:	Scale:	
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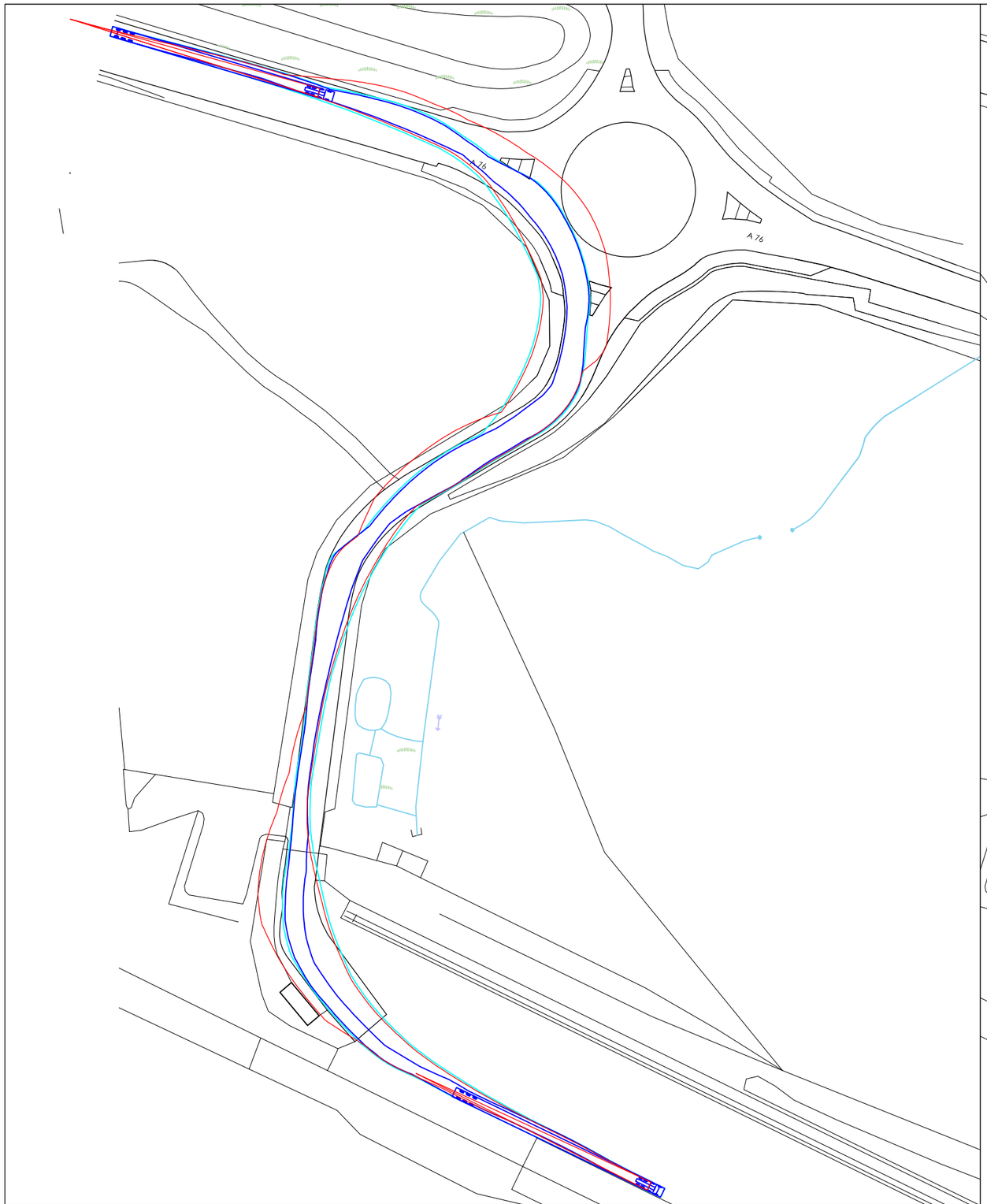
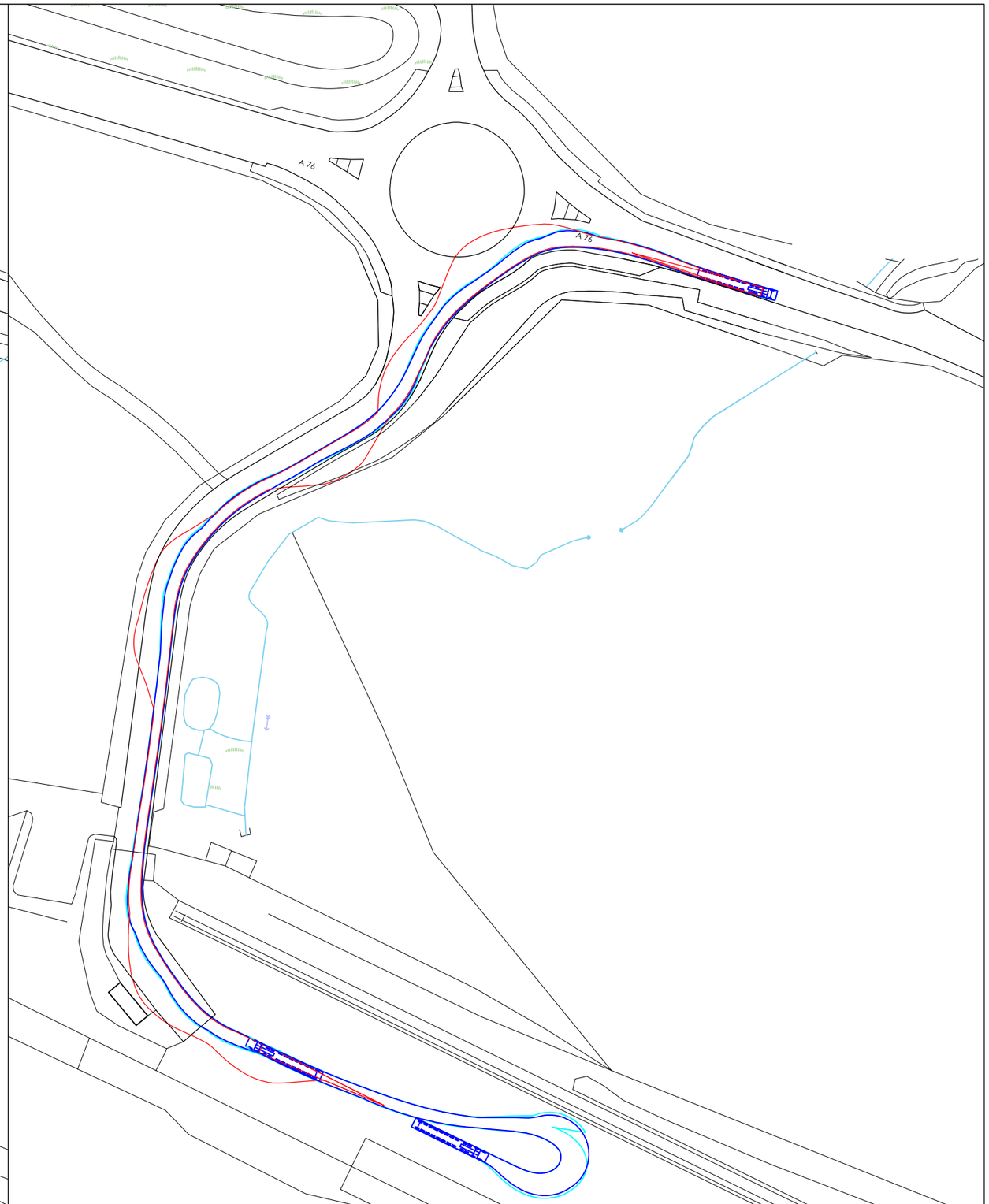
Drawn by: NW	Date: Mar 2019	Checked by: IL

TRANSPORT PLANNING





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KEY

- Line of Wheels
- Line of Trailer
- Line of Turbine Blade

Pencloe Wind Farm

Swept Path Analysis - Wind Turbine Component Transporter with 67m Blade being Transferred onto FTV300 and raised 59°

Pencloe Wind Energy Ltd

Drawing Number:	Scale:	
TP442/SK/225	1:1250 @ A3	
Drawn by: NW	Date: Apr 2019	Checked by: IL

TRANSPORT PLANNING

N

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KEY

- Line of Wheels
- Line of Trailer
- Line of Turbine Blade
- Extent of Adopted Road

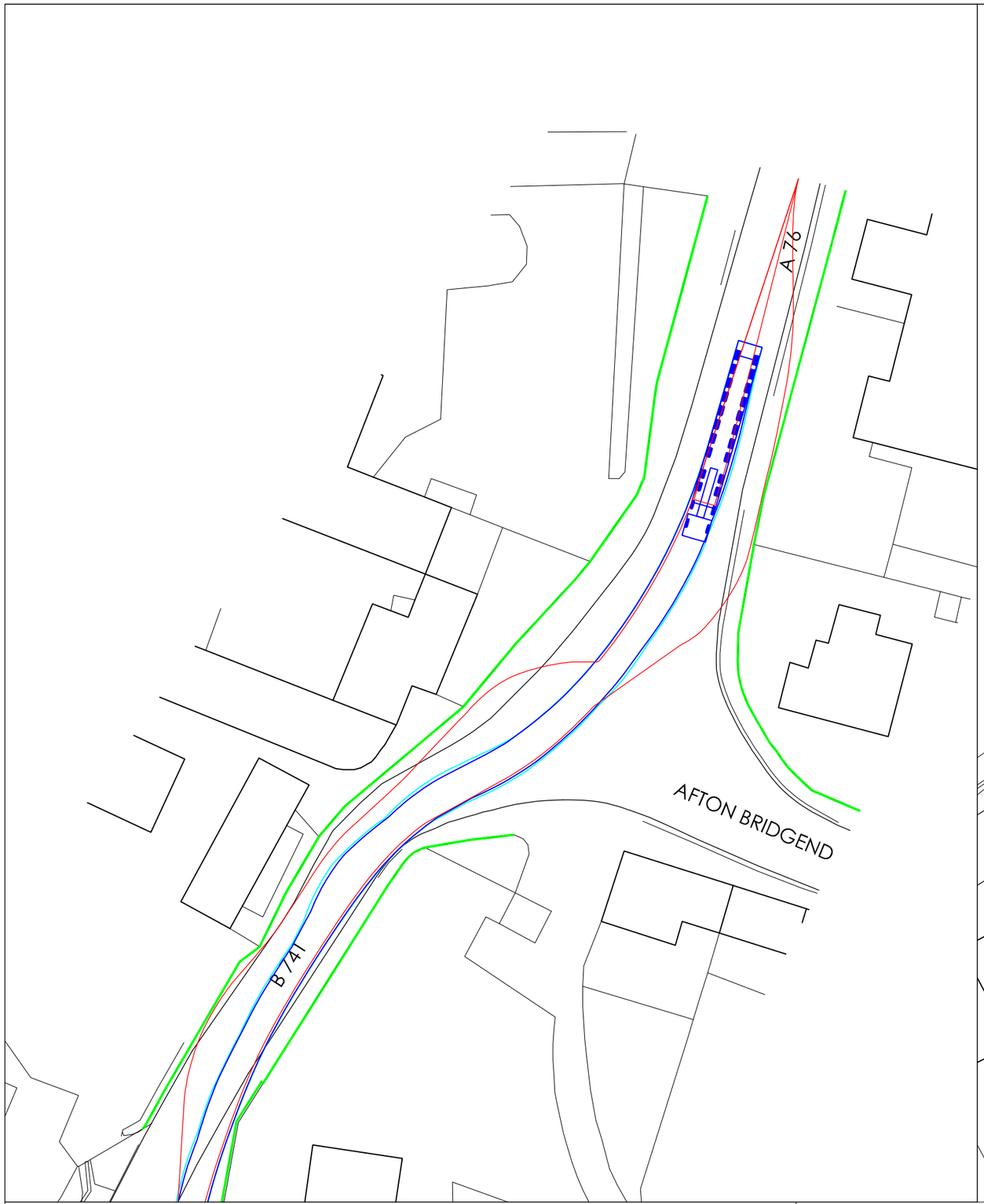
Pencloe Wind Farm

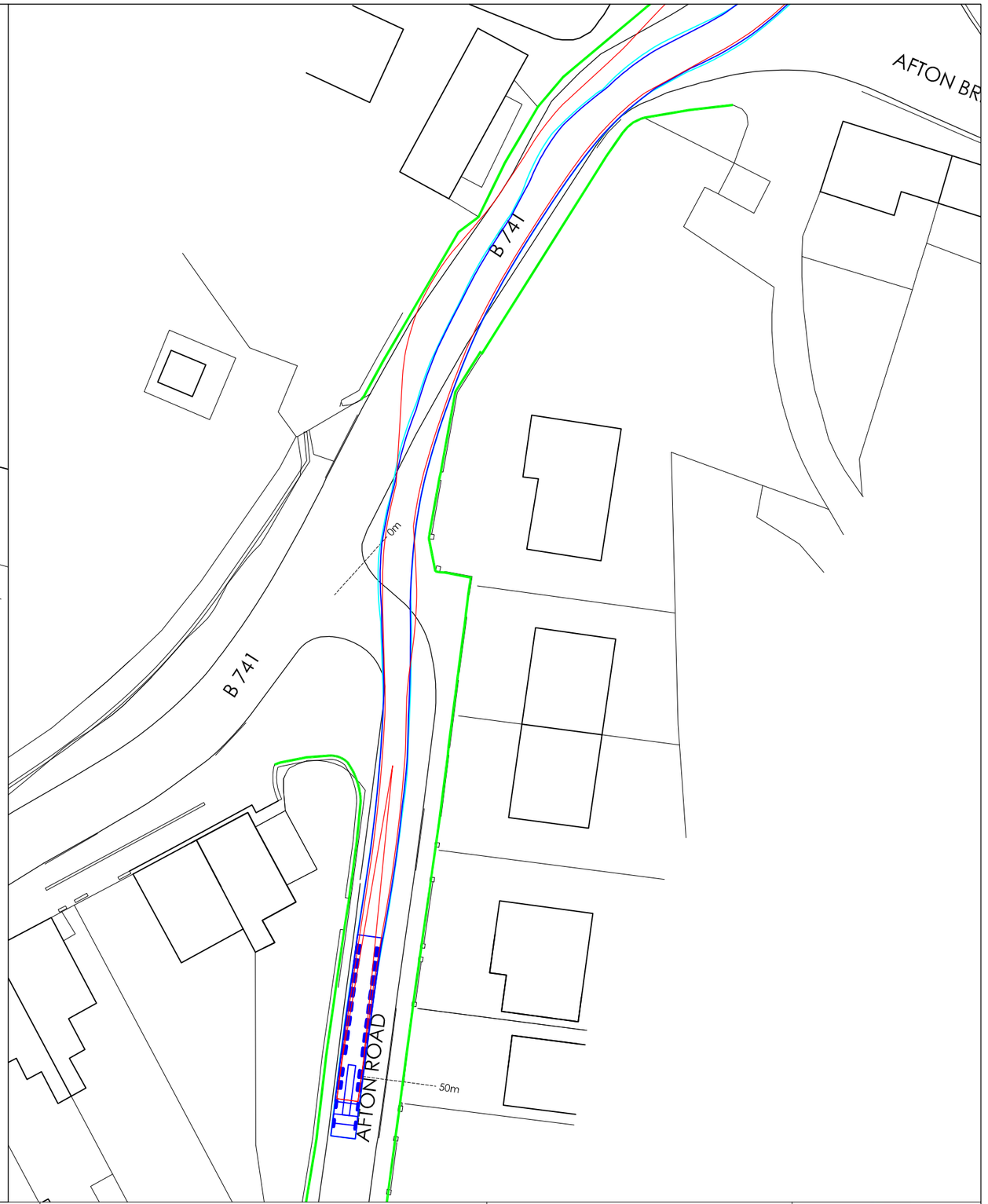
Swept Path Analysis - Wind Turbine Component Transporter with 67m Blade raised up by 59 degrees in Pathhead

Pencloe Wind Energy Ltd

Drawing Number:	Scale:	
TP442/SK/204G	1:1000 @ A3	
Drawn by: NW	Date: Apr 2019	Checked by: AS

TRANSPORT PLANNING





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KEY

- Line of Wheels
- Line of Trailer
- Line of Turbine Blade
- Extent of Adopted Road

Pencloe Wind Farm

Swept Path Analysis - Wind Turbine Component Transporter with 67m Blade raised by 59 degrees at Afton Bridge / B741 / Afton Road

Pencloe Wind Energy Ltd

Drawing Number:	Scale:	
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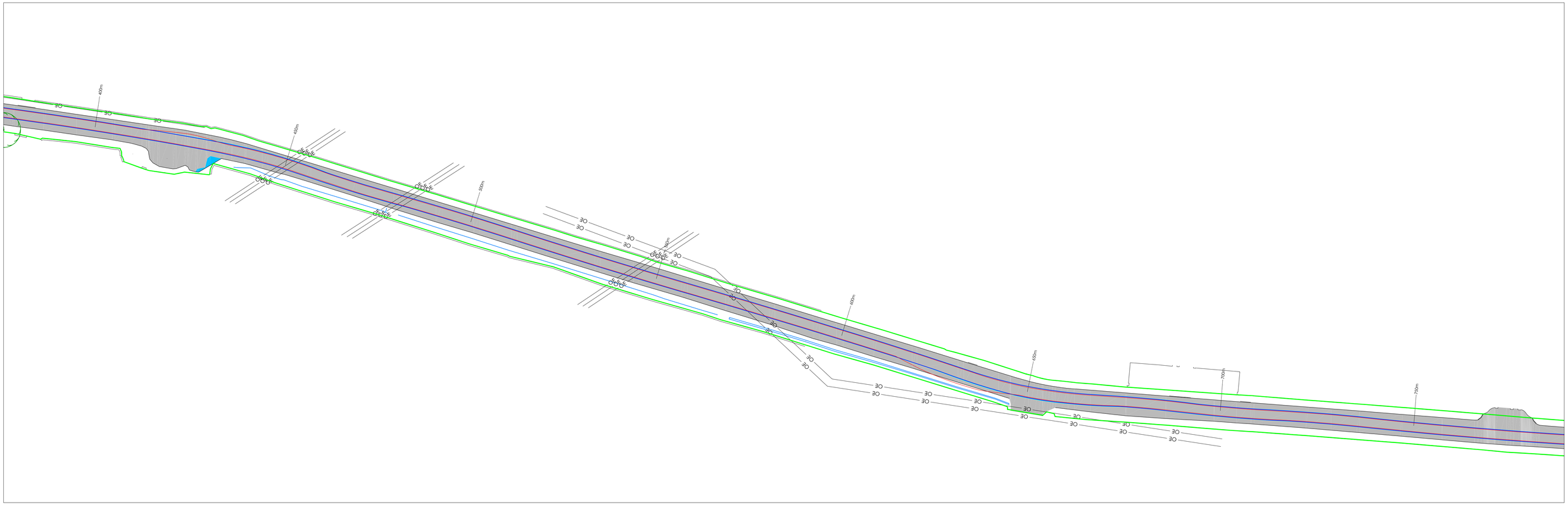
Drawn by: NW	Date: Apr 2019	Checked by: IL

TRANSPORT PLANNING



Based on topographical survey carried out in August 2017
(after construction of improvements associated with Afton Wind Farm)

KEY

- Line of Wheels
- Line of Trailer
- Line of Turbine Blade
- Extent of Adopted Road

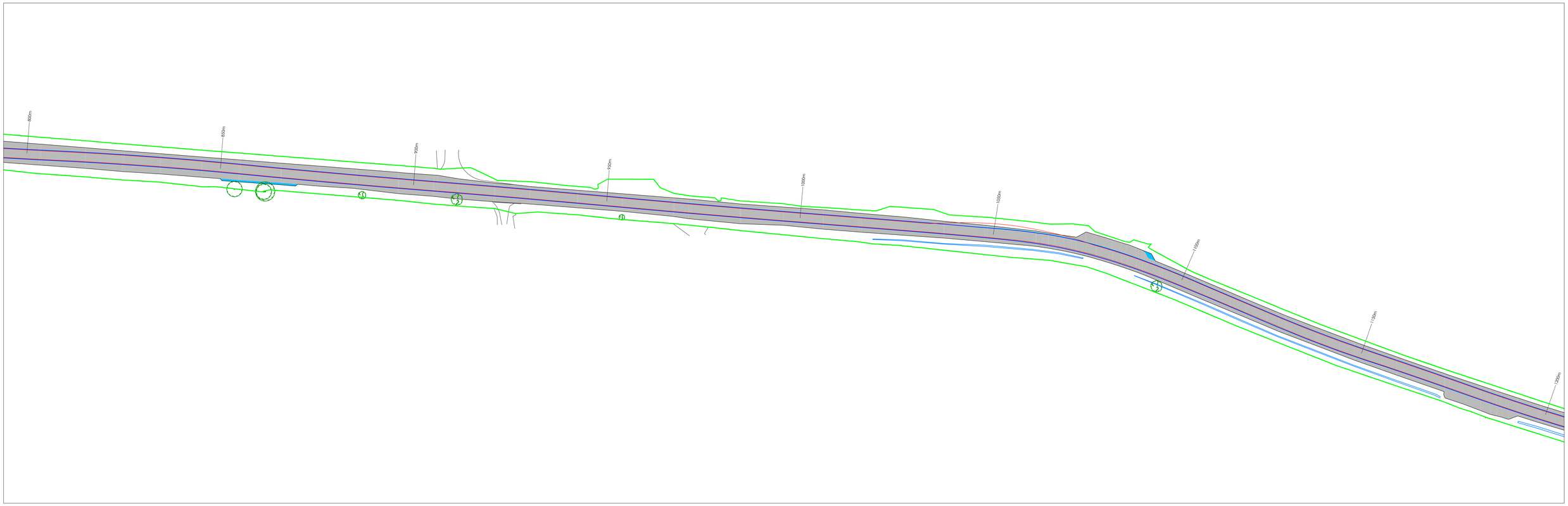
Pencloe Wind Farm

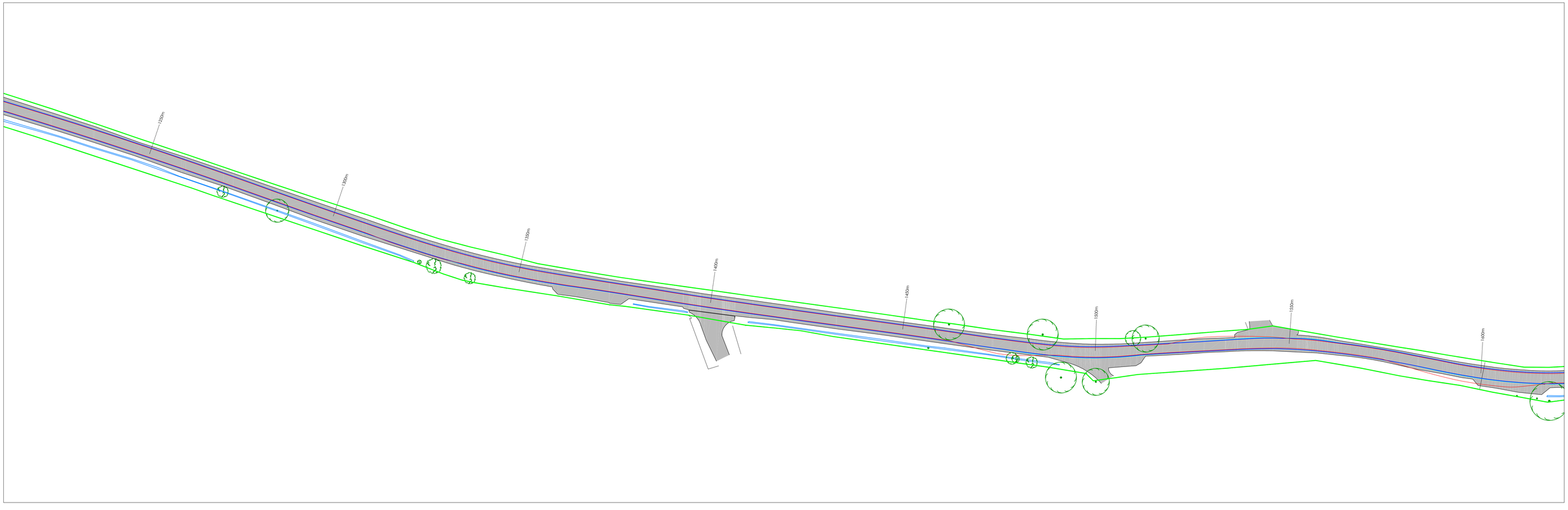
Swept Path Analysis - Sheet 1 of 5
Wind Turbine Component Transporter with 67m Blade raised up by 59 degrees on Afton Road

Pencloe Wind Energy Ltd

Drawing Number:	Scale:	
TP442/SK/301A	1:500 @ A1	
Drawn by: NW	Date: Mar 2019	Checked by: IL

TRANSPORT PLANNING





Based on topographical survey carried out in August 2017
(after construction of improvements associated with Afton Wind Farm)

KEY

- Line of Wheels
- Line of Trailer
- Line of Turbine Blade
- Extent of Adopted Road

Pencloe Wind Farm

Swept Path Analysis - Sheet 2 of 5
Wind Turbine Component Transporter with 67m Blade raised up by 59 degrees on Afton Road

Pencloe Wind Energy Ltd

Drawing Number:	Scale:	
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Drawn by: NW	Date: Mar 2019	Checked by: IL

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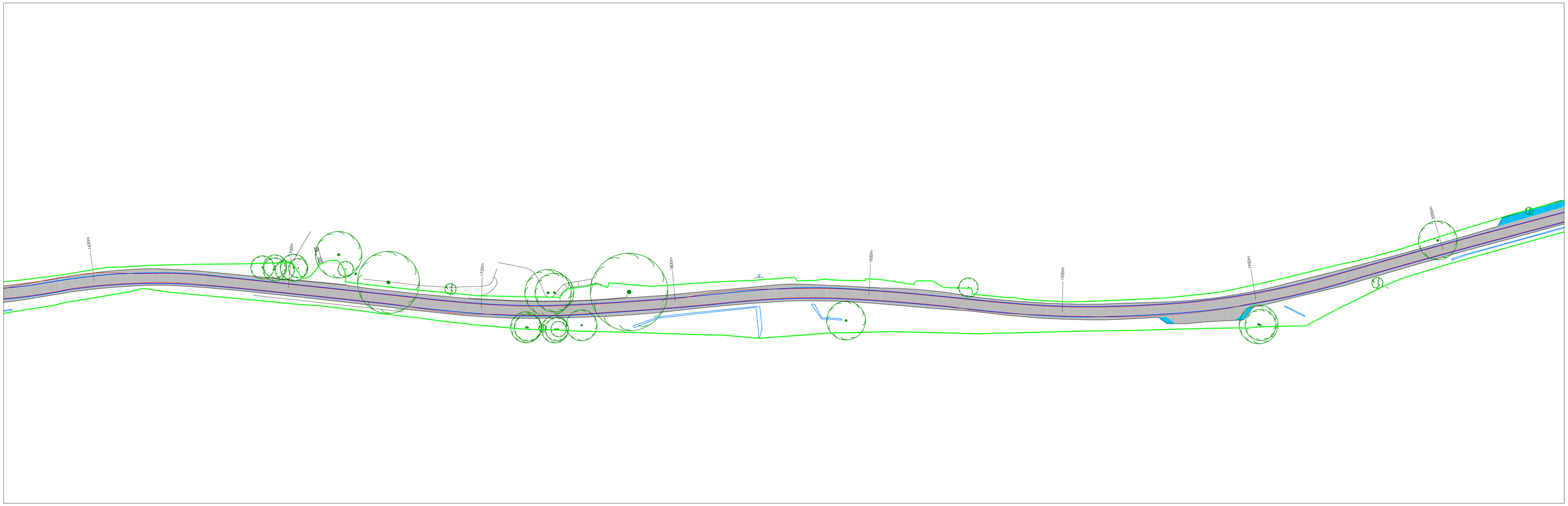
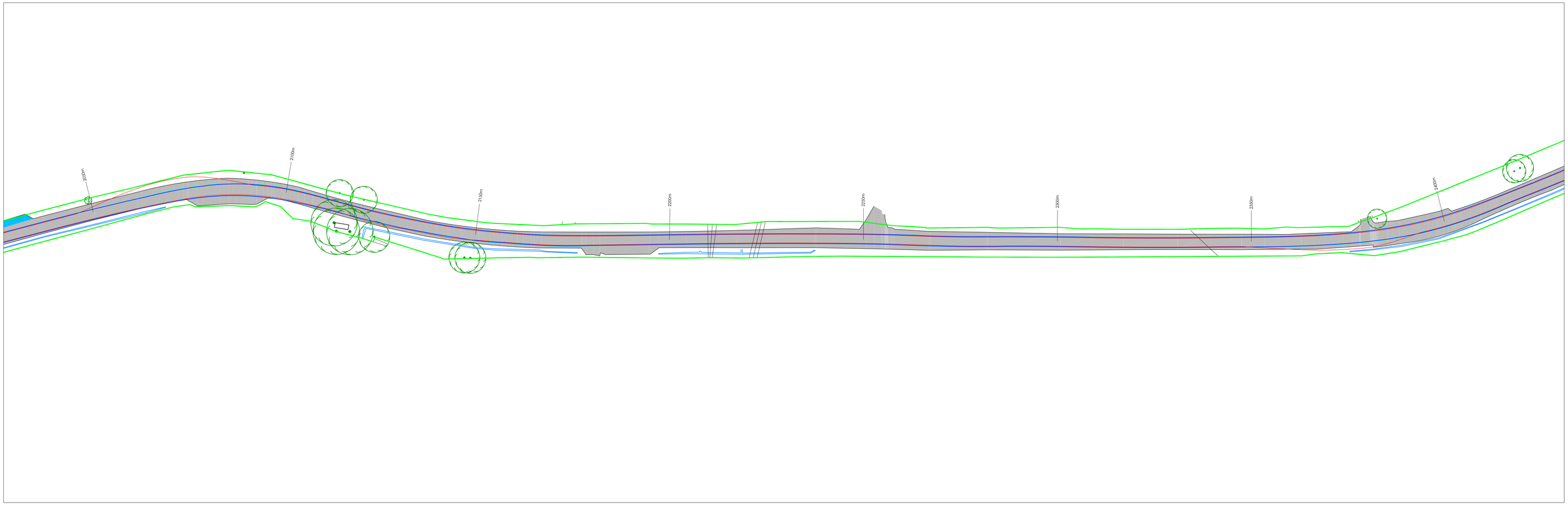




Based on topographical survey carried out in August 2017
(after construction of improvements associated with Afton Wind Farm)

KEY
- Line of Wheels
- Line of Trailer
- Line of Turbine Blade
- Extent of Adopted Road

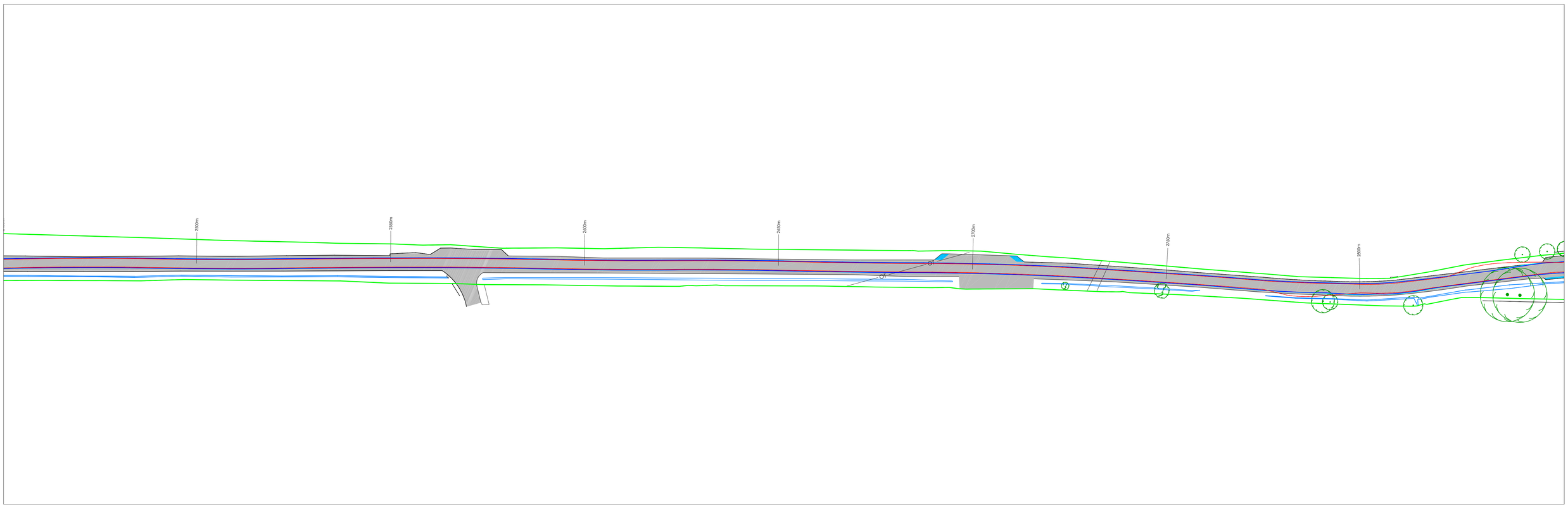
Pencloe Wind Farm

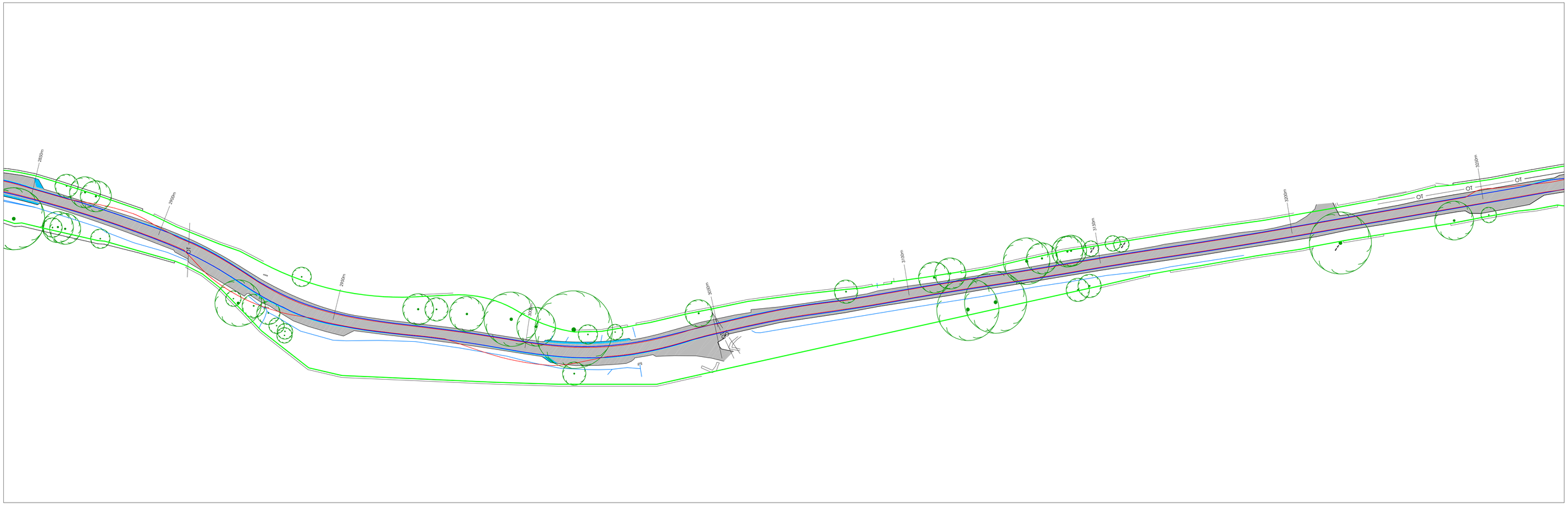
Swept Path Analysis - Sheet 3 of 5
Wind Turbine Component Transporter with 67m Blade raised up by 59 degrees on Afton Road

Pencloe Wind Energy Ltd

Drawing Number:	Scale:
TP442/SK/303A	1:500 @ A1
Drawn by: NW	Date: Mar 2019
Checked by: IL	

TRANSPORT PLANNING





Based on topographical survey carried out in August 2017
(after construction of improvements associated with Afton Wind Farm)

KEY

- Line of Wheels
- Line of Trailer
- Line of Turbine Blade
- Extent of Adopted Road

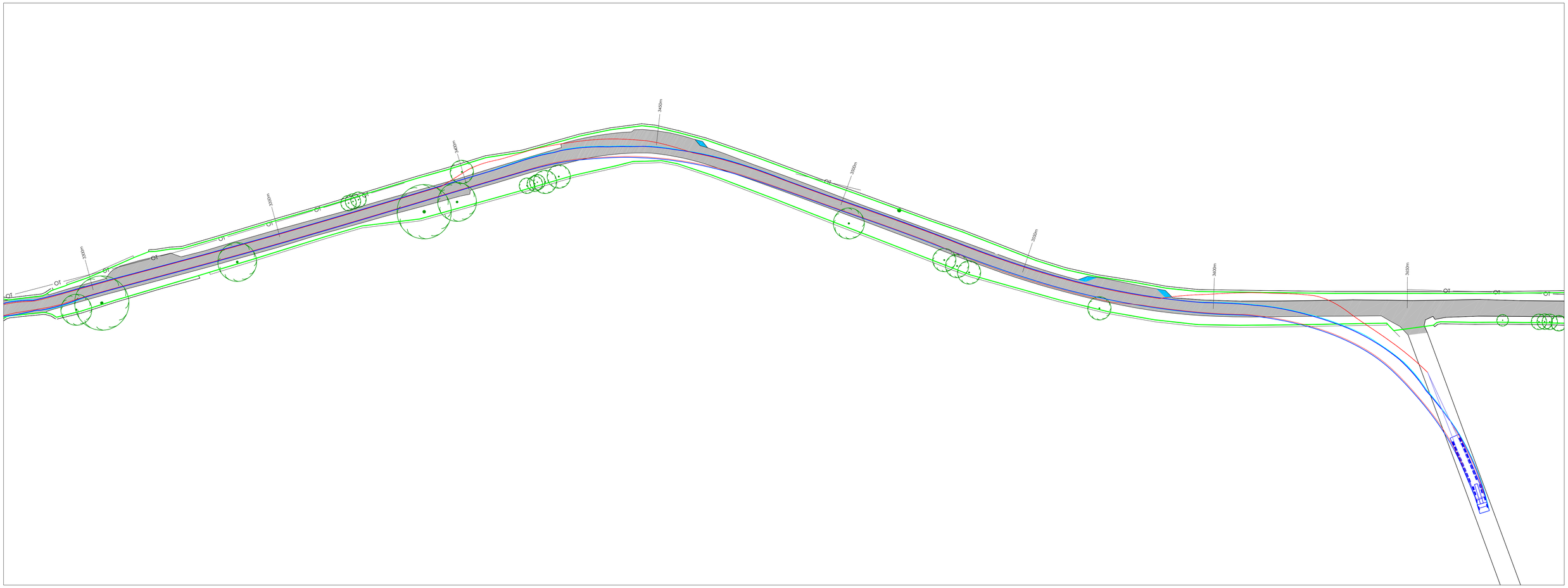
Pencloe Wind Farm

Swept Path Analysis - Sheet 4 of 5
Wind Turbine Component Transporter with 67m Blade raised up by 59 degrees on Afton Road

Pencloe Wind Energy Ltd

Drawing Number:	Scale:
TP442/SK/304A	1:500 @ A1
Drawn by: NW	Date: Mar 2019
	Checked by: IL

TRANSPORT PLANNING



Based on topographical survey carried out in August 2017
(after construction of improvements associated with Afton Wind Farm)

KEY
- Line of Wheels
- Line of Trailer
- Line of Turbine Blade
- Extent of Adopted Road

Pencloe Wind Farm

Swept Path Analysis - Sheet 5 of 5
Wind Turbine Component Transporter with 67m Blade raised up by 59 degrees on Afton Road

Pencloe Wind Energy Ltd

Drawing Number:	Scale:
TP442/SK/305A	1:500 @ A1
Drawn by: NW	Date: Mar 2019
Checked by: IL	

TRANSPORT PLANNING

ANNEX D

NETWORK RAIL EMAIL

Iain Lamb

From: Davies Andrew <Andrew.Davies3@networkrail.co.uk>
Sent: 29 March 2019 11:33
To: Iain Lamb
Cc: Alex Sneddon; Little Robert
Subject: RE: NR question

Hi Iain

Thank you for the email and information below and the answer to your query is yes we have facilitated similar requests. Having checked with my Asset Protection colleagues they have advised there is not enough detail to allow them to fully assess the proposal, however, on the basis of what you have provided they would say as a minimum that they would not allow anything to cross over the structure which would have the potential to breach the bridge parapets and/or oversail our airspace except under a full blockade of the line to rail traffic (i.e. possession of the lines/s) which would need to be pre-arranged with Network Rail and facilitated under the terms and conditions of a Basic Asset Protection Agreement and as such you should make contact with the Asset Protection Team to discuss the project and allow them to assess the interfaces with the operational railway and infrastructure and they can then advise accordingly.

Whilst The Railway have no responsibility for the structure itself, this is a Transport Scotland structure, we will be interested in receiving the additional detail, in addition to the indicative swept path provided, in respect of the type of vehicles, including axle/ combined weights and volumes of the traffic which will require to utilise this bridge as a consequence of this project in order to assess the implications regarding railway operations and they would also anticipate that some elements are likely to be considered as abnormal loads under Road Vehicles (Construction & Use) Legislation and will need to go through the required Transport Scotland/ Police notification process which Network Rail are also consultees via our abnormal loads team in Milton Keynes.

If you would decide to go ahead with your proposal route and use bridge 161/182, including oversailing the operational railway, as well as the above the request would require to go our Clearance process before an Oversailing Agreement can be formalised.

I trust the above helps, please let me know if I can be of any assistance.

Kind regards

Andy

Property NetworkRail

Andy Davies
Technical Surveyor
Property Services
151/155 St Vincent Street
Glasgow
G2 5NW
Mobile: 07734 649165
Email: Andrew.davies3@networkrail.co.uk

From: Iain Lamb <Iain@TranPlanWorld.co.uk>
Sent: 29 March 2019 08:02
To: Davies Andrew <Andrew.Davies3@networkrail.co.uk>
Cc: Alex Sneddon <Alex@tranplanworld.co.uk>
Subject: RE: NR question

Hi Andrew

The bridge in question is in this map link (https://www.google.co.uk/maps/@55.4021342,-4.1821144,110m/data=!3m1!1e3?hl=en) and it carries the A76 over the railway line at New Cumnock, immediately to the east of New Cumnock station. The turbine blade will extend over the rear of the transport vehicle, as shown in the example below. The vehicle transporting the turbine blades will travel from north to south over the bridge and the rear of the blade will oversail the railway line, as shown in the attached drawing (the red line shows the swept path of the rear of the blade). As my colleague Alex asks below, is this something NR have dealt with before and if so, how do you deal with it?

I hope that the above and attached are clear enough, but please don't hesitate to contact me should you wish to discuss matters further.

Regards

Iain

Iain Lamb
Transport Development Associate
Mob: 07813 213243
Tel: 0131 208 1267
Web: www.tranplanworld.co.uk

Transport Planning Limited
Forsyth House, 93 George Street, Edinburgh, EH2 3ES
Also at 4 West Philpstoun Steadings, Old Philpstoun, Linlithgow, EH49 7RY Tel: 01506 830893

Regd in Scotland No. SC379909 Regd office: Apex 2, 97 Haymarket Terrace, Edinburgh EH12 5HD

From: Alex Sneddon <Alex@tranplanworld.co.uk>
Sent: 28 March 2019 15:16
To: Davies Andrew <Andrew.Davies3@networkrail.co.uk>
Cc: Iain Lamb <Iain@TranPlanWorld.co.uk>
Subject: RE: NR question

Hi Andrew – thanks for getting back – by copy of this ill ask my colleague Iain to respond.

Alex.

From: Davies Andrew <Andrew.Davies3@networkrail.co.uk>
Sent: 28 March 2019 14:54
To: Alex Sneddon <Alex@tranplanworld.co.uk>
Subject: FW: NR question

Good afternoon Mr Sneddon

Robert has asked me to contact you re your query for oversailing a bridge parapet at Cumnock.

Can you please forward on some further information for your project and the bridge number that you are looking to oversail?

Kind regards

Andy

Andy Davies
Technical Surveyor
Property Services
151/155 St Vincent Street
Glasgow
G2 5NW
Mobile: 07734 649165
Email: Andrew.davies3@networkrail.co.uk

From: Alex Sneddon <Alex@tranplanworld.co.uk>
Sent: 15 March 2019 15:31
To: Little Robert <Robert.LITTLE@networkrail.co.uk>
Subject: NR question

Robert

You may (or may not!) recall we met as part of the Winchburgh project.

We have a query for NR but do not know who to direct it to and I wonder if you could help by forwarding this accordingly.

We have been carrying out some vehicle tracking for wind farm components that would cross the line close to Cumnock – where the blade components cross the railway, the tip of the wind turbine blade would oversail a bridge parapet and live rail.

Before we look at alternative routings, is this something NR have dealt with before and if so, how do you deal with it??

Many thanks

Alex.

Alex Sneddon
Director
Mob: 07837 563313
Tel: 0131 208 1267
Web: www.tranplanworld.co.uk

Transport Planning Limited
Forsyth House, 93 George Street, Edinburgh, EH2 3ES
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Regd in Scotland No. SC379909 Regd office: Apex 2, 97 Haymarket Terrace, Edinburgh EH12 5HD

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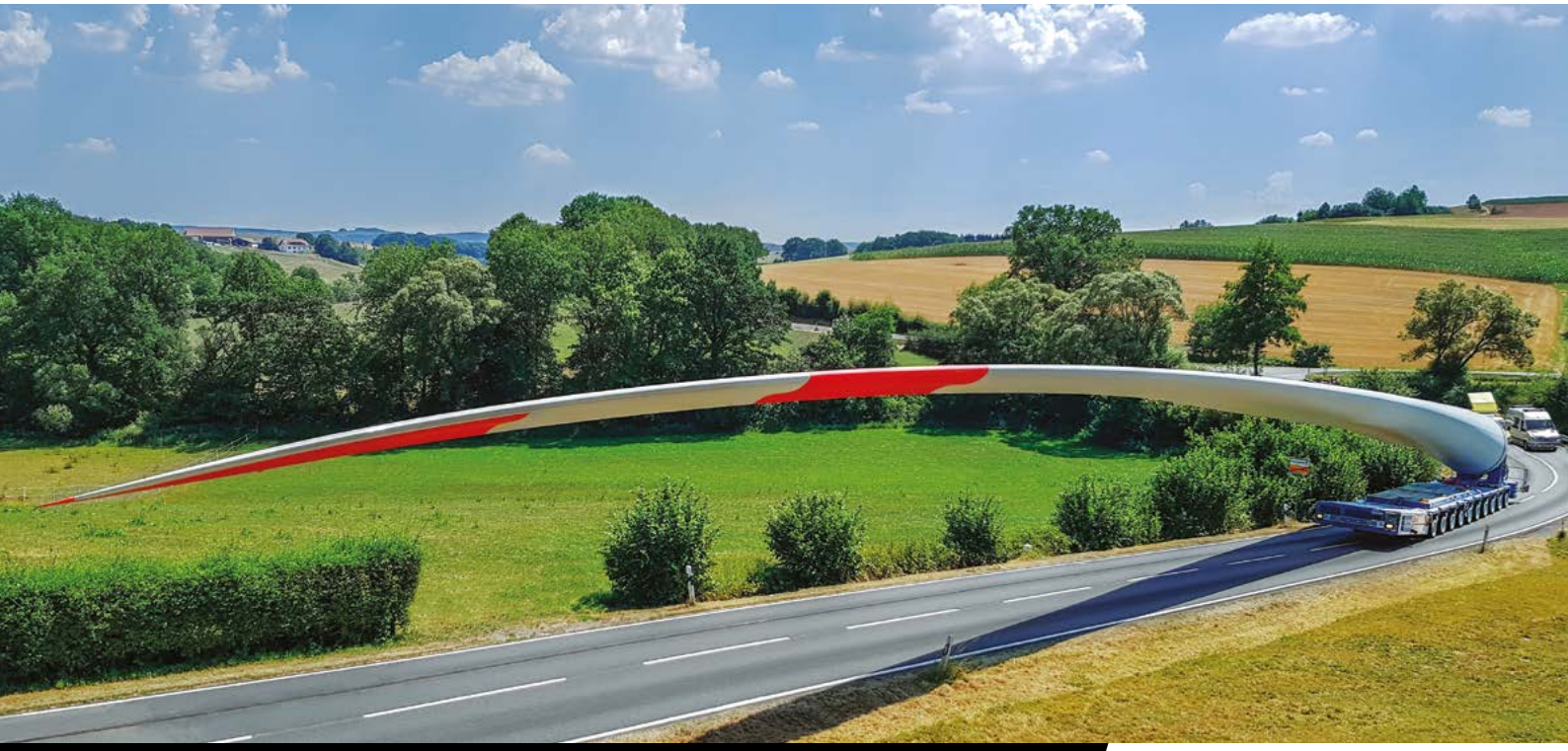
ANNEX E

FTV300/500 DETAILS

» PRODUCT BROCHURE

Goldhofer



FTV 300
FTV 500

SPECIAL APPLICATIONS

NEW!
FTV 550
EVEN MORE CAPACITY!

MADE FOR YOUR MISSION

ROTOR BLADES TRANSPORTING THEM SAFELY

The number of onshore and offshore wind farms for harvesting energy has been constantly increasing worldwide for many years. The installed capacity gained from wind energy doubled just between 2011 and 2016 around the world from 250 to 500 Gigawatts. In order to reach the increasingly powerful wind turbines, it is often necessary to cross narrow bends or pass through developed areas. Our blade-carrying transport devices, which can be combined with towed or driven heavy-duty modules, enable easy and economical transport to the construction sites – irrespective of how narrow it gets.

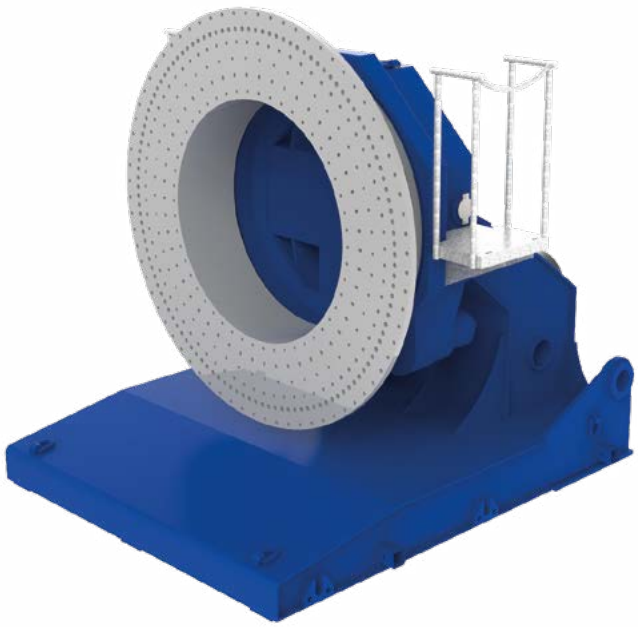
MANEUVERABLE AND FLEXIBLE 04

The FTV 300 comes into its own on mostly narrow route sections where conventional transport solutions quickly reach their limitations. With an alignment angle of up to 60°, even difficult passages can be effortlessly overcome and the rotor blades can thereby reach their planned destination safely and efficiently.

SAFE AND TRIED AND TESTED HUNDREDS OF TIMES 06

Goldhofer's FTV 500 takes the progressive development of wind turbines into account. The FTV 500 is able to accommodate even the largest rotor blades. The ingenious FTV 500 has already proven itself hundreds of times in practical situations for the transport of the latest rotor blade generations and easily masters them.

FTV 300
MANEUVERABLE AND FLEXIBLE



YOUR BENEFITS

- ✔ Ballast weights to compensate for different blade weights
- » Cost effective transport solution for all customary rotor blades

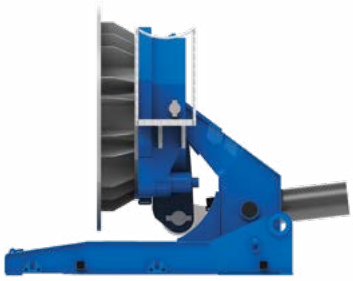
- ✔ Interchangeable rotor blade adaptor
- » Extendable and adjustable for future hole-pattern variants

- ✔ Possible utilization as self-driven and towed modular chassis
- » Efficient in action

TECHNICAL FEATURES

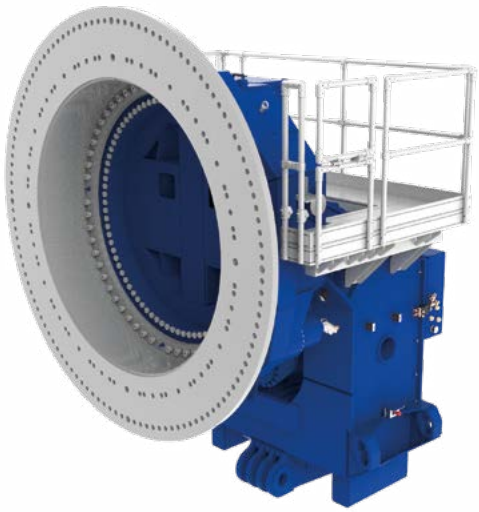
+	Alignment angle maximum	60°
+	Pitch angle	endless
+	Maximum rotor blade diameter	2,800 mm
+	Dead weight	12.6 t
+	Ballast weight	14 t
+	Lifting torque	300 mt

TRANSPORT ON THE VOLCANO
An order for seven Vestas V 112 wind turbines in Guatemala meant that the FTV 300 had to handle a serpentine-strewn, narrow mountain road lined with rocky outcrops and trees with inclines of up to 18% as well as declines of up to 13%.



NEW!
FTV 550
EVEN MORE CAPACITY!

FTV 500
SAFE AND TRIED AND TESTED HUNDREDS OF TIMES



YOUR BENEFITS

- ✔ Display for essential application parameters
- » Safe and reliable operating concept

- ✔ Installed between the modular chassis to reduce the total height
- » Very low centre of gravity for increased safety

- ✔ Closed in working platform
- » Safety at work when attaching the blades

TECHNICAL FEATURES

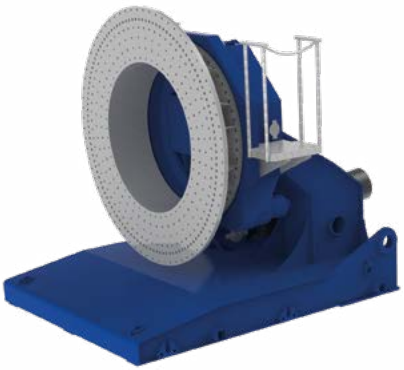
+	Alignment angle maximum	60°
+	Pitch angle	endless
+	Maximum rotor blade diameter	3,400 mm
+	Dead weight	15.7 t
+	Ballast weight	18 t
+	Lifting torque	500 mt

CHALLENGE ACCEPTED
The route for a total of nine rotor blades included a distance of 8 km, passing through villages, corners and bends underneath high-voltage cables and was one of the first transports with the FTV 500 in Germany.

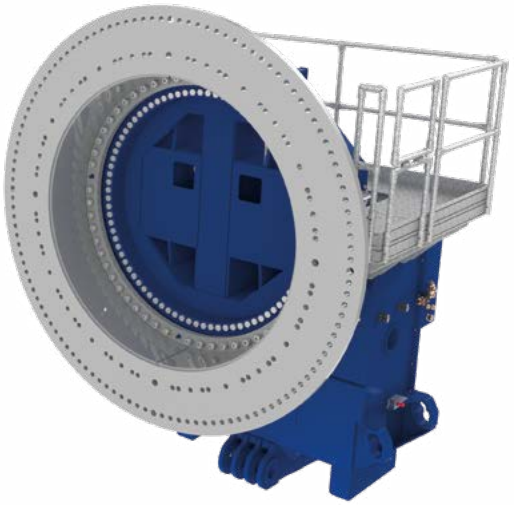
Goldhofer

FTV 300 | FTV 500
TECHNICAL DATA

	FTV 300	FTV 500
TECHNICAL DATA		
Dead weight	12.6 t	15.7 t
Ballast weight	14 t	18 t
Lifting torque	300 mt	500 mt
Alignment angle	60°	60°
Pitch angle	Limitless	Limitless
ACCESSORIES	+ Wind measuring on the blade tip + Remote radio control with axle pressure indicator and wind indicator + Safety terrain for safe work on the adaptor + Access ladder	
ROTOR BLADE ADAPTOR	+ FTV 300, dead weight 2.4 t for diameter up to 2,800 mm + FTV 500, dead weight 2.6 t for diameter up to 3,400 mm	



FTV 300



FTV 500

04/2019-EN We reserve the right to make design alterations and changes in the sense of technical progress and on the basis of statutory regulations. Technical data in loaded vehicle condition.

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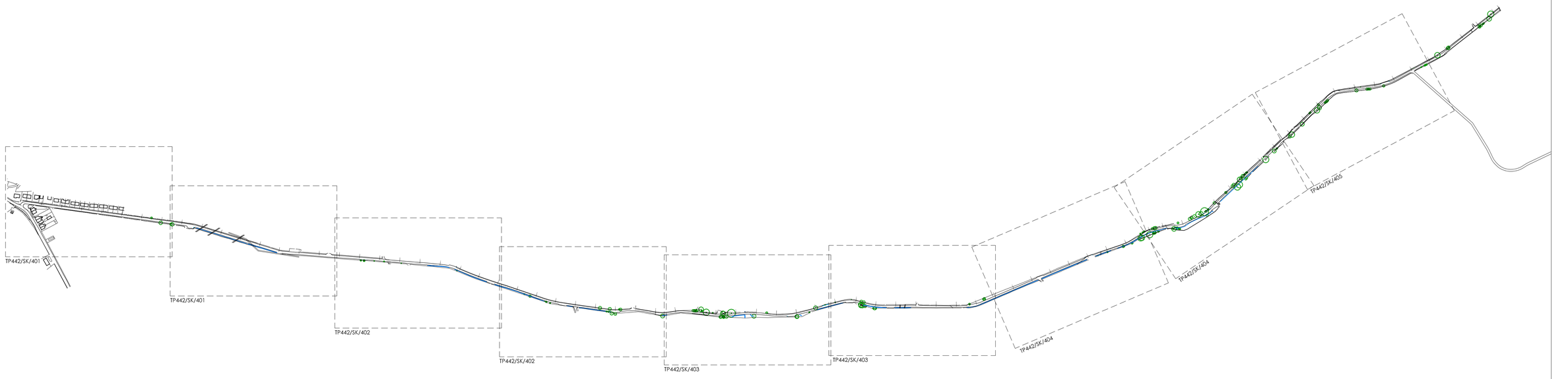
Web: www.flitelineusa.com, E-Mail: info@flitelineusa.com

SERVICES AND SPARE PARTS
Telephone: +49 8331 15-400, Fax: +49 8331 15-247
Emergency Hotline: +49 172 837 61 65
E-Mail: service-transporttechnology@goldhofer.com

MADE FOR YOUR MISSION

ANNEX F

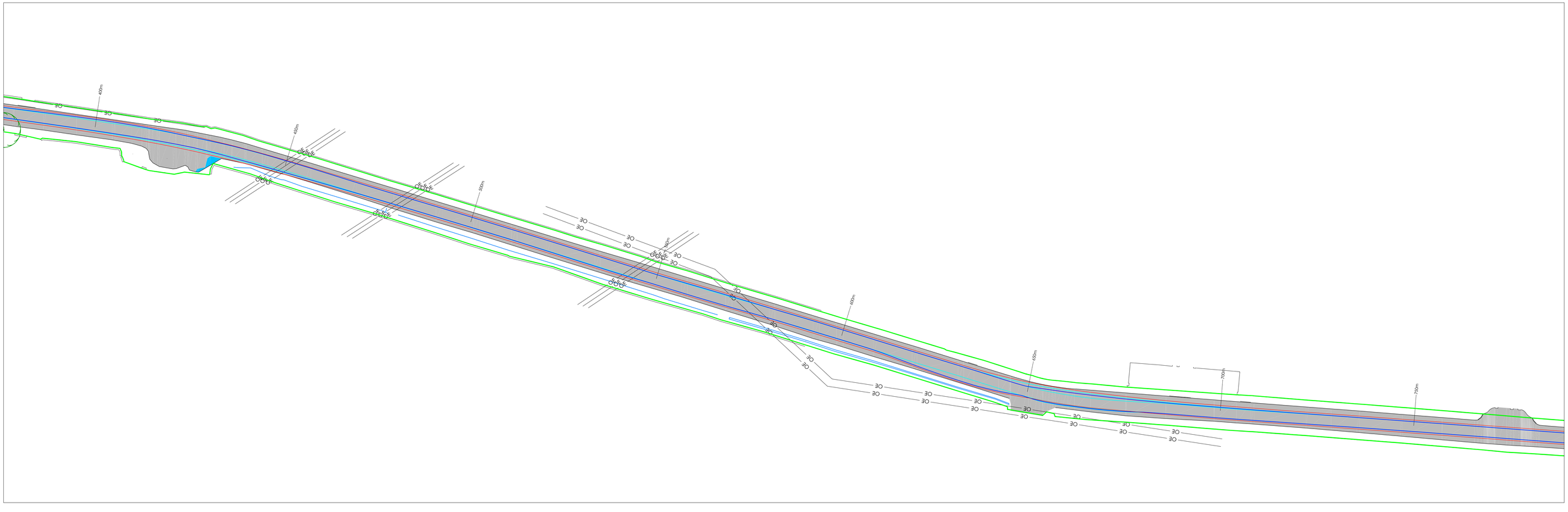
TOWER SWEPT PATH DRAWINGS ROUTE 1A



Based on topographical survey carried out in August 2017
(after construction of improvements associated with Afton Wind Farm)

Pencloe Wind Farm		Pencloe Wind Energy Ltd	
Swept Path Analysis - Key Plan Wind Turbine Component Transporter with 35m Tower Component on Afton Road	Drawing Number: TP442/SK/400		Scale: 1:5000 @ A1
	Drawn by: NW	Date: Apr 2019	Checked by: IL

TRANSPORT PLANNING



Based on topographical survey carried out in August 2017
(after construction of improvements associated with Afton Wind Farm)

KEY

- Line of Wheels
- Line of Trailer
- Line of Tower Component
- Extent of Adopted Road

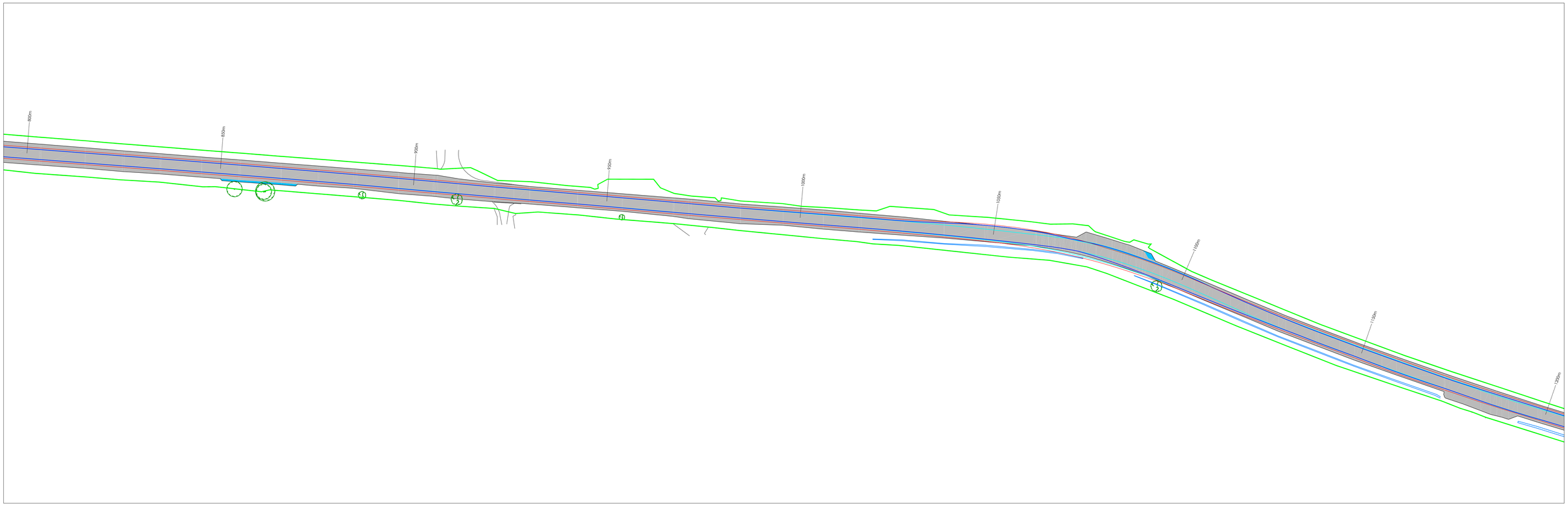
Pencloe Wind Farm

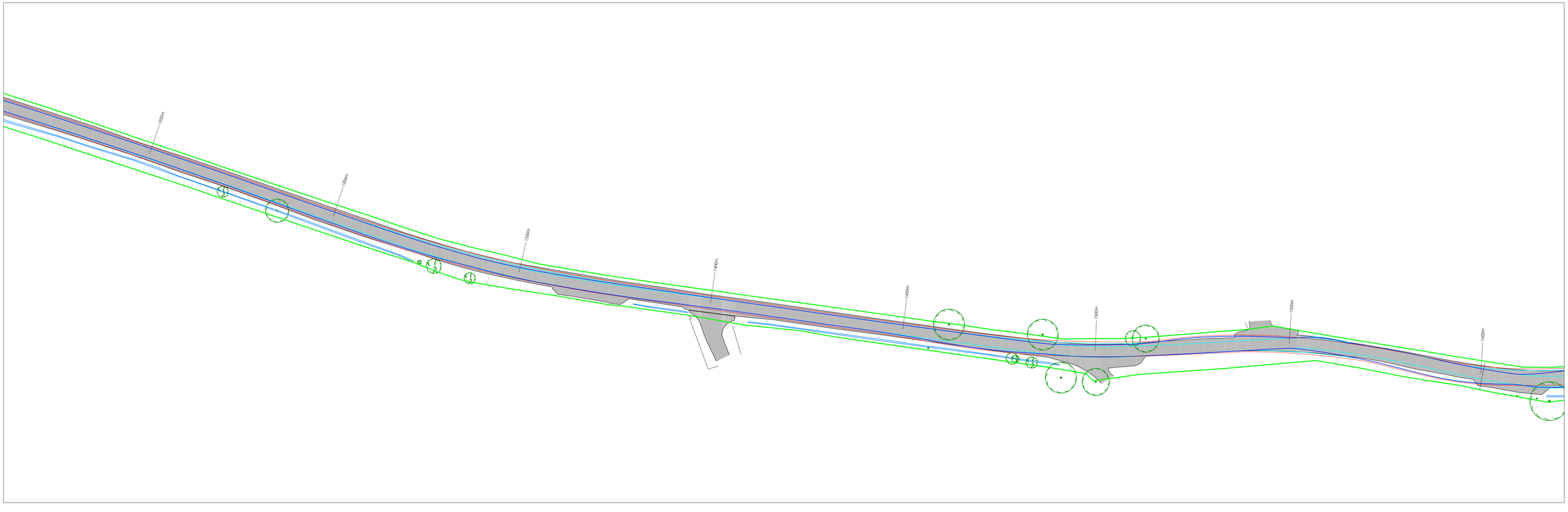
Swept Path Analysis - Sheet 1 of 5
Wind Turbine Component Transporter with 35m Tower Component on Afton Road

Pencloe Wind Energy Ltd

Drawing Number:	Scale:
TP442/SK/401	1:500 @ A1
Drawn by: NW	Date: Apr 2019
Checked by: IL	

TRANSPORT PLANNING





Based on topographical survey carried out in August 2017
(after construction of improvements associated with Afton Wind Farm)

KEY

- Line of Wheels
- Line of Trailer
- Line of Tower Component
- Extent of Adopted Road

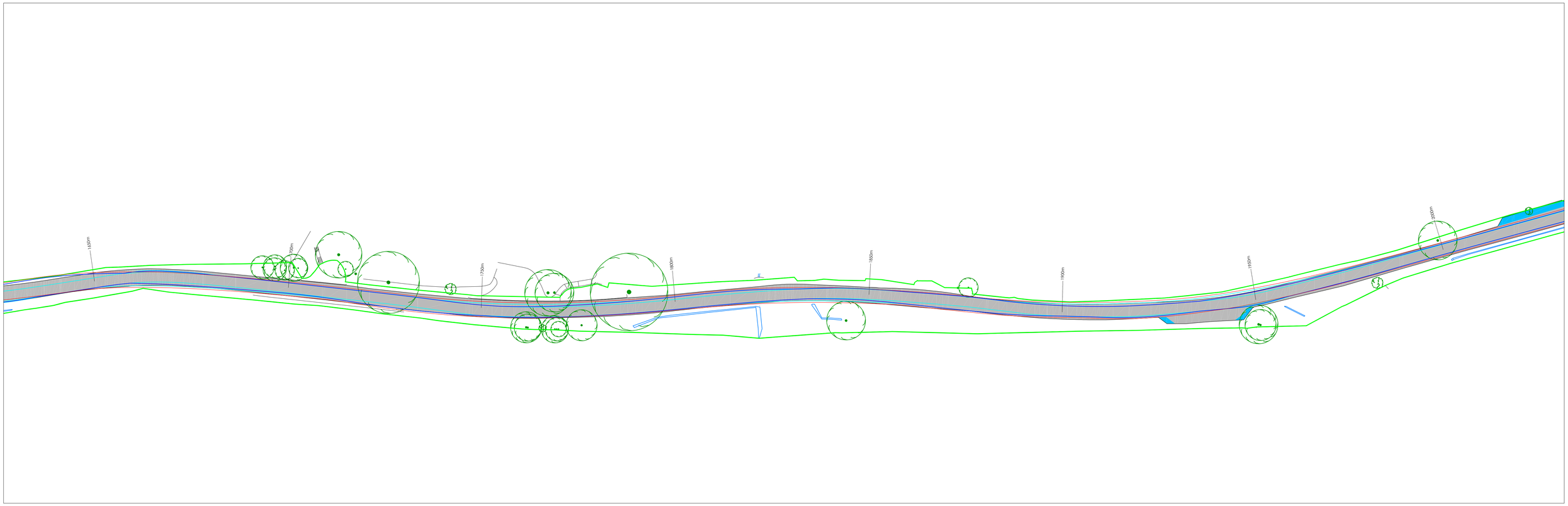
Pencloe Wind Farm

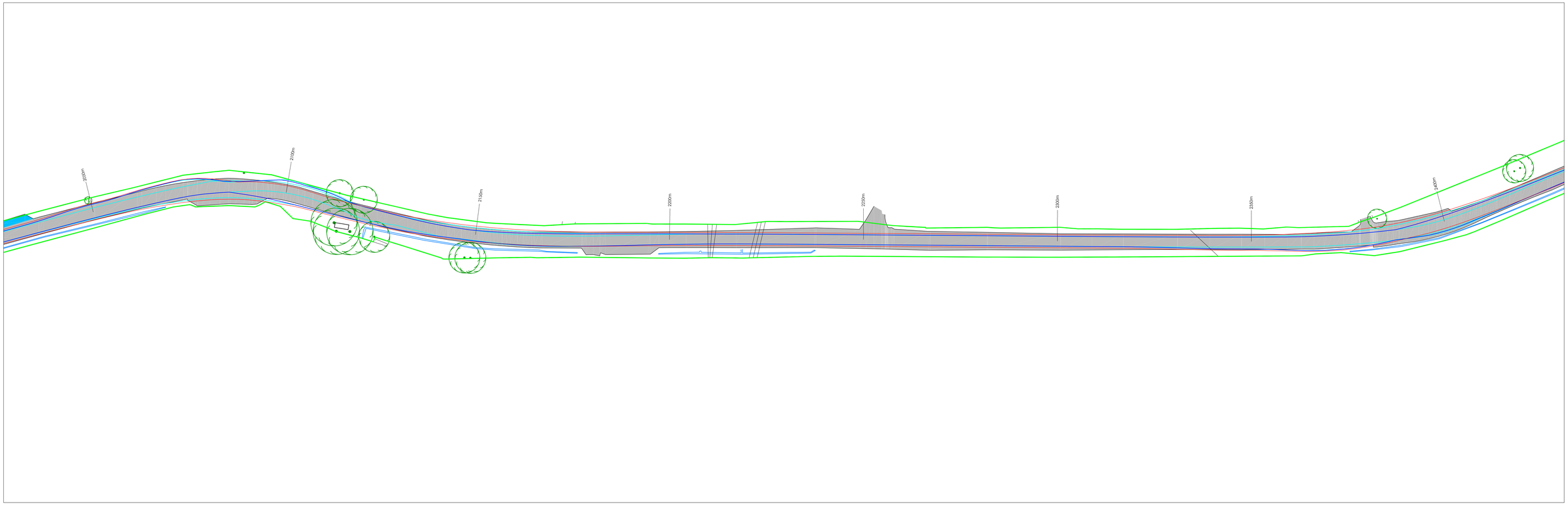
Swept Path Analysis - Sheet 2 of 5
Wind Turbine Component Transporter with 35m Tower Component on Afton Road

Pencloe Wind Energy Ltd

Drawing Number:	Scale:
TP442/SK/402	1:500 @ A1
Drawn by: NW	Date: Apr 2019
	Checked by: IL

TRANSPORT PLANNING





Based on topographical survey carried out in August 2017
(after construction of improvements associated with Afton Wind Farm)

KEY

- Line of Wheels
- Line of Trailer
- Line of Tower Component
- Extent of Adopted Road

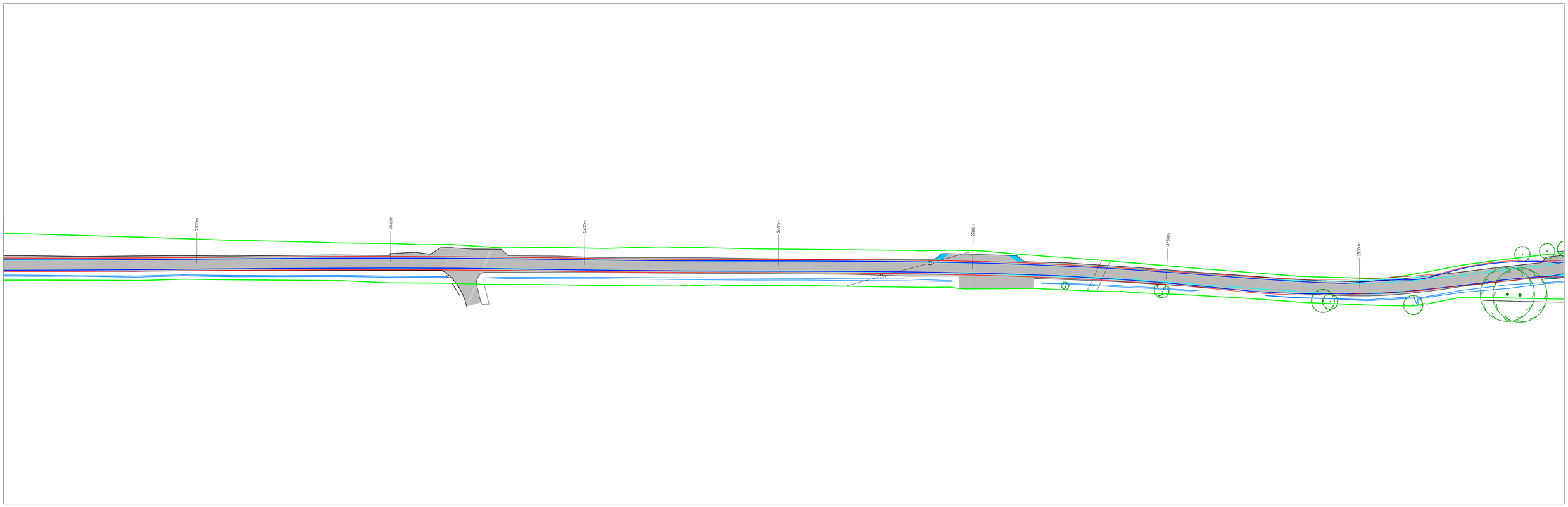
Pencloe Wind Farm

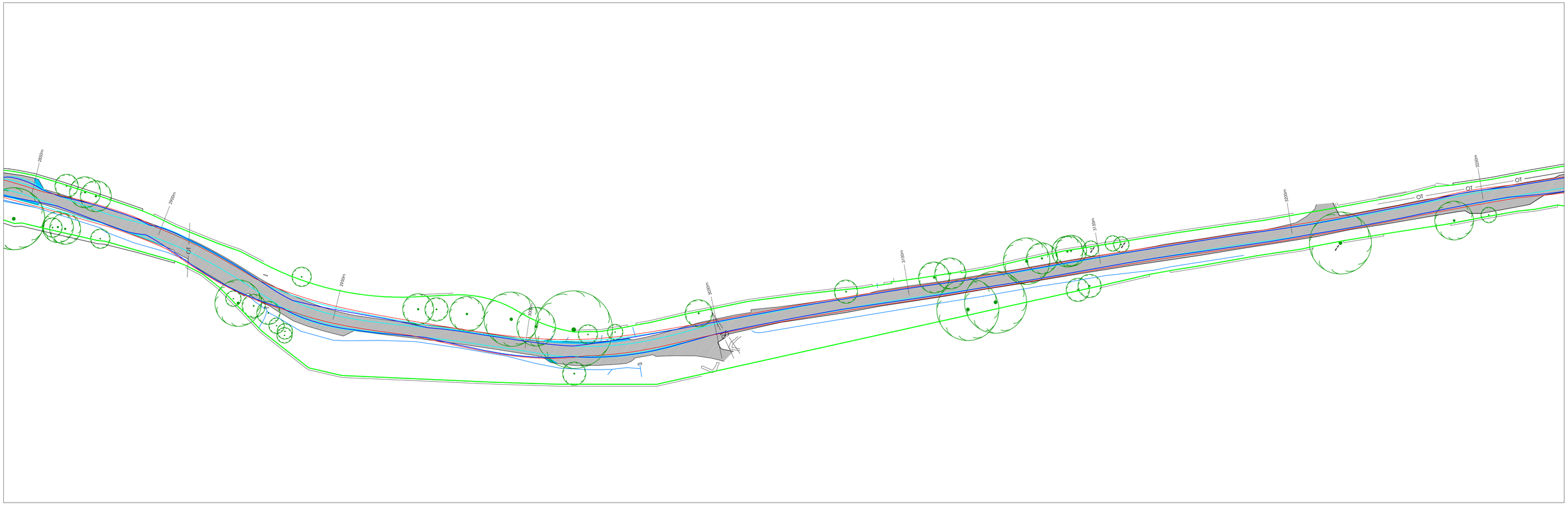
Swept Path Analysis - Sheet 3 of 5
Wind Turbine Component Transporter with 35m Tower Component on Afton Road

Pencloe Wind Energy Ltd

Drawing Number:	Scale:
TP442/SK/403	1:500 @ A1
Drawn by: NW	Date: Apr 2019
	Checked by: IL

TRANSPORT PLANNING





Based on topographical survey carried out in August 2017
(after construction of improvements associated with Afton Wind Farm)

KEY

- Line of Wheels
- Line of Trailer
- Line of Tower Component
- Extent of Adopted Road

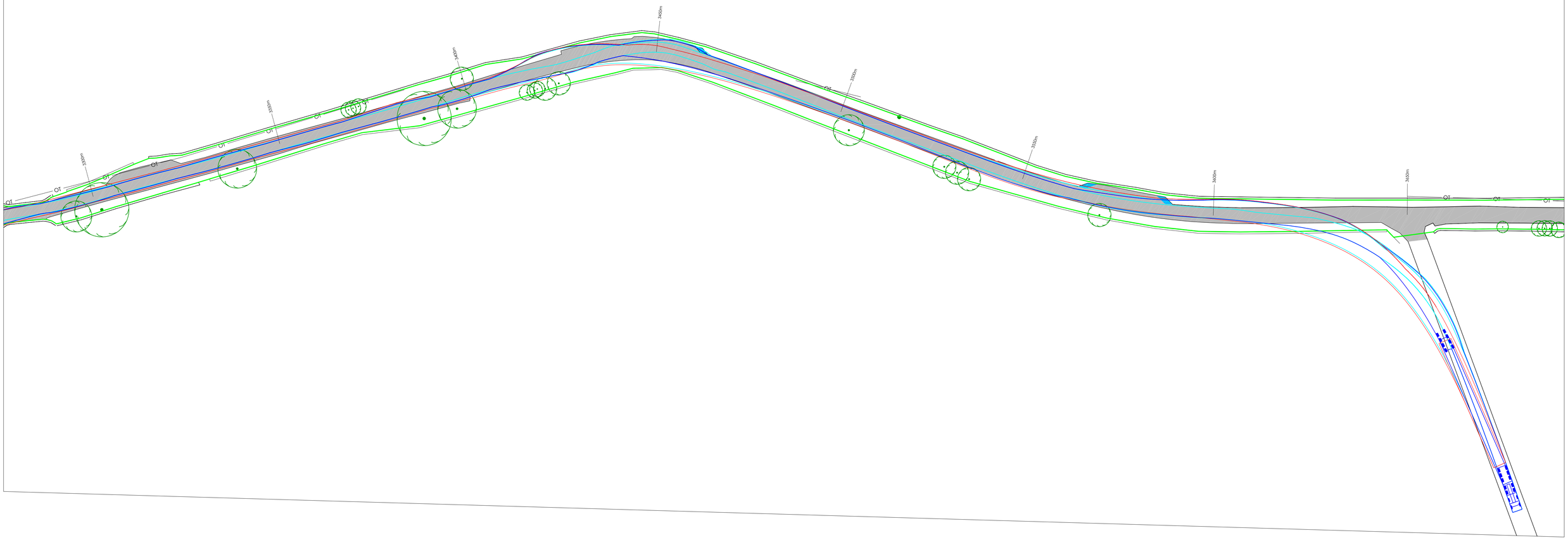
Pencloe Wind Farm

Swept Path Analysis - Sheet 4 of 5
Wind Turbine Component Transporter with 35m Tower Component on Afton Road

Pencloe Wind Energy Ltd

Drawing Number:		Scale:
TP442/SK/404		1:500 @ A1
Drawn by: NW	Date: Apr 2019	Checked by: IL

TRANSPORT PLANNING



Based on topographical survey carried out in August 2017
(after construction of improvements associated with Afton Wind Farm)

KEY
- Line of Wheels
- Line of Trailer
- Line of Tower Component
- Extent of Adopted Road

Pencloe Wind Farm

Swept Path Analysis - Sheet 5 of 5
Wind Turbine Component Transporter with 35m Tower Component on Afton Road

Pencloe Wind Energy Ltd

Drawing Number:	Scale:
TP442/SK/405	1:500 @ A1
Drawn by: NW / Date: Apr 2019	Checked by: IL

TRANSPORT PLANNING

ANNEX G

BLADE SWEPT PATH DRAWINGS ROUTE 1B

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KEY

- Line of Wheels
- Line of Trailer
- Line of Turbine Blade

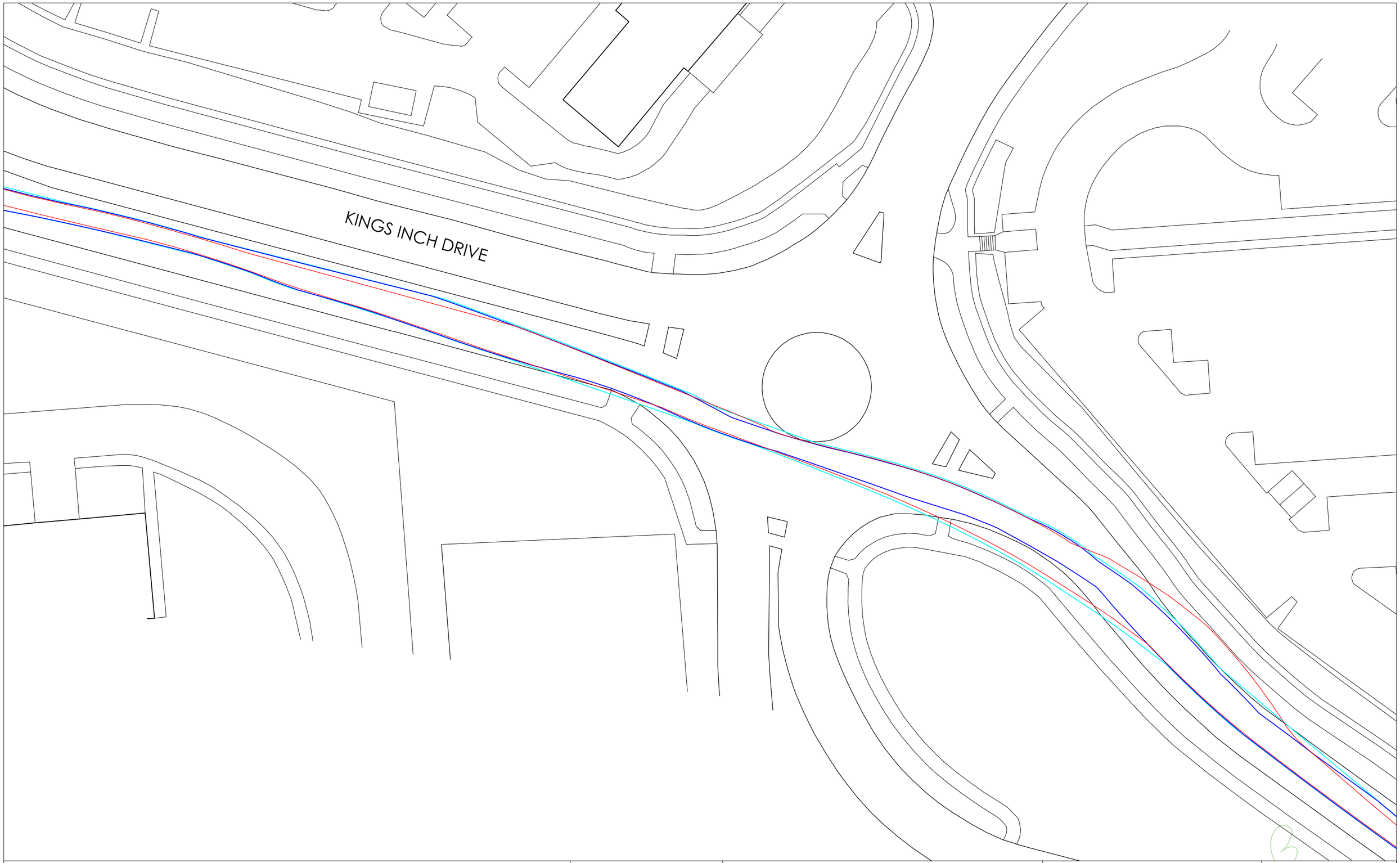
Pencloe Wind Farm

Swept Path Analysis - Wind Turbine Component Transporter with 67m Blade at Kings Inch Drive Roundabout 1 of 3

Pencloe Wind Energy Ltd

Drawing Number:	Scale:	
TP442/SK/601	1:500 @ A3	
Drawn by: NW	Date: May 2019	Checked by: IL

TRANSPORT PLANNING



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KEY

- Line of Wheels
- Line of Trailer
- Line of Turbine Blade

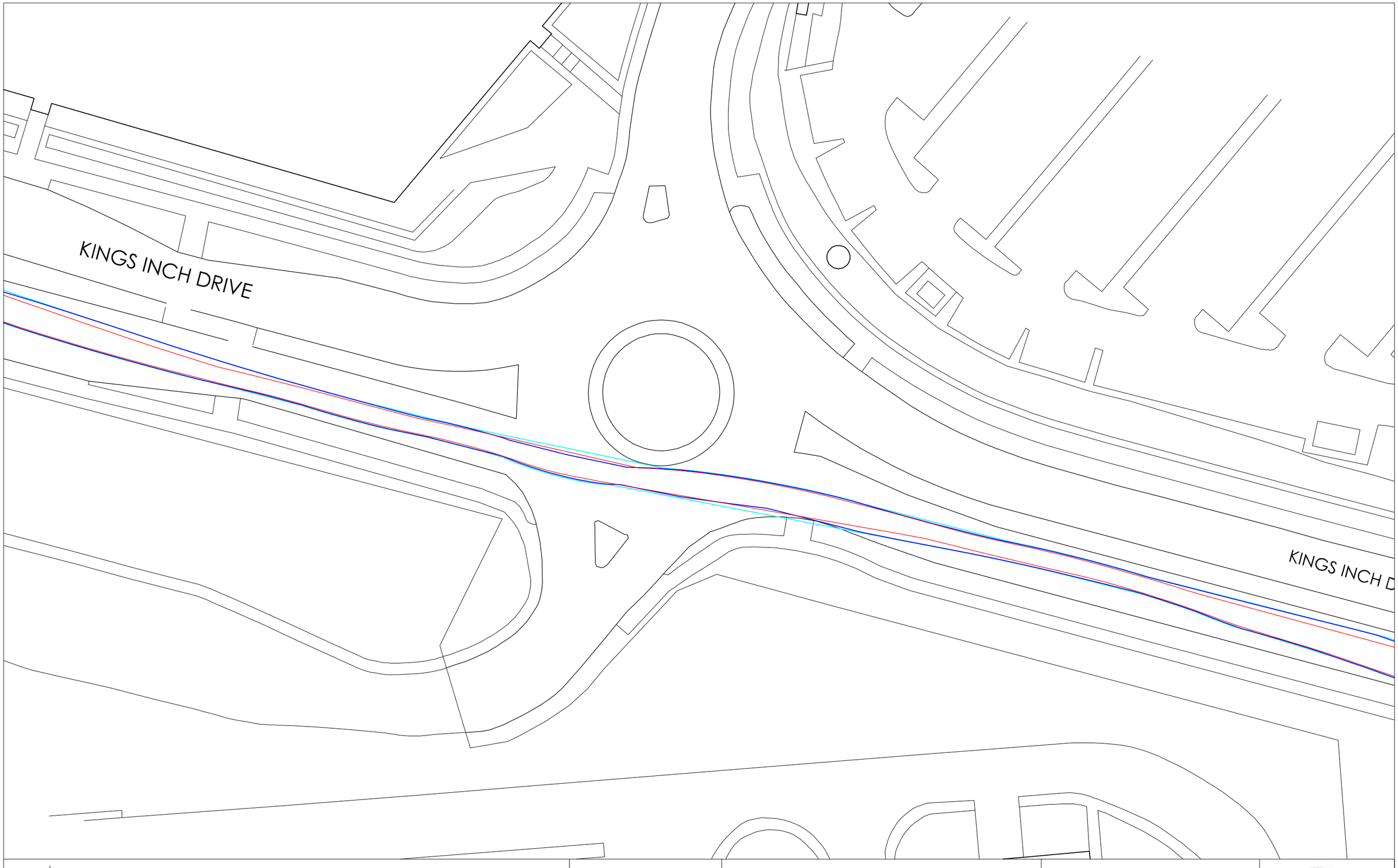
Pencloe Wind Farm

Swept Path Analysis - Wind Turbine Component Transporter with 67m Blade at Kings Inch Drive Roundabout 2 of 3

Pencloe Wind Energy Ltd

Drawing Number:	Scale:	
TP442/SK/602	1:500 @ A3	
Drawn by: NW	Date: May 2019	Checked by: IL

TRANSPORT PLANNING



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KEY

- Line of Wheels
- Line of Trailer
- Line of Turbine Blade

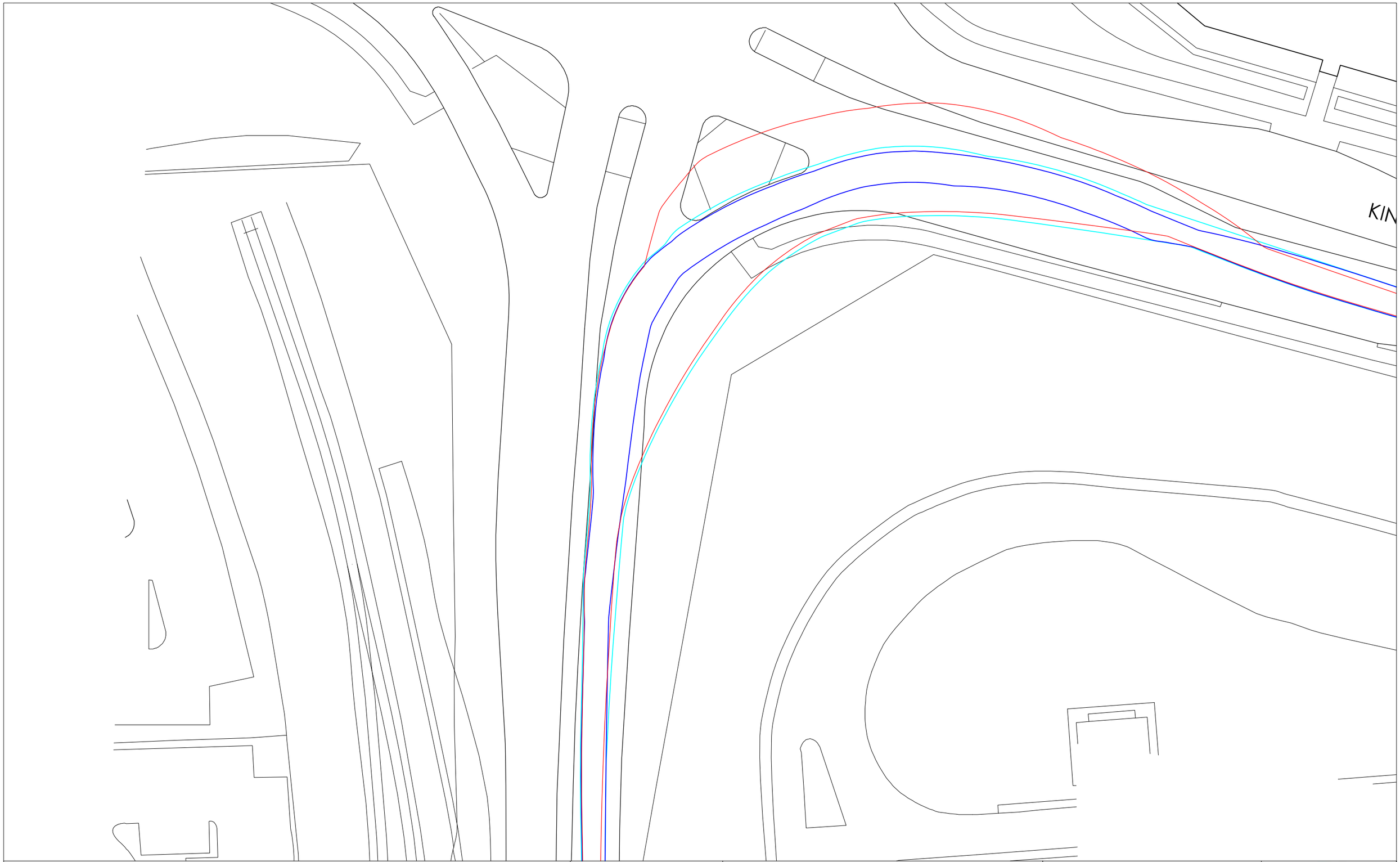
Pencloe Wind Farm

Swept Path Analysis - Wind Turbine Component Transporter with 67m Blade at Kings Inch Drive Roundabout 3 of 3

Pencloe Wind Energy Ltd

Drawing Number:	Scale:	
TP442/SK/603	1:500 @ A3	
Drawn by: NW	Date: May 2019	Checked by: IL

TRANSPORT PLANNING



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KEY

- Line of Wheels
- Line of Trailer
- Line of Turbine Blade

Pencloe Wind Farm

Swept Path Analysis - Wind Turbine Component Transporter with 67m Blade at Kings Inch Drive Signalised Junction

Pencloe Wind Energy Ltd

Drawing Number:	Scale:	
TP442/SK/604	1:500 @ A3	
Drawn by: NW	Date: May 2019	Checked by: IL

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KEY

- Line of Wheels
- Line of Trailer
- Line of Turbine Blade

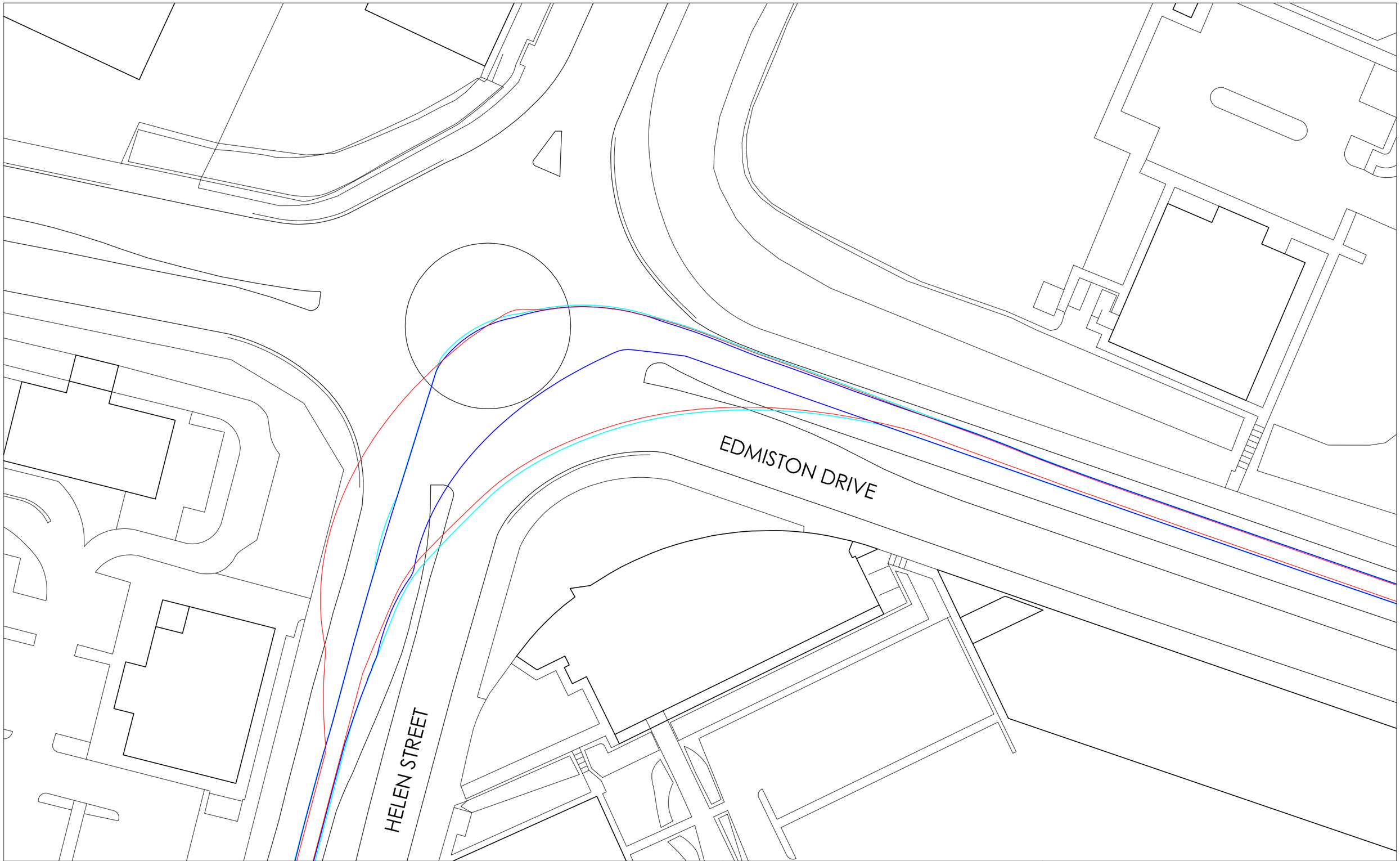
Pencloe Wind Farm

Swept Path Analysis - Wind Turbine Component Transporter with 67m Blade at M8 Slip / Helen Street Junction

Pencloe Wind Energy Ltd

Drawing Number:		Scale:
TP442/SK/605		1:500 @ A3
Drawn by: NW	Date: May 2019	Checked by: IL

TRANSPORT PLANNING



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KEY

- Line of Wheels
- Line of Trailer
- Line of Turbine Blade

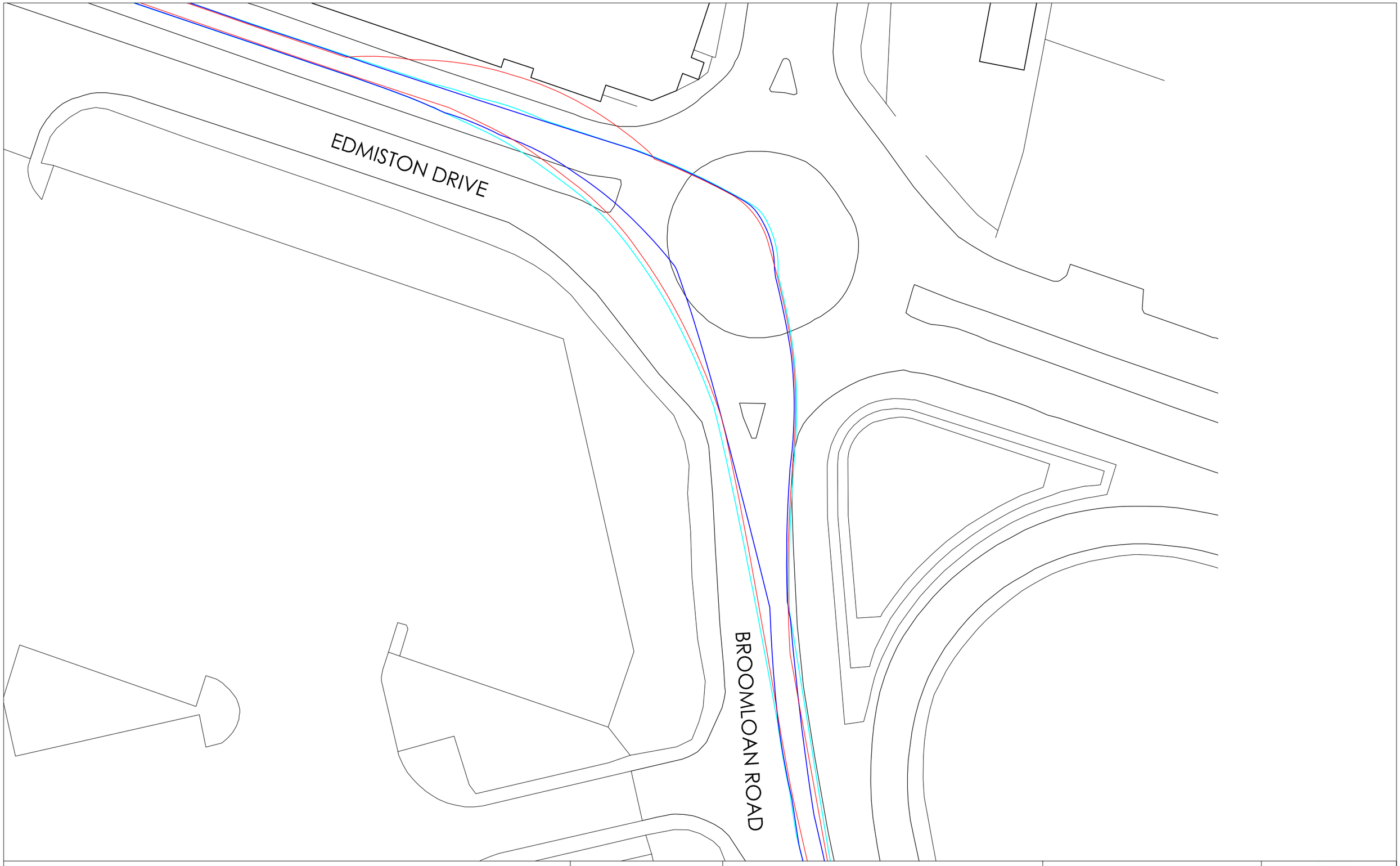
Pencloe Wind Farm

Swept Path Analysis - Wind Turbine Component Transporter with 67m Blade at Helen Street/ Edmiston Drive Roundabout

Pencloe Wind Energy Ltd

Drawing Number:	Scale:	
TP442/SK/606	1:500 @ A3	
Drawn by: NW	Date: May 2019	Checked by: IL

TRANSPORT PLANNING



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KEY

- Line of Wheels
- Line of Trailer
- Line of Turbine Blade

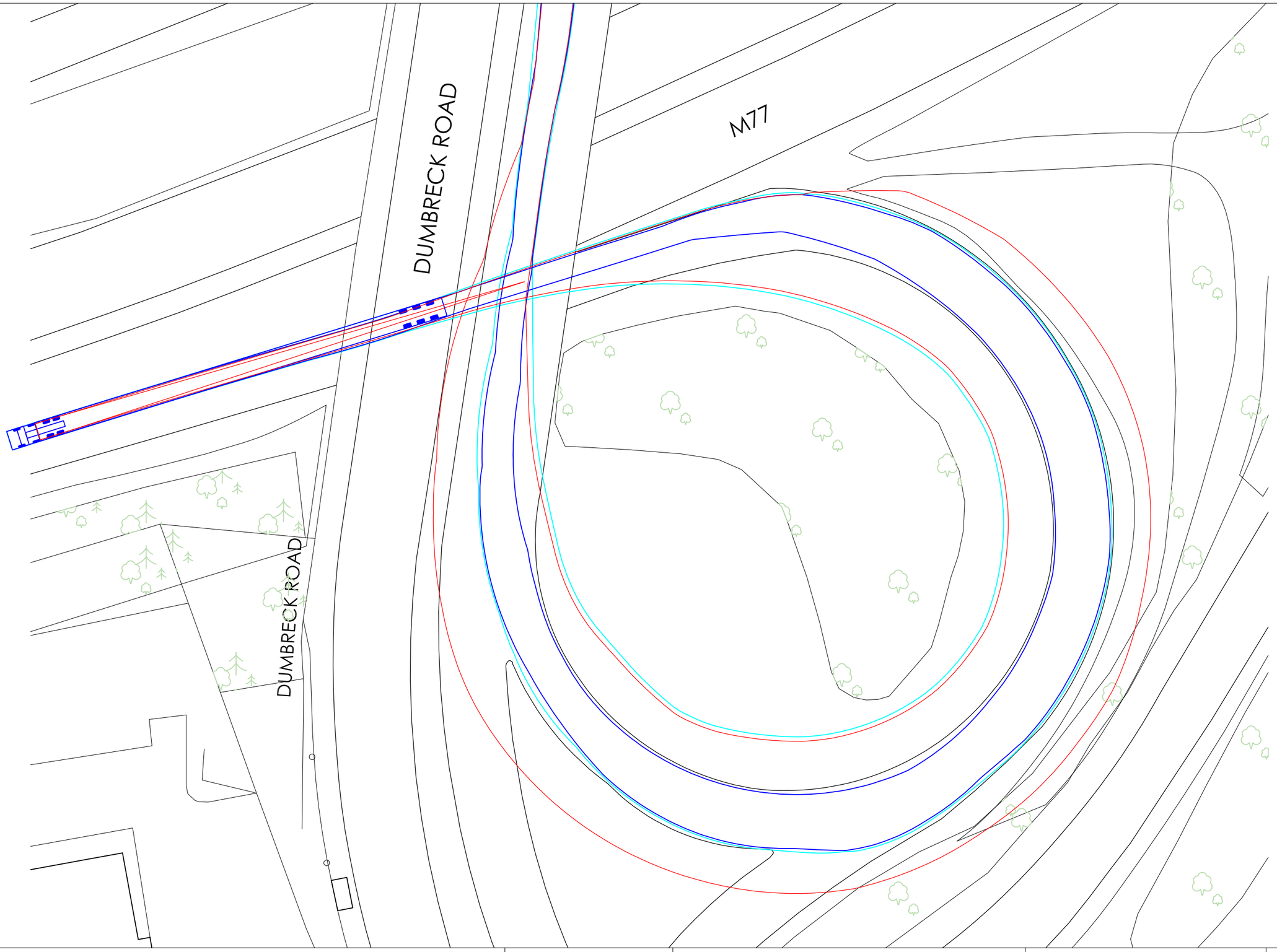
Pencloe Wind Farm

Swept Path Analysis - Wind Turbine Component Transporter with 67m Blade at Edmiston Dr/Broomloan Rd Roundabout

Pencloe Wind Energy Ltd

Drawing Number:	Scale:	
TP442/SK/607	1:500 @ A3	
Drawn by: NW	Date: May 2019	Checked by: IL

TRANSPORT PLANNING



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KEY

- Line of Wheels
- Line of Trailer
- Line of Turbine Blade

Pencloe Wind Farm

Swept Path Analysis - Wind Turbine Component Transporter with 67m Blade at Drumbreck Road/M77 Slip Road

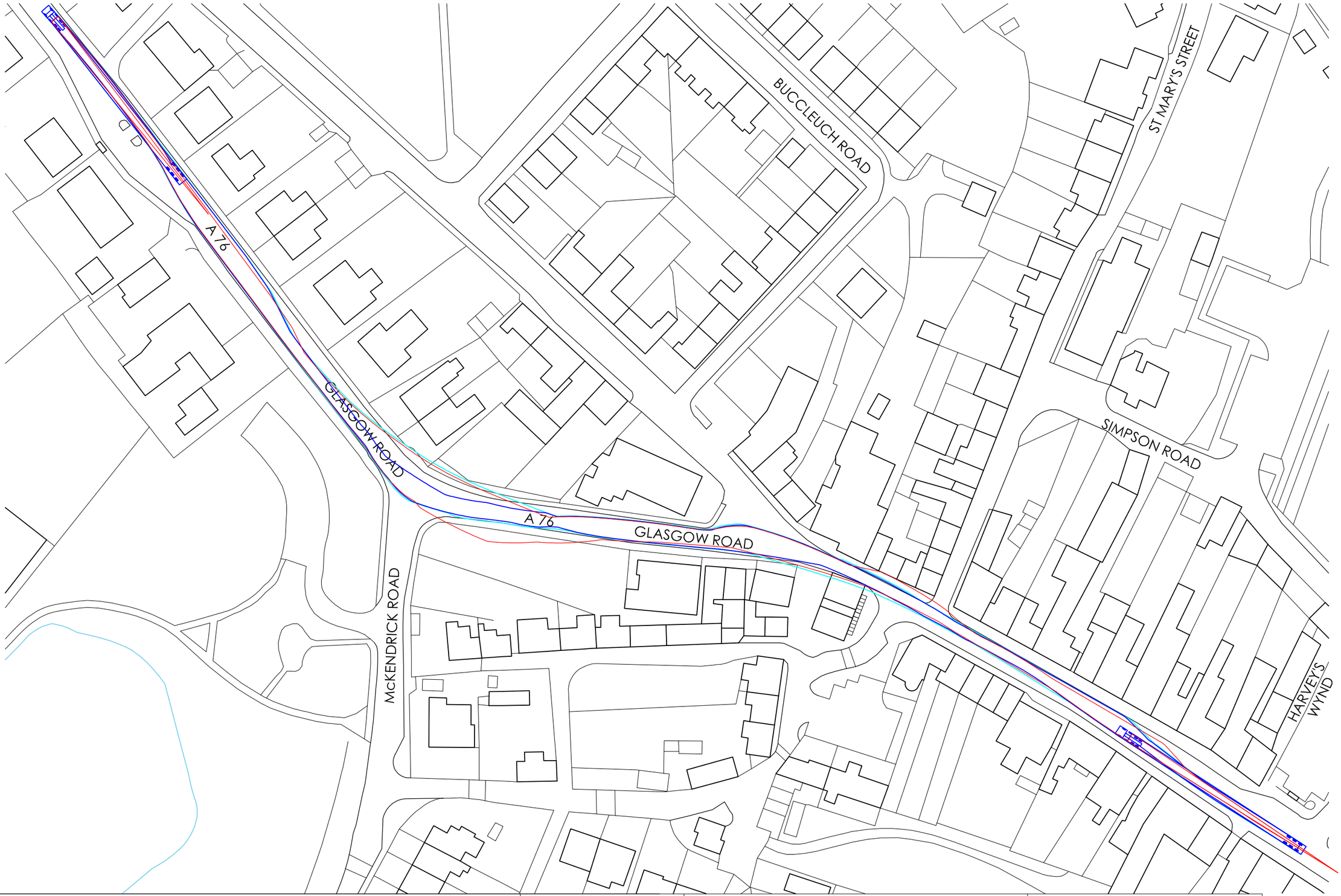
Pencloe Wind Energy Ltd

Drawing Number:	Scale:	
TP442/SK/608	1:500 @ A3	
Drawn by: NW	Date: May 2019	Checked by: IL

TRANSPORT PLANNING

ANNEX H

BLADE SWEPT PATH DRAWINGS ROUTE 2



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KEY

- Line of Wheels
- Line of Trailer
- Line of Turbine Blade

Pencloe Wind Farm

Swept Path Analysis - Wind Turbine Component Transporter with 67m Blade through Sanquhar

Pencloe Wind Energy Ltd

Drawing Number:	Scale:	
TP442/SK/226	1:1000 @ A3	
Drawn by: NW	Date: Apr 2019	Checked by: IL

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KEY

- Line of Wheels
- Line of Trailer
- Line of Turbine Blade

Pencloe Wind Farm

Swept Path Analysis - Wind Turbine Component Transporter with 67m Blade through Kirkconnel

Pencloe Wind Energy Ltd

Drawing Number:	Scale:	
TP442/SK/227	1:1000 @ A3	
Drawn by: NW	Date: Apr 2019	Checked by: IL

TRANSPORT PLANNING