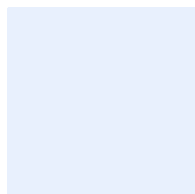
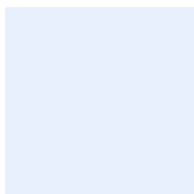


ABNORMAL LOADS ASSESSMENT



SYSTRA

CRAIGINMODDIE WINDFARM

ABNORMAL LOADS ASSESSMENT

IDENTIFICATION TABLE

Client/Project owner	EnergieKontor
Project	Craiginmoddie Windfarm
Study	Abnormal Loads Assessment
Type of document	Report
Date	25/11/2020
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APPROVAL

Version	Name		Position	Date	Modifications
1	Author	S. McGinn	Consultant	10/09/2020	
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2	Author	S. McGinn	Consultant	25/11/2020	Minor amendments
	Checked by	A DeVenny	Projects Director	25/11/2020	
	Approved by	A DeVenny	Projects Director	25/11/2020	

1. INTRODUCTION

1.1 General

- 1.1.1 SYSTRA Ltd (SYSTRA) has been commissioned by EnergieKontor to undertake an Abnormal Loads Assessment for the proposed Craiginmoddie wind farm development which is located to the south of Dailly, in South Ayrshire.
- 1.1.2 The development is for a number of turbines which would be manufactured off-site and transferred to the site for assembly from the Port of Entry (PoE) at Ayr in South Ayrshire. The longest component parts of the turbine are the blades, which will be 76.5m long and would be the “worst case” in terms of the *length and width* combination to be moved.
- 1.1.3 Systra has undertaken an initial review of the route from the POE to the site and has identified a total of 23 pinch points on the route from the POE to the site. The pinch points are points of interest (bends, junctions etc) that will need to be overcome in order to facilitate the safe and efficient movement of the abnormal load vehicles. Swept paths have been undertaken for each pinch point based on the movement of 76.5m blades.

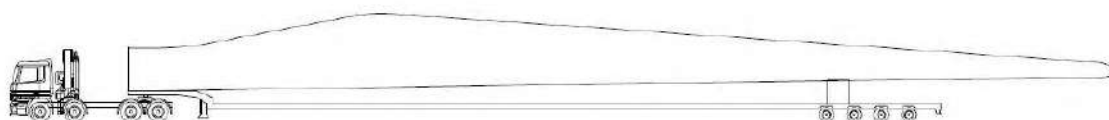
1.2 Description of Route

- 1.2.1 As is standard practice with wind turbine developments, the turbine components will be delivered to the chosen PoE and then be transported to site via the public road network. The abnormal load vehicles are likely to require a police escort for the duration of the route.
- 1.2.2 This assessment assumes that the port of delivery for the wind turbine components will be the Port of Ayr, located to the north of the site. The Port is well used for the importation of wind turbine components and has suitable facilities to accommodate the turbine components associated with the proposed windfarm. The following route has been identified as suitable for abnormal loads vehicles travelling to the site:
- From Port of Ayr to York Street/ Waggon Road and then travelling south on A79 Allison Street;
 - Vehicles will then travel east on the A719 to Whitletts Roundabout where they will then travel south on the A77(T);
 - The vehicles will then leave the A77(T) approximately 35km to the south of Whitletts roundabout and turn left onto the B734;
 - Vehicles will follow the B734 in an eastward direction for approximately 4km where the transporter vehicles will turn off the B734 to join the unclassified road towards Dailly;
 - The vehicles will then follow the unclassified road for approximately 5.5km, where it becomes Eldinton Terrace on approach to Dailly, and turn right in the vicinity of “The Loaning” and continue in a generally south-east direction on a mix of existing unclassified roads and new access tracks where it will join the public unclassified road and route south for approximately 4km towards the site access point.

1.3 Turbine Transport Requirements

- 1.3.1 For the purposes of this assessment, the “design” case component has been assessed which is a 76.5m long turbine blade.
- 1.3.2 At this stage in the design process, the haulier of the wind turbine blades is not yet known nor the exact specifics of the vehicles that they will use. However, from experience of previous developments and from the details of the components to be moved, it is possible to estimate (with some degree of accuracy) the specifics of the design vehicles that will be used to allow a route assessment to be undertaken.
- 1.3.3 SYSTRA has used the computer package AutoTrack to produce a swept path analysis for the identified pinch points on the delivery route. The following worst-case vehicle/trailer combination has been used to produce the SPA:
- A 69.1m long and 2.59m wide articulated vehicle which consists of a tractor unit and an extendible trailer for the transportation of the blades. The blades will overhang the back end of the trailer by 12m while the total length of the load and vehicle combination is 76.5m.
- 1.3.4 Details of the blade transporter vehicle are contained within **Appendix A** of this report for reference while schematic of the load configuration is indicated by **Figure 2** below for the blade.
- 1.3.5 A schematic of the load configuration is indicated in **Figure 3** below.

Figure 3. Blade Transport Configuration



- 1.3.6 It is noted that the trailer units associated with the design vehicle for the transportation of the blades is extendible so on delivery of the abnormal load, the trailer can be reduced in length. The tower transport vehicle will also be greatly reduced in length for its return journey. In these circumstances, the Autotracking and route assessment has only been undertaken for the route to the site and not the route away from site.

1.4 Swept Paths

- 1.4.1 The swept paths for the 23 identified pinch points are contained within Appendix A while a summary of the impacts and mitigation requirements at each pinch point is contained within **Section 2** of this report.

2. SUMMARY OF MITIGATION REQUIREMENTS

2.1.1 **Table 1** below provides a summary of the pinch points and the mitigation requirements that have been established from the swept path assessments.

Table 1. Summary of required Mitigation Measures

PINCH POINT	STREET FURNITURE REMOVAL	TEMPORARY PAVING	THIRD PARTY LAND
PP1 (Waggon Rod / A79 Roundabout)	4no. traffic lights 8no. lit bollards 1no. lighting column 1no. tree Sections of pedestrian guard rail	Area of temporary paving required on the central island of the roundabout to allow overrun.	None anticipated. All works within the adopted road boundary.
PP2 (A79 / A719 Roundabout)	3no. traffic signs 3no. lighting columns 10no. bollards	Area of temporary paving required on the central island of the roundabout. Transition ramps to allow islands and central reserve area to be over-run.	3rd party land required to accommodate the over-sail of the blade transporter on the car park area to the north-west corner of the roundabout .
PP3 (Whittleys Roundabout)	3no. traffic signs 1no. lighting column 4no. traffic lights	Area of temporary paving required on the central island of the roundabout.	None anticipated.
PP4 (Holmston Roundabout)	2no. Traffic Signs (lit chevron boards)	Area of temporary paving required on the central island of the roundabout to allow the vehicle to overrun the central island.	None anticipated.

PINCH POINT	STREET FURNITURE REMOVAL	TEMPORARY PAVING	THIRD PARTY LAND
PP5 (Bankfield Roundabout)	4no. traffic signs 1no. lighting column	Areas of temporary paving required on the central island of the roundabout, in the east verge on approach to the roundabout and in the east verge on exit from roundabout.	None anticipated.
PP6 (North Roundabout on Maybole Bypass)	TBC	Areas of temporary paving required on the central island of the roundabout	None anticipated.
PP7 (Central Roundabout on Maybole Bypass)	TBC	Areas of temporary paving required on the central island of the roundabout	None anticipated.
PP8 (Southern Roundabout on Maybole Bypass)	TBC	Areas of temporary paving required on the central island of the roundabout	None anticipated.
(Bends south of Kirkoswald)	3no. traffic signs 9no. hazard marker posts	Areas of temporary paving required on the outside of the first bend and on the outside and inside of the second bend.	None anticipated.
PP10 (A77 / B734 Roundabout)	4no. lighting columns 4no. traffic signs	Areas of temporary paving required on the central island of the roundabout and in the verge area on the inside of the turn (NE corner of roundabout).	None anticipated. All works within the adopted roads boundary.
PP11 ("S" Bend on B734 located 250m east of A77 roundabout)	Section of fencing	Areas of temporary paving required on the outside of the first bend and on the outside and inside of the second bend.	Extent of highway verge to be checked on north side of the B734 at the second bend.

PINCH POINT	STREET FURNITURE REMOVAL	TEMPORARY PAVING	THIRD PARTY LAND
PP12 ("S" Bend on B734 located 1.75km east of A77 roundabout)	Section of fencing	Areas of temporary paving required on the inside and outside of both bends.	Extent of highway land in the area to the north of B734 at the left-hand bend section pf pinch point to be checked.
PP13 ("S" Bend on B734 located 100m east of previous pinch point and south of Camregan Cottage)	2 Sections of fencing	Areas of temporary paving required on the outside of right-hand bend and inside of left-hand bend.	Extent of highway land to be checked to the north of both bends.
PP14 (Left-hand Bend over Bridge at Old Daily)	4no. utility bollards and service covers may require protection	Areas of temporary paving required on the inside and outside of the bend. A topographical survey will be required to determine height of bridge parapet.	Extent of highway boundary to be checked on both sides of the road.
PP15 (Right turn at Daily onto new Access Track)	2no. sections of fencing	Area of temporary paving required to construct over-run area.	Land under control of the applicant for the purposes of a planning submission
PP16 (Junction of new access track and unclassified road)	Sections of fencing	Large area of temporary paving required to construct over-run area.	Land under control of the applicant for the purposes of a planning submission
PP17 (Right-hand Bend on Unclassified Road. 275m south-east of farm buildings)	Section of fencing	Area of temporary paving required on the inside of the bend.	Land under control of the applicant for the purposes of a planning submission
PP18 (270m south of previous pinch point)	Section of fencing	Area of temporary paving required on the inside of the bend.	Land under control of the applicant for the purposes of a planning submission

PINCH POINT	STREET FURNITURE REMOVAL	TEMPORARY PAVING	THIRD PARTY LAND
PP19 (Tight “S” Bend 1.2km south of farm buildings on unclassified road)	None anticipated.	Areas of temporary paving required on the inside of the left-hand bend and, the inside and outside of the right-hand bend. A topographical survey will be required to determine the extent of earthworks required for construction of over-run areas.	Land under control of the applicant for the purposes of a planning submission
PP20 (Bend adjacent to Delamford Burn on Unclassified Road)	None anticipated.	Area of temporary paving required on the inside of the bend.	None anticipated.
PP21 (Right-Hand Bend south of farm on unclassified Road)	None anticipated.	Area of temporary paving required on the inside of the bend. A topographical survey will be required to determine the extent of earthworks required for construction of over-run areas.	Land under control of the applicant for the purposes of a planning submission
PP22 (Tight left-hand bend on unclassified road just NE of Hadyard Hill WF parking area)	Section of fencing	Area of temporary paving required to construct a suitable over-run area. A topographical survey will be required to determine the extent of earthworks required for construction of over-run areas.	Land under control of the applicant for the purposes of a planning submission
PP23 (Right-hand bend on unclassified road approx. 270m from site access junction)	None anticipated.	Area of temporary paving required on the outside of the bend.	None anticipated.

PINCH POINT	STREET FURNITURE REMOVAL	TEMPORARY PAVING	THIRD PARTY LAND
PP24 (Long left-hand bend on unclassified road 140m from site access point)	None anticipated.	Area of temporary paving required on the inside and outside of the bend.	Land under control of the applicant for the purposes of a planning submission.
PP25 (Junction of Unclassified Road and Site Access)	None anticipated.	Area required for construction of access track	Land under control of the applicant for the purposes of a planning submission.

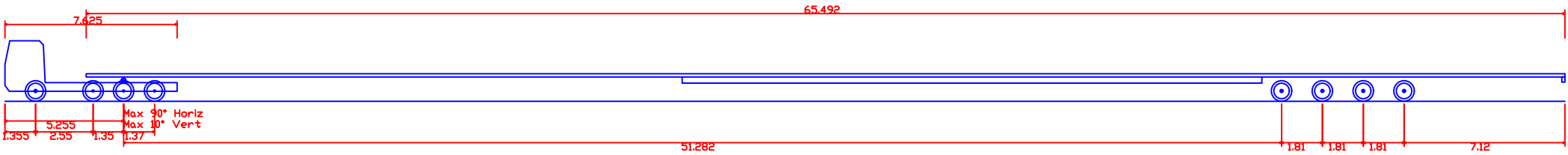
2.1.2 It is considered that the route assessed is technically feasible subject to the mitigation works highlighted in the table above.

2.2 Recommendations

- If the necessary amendments are made the proposed can be navigated by vehicles carrying wind turbine components to the proposed site;
- Police escort or Pilot car will be required to accompany abnormal loads in order to assist with traffic control and the control of oncoming traffic;
- The turbine manufacturer's guidelines need to be checked (once candidate turbine has been selected) to check the minimum road widths required for the transportation of the turbine components;
- It is recommended to have adequate warning signs implemented to warn other road users at critical points along the route;
- All hedges, shrubs, bushes, trees and overhanging branches along the nominated routes must be trimmed from within highway verges especially along Unclassified Roads;
- Full carriageway widths must be available along the entirety of the route. Measures to remove parked vehicles must therefore be in place;
- Specific street furniture has been nominated in this report for removal to facilitate over-sailed and 'swept' areas;
- Measures to assist the vehicle negotiating the kerbed level changes at footways, roundabouts, pedestrian refuges etc. will be required; and
- Steel road plates may be required at locations where the vehicle overruns utility boxes or footways.

APPENDIX A – SWEPT PATH PLANS

Craiginmoddie Wind Farm	
Abnormal Loads Assessment	109234
Report	25/11/2020



76.5m Blade
Overall Length 69.087m
Overall Width 2.591m
Overall Body Height 2.677m
Min Body Ground Clearance 0.443m
Max Track Width 2.591m
Lock to lock time 1.00s
Max Wheel Angle 45.00°

- Notes:**
- 1. Do not scale from drawing
 - 2. All dimensions in metres unless otherwise stated
- Key:-**
- Outline of area being oversailed by trailer bed
 - Outline of area being swept by tractor and trailer wheels
 - Outline of Blade

Rev	Date	Revision details	Drawn	Checked	Approved

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Project
Craigenmoddie Wind Farm

Title
Vehicle Specification
Blade Transporter

Drawn	SM	Checked	ADV	Approved	ADV
Original dwg. size	A3	Date	Sept '20	Scale	1:250
Drawing Status	Information	Drawing Number	10923419/II/VS/001	Rev.	-





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