Appendix K

ELS TURBINE DELIVERY REPORT

APPENDIX K1

Copy of ELS Report

MAIGHNE WIND FARM

Delivery Route Selection and Assessment

Element Power Ireland

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Route Selection and Assessment Report- Maighne Wind Farm

This report provides a delivery route proposal for the following Maighne Clusters

1) Drehid-Hortland Turbine Cluster
2) Windmill Turbine Cluster
3) Derrybrennan Turbine Cluster
4) Cloncumber Turbine Cluster
5) Ballinakill Turbine Cluster

Addressee
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This document has been prepared by Barry Maher in conjunction with survey information provided by Exceptional Load Services.

Barry Maher
Element Power Ireland

CONTENTS

Maighne Wind Farm

Turbine Delivery Route Report

i. Executive Summary

The Turbine Delivery Route (TDR) report identifies the alterations needed for the transport of turbine components between the port of entry and the site entrance of the proposed wind farm. Due to the oversize nature of Wind Turbine components, standard road designs are often not suitable at areas such as junctions, roundabouts and bends. This not only applies to narrow local roads, it also applies to regional and national roads that are often not physically capable of allowing a components such as 60m Blades, 5m wide tower sections to pass without some alterations. Most alterations involve the short term removal of street furniture, or removing the grass from a verge and replacing with stone however others could require more extensive work such as alterations to bridges etc.

The scope of this document is to identify all alterations needed at bends and junctions required for Turbine Component delivery to the Maighne wind farm clusters. The report was developed following several months of survey work carried out by specialist surveying contractors on National, Regional and Local roads between the Port of entry for the turbine components and the various site entrances.

A point on the delivery route that needs to be upgraded is known as a Node Point. The majority of node points occur on Regional and Local roads however roundabouts and junctions on national roads and motorways often require upgrade work.
There are 23 no node points on the TDR routes to Maighne WF.

- 10 nodes are under Kildare county council control (2 nodes under NRA control)
- 2 nodes are under Meath County Council control (2 nodes under NRA control)
- 8 nodes involve private landowners,
- 1 node involves Waterways Ireland
- 2 nodes involve BnM (Derrybrennan Entrance and exit for Cloncumber)

ii. INTRODUCTION AND ROUTE OVERVIEW

Abnormal load delivery routes to Maighne Wind Farm were surveyed on the June 2013 by Edwin Sunderland of Exceptional Load Services. The basis for the survey was 60m turbine blade deliveries, together with tower sections on clamp adaptor trailers with rigid length up to 42m.

A number of routes were surveyed, and routes to various site entrances are presented. All deliveries are proposed via the M4, exit at junction 9 Enfield to the R402, through Johnstown Bridge along the newly upgraded R402. **Drehid Turbine Cluster** is accessed by exiting left off the R402 Collinstown Junction and continuing on the L5025 and turning left into the site after Drehid Junction. For access to **Hortland** continue on the L5025 to Timahoe Cross Roads. Take a Left and continue on the L1010 to the site entrance on the left. See details below on delivery overview **Map 1**

To access **Windmil**l continue on the R402 to Carbury cross roads and turn right onto the local road L1005. Continue on the local road for 3.3km to the site entrance on the left. See details below on delivery overview **Map 1**

To access **Derrybrennan** continue on the R402 to the newly constructed roundabout at Carbury. From the roundabout follow the R403 through Derrinturn towards Allenwood. Access to Derrybrennan is on the right off the R403 at Killanagh Lower, using the same entrance as the Bord Nan Mona Lullymore Briquette Factory. **Map 1**

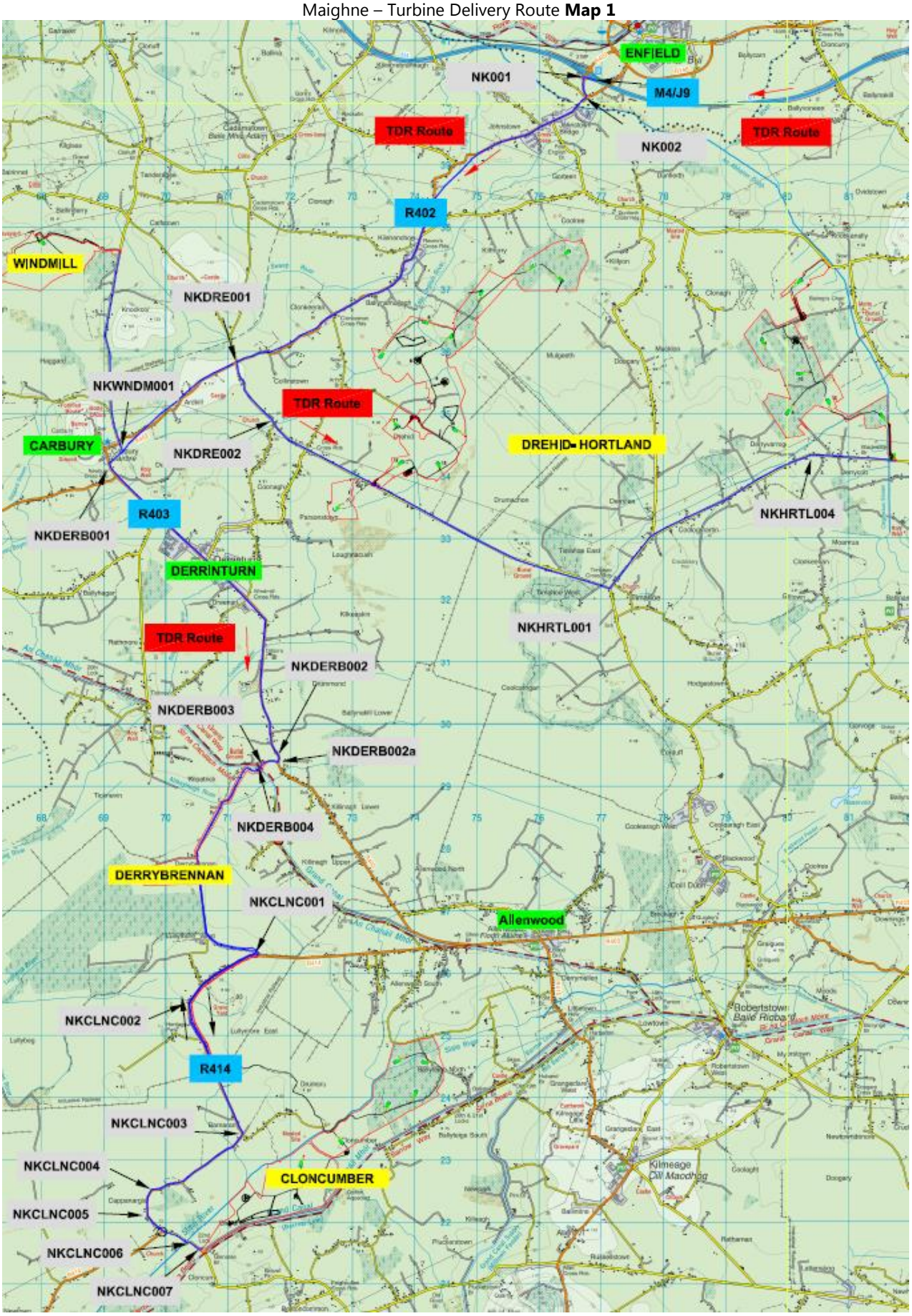
Cloncumber To access Cloncumber all component deliveries must first pass through Derrybrennan, exiting to the south at Lullymore West onto the R414. Travel south on the R414 towards Rathangan. Enter the site at Cloncurry between the Slate River and the Grand Canal. **Map 1**

To access **Ballynakill** exit the M4 motorway at junction 8 Kilcock. Travel around the roundabout exiting onto the R158 and then onto the R148. Continue on the R148 through the town of Enfield to the site entrances on the right hand side. See details below on delivery overview **Map 2**

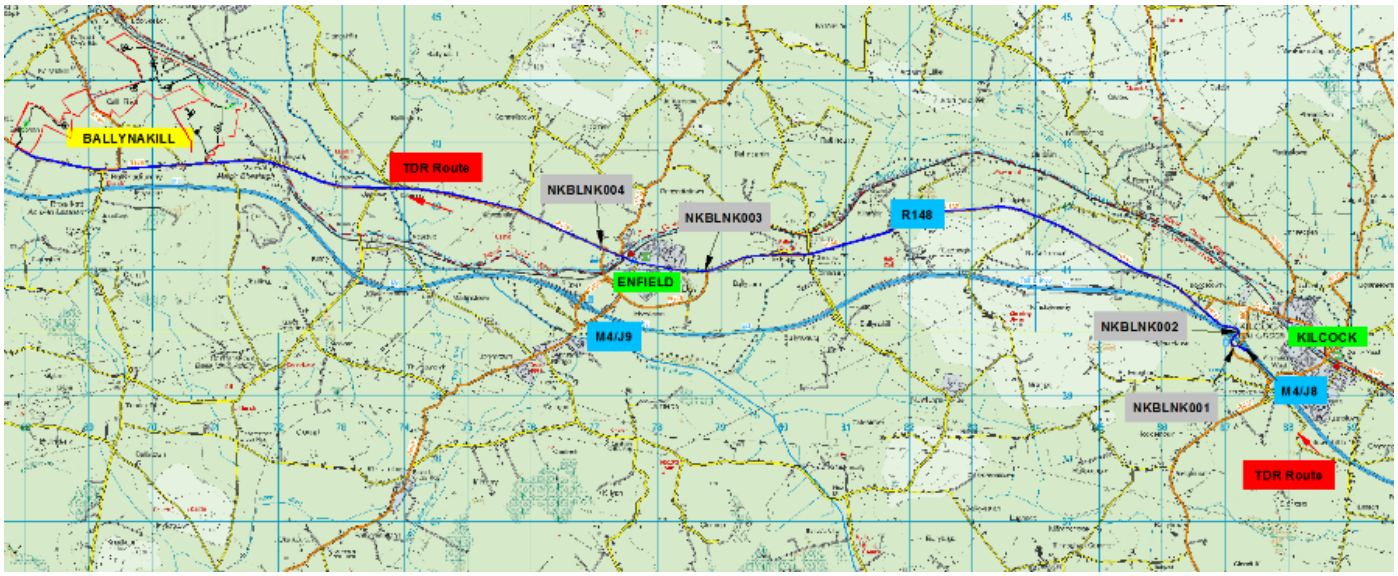
Customer	Element Power
Route No	Maighne Delivery route
Survey Dates	June 2013
Survey Personnel	Edwin Sunderland, ELS John Webb, ELS
Load Dimensions	60m Blades Tower sections on clamp adaptor trailers with rigid length up to 42m
Route Surveyed	As detailed above
Route Assesment Criteria	Dublin was assumed as the Port of entry. This route was surveyed and assessed from the M4 to site.
Route Requirements	The route from Dublin passes through 4 Local Authority areas and will require permits from each one (Dublin City, Fingal, South Dublin and Kildare.)There are no exceptional traffic management requirements on route.
Alternative Routes	Alternative routes to these site will prove extremely difficult due to the presence of canals, peat bogs and the fact that oversize vehicles cannot pass through Edenderry.

iii. Delivery Route Maps

Maighne – Turbine Delivery Route **Map 1**



Maighne – Turbine Delivery Route **Map 2**



iv. NODE UPGRADE DETAILS

Motorway Exit from M4 – TDR route to Drehid/Hortland, Windmill, Derrybrennan and Cloncumber turbine clusters

The following nodes detail the access route upgrade requirements to exit the M4 motorway at Junction 9 Enfield onto the R402 Westbound

NK001	M4(J9)/ Enfield Interchange to R402 Junction	X 676679 Y 740414

Photo Reference:

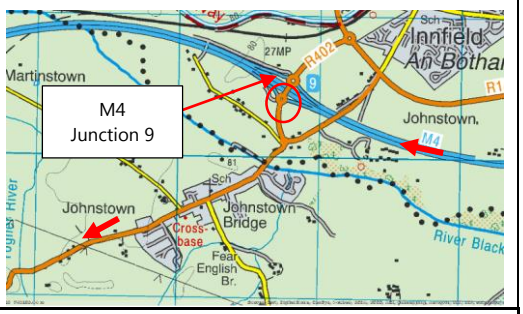
LEGEND:

Direction of Delivery

Area requiring hardcore

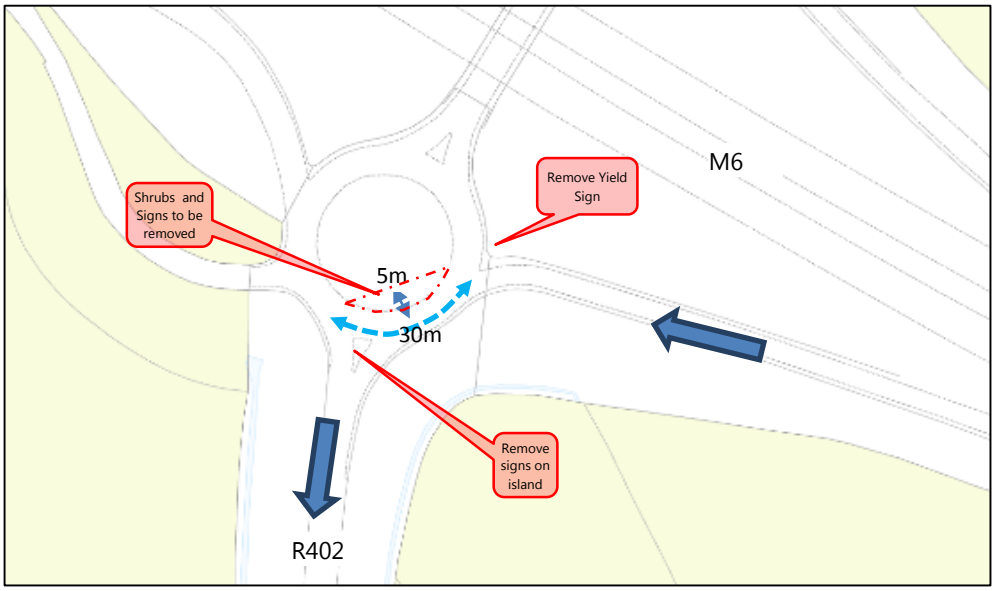
Area of oversail

Location Map:



Upgrade works:
This is a good open roundabout but will require modifications to the roundabout island.
Ringed street furniture should be removed. The roundabout island should be filled to load bearing as per sketch. Kerbs should be ramped.

Sketch:



Node Aerial View

NK002	Johnstown Bridge Roundabout (R402)	X 676684 Y 740136

Photo Reference:

LEGEND:

Direction of Delivery

Area requiring hardcore

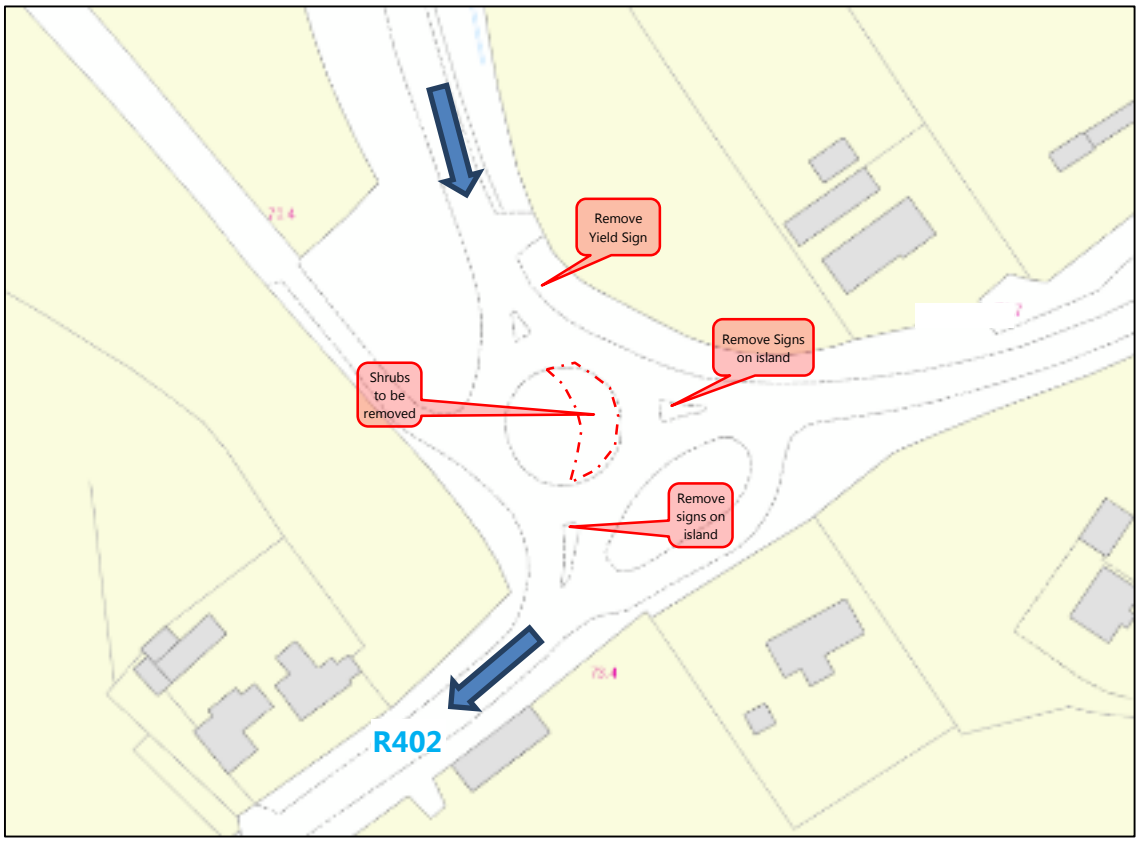
Area of oversail

Location Map:

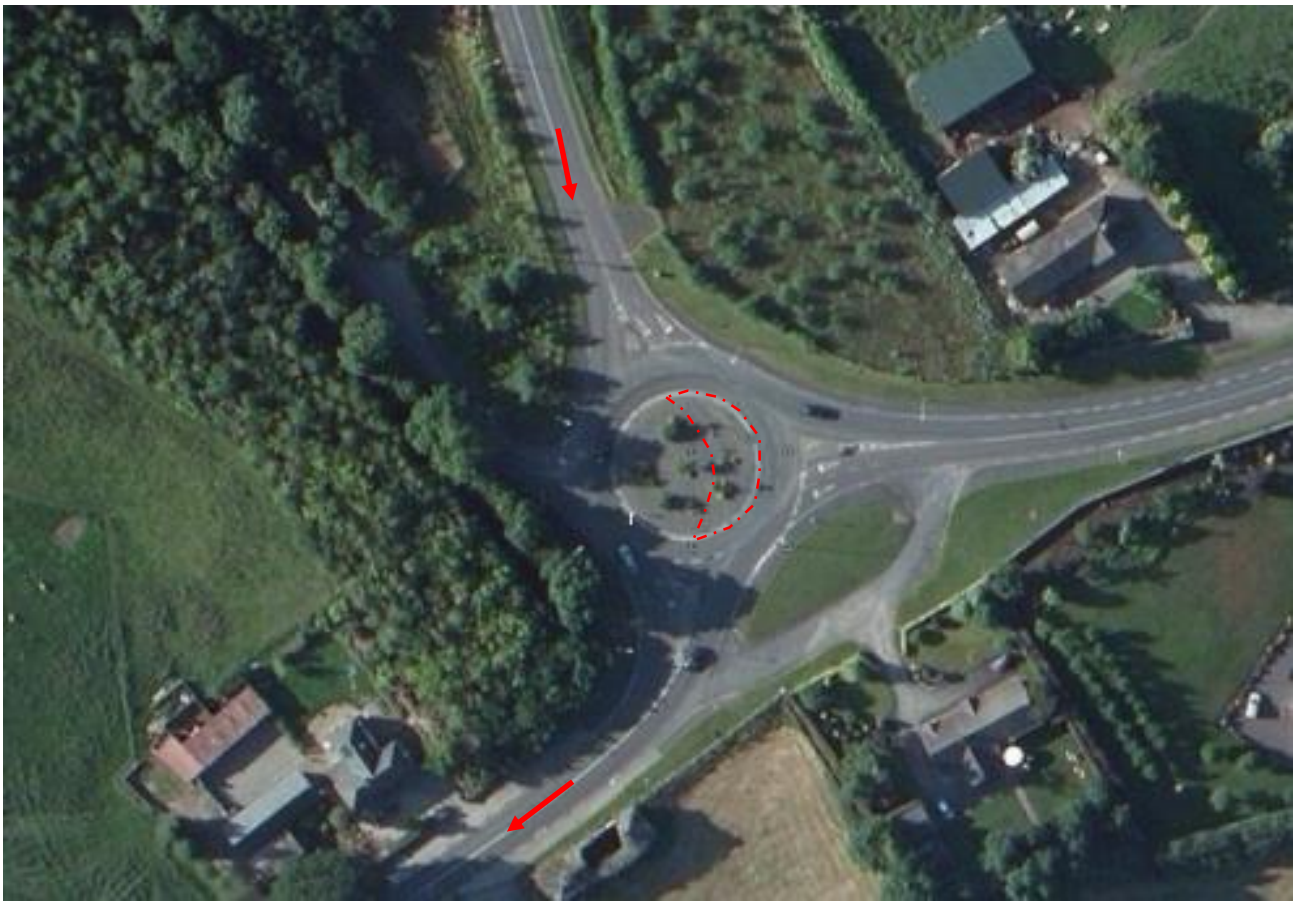
Upgrade works:

This roundabout will require the filling of a section of centre island to load bearing.

Sketch:



Aerial View of node



Drehid/Hortland Access

The following nodes detail the access route upgrade requirements to the Drehid/Hortland Cluster.

NKDRE001	**The Sweep Cross Roads** **R402/L5025 Junction**	X 671061 Y 735822

Photo Reference:

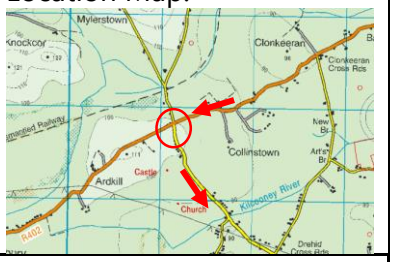
LEGEND:

Direction of Delivery

Area requiring hardcore

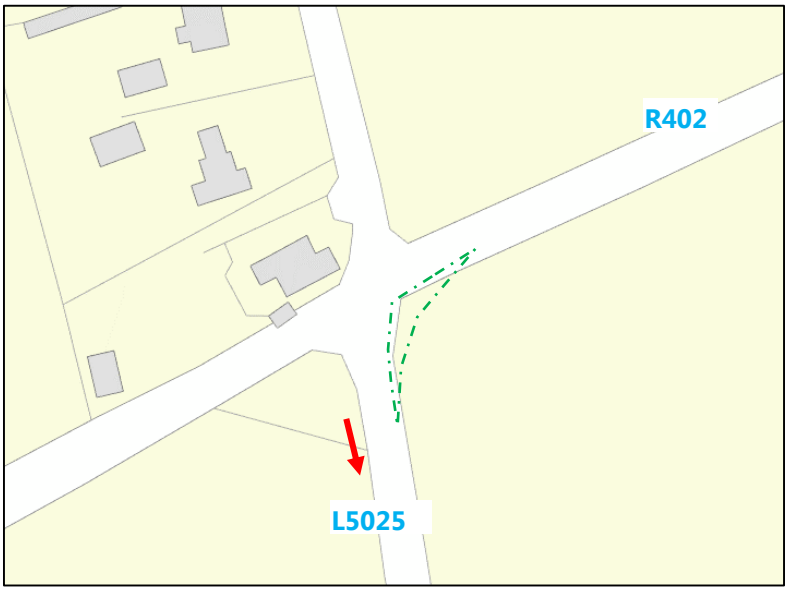
Area of oversail

Location Map:



Upgrade works:
Signs on the left hand side will have to be removed for oversail during deliveries. 1no light will also have to be removed.

Sketch:



Aerial View of node

NKDRE002	'S' Bend on L5025	X 671194 Y 735429

Photo Reference:

LEGEND:

Direction of Delivery

Area requiring hardcore

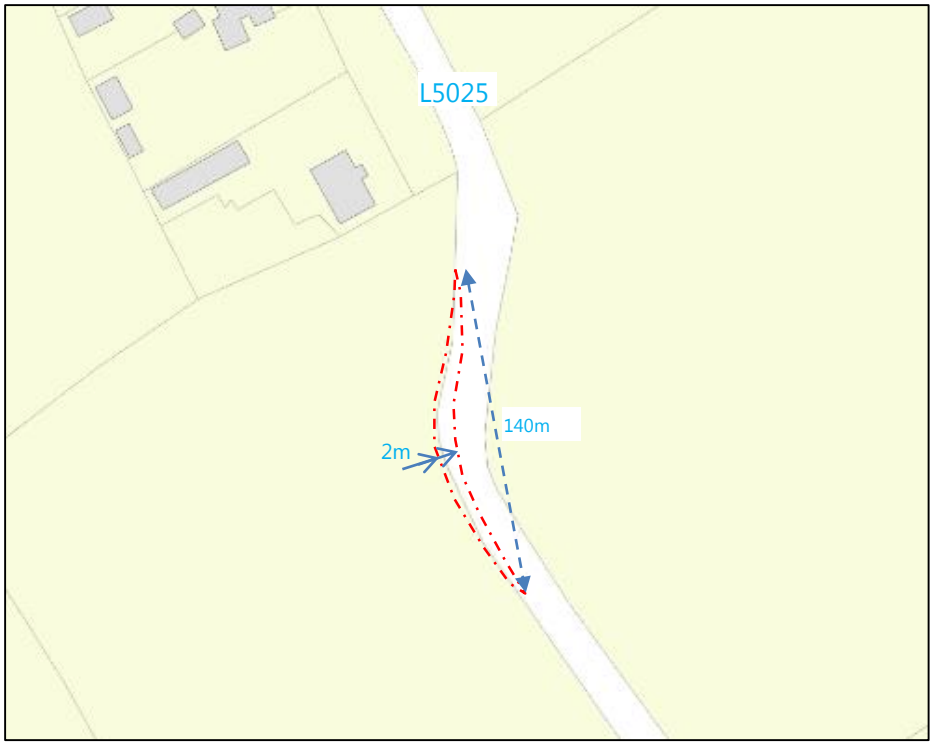
Area of oversail

Location Map:

Upgrade works:

At this set of bends the area of grass margin highlighted on the right hand side of the roads is to be made load bearing for approx. 140m into the hedge line. Hedges will have to be trimmed back on both sides of the road. 1no Eircom pole to be moved

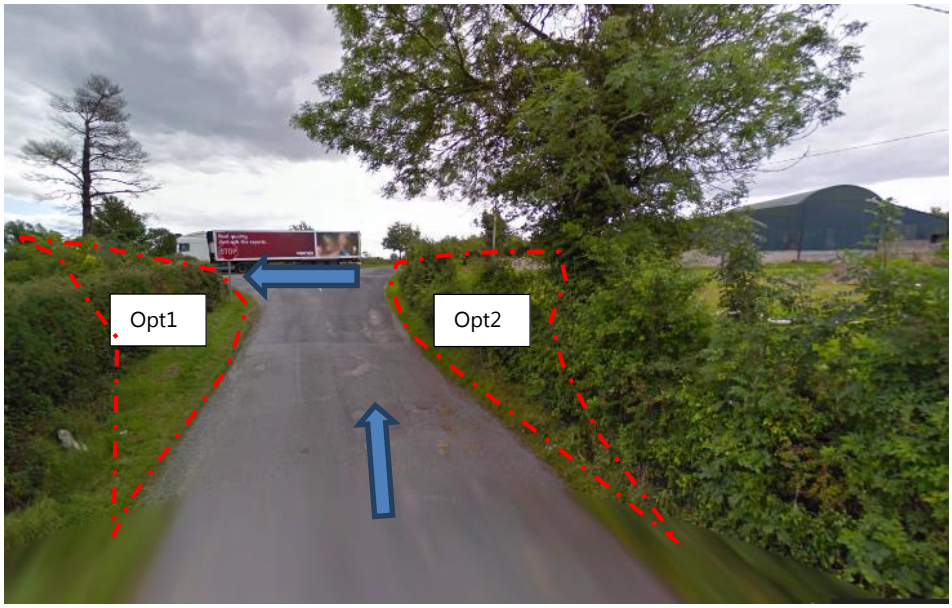
Sketch:



Aerial View of node

NKHRTL001	Timahoe Cross Roads	X 677080 Y 732215

Photo Reference:



LEGEND:

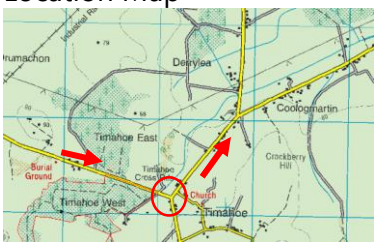
Direction of Delivery

Area requiring hardcore

Area of oversail

Area for hardcore and oversail in private land

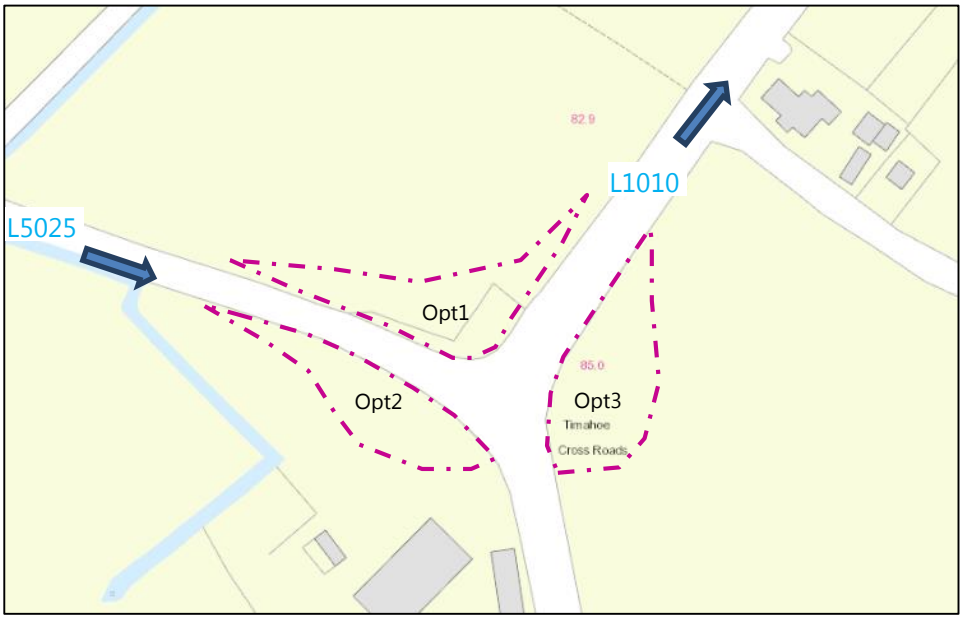
Location Map



Upgrade works:

This left turn at Timahoe Cross will require land take. There are a number of options available 1) Take land on the left, 2) take land on the right, 3) take land straight ahead, 4) use a combination of 1, 2 and 3. In all options Hedges and trees will need to be removed and the ground made load bearing.

Sketch:



Aerial View of node
Option1

Option 2

Option 3

NKHRTL004	Right bend at Derrycrib L1010	X 680304 Y 734352

Photo Reference:

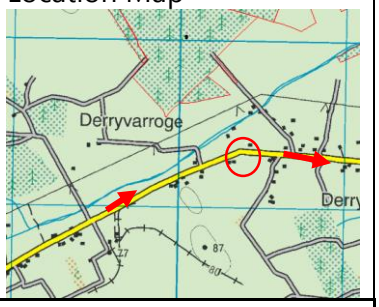
LEGEND:

Direction of Delivery

Area requiring hardcore

Area of oversail

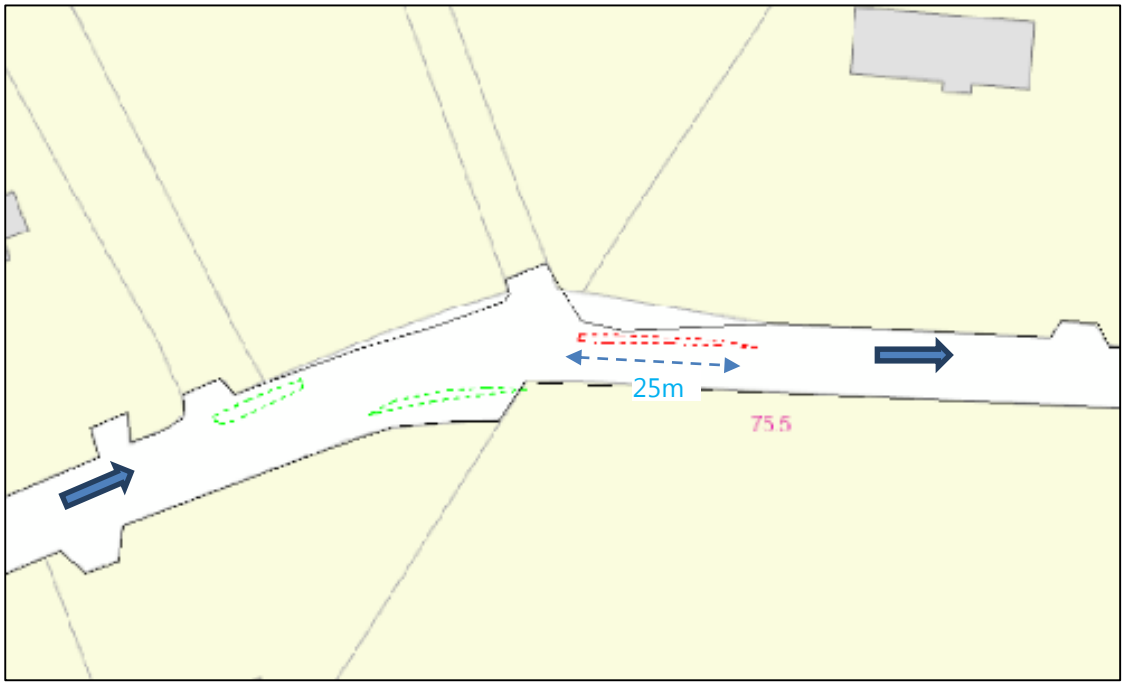
Location Map



Upgrade works:

Oversail tree clearance overhanging the public road is needed at this bend. Verge to be reinforced with hardcore as per the sketch below

Sketch:



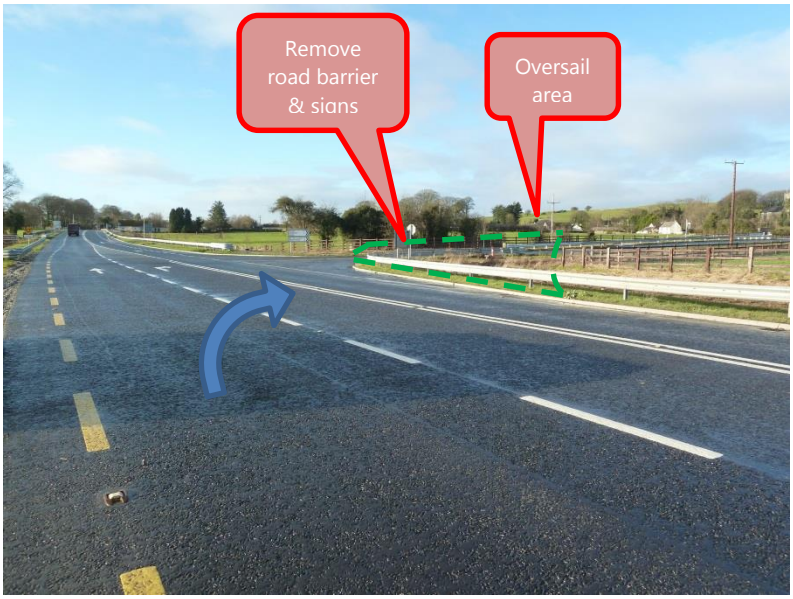
Aerial View of node

Windmill

Windmill is accessed from the R402 at the new Carbury junction onto the L1005. This is the only node on this access route. The site entrance is to be constructed to Turbine Suppliers specifications.

NKWIND001	Right Turn (R402/L1005) at Carbury	E 669334 N 734458

Photo Reference:



LEGEND:

Direction of Delivery

Area requiring hardcore

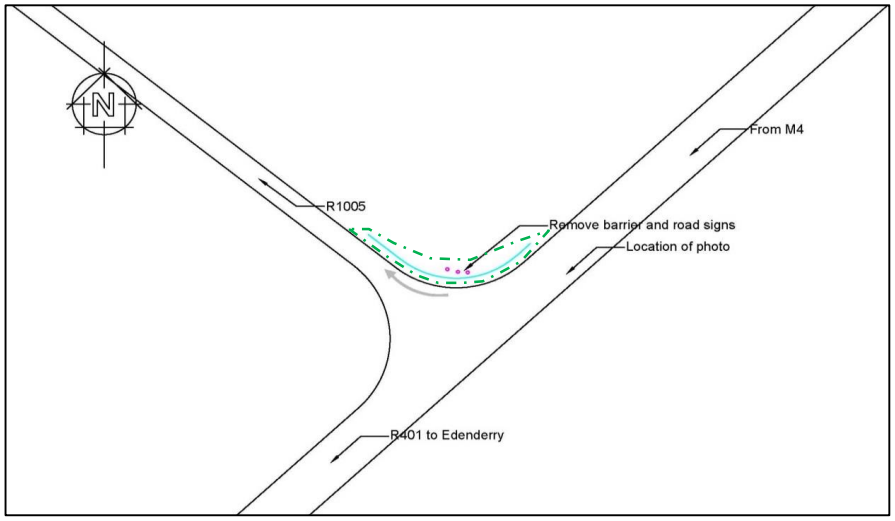
Area of oversail

Location Map

Upgrade works:

An oversail area will be required on the northern side as per the sketch below. 10 sections of crash barrier and 2 traffic signs will have to be removed as part of the upgrade works.

Sketch:



Aerial View of node

Continue 3km on the L1005 to the entrance to Windmill on the Left Hand Side

Derrybrennan

To access the Derrybrennan site, continue from Carbury Roundabout onto the R403. Exit the R403 at Lullymore BnM Plant. Continue on the local road entering the BnM facility and crossing the Canal on route.

NKDERB001 **Carbury Roundabout R402/R403** X 635526
Y 725313

Photo Reference:

LEGEND:

Direction of Delivery

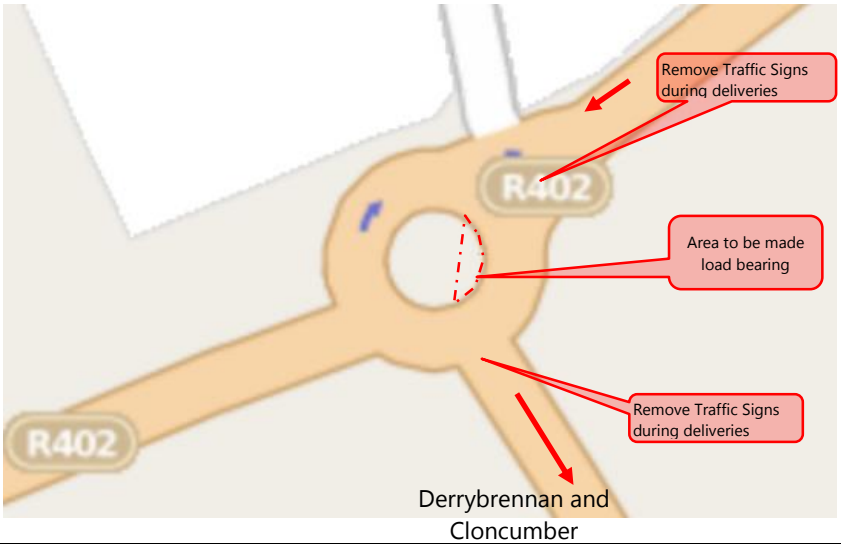
Area requiring hardcore

Area of oversail

Location Map:

Upgrade works:
This roundabout will have to be altered temporarily to allow oversize loads turn left to Derrybrennan and Cloncumber. Traffic Signs will have to be movable during deliveries. Kerbs will have to be ramped and shrubs to be removed and replaced with hardcore for deliveries.

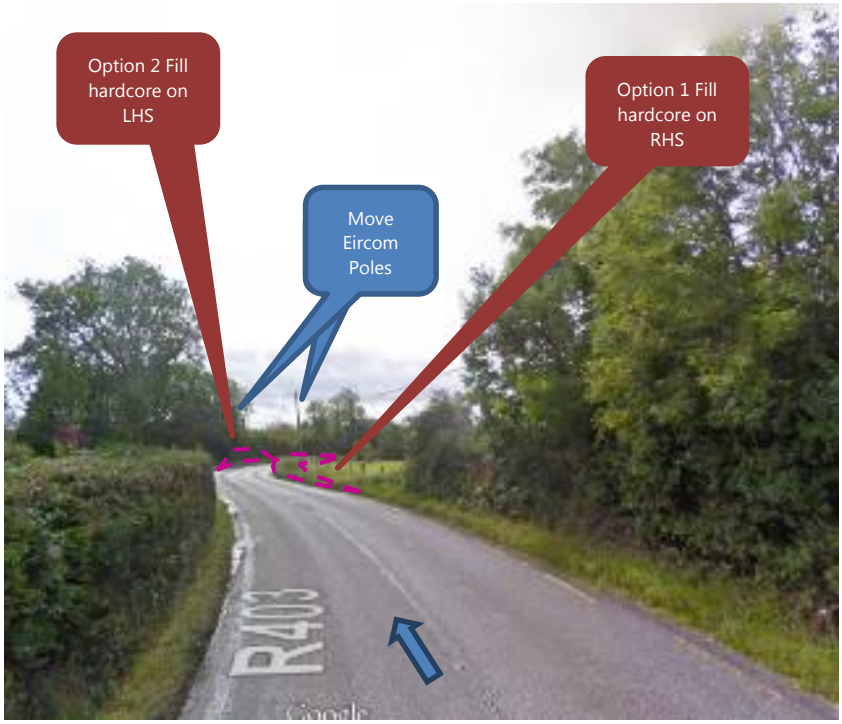
Sketch:



Aerial View of node

NKDERB002	**Left & right turn on approach to BnM junction R403**	X 671740 Y 729524

Photo Reference:



LEGEND:

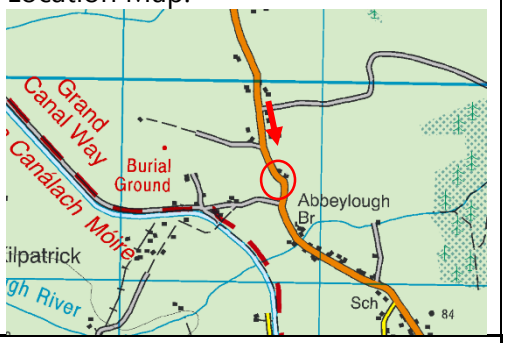
Direction of Delivery

Area requiring hardcore

Area of oversail

Area for hardcore and oversail in private land

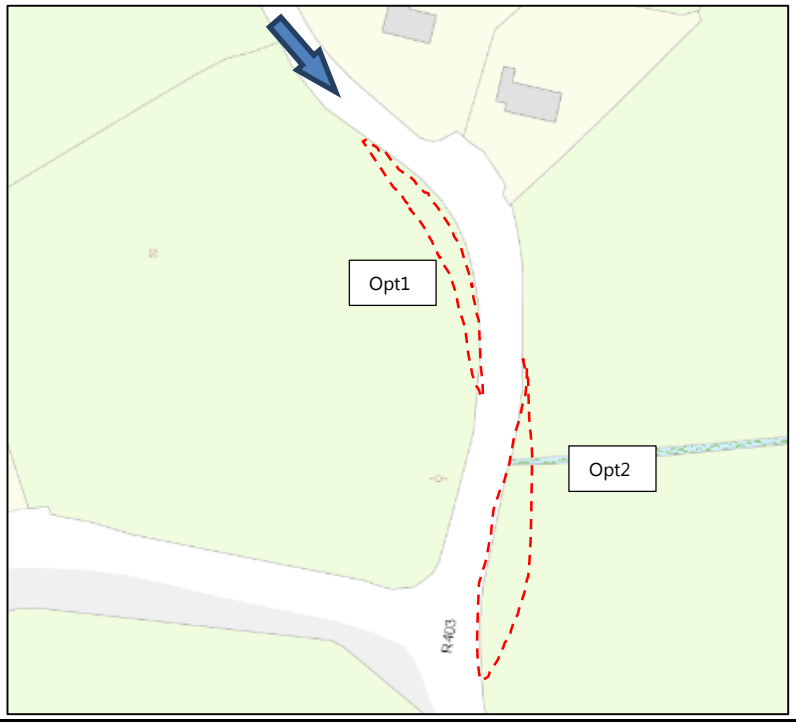
Location Map:



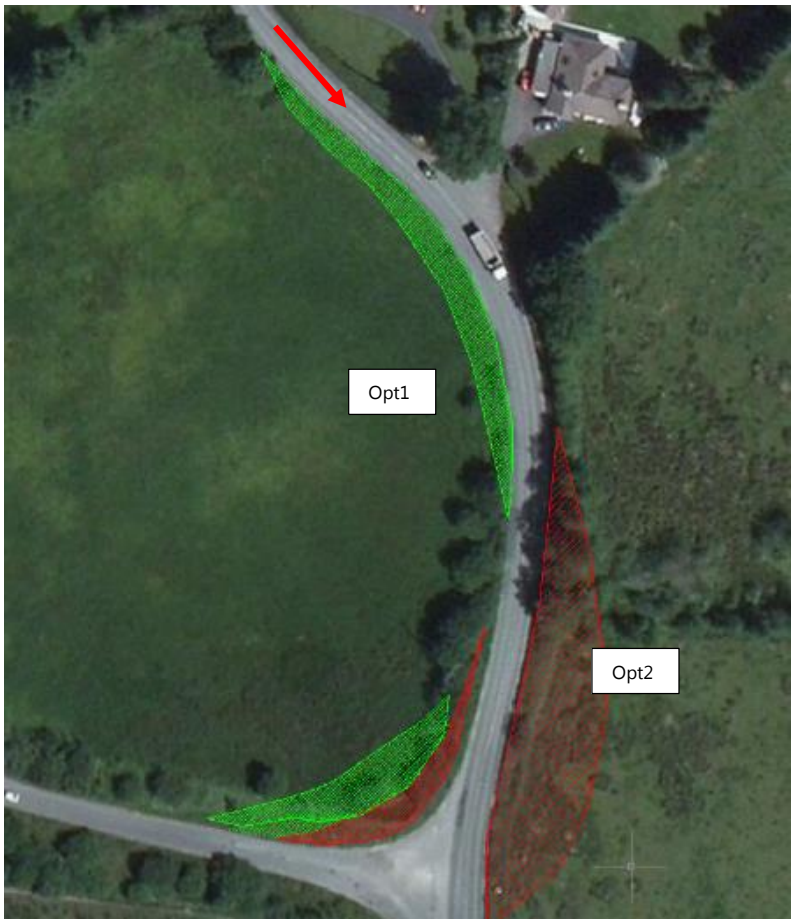
Upgrade works:

There are two option available to get around this bend each requiring private land take on either the Left Hand Side or the Right Hand Side. On the RHS the wire fence is to be removed for approximately 200m, the existing ground is to be replaced with hardcore. One Eircom pole will have to be removed. On the LHS side the hedge line will have to be removed for 90m. The existing drain will have to be piped and backfilled and the ground will have to be raised to road level with compacted hardcore. One Eircom pole will have to be removed

Sketch:



Aerial View of node

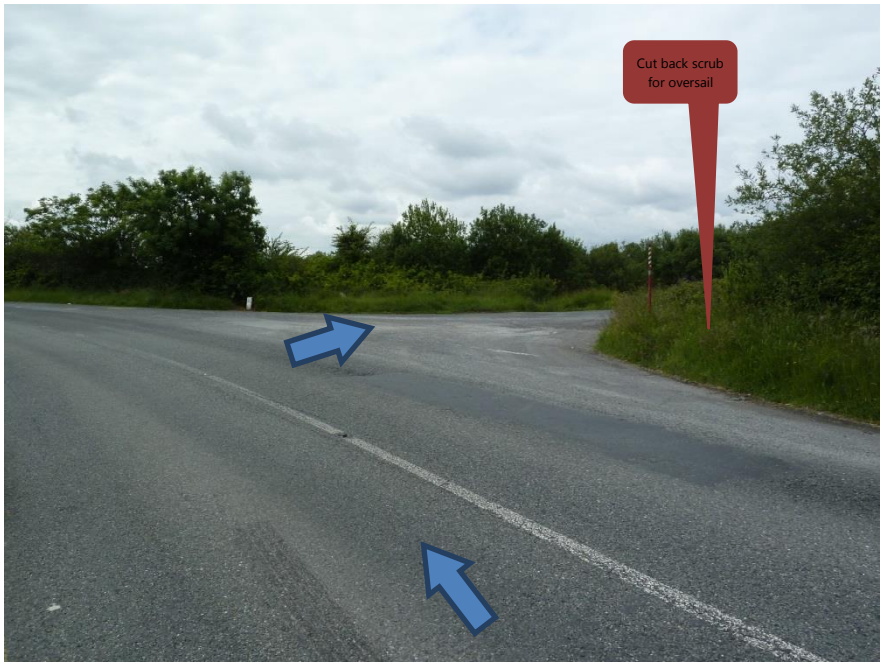


NKDERB002 Opt 1

NKDERB002 Opt 2

NKDERB002a	**Right Turn off R403**	X 671740, Y 729416

Photo Reference:



LEGEND:

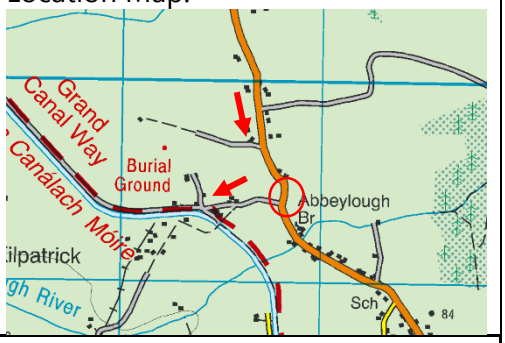
Direction of Delivery

Area requiring hardcore

Area of oversail

Area for hardcore and oversail in private land (aerial View)

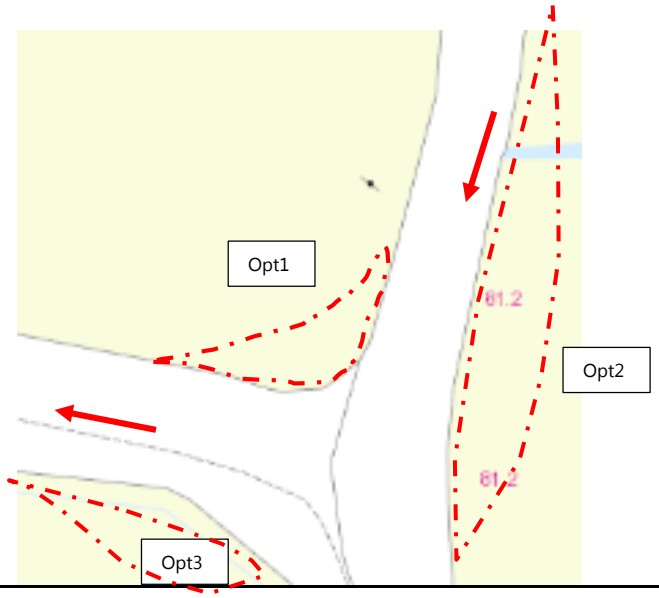
Location Map:



Upgrade works:

Access to Derrybrennan has three possible options, Option 1) land take on the right before the entrance, Option 2) Land take on the opposite side of the entrance, Option 3) land take on the left before the entrance. Each option will require land take in the verges and in private land to the dimensions shown in the sketches below

Sketch:



Aerial View of node

NKDERB002a Opt 1

NKDERB002a Opt 2

NKDERB002a Opt 3

NKDERB003	**Left Turn into Lullymore**	X 671507, Y 729396

Photo Reference:

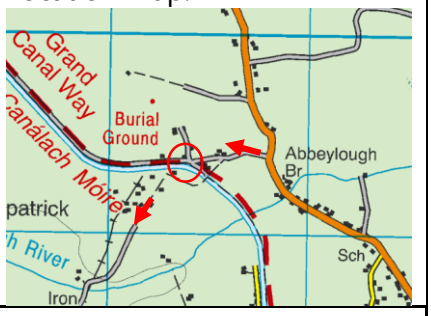
LEGEND:

Direction of Delivery

Area requiring hardcore

Area of oversail

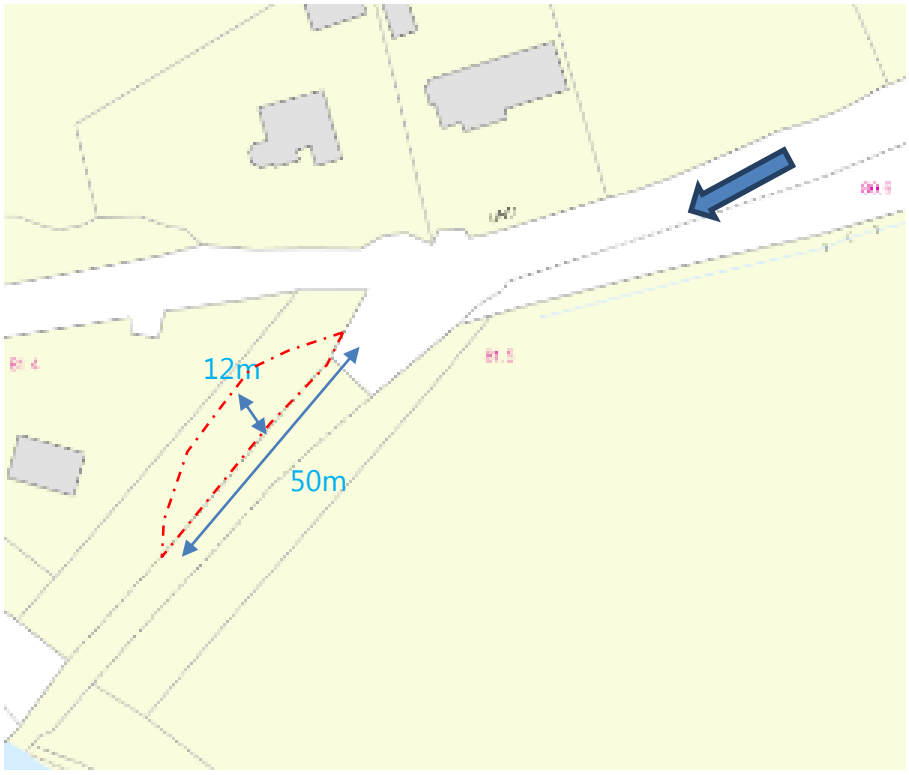
Location Map:



Upgrade works:

This left turn will require some tree trimming on left side; removal of one section of entrance wall on right and widening of road on right inside entrance.

Sketch:



Aerial View of node

NKDERB004	**Canal Bridge**	X 671428 Y 729301

Photo Reference:

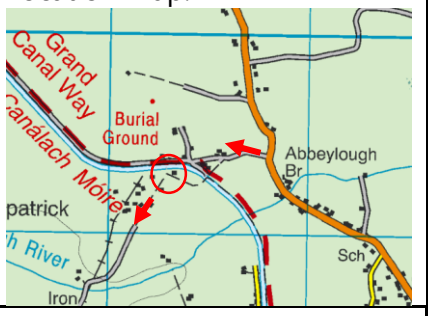
LEGEND:

Direction of Delivery

Area requiring hardcore

Area of oversail

Location Map:



Upgrade works:

A structural survey will need to be carried out of this canal bridge. It is presumed that the bridge does not have sufficient capacity or width for turbine deliveries. A new, wider bridge should be considered or alternatively a temporary baily bridge installed ensuring no excessive loading of the current bridge deck. Properly designed this could deal with both the capacity and width issues. Current width of bridge is 3.70m

Sketch:

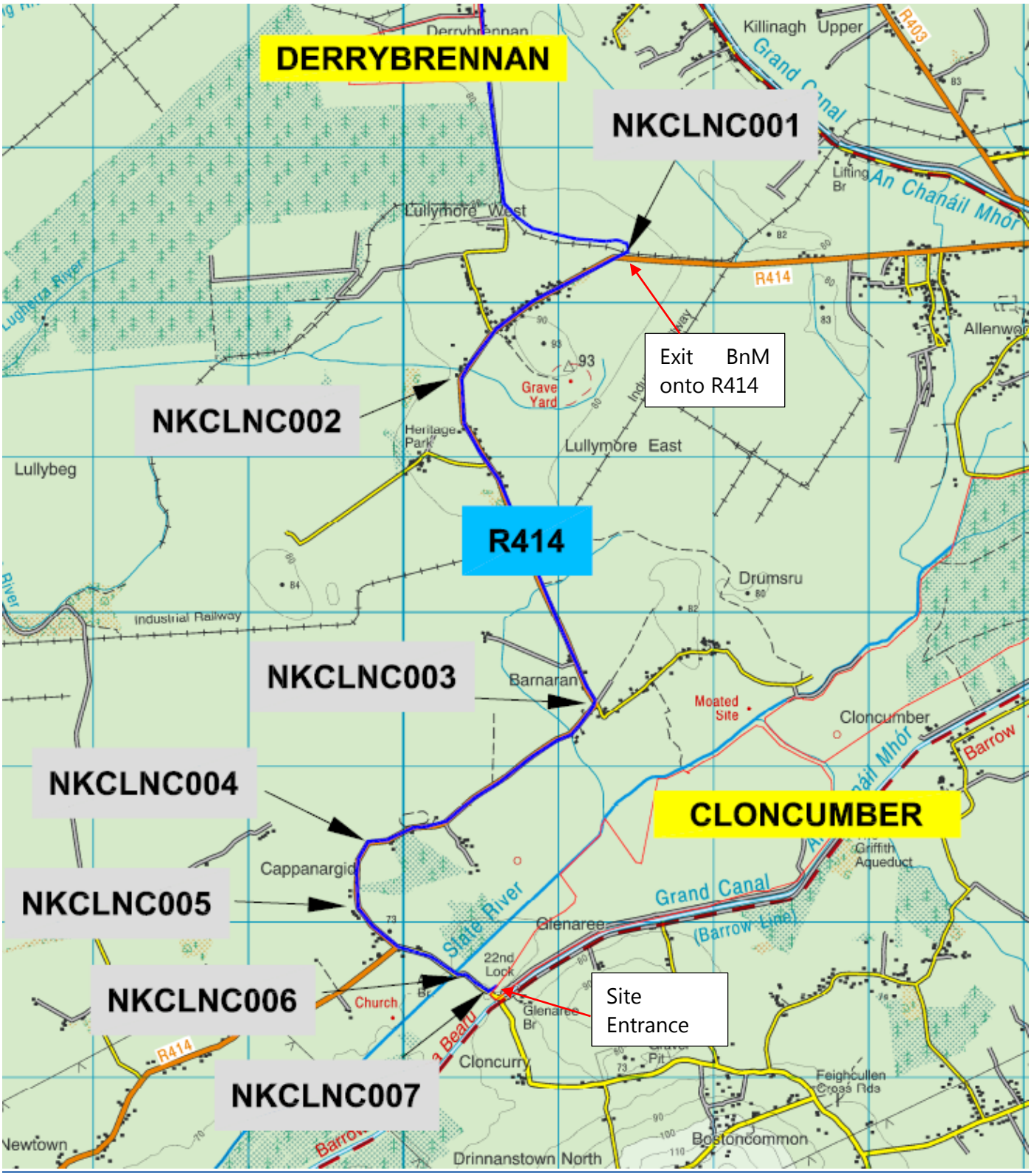
NO SKETCH

Aerial View of node

CLONCUMBER

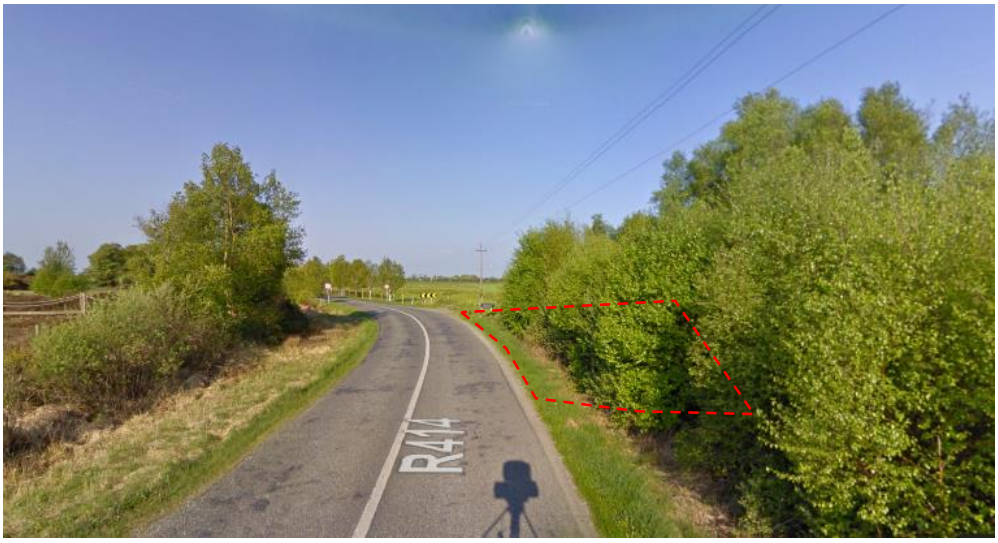
The following nodes detail the access route alterations for component deliveries to the Cloncumber Site. The delivery route will be a continuation from the Derrybrennan site. Deliveries will continue south from the Lullymore Briquette factory and exit the BnM lands onto the R414 at Lullymore West. Loads will travel south on the R414 and onto a local road at Cappanargrid, cross the river slate at Agar Bridge and turn left into the site approximately 100m before 22nd Lock at Glenaree Bridge. Please note no works are required to Glenaree Bridge or close to the canal.

Delivery Route Map to Cloncumber



NKCLNC001	**Exit onto R414** East of Rathangan	N 671281 E 726314

Photo Reference:



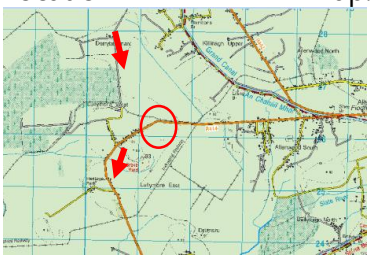
LEGEND:

Direction of Delivery

Area requiring hardcore

Area of oversail

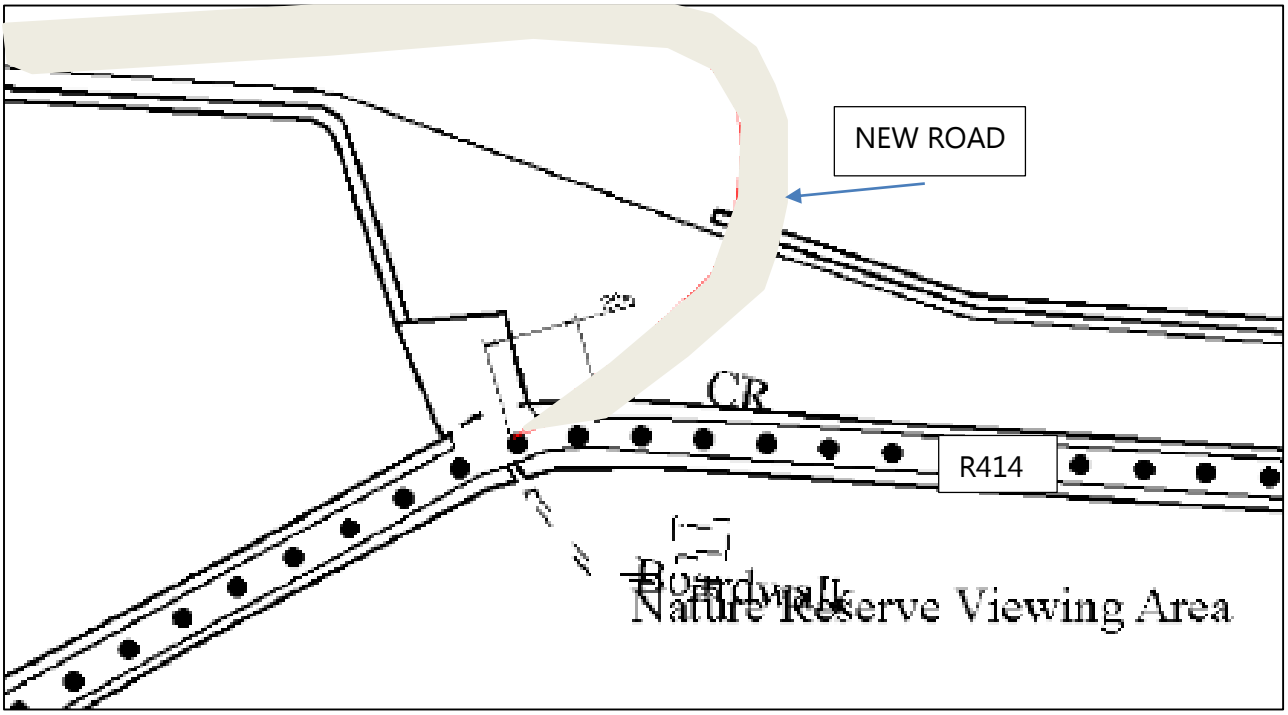
Location Map:



Upgrade works:

Exit from BnM site to R414. Hedge to be removed and hardcore to be placed over verge and drained. Care to be given to overhead power lines at exit point.

Sketch:



Aerial View of Node

NKCLNC002 **Left Bend on R414** East of Rathangan N 670313 E 725523

Photo Reference:

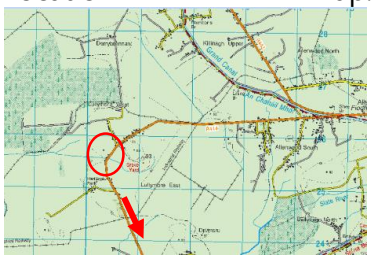
LEGEND:

Direction of Delivery

Area requiring hardcore

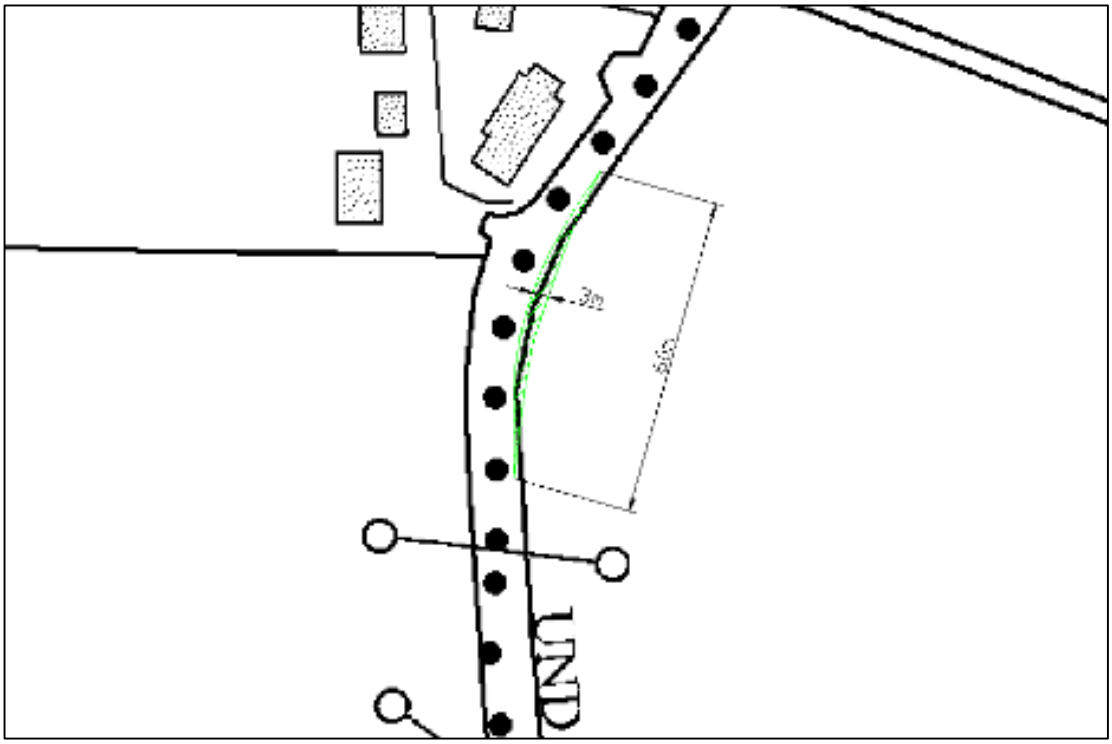
Area of oversail

Location Map:



Upgrade works:
Area for oversail needed here

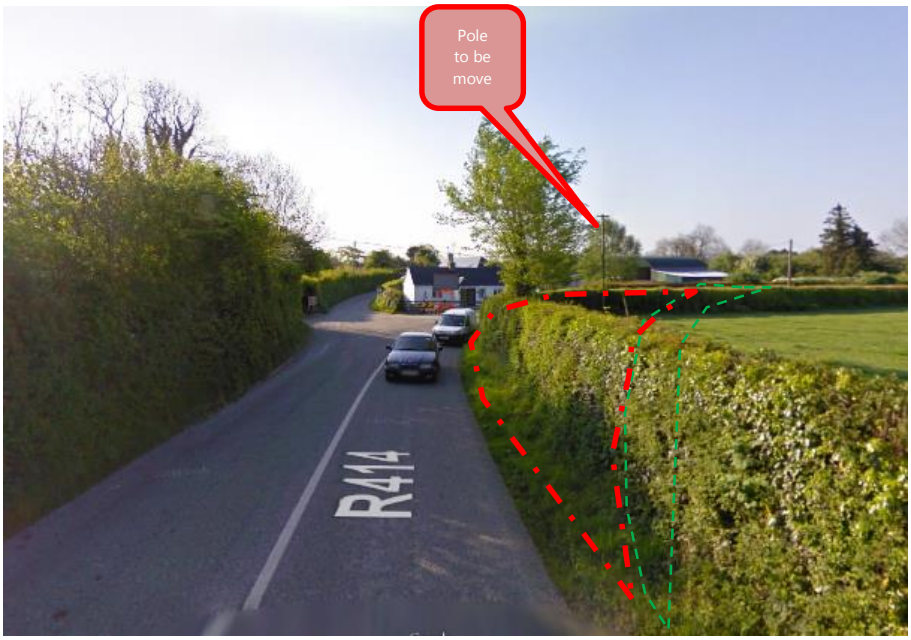
Sketch:



Aerial View of Node

NKCLNC003 **Right Bend on R414** N 671154
East of Rathangan E 723437

Photo Reference:



LEGEND:

Direction of Delivery

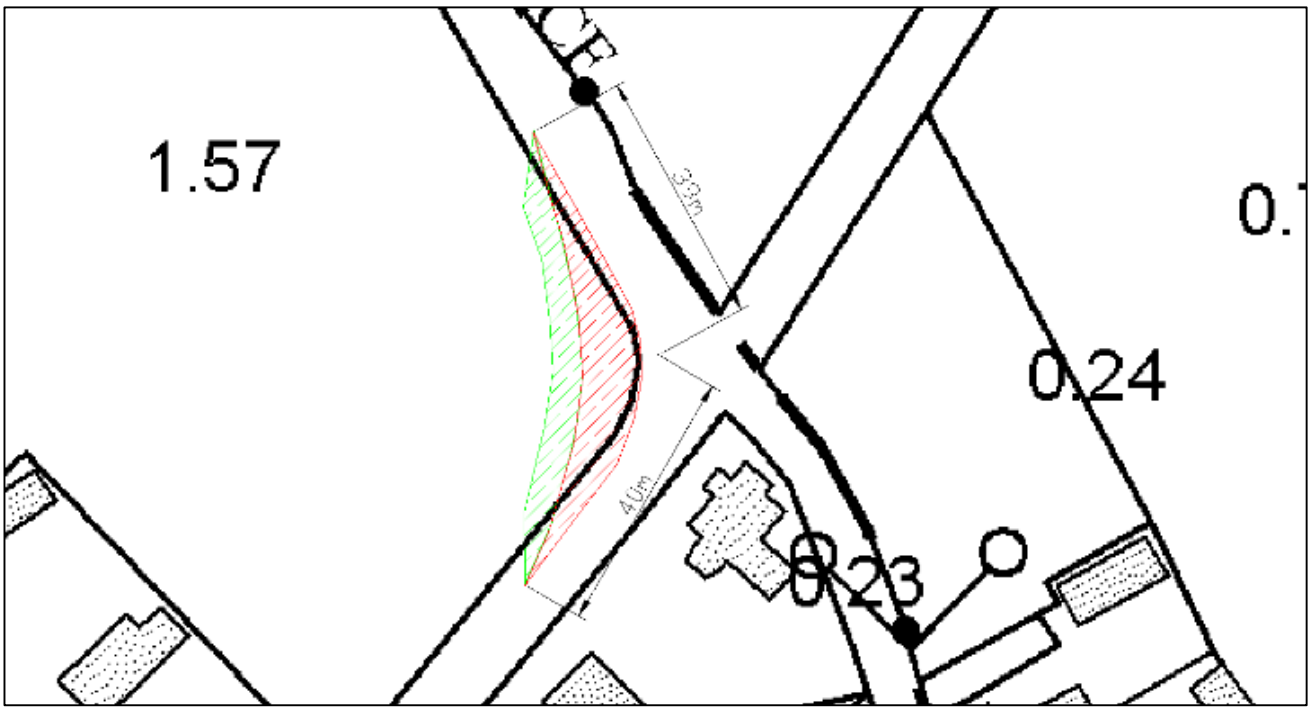
Area requiring hardcore

Area of oversail

Location Map:

Upgrade works:
Remove hedge and trees to dimensions highlighted and hardcore area. 1no ESB Pole to be moved

Sketch:



Aerial View of Node

NKCLNC004	**Left Bend on R414** East of Rathangan	N 669720 E 722525

Photo Reference:

LEGEND:

Direction of Delivery

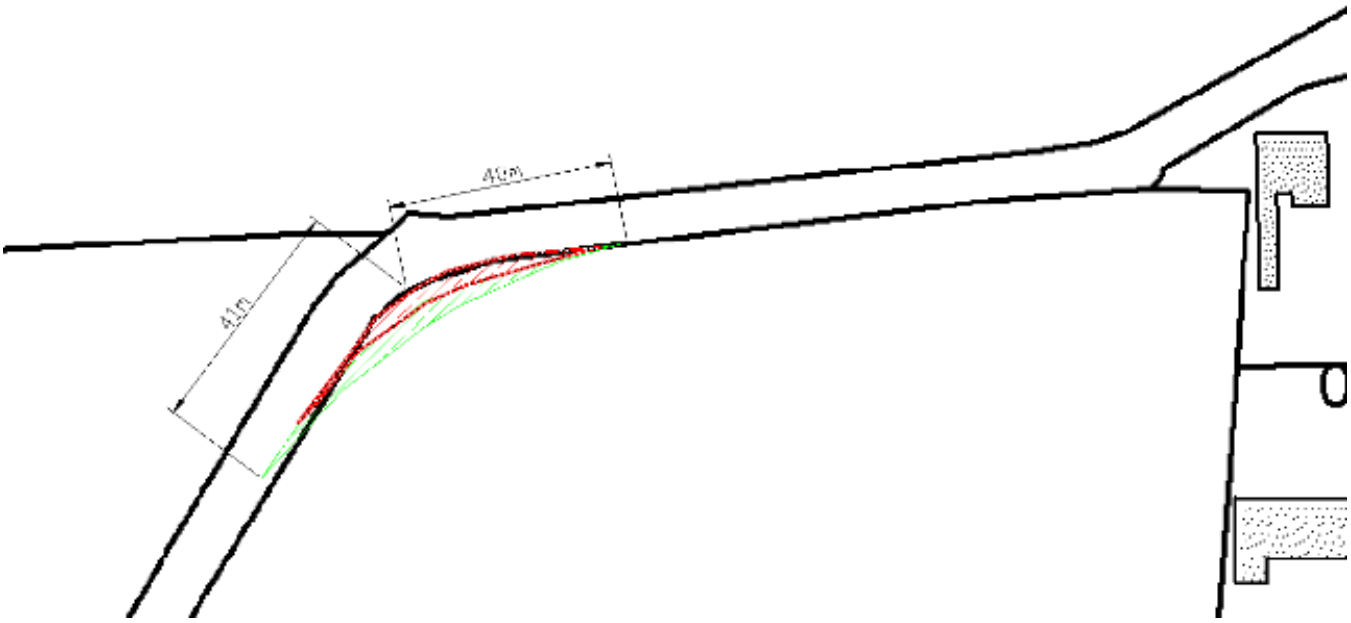
Area requiring hardcore

Area of oversail

Location Map:

Upgrade works:
Remove hedge and trees to dimensions highlighted and hardcore area. 1no Eircom Pole to be removed.

Sketch:



Aerial View of Node

NKCLNC005	**Left Bend on R414** East of Rathangan	N 669654 E 722121

Photo Reference:

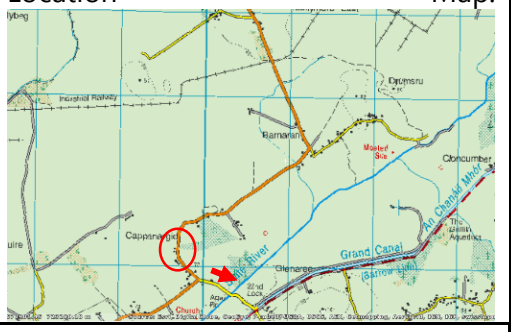
LEGEND:

Direction of Delivery

Area requiring hardcore

Area of oversail

Location Map:



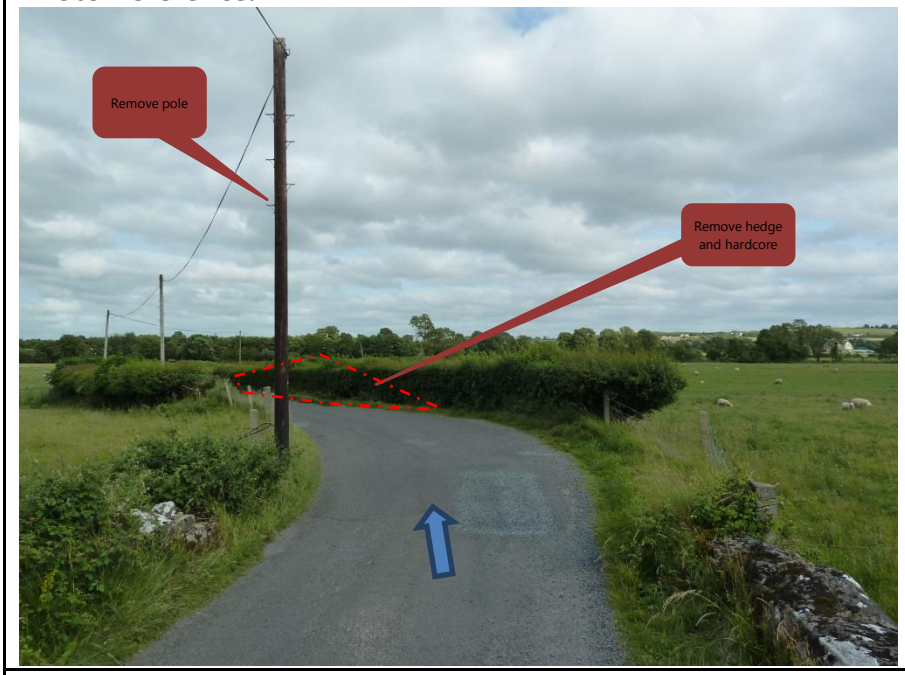
Upgrade works:
Lower Verge for oversail

Sketch:

Aerial View of Node

NKCLNC006	**"S" Bend after Agar Bridge**	X 670257 Y 721702

Photo Reference:



LEGEND:

Direction of Delivery

Area of Upgrade Works

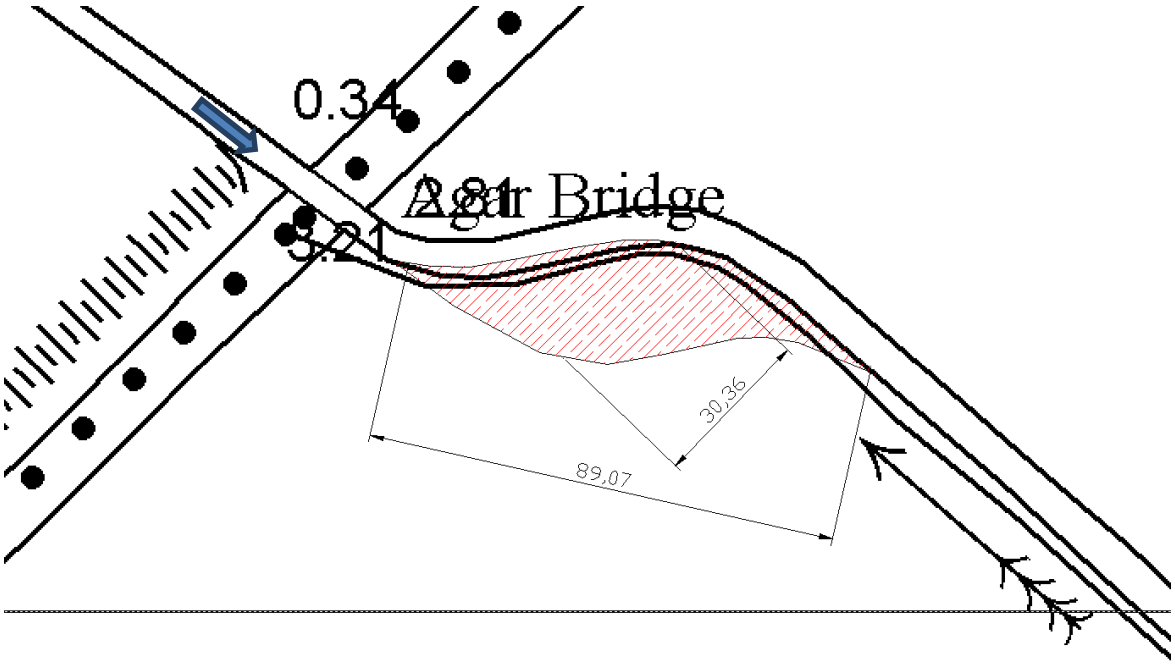
Area of oversail

Location Map:

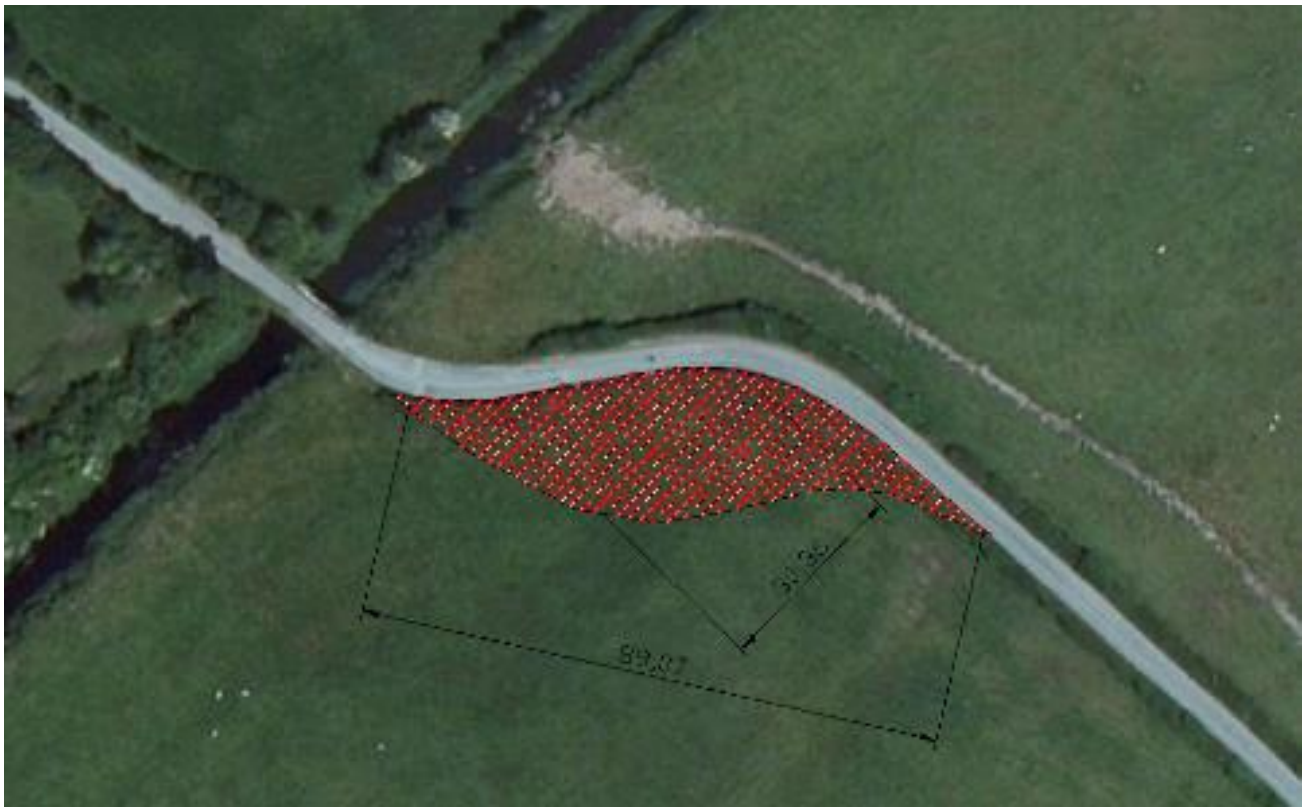
Upgrade works:

To cross the bridge land take will be required straight ahead after bridge. Hedge to be removed and hardcore to be placed. 1no Eircom Pole to be removed

Sketch:

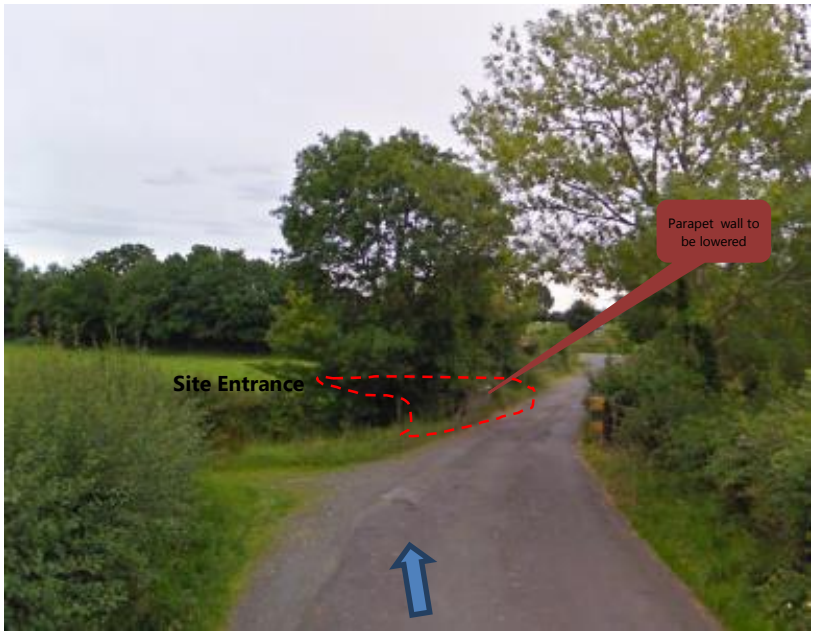


Aerial View of node



NKCLNC007	**Land drain bridge before the Site Entrance**	X 670496 Y 721579

Photo Reference:



LEGEND:

Direction of Delivery

Area of Upgrade Works

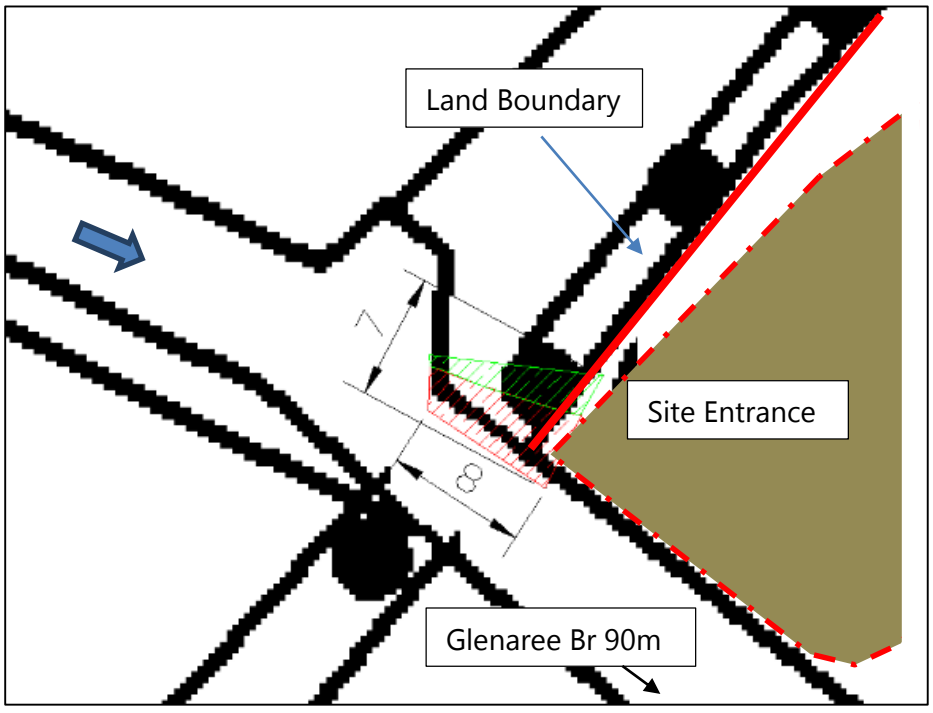
Area of oversail

Location Map:

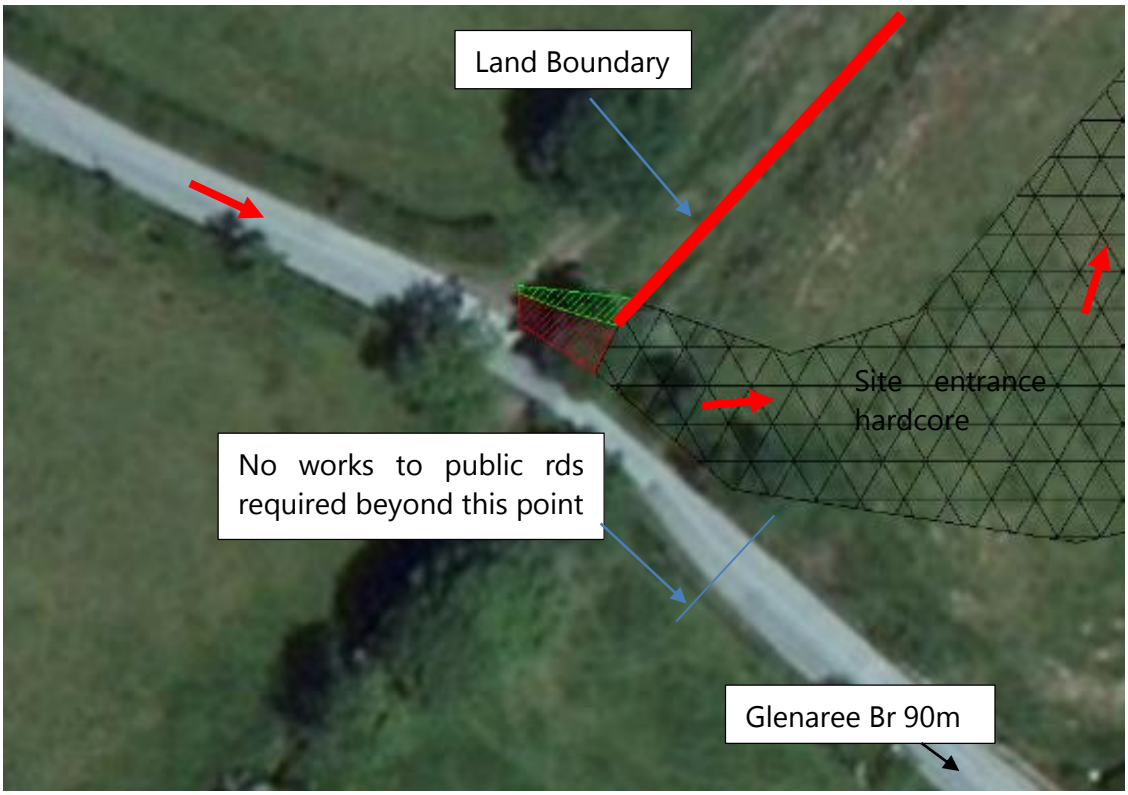
Upgrade works:

Before vehicles enter the site the land drain bridge will have to be extended and hardcore placed on the left hand side. Tree will have to be removed. The parapet wall of the unnamed bridge is to be lowered to allow vehicles to pass. No works are required at Glenaree Bridge

Sketch:

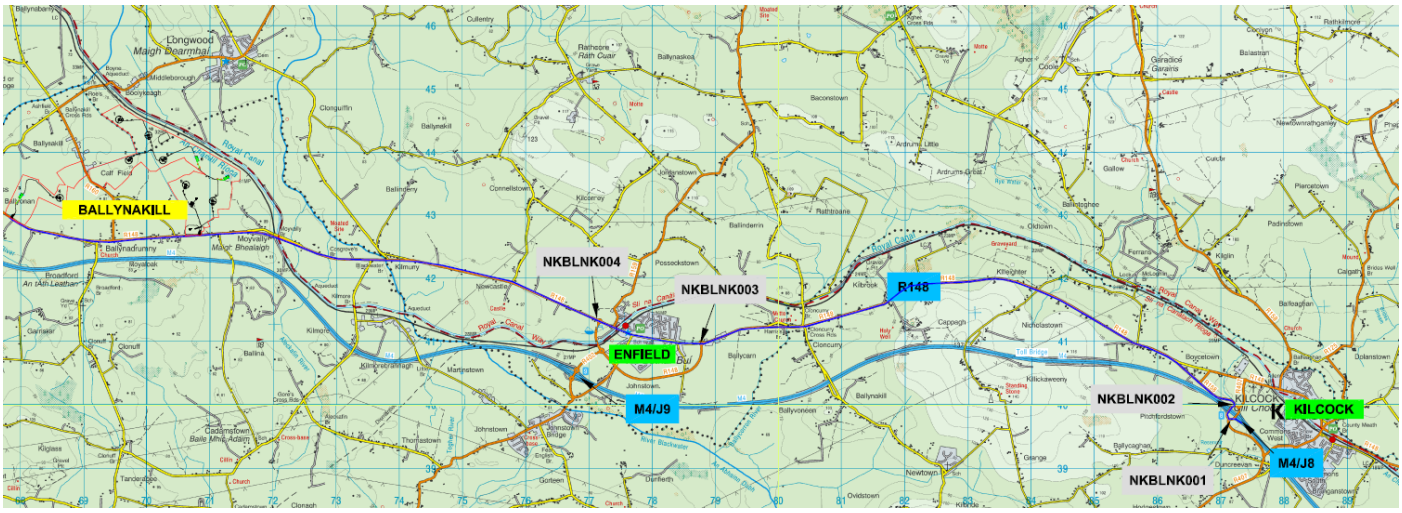


Aerial View of node



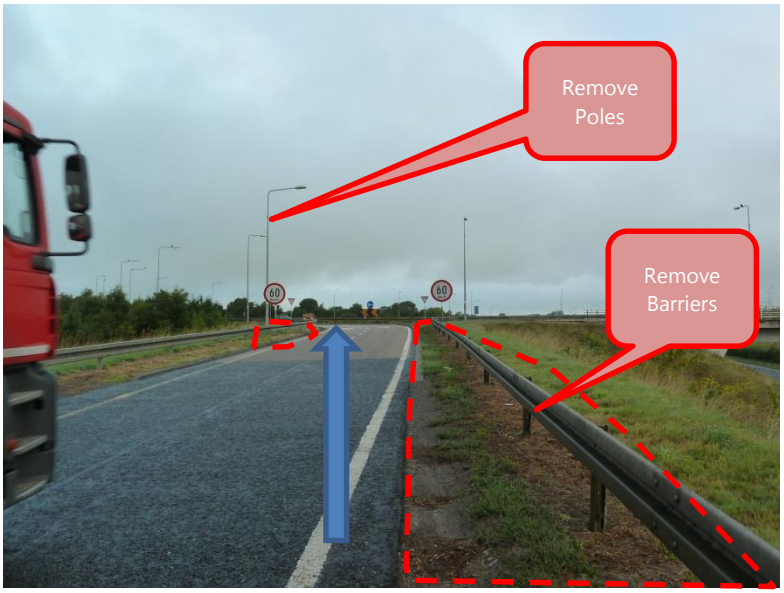
Ballynakill

To access Ballynakill exit the M4 motorway at junction 8 Kilcock. Travel around the roundabout exiting onto the R158 and then onto the R148. Continue on the R148 through the town of Enfield to the site entrances on the right hand side. The site entrance is to be constructed to Turbine Suppliers specifications.



NKBLNK001 **NRA Land Take** N 687147
KILCOCK EXIT E 739807
(M4 WEST)

Photo Reference:



LEGEND:

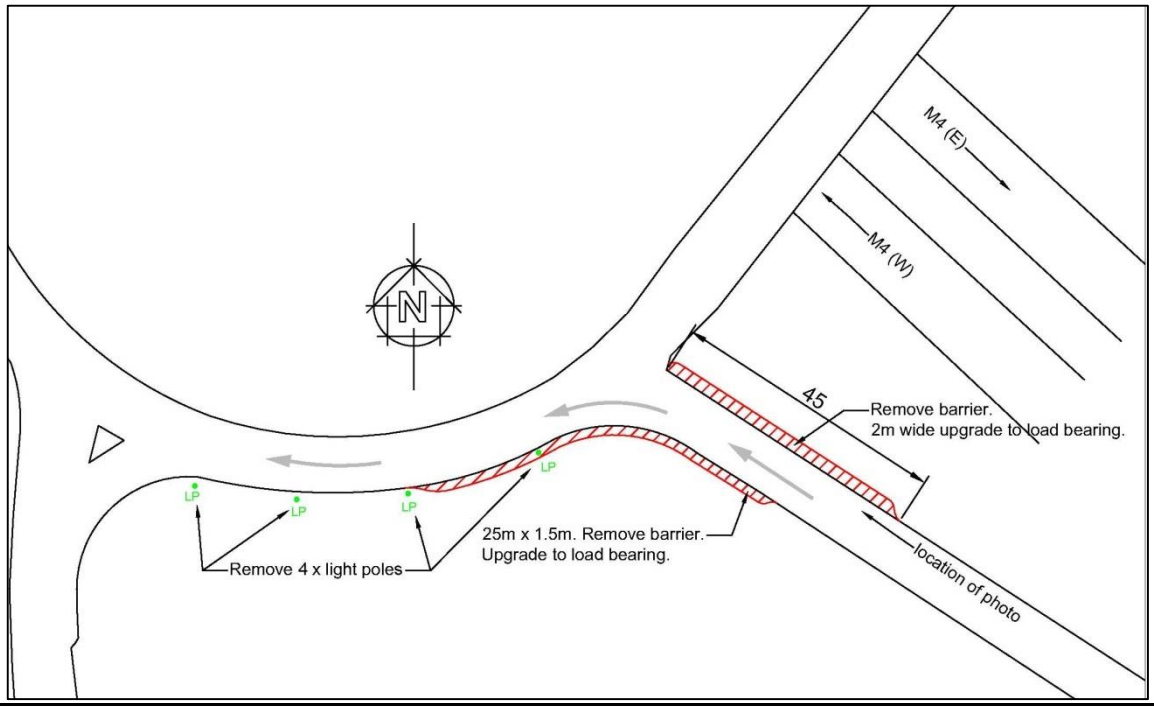
Direction of Delivery

Area requiring hardcore

Location Map:

Upgrade works:
Remove barriers and upgrade the locations shown below to load bearing. 4 No. light poles are also required to be removed.

Sketch:



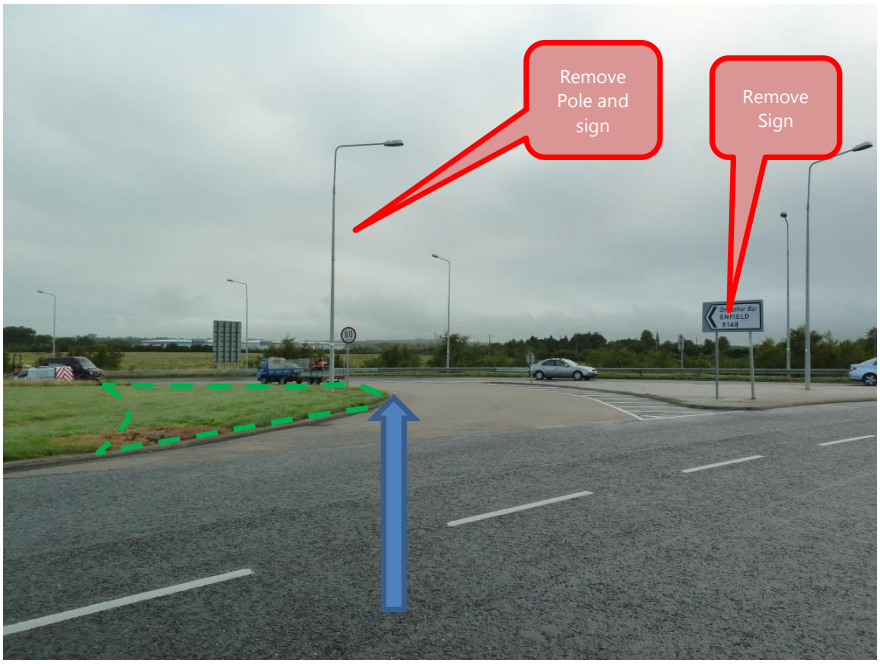
Aerial View of Node

NKBLNK002

NRA oversail
KILCOCK EXIT
TO R148

N 687139
E 740014

Photo Reference:



LEGEND:

Direction of Delivery

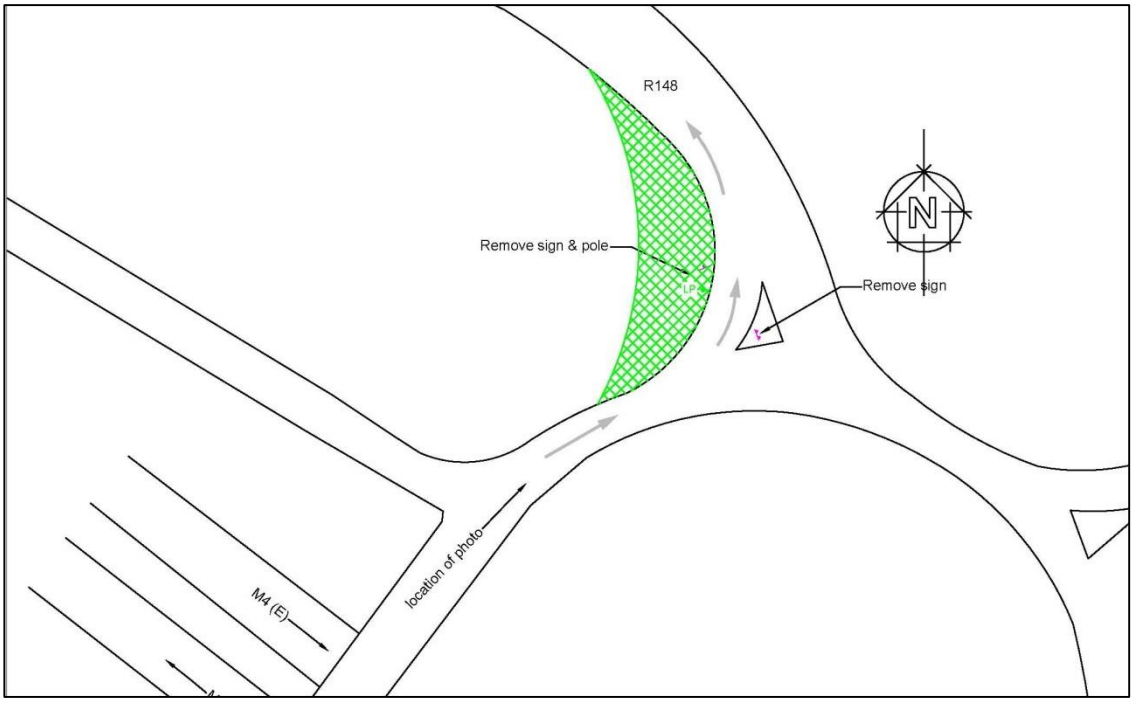
Area requiring hardcore

Area of oversail

Location Map:

Upgrade works:
Remove light pole and 2 signs as shown. An oversail area is required.

Sketch:



Aerial View of Node

NKBLNK003 **County Council Land Take** N 678717
R148 AT ENFIELD EAST E 740998

Photo Reference:

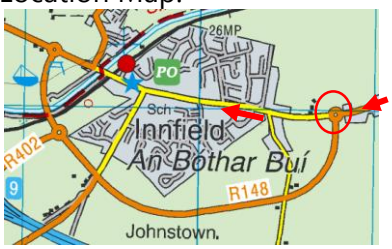
LEGEND:

Direction of Delivery

Area requiring hardcore

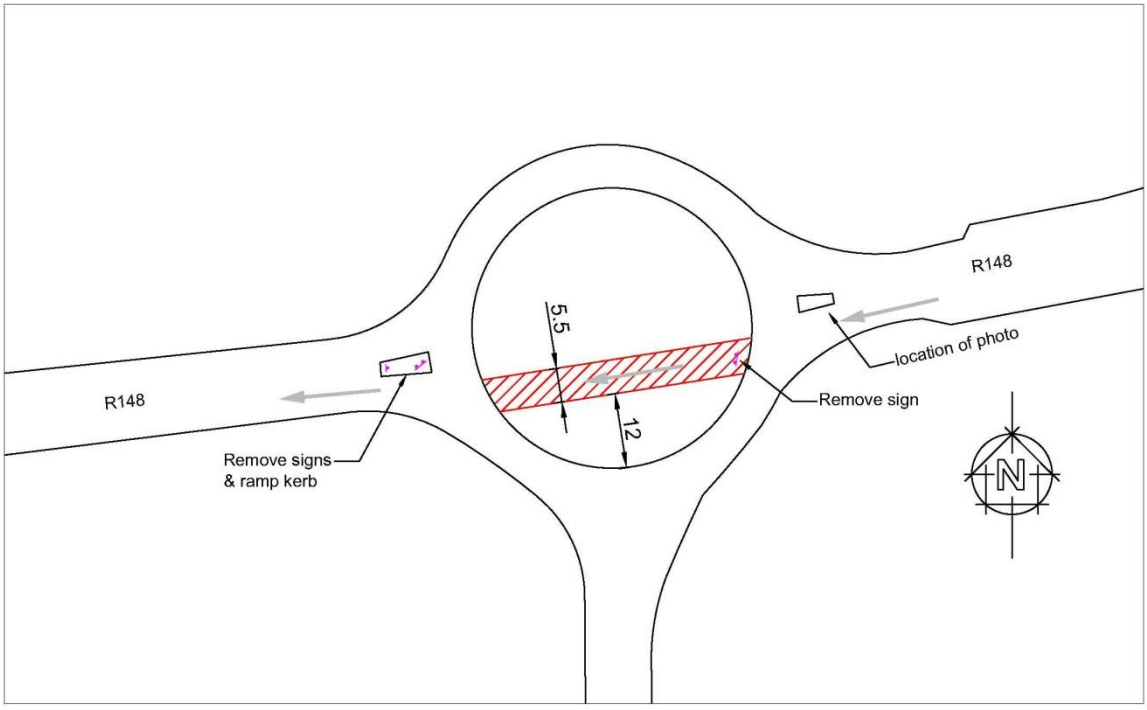
Area of oversail

Location Map:

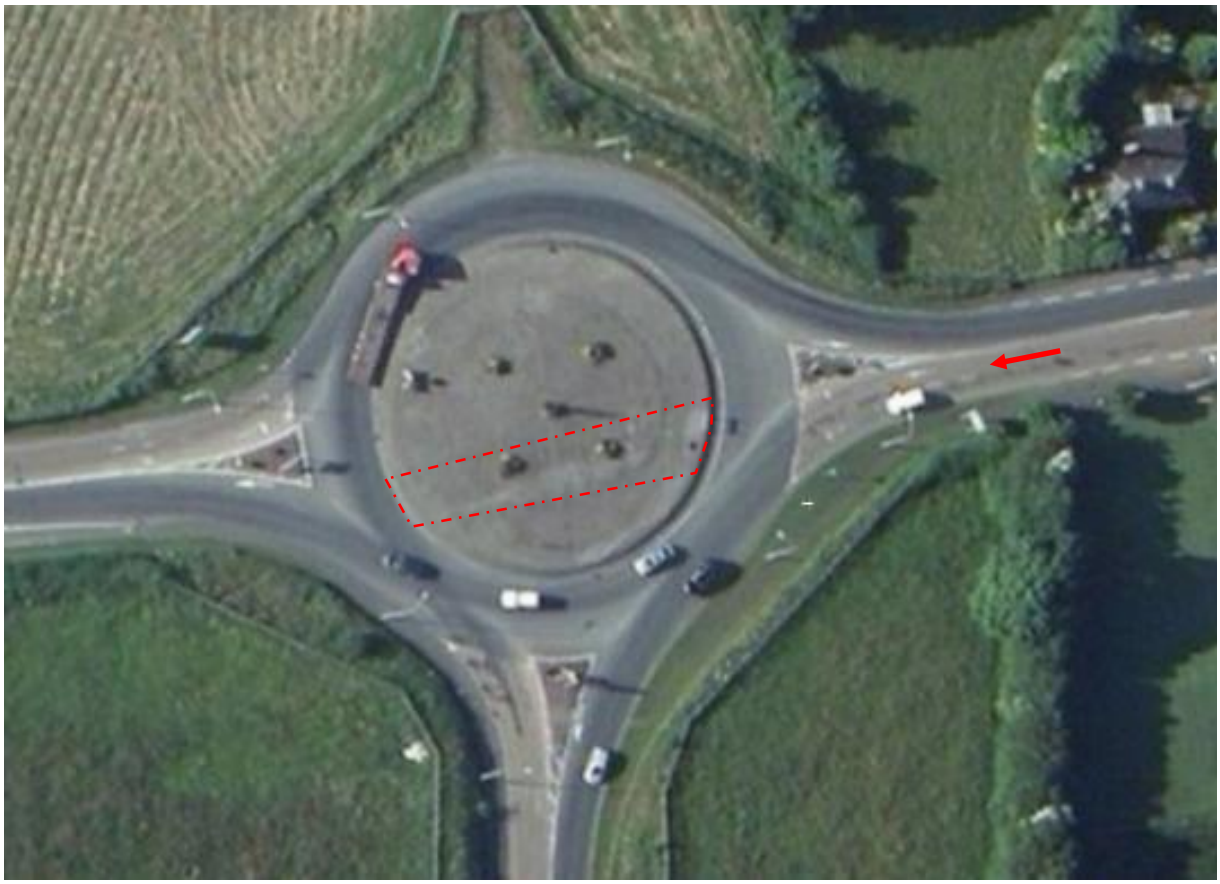


Upgrade works:
Construct a new track through the central island. Remove signage to facilitate this construction. Paving on centre island to be removed and the level will need to be lowered for deliveries to pass.

Sketch:



Aerial View of Node



NKBLNK004	**County Council Land Take** R148 AT ENFIELD WEST	N 677102 E 741338

Photo Reference:

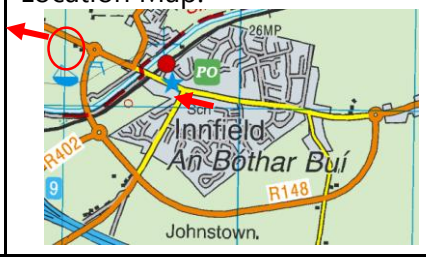
LEGEND:

Direction of Delivery

Area requiring hardcore

Area of oversail

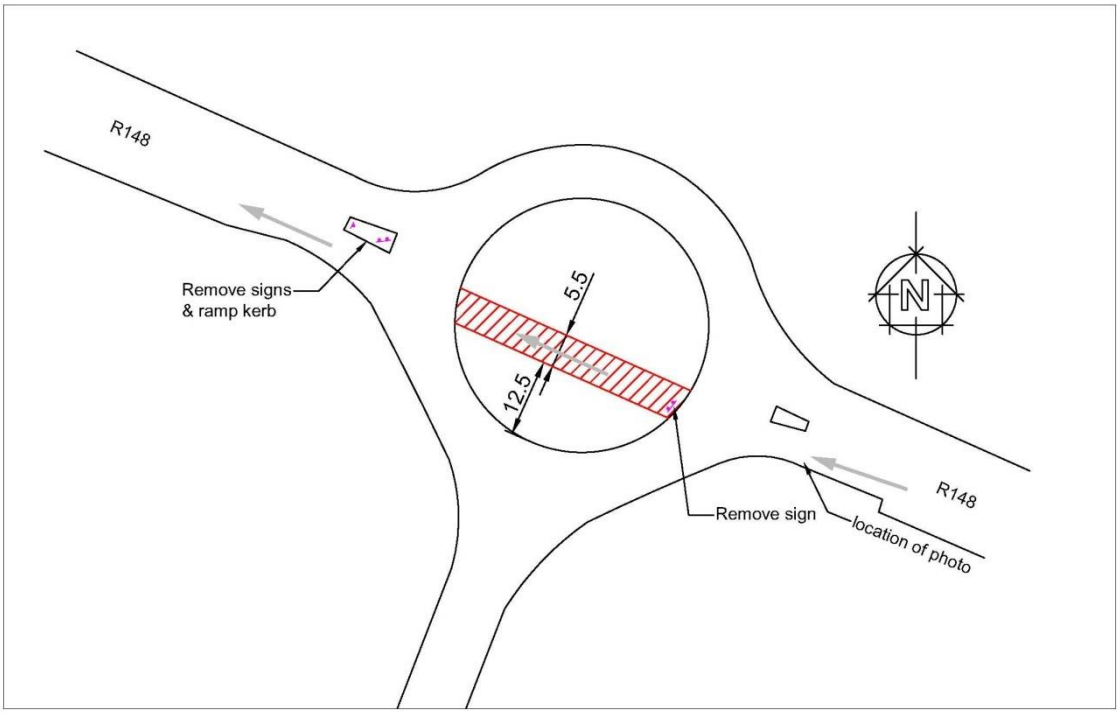
Location Map:



Upgrade works:

Construct a new track through the central island. Remove signage to facilitate this construction. Paving on centre island to be removed and the level will need to be lowered for deliveries to pass.

Sketch:



Aerial View of Node

Continue in the R148 to the Ballynakill entrances 1 and 2

Alternative Delivery Methods

In order to minimise the impact on the existing environment during turbine component deliveries there are several alternative options available.

The above report details the alterations needed for the delivery of the largest turbine component using an extendable rear steer trailer.

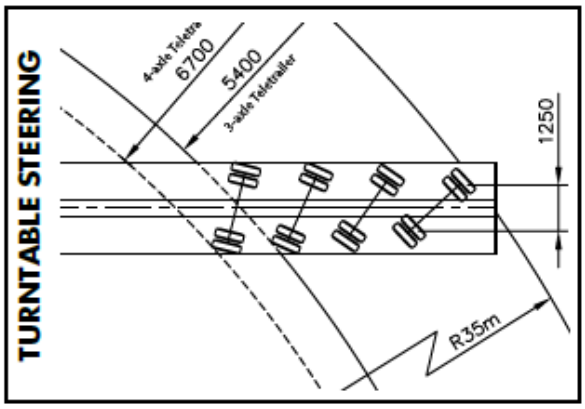
1. Multi Adapt Blade Trailers

See below details of the Nooteboom Mega Wing blade transporter currently in use on wind farm sites.

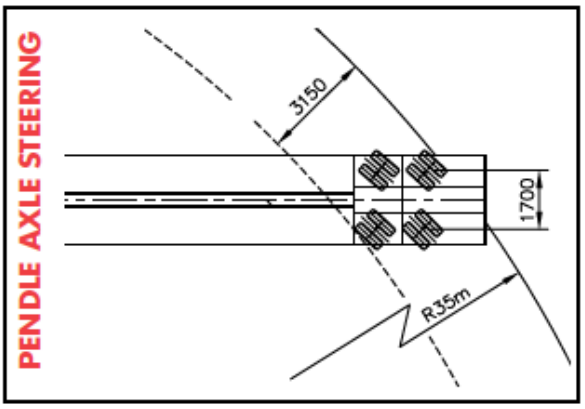
- Retractable Axle Assembly – (helps to reduce the turning area of the trailer)

- Pendle Axle Steering – rear axle steering requires less hardcore area and offers a tighter turning radius

Conventional Rear wheel steer



New Pendle axle steering



- Height Adjustable Trailer – The trailer load can be raised by up to 1.2m above FRL

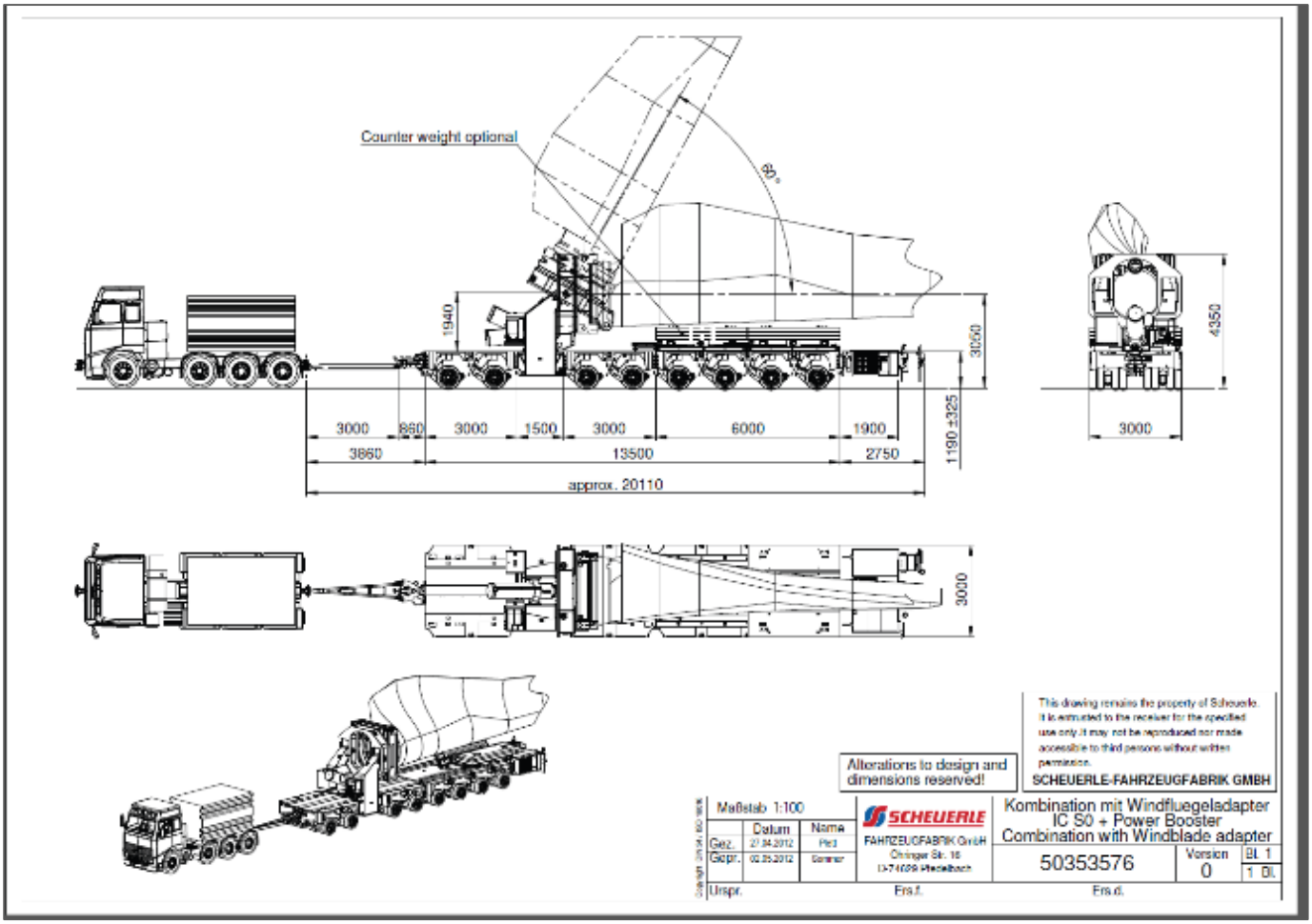


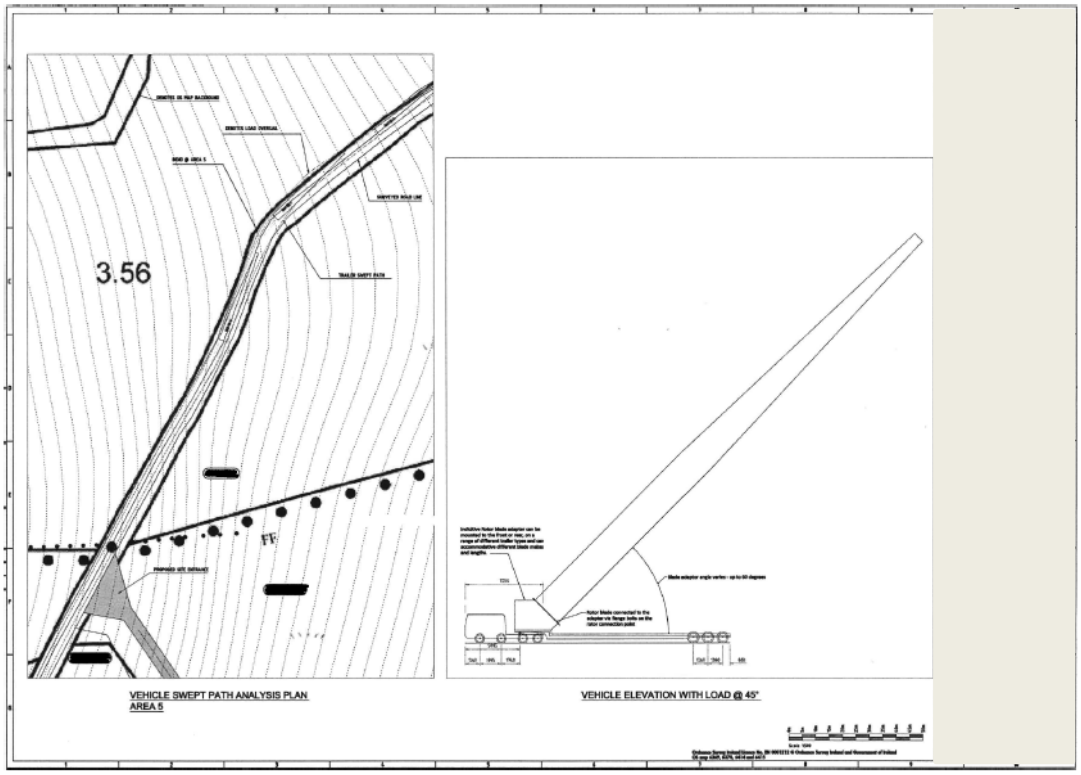
2. Blade Adaptor

Depending on the site location, some access routes may not have the physical landscape to allow alterations be carried out. This can happen on narrow access roads where there is no option to cut/fill at bends. Circumstances on delivery routes could change resulting in a node too tight to get around with the blade in the conventional position i.e. horizontal. If this situation arises, a blade adaptor can be used whereby the blade is connected to a specially adapted motorised unit, tilted up to 60deg into the air and transported through the restricted area. By tilting, the blade length is effectively reduced to 30m thus the land area needed for transport is reduce. A detailed topographical survey will be needed to ensure the public road is capable of taking the load in the adapted position. The transport company is to ensure all overhead utilities are locally diverted or temporarily lowered.

Blade connected to the balde adaptor


See below Blade adaptor considered on another Wind Farm project in Ireland


Counter weight optional
1940
3050
4350
3000
880
3000
1500
3000
6000
1900
3860
13500
2750
approx. 20110
1190 ±325
3000
Alterations to design and dimensions reserved!
This drawing remains the property of Scheuerle. It is entrusted to the receiver for the specified use only. It may not be reproduced nor made accessible to third persons without written permission.
SCHEUERLE-FAHRZEUGFABRIK GMBH
Maßstab 1:100
Datum
Name
Gez.
Gepr.
SCHEUERLE
FAHRZEUGFABRIK GmbH
Kombination mit Windfluegeladapter
IC S0 + Power Booster
Combination with Windblade adapter
50353576
Version
0
BL 1
1 DL
Urspr.
Ers.f.
Ers.d.


3.56
VEHICLE SWEPT PATH ANALYSIS PLAN
AREA 5
VEHICLE ELEVATION WITH LOAD @ 45°

NOTES

1. All works identified in the above are to be assessed and approved by the NRA and Kildare/Meath County Council.
2. At NK001 and NK002 and NKBLNK001, 002 the NRA and the Motorway Management Company are to be consulted.
3. Topographical survey to be carried out on all nodes before works commence.
4. All road upgrade dimensions are to comply with Turbine Manufacturers details.
5. The surface of several roads will require structural assessment due to unever pavement and local surface failures that could affect the clearence under the oversive loads.
6. Utilities such as ESB and Eircom poles are subject to ongoing upgrade and maintenance and every effort was made at the time of the survey to identify these. Some movement may occur resulting in poles coming into or out of the node area.

APPENDIX K2

Comprehensive breakdown of the estimated traffic

Table A: Estimated Indicative Movements across Construction Programme for Site Set Up

Site Set up	Unit	No/Qty	Qty/ Load	Total No of Loads	Vehicle Type		Site	*Tot/Split*	Month											
									1	2	3	4	5	6	7	8	9	10	11	12
Site Compounds General Fill Import	m^3	6000	0.1	600	HGV		Ballynakill	*0*												
							Windmill	*0*												
							Drehid/Hortland	*600*	300	300										
							Cloncumber	*0*												
							Derrybrennan	*0*												
								600												
Site Compounds Capping Import	m^3	2000	0.1	200	HGV		Ballynakill	*50*	25	25										
							Windmill	*0*												
							Drehid/Hortland	*100*	50	50										
							Cloncumber	*50*				20	20	10						
							Derrybrennan	*0*												
								200												
Site Office	no	9	1	9	HGV		Ballynakill	*2*	2											
							Windmill	*0*												
							Drehid/Hortland	*5*	5											
							Cloncumber	*2*				2								
							Derrybrennan	*0*												
								9												
Storage and Welfare	no	6	2	12	HGV		Ballynakill	*3*	3											
							Windmill	*0*												
							Drehid/Hortland	*6*	6											
							Cloncumber	*3*					3							
							Derrybrennan	*0*												
								12												
Perimeter Fencing	no	4	4	16	HGV		Ballynakill	*1*	1											
							Windmill	*0*												
							Drehid/Hortland	*2*	2											
							Cloncumber	*1*						1						
							Derrybrennan	*0*												
								4												
Split per Cluster (HGV)							Ballynakill	*55*	*31*	*25*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Split per Cluster (HGV)							Windmill	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Split per Cluster (HGV)							Drehid/Hortland	*713*	*363*	*350*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Split per Cluster (HGV)							Cloncumber	*56*	*0*	*0*	*0*	*22*	*23*	*11*	*0*	*0*	*0*	*0*	*0*	*0*
Split per Cluster (HGV)							Derrybrennan	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Total No. of HGV Traffic (Loads per month)								*824*	*394*	*375*	*0*	*22*	*23*	*11*	*0*	*0*	*0*	*0*	*0*	*0*
Site Set-up team	days	30	10	300	LGV		Ballynakill	*64*	24	20	20									
							Windmill	*0*												
							Drehid/Hortland	*150*	50	50	50									
							Cloncumber	*75*				25	25	25						
							Derrybrennan	*0*												
								289												
Permanent Site Vehicles	days	400	10	4000	LGV		Ballynakill	*851*	170	170	170	170	170							
							Windmill	*0*												
							Drehid/Hortland	*2000*	167	167	167	167	167	167	167	167	167	167	167	167
							Cloncumber	*1000*					143	143	143	143	143	143	143	
							Derrybrennan	*0*												
								3851												
Split per Cluster (LGV)							Ballynakill	*915*	*194*	*190*	*190*	*170*	*170*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Split per Cluster (LGV)							Windmill	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Split per Cluster (LGV)							Drehid/Hortland	*2150*	*217*	*217*	*217*	*167*	*167*	*167*	*167*	*167*	*167*	*167*	*167*	*167*
Split per Cluster (LGV)							Cloncumber	*1075*	*0*	*0*	*0*	*25*	*168*	*168*	*143*	*143*	*143*	*143*	*143*	*0*
Split per Cluster (LGV)							Derrybrennan	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Total No. of LGV Traffic (Loads per month)								*4140*	*411*	*407*	*407*	*362*	*505*	*335*	*310*	*310*	*310*	*310*	*310*	*167*

Table B: Estimated Indicative Movements across Construction Programme for Site Civil Works

On Site Civil Works	Unit	No/Qty	Qty/Load	Total No of Loads	Vehicle Type	Site	Tot/Split	Month												
								1	2	3	4	5	6	7	8	9	10	11	12	13	14
Civil Plant Deliveries	no	100	1	100	HGV	Ballynakill	21	8	8	8	8										
						Windmill	6				4	3	3								
						Drehid/Hortland	45	9	9	8	8	7	7	6	6	4	3				
						Cloncumber	23					5	5	5	5	5	5	5			
						Derrybrennan	4										3	2	1		
							100														
Roads Capping Import	m^3	18540	0.1	1854	HGV	Ballynakill	394	131	131	131											
						Windmill	118				118										
						Drehid/Hortland	828	118	118	118	118	118	118	118							
						Cloncumber	434					87	87	87	87	87					
						Derrybrennan	79											39	39		
							1854														
General Fill Import	m^3	121672	0.1	12167	HGV	Ballynakill	0														
						Windmill	1404				351	351	351	351							
						Drehid/Hortland	9827	702	702	702	702	702	702	702	702	702	702	702	702	702	702
						Cloncumber	0														
						Derrybrennan	936											312	312	312	
							12167														
Reinforcing Steel	t	2820	0.04	113	HGV	Ballynakill	24		8	8	8										
						Windmill	7			2	2	2									
						Drehid/Hortland	50		5	5	5	5	5	5	5	5	5	5	5		
						Cloncumber	26										9	9	9		
						Derrybrennan	5														5
							113														
Concrete Import	m^3	27730	0.125	3466	HGV	Ballynakill	738		246	246	246										
						Windmill	221			74	74	74									
						Drehid/Hortland	1549		155	155	155	155	155	155	155	155	155	155			
						Cloncumber	811										270	270	270		
						Derrybrennan	148														148
							3466														
Cranes (2 movement per site)	no	20	2	40	HGV	Ballynakill	4		2		2										
						Windmill	4					2		2							
						Drehid/Hortland	12		2		2		2		2		2				
						Cloncumber	4									2				2	
						Derrybrennan	4													4	
							28														
Construction Formwork	no	5	4	20	HGV	Ballynakill	4		2		2										
						Windmill	4			2		2									
						Drehid/Hortland	12		6									6			
						Cloncumber	4									2		2			
						Derrybrennan	4													4	
							28														
Hardstands Capping	m^3	7050	0.1	705	HGV	Ballynakill	150			75	75										
						Windmill	45							45							
						Drehid/Hortland	315								63	63	63	63	63		
						Cloncumber	165												82.5	82.5	
						Derrybrennan	30													30	
							705														
Passing Bays Capping Import	m^3	589	0.1	59	HGV	Ballynakill	13			13											
						Windmill	4				4										
						Drehid/Hortland	26						13	13							
						Cloncumber	14									14					
						Derrybrennan	3												3		
							59														
Turning Heads Capping Import	m^3	705	0.1	71	HGV	Ballynakill	15			15											
						Windmill	5				5										
						Drehid/Hortland	32						16	16							
						Cloncumber	17									17					
						Derrybrennan	3												3		
							71														
Cable Trench Materials (sand)	m	40003	0.020	800	HGV	Ballynakill	170					170									
						Windmill	51							51							
						Drehid/Hortland	357										119	119	119		
						Cloncumber	187											94	94		
						Derrybrennan	34													34	
							800														
Cable Drums	no	200	0.1	25	HGV	Ballynakill	5					5									
						Windmill	2							2							
						Drehid/Hortland	11										4	4	4		
						Cloncumber	6											3	3		
						Derrybrennan	1													1	
							25														
Split per Cluster (HGV)						Ballynakill	1538	139	397	496	341	176	0	0	0	0	0	0	0	0	0
Split per Cluster (HGV)						Windmill	1871	0	0	80	558	434	354	449	0	0	0	0	0	0	0
Split per Cluster (HGV)						Drehid/Hortland	13065	829	997	988	990	987	1018	1015	933	928	1053	1053	892	702	702
Split per Cluster (HGV)						Cloncumber	1691	0	0	0	0	92	92	92	92	126	284	383	458	85	0
Split per Cluster (HGV)						Derrybrennan	1250	0	0	0	0	0	0	0	0	354	353	313	6	73	152
Total No. of HGV Traffic Movemnets per month							19416	969	1394	1564	1889	1688	1464	1555	1025	1409	1690	1749	1356	860	854
Construction Team Vehicles	days	240	25	6000	LGV	Ballynakill	1277	255	255	255	255	255									
						Windmill	383			77	77	77	77	77							
						Drehid/Hortland	2681	223	223	223	223	223	223	223	223	223	223	223	223		
						Cloncumber	1404					201	201	201	201	201	201	201			
						Derrybrennan	255											64	64	64	64
Total No. LGV Traffic Movements per month							6000	479	479	555	555	756	501	501	424	424	424	488	287	64	64

Table C: Estimated Indicative Movements across Construction Programme for Public Road MVAC Civil Works

MV Public Road Civil Works	Unit	No/Qty	Qty/Load	Total No of Loads	Vehicle Type	Site	Tot/Split	Month													
								1	2	3	4	5	6	7	8	9	10	11	12	13	14
Plant Deliveries	m	15	1	15	HGV	Ballynakill	3		3												
						Windmill	1											1			
						Drehid	7	7													
						Cloncumber	4						4								
						Derrybrennan	1	1													
							15														
Cable Trenching (1load/20m)	m	33887	0.03	1130	HGV	Ballynakill	240		30	30	30	30	30	30	30	30					
						Windmill	72										36	36			
						Drehid	505		126	126	126	126									
						Cloncumber	264						44	44	44	44	44	44			
						Derrybrennan	48	8	8	8	8	8	8								
							1130														
Cable Drums (600m/drum)	no	169	0.1	21	HGV	Ballynakill	5								1	1	1	1	1		
						Windmill	1								0	0	0	0	0		
						Drehid	9								2	2	2	2	2		
						Cloncumber	5								1	1	1	1	1		
						Derrybrennan	1								0	0	0	0	0		
							21														
Ducting (2000m/load)	m	169435	0.0005	85	HGV	Ballynakill	18		2	2	2	2	2	2	2	2					
						Windmill	5										3	3			
						Drehid	38			5	5	5	5	5	5	5	5				
						Cloncumber	20							4	4	4	4	4			
						Derrybrennan	4		1		1	1									
							85														
Backfill Import ($0.5m^3/m$)	m	33887	0.03	1130	HGV	Ballynakill	240		30	30	30	30	30	30	30	30					
						Windmill	72										36	36			
						Drehid	505			63	63	63	63	63	63	63	63				
						Cloncumber	264							53	53	53	53	53			
						Derrybrennan	48		10	10	10	10	10								
							1130														
Road Reinstatement (in-situ road recycling)	m	33887	0.02	678	HGV	Ballynakill	144		18	18	18	18	18	18	18	18					
						Windmill	43										22	22			
						Drehid	303			38	38	38	38	38	38	38	38				
						Cloncumber	159							32	32	32	32	32			
						Derrybrennan	29		6	6	6	6	6								
							678														
Split per Cluster						Ballynakill	651	0	84	80	80	80	80	80	81	81	1	1	1	0	0
Split per Cluster						Windmill	195	0	0	0	0	0	0	0	0	0	97	98	0	0	0
Split per Cluster						Drehid/Hortland	1366	7	126	232	232	232	106	106	108	108	108	2	2	0	0
Split per Cluster						Cloncumber	716	0	0	0	0	0	48	133	134	134	134	134	1	0	0
Split per Cluster						Derrybrennan	130	9	25	23	25	25	23	0	0	0	0	0	0	0	0
Total No. of HGV Traffic (Loads per month)							3058	15	234	336	337	337	257	319	323	323	339	234	4	0	0
Construction Team Vehicles	days	312	7	2184	LGV	Ballynakill	465		36	36	36	36	36	36	36	36	36	36	36	36	36
						Windmill	139		11	11	11	11	11	11	11	11	11	11	11	11	11
						Drehid/Hortland	976	70	70	70	70	70	70	70	70	70	70	70	70	70	70
						Cloncumber	511		39	39	39	39	39	39	39	39	39	39	39	39	39
						Derrybrennan	93	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Total No. LGV Traffic Movements per month							2184		162	162	162	162	162	162	162	162	162	162	162	162	162

Table D: Estimated Indicative Movements across Construction Programme for Turbine Works

Turbines	Unit	No/Qty	Qty/Load	Total No of Loads	Vehicle Type		Site	Month													
								10	11	12	13	14	15	16	17	18	19	20	21	22	23
Component Delivery	m^3	47	10	470	HGV		Ballynakill	25	25	25											
							Windmill			15	15										
							Drehid/Hortland		35	35	35	35	35	35							
							Cloncumber						28	28	28	28					
							Derrybrennan									10	10				
Cranes	no	2	25	50	HGV		Ballynakill	5	0	0	0	5									
							Windmill				2	2									
							Drehid/Hortland			11	0	0	0	0	0	0	11				
							Cloncumber								6	0	0	0	6		
							Derrybrennan													2	
Split per Cluster							Ballynakill	30	25	25	0	5	0	0	0	0	0	0	0	0	0
Split per Cluster							Windmill	0	0	15	17	2	0	0	0	0	0	0	0	0	0
Split per Cluster							Drehid/Hortland	0	35	46	35	35	35	35	0	0	11	0	0	0	0
Split per Cluster							Cloncumber	0	0	0	0	0	28	28	33	28	0	0	6	0	0
Split per Cluster							Derrybrennan	0	0	0	0	0	0	0	0	10	10	0	0	2	0
Total No. of HGV Traffic Movemnets per month								30	60	86	52	42	63	63	33	38	21	0	6	2	0
Construction Team Vehicles	days	360	15	5400	LGV		Ballynakill	181	181	181	181	191	10	5	5	5	5	5	5	5	5
							Windmill			105	105	110	3	3	3	3	3	3	3	2	2
							Drehid/Hortland		258	258	268	268	268	268	268	258	258	10	10	10	10
							Cloncumber				176	176	176	176	181	181	181	5	5	5	5
							Derrybrennan					5	5	5	67	67	5	5	67	3	2
Total No. LGV Traffic Movements per month								181	440	544	730	750	462	457	523	513	452	28	90	25	24

Table E: Estimated Indicative Movements across Construction Programme for Maighne Substation

Substation & Ctrl Bld at Maighne	Unit	No/Qty	Qty/Load	Total No of Loads	Vehicle Type		Site	Tot/Split		Month														
									4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
Platform general fill import (est. 20% won on site)	m^3	3072	0.1	307	HGV		Drehid/ Hortland	307	76.8	76.8	76.8	76.8												
Hardstands Capping Import	m^3	1920	0.1	192	HGV		Drehid/ Hortland	192	38	38	38	38	38											
Concrete Import	m^3	500	0.125	63	HGV		Drehid/ Hortland	63		10	10	10	10	10	10									
Building Materials	no	50	1	50	HGV		Drehid/ Hortland	22		4	4	4	4	4	4									
Equipment Supply	no	50	1	50	HGV		Drehid/ Hortland	50										10	10	10	10	10		
Total No. of HGV Traffic Movemnets per month							Drehid/ Hortland	634	115	129	129	129	53	14	14	0	0	10	10	10	10	10	0	
Construction Team Vehicles	days	240	10	2400	LGV		Drehid/ Hortland	2400	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Total No. LGV Traffic Movements per month																								

Table F: Estimated Total Number of Vehicular Movements acorss Construction Programme (excluding HV Public Road Civil Works)

		Month																						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Total No. of HGV Loads per month per cluster	Ballynakill	170	422	579	421	256	80	80	80	106	112	26	26	1	5	0	0	0	0	0	0	0	0	0
	Windmill	0	0	80	558	434	354	449	0	0	0	97	113	17	2	0	0	0	0	0	0	0	0	0
	Drehid/Hortland	1192	1354	1114	1222	1219	1250	1120	1038	1036	1160	1196	940	739	737	35	35	0	0	11	0	0	0	0
	Cloncumber	0	0	0	22	115	103	139	224	260	418	516	592	85	0	28	28	33	28	0	0	6	0	0
	Derrybrennan	0	9	25	23	25	25	23	0	355	354	313	6	73	152	0	0	0	10	10	0	0	2	0
	Total - Maighne Wind Farm	1363	1785	1798	2246	2048	1812	1812	1343	1757	2044	**2148**	1677	915	896	63	63	33	38	21	0	6	2	0
Total No. of HGV TRIPS (Loads x2 to allow for return trips)	Ballynakill	341	845	***1159***	842	512	161	161	161	213	223	52	52	2	11	0	0	0	0	0	0	0	0	0
	Windmill	0	0	160	***1115***	868	708	897	0	1	1	193	225	34	3	0	0	0	0	0	0	0	0	0
	Drehid/Hortland	2385	2708	2228	2444	2437	2500	2241	2077	2072	2321	***2392***	1881	1478	1474	70	70	0	0	22	0	0	0	0
	Cloncumber	0	0	0	44	230	206	279	449	519	836	1033	***1184***	171	0	55	55	67	55	0	0	12	0	0
	Derrybrennan	0	17	49	47	49	49	47	0	***709***	707	626	11	147	305	0	0	0	20	20	0	0	4	0
	Maighne Wind Farm	2726	3570	3596	4493	4096	3623	3624	2687	3514	4087	***4296***	3353	1831	1792	125	125	67	75	42	0	12	4	0
Total No. LGV Loads per month	Ballynakill	450	446	***481***	461	461	36	36	36	217	217	217	217	217	227	46	5	5	5	5	5	5	5	5
	Windmill	0	0	87	87	87	87	87	11	11	11	11	116	116	***121***	14	3	3	3	3	3	3	2	2
	Drehid/Hortland	440	510	510	460	460	460	460	460	460	460	***718***	***718***	338	338	338	268	268	258	258	10	10	10	10
	Cloncumber	0	0	39	64	***408***	***408***	383	383	383	383	383	39	215	215	215	176	181	181	181	5	5	5	5
	Derrybrennan	0	7	7	7	7	7	7	7	7	7	70	70	70	***75***	12	5	67	67	5	5	67	3	2
	Maighne Wind Farm	890	962	1124	1079	***1423***	997	972	896	1077	1077	1399	1160	956	976	624	457	523	513	452	28	90	25	24
Total No. of LGV TRIPS (Loads x2.5 to allow for return trips)	Ballynakill	1124	1114	***1203***	1153	1153	89	89	89	543	543	543	543	543	568	114	13	13	13	13	13	13	13	13
	Windmill	0	0	218	218	218	218	218	27	27	27	27	289	289	***302***	34	8	8	8	8	8	8	5	5
	Drehid/Hortland	1100	1274	1274	1149	1149	1149	1149	1149	1149	1149	***1795***	***1795***	844	844	844	670	670	645	645	25	25	25	25
	Cloncumber	0	0	98	161	***1019***	***1019***	957	957	957	957	957	98	537	537	537	439	451	451	451	13	13	13	13
	Derrybrennan	0	17	17	17	17	17	17	17	17	17	176	176	176	***189***	29	13	166	166	13	13	166	8	5
	Maighne Wind Farm	2224	2405	2811	2698	***3557***	2493	2431	2239	2693	2693	3498	2901	2390	2440	1559	1142	1308	1283	1129	70	224	63	60

	Cluster Name	Month																						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Total TRIPS (HGV + LGV)	Ballynakill	1465	1958	**2362**	1996	1665	250	250	250	756	766	595	595	545	579	114	13	13	13	13	13	13	13	13
	Windmill	0	0	379	**1334**	1087	926	1116	27	27	27	220	514	323	305	34	8	8	8	8	8	8	5	5
	Drehid/Hortland	3485	3982	3502	3593	3587	3649	3390	3226	3221	3470	**4186**	3676	2322	2318	914	740	670	645	668	25	25	25	25
	Cloncumber	0	0	98	205	1249	1225	1236	1406	1476	1793	**1990**	1282	708	537	592	494	518	506	451	13	24	13	13
	Derrybrennan	0	34	66	63	66	66	63	17	726	724	**802**	188	323	493	29	13	166	186	33	13	166	12	5
	Maighne Wind Farm	4950	5975	6407	7191	7653	6116	6055	4926	6206	6780	**7794**	6254	4221	4232	1684	1267	1375	1358	1171	70	236	67	60
	Mean																							

4002

Cluster Name	Max Month Total TRIPS (HGV & LGV)	TRIPS Per week	TRIPS per day (based on 6 days)	TRIPS / hr (10 hrs/day)
Ballynakill	2,362	545	91	9
Windmill	1,334	308	51	5
Drehid/Hortland	4,186	967	161	16
Cloncumber	1,990	460	77	8
Derrybrennan	802	185	31	3
Overall Maighne Wind Farm	7,794	1,800	300	30
Mean	4,002	924	154	15

Mean/ mt	mean per/day
619	24
277	11
2232	87
688	27
185	7
4002	155
4002	155

Table G: Estimated Indicative Movements across Construction Programme for Public Road HVAC Civil Works

HV Public Road Civil Works	Unit	No/Qty	Qty/Load	Total No of Loads	Vehicle Type		Site	Tot/ Split		Month														
										1	2	3	4	5	6	7	8	9	10	11	12	13	14
Plant Deliveries	m	15	1	15	HGV		Drehid/ Hortland to Woodlands	15		1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cable Trenching (1load/20m)	m	35725	0.033333	1191	HGV		Drehid/ Hortland to Woodlands	1191		85	85	85	85	85	85	85	85	85	85	85	85	85	85
Cable Drums (600m/drum)	no	179	0.5	89	HGV		Drehid/ Hortland to Woodlands	89		6	6	6	6	6	6	6	6	6	6	6	6	6	6
Ducting (2000m/load)	m	107175	0.0005	54	HGV		Drehid/ Hortland to Woodlands	54		4	4	4	4	4	4	4	4	4	4	4	4	4	4
Backfill Import ($0.5m^3/m$)	m	35725	0.033333	1191	HGV		Drehid/ Hortland to Woodlands	1191		85	85	85	85	85	85	85	85	85	85	85	85	85	85
Road Reinstatement (in-situ road recycling)	m	35725	0.02	715	HGV		Drehid/ Hortland to Woodlands	715		51	51	51	51	51	51	51	51	51	51	51	51	51	51
Total No. of HGV Traffic Movemnets per month								3254		232	232	232	232	232	232	232	232	232	232	232	232	232	232
Construction Team	days	240	7	1680	LGV		Drehid/ Hortland to Woodlands	1680		120	120	120	120	120	120	120	120	120	120	120	120	120	120
Total No. LGV Traffic Movements per month																							

Public Road HVAC Civil Works from Drehid Hortland	Month													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Total No. of HGV Loads per month	232	232	232	232	232	232	232	232	232	232	232	232	232	232
Total No. of HGV TRIPS (Loads x2 to allow for return trips)	465	465	465	465	465	465	465	465	465	465	465	465	465	465
Total No. LGV Loads	120	120	120	120	120	120	120	120	120	120	120	120	120	120
Total No. of LGV TRIPS (Loads x2.5 to allow for return trips)	300	300	300	300	300	300	300	300	300	300	300	300	300	300

	HGV	LGV	Total
Trips per month	464.87	300.00	764.87
HGV Trips per week	108.11	69.77	177.88
HGV Trips per day	18.02	11.63	29.65

APPENDIX K3

Sightlines assessment

ENVIRONMENTAL BALANCE IN DESIGN AND CONSTRUCTION

ELEMENT POWER IRELAND LTD.

PROPOSED MAIGHNE WIND FARM, COUNTY KILDARE

ASSESSMENT OF SIGHTLINES

MARCH 2015

FEHILY TIMONEY & COMPANY

NORTH MEATH WIND FARM LTD.

PROPOSED MAIGHNE WIND FARM, COUNTY KILDARE

ASSESSMENT OF SIGHTLINES

User is Responsible for Checking the Revision Status of This Document

Rev. Nr.	Description of Changes	Prepared by:	Checked by:	Approved by:	Date:
1	Issue to Client	SAT/MT	AS	TPR	29.03.2015

Client: Element Power Ireland Ltd.

Keywords: Maighne Wind Farm, Sightlines, Access Road,

Abstract: This document has been prepared following an assessment carried out by Fehily Timoney and Company of existing sightlines at the locations of proposed access for the proposed Maighne Windfarm.

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1 INTRODUCTION

This report has been prepared following an assessment of sightlines at the locations of the proposed access road tie-ins to the existing road infrastructure for the proposed Maighne Windfarm development site. The assessment of sightlines was carried out on 18 November 2014 and was carried out in accordance with the requirements of Chapter 7 Geometric Design Features for Single Carriageway Roads of Volume 6 Section 2 Part 6 NRA TD 41-42/11.

2 STANDARDS REQUIRED

TD41-42/11 sets out the minimum visibility requirements for direct access to single carriageway roads. Where possible the visibility assessment for the proposed Maighne accesses have been carried out at a 3.0m setback from the existing carriageway as per the requirements set out in Clause 7.7 c. of TD 41-42/11. Table 2.1 below which has been extracted from Table 7/1 of TD41-42/11 summarises the visibility requirements from accesses.

Table 2.1: Visibility Distances from the Minor Road

Design Speed of Major Road (kph)	Visibility Distance (m)
42	50
50	70
60	90
70	120
85	160
100	215

In a number of areas where no current access existed at the location of the proposed Maghne Windfarm accesses it was not possible to carry out an visibility assessment in line with the requirement of Clause 7.7 c., in these areas an assessment of the possible constraints to visibility was carried out the details of which are discussed in detail below.

3 VISIBILITY ASSESSMENTS

3.1 Ballynakill Proposed South West Access to Turbines T4 and T5 from R148

Sightlines at the location of the proposed South West access of Ballynakill to turbines T4 and T5, as shown on Figure No. 13.1. Rev A of Volume 2a of the EIS was assessed as outlined below. Regional road, R148 (formerly the N4), was assessed assuming a design speed of 100kph. The horizontal alignment of the R148 at this location is straight approaching the junction from the East and curved on the approach to the junction from the West.

The sightlines assessment was initially carried out at a 3.0m setback from the carriageway, given the minimal cross section of the current field entrance and dense vegetative growth which will require to be removed for the Access Track an assessment was carried out at the edge of carriageway.

From the edge of the carriageway looking North West the required visibility of 215m was achieved. The visibility achieved looking South East was compromised slightly by the horizontal curvature of the existing carriageway together with the narrowing hard shoulder for a ghost island junction. A sight distance of 144m was achieved at this location.

Figure 3.1: Existing southwest access to Ballynakill Cluster

Figure 3.2: View west from the existing southwest access to Ballynakill Cluster

Figure 3.3: View east from the existing southwest access to Ballynakill Cluster

3.2 Ballynakill Proposed South East Access to Turbines T1 to T3 and T6 to T10 from R148

Sightlines at the location of the proposed South East access of Ballynakill to turbines T1 to T3 and T6 to T10, as shown on Figure No. 13.1. Rev A of Volume 2a of the EIS was assessed as outlined below. Regional road, R148 (formerly the N4), was assessed assuming a design speed of 100kph. The horizontal alignment of the R148 at this location is straight approaching the junction from the East and curved on the approach to the junction from the West.

The sightlines assessment was carried out at a 2.4m setback from the carriageway, as there was currently no entrance at this location and the boundary fencing did not allow for an assessment to be carried out at 3.0m setback from the carriageway.

From a 2.4m offset off of the edge of the carriageway looking East and West the required visibility of 215m was achieved.

Figure 3.4: Proposed location of southeast access to Ballynakill Cluster

Figure 3.5: View west from proposed location of southeast access to Ballynakill Cluster

Figure 3.6: View east from proposed location of southeast access to Ballynakill Cluster

3.3 Windmill Proposed Access to Turbines T24, T5 and T26 from L-1005

Sightlines at the location of the proposed access to turbines T24, T25 and T26, as shown on Figure No. 13.1. Rev A of Volume 2a of the EIS was assessed as outlined below. Local road, L-1005, was assessed and a design speed of 80kph was assumed. The horizontal alignment of the road at this location is a straight on the approach to the proposed junction from the North and straight on the approach from the South.

The sightlines assessment was initially carried out at a 2.4m setback from the carriageway, given the minimal cross section of the current entrance and dense vegetative growth which will require to be removed for the Access Track.

From a setback of 2.4m to the edge of the carriageway looking North the required visibility of 160m was not achieved due to the dense vegetative growth at the current entrance, the visibility achieved was 123m. The visibility achieved looking South again was not achieved due to the dense vegetative growth, the visibility achieved was 75m. Based on the assessment carried out at this location, once the entrances are constructed and the vegetation at the entrance removed the required sightlines should be achievable.

Figure 3.7: Entrance to existing access for Windmill Cluster

Figure 3.8: View north from existing access for Windmill Cluster

Figure 3.9: View south from existing access for Windmill Cluster

3.4 Drehid Hortland Access to Turbine 47 from L-5025

Sightlines at the location of the proposed access to Drehid Hortland turbine T47, as shown on Figure No. 13.1. Rev A of Volume 2a of the EIS was assessed as outlined below. Local road, L-5025, was assessed and a design speed of 80kph was assumed. The horizontal alignment of the road at this location is a straight on the approach to the proposed junction from the North West and straight on the approach from the South East.

It was not possible to carry out an assessment of sightlines at the required setback at the proposed junction location as there was currently no field entrance at this location, the sightlines assessment was therefore carried out at the edge of carriageway.

From the edge of the carriageway looking North West the required visibility of 160m was achieved. The required visibility looking South East of 160m was also achieved. Based on the assessment carried out at this location, once the entrances are constructed and the vegetation at the entrance removed the required sightlines at the required setbacks should be achievable.

Figure 3.10: Proposed location of access road to T47

Figure 3.11: View northwest of proposed location of access road to T47

Figure 3.12: View southeast of proposed location of access road to T47

3.5 Drehid Hortland Access to Turbines T11 to T23 from L-5025

Sightlines at the location of the proposed access to Drehid Hortland turbines T11 to T23, as shown on Figure No. 13.1. Rev A of Volume 2a of the EIS was assessed as outlined below. Local road, L-5025, was assessed and a design speed of 80kph was assumed. The horizontal alignment of the road at this location is a straight on the approach to the proposed junction from the North West and straight on the approach from the South East.

It was not possible to carry out an assessment of sightlines at the proposed junction location as there was currently no field entrance at this location, the sightlines assessment was therefore carried out at the edge of carriageway.

From the edge of the carriageway looking North West the required visibility of 160m was achieved. The required visibility looking South East of 160m was also achieved. Based on the assessment carried out at this location, once the entrances are constructed and the vegetation at the entrance removed the required sightlines at the required setbacks should be achievable.

Figure 3.13: Proposed location of access road to T11 to T23

Figure 3.14: View southeast of proposed location of access road to T11 to T23

Figure 3.15: View northwest of proposed location of access road to T11 to T23

3.6 Drehid Hortland Access to Turbine T46 from L-1004

Sightlines at the location of the proposed access to Drehid Hortland turbine T46, as shown on Figure No. 13.1. Rev A of Volume 2a of the EIS was assessed as outlined below. Local road, L-1004, was assessed and a design speed of 80kph was assumed. The horizontal alignment of the road at this location is a straight on the approach to the proposed junction from the North West and a curve on the approach from the South East.

From a setback of 3.0m to the edge of the carriageway looking North West the required visibility of 160m was achieved. The required visibility looking South East of 160m was also achieved.

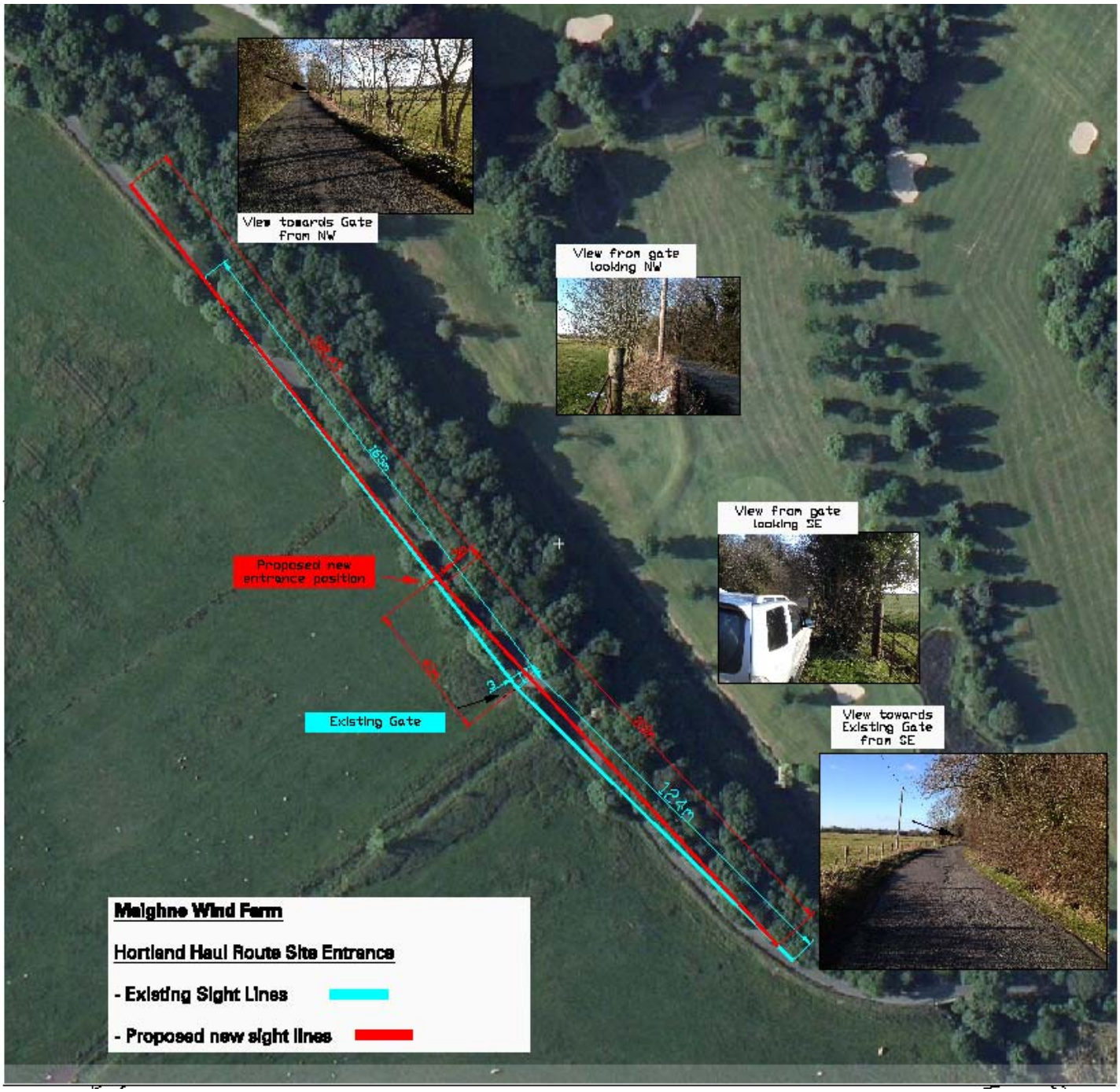

Figure 3.16: Proposed location of access to T46

3.7 Drehid Hortland Access to Turbines T40 to T45 from L-1017

Sightlines at the location of the proposed access to Drehid Hortland turbines T40 to T45 as shown on Figure No. 13.1. Rev A of Volume 2a of the EIS was assessed as outlined below. Local road, L-1017, was assessed and a design speed of 80kph was assumed. The horizontal alignment of the road at this location is a straight on the approach to the proposed junction from the East and a straight on the approach from the West.

The sightlines assessment was initially carried out at a 2.4m setback from the carriageway, given the minimal cross section of the current entrance and dense vegetative growth which will require to be removed for the Access Track.

From a setback of 2.4m to the edge of the carriageway looking East the required visibility of 160m was not achieved due to the dense vegetative growth at the current entrance, the visibility achieved was 105m. From a setback of 2.4m to the edge of the carriageway the visibility achieved looking West again was not achieved due to the dense vegetative growth, the visibility achieved was 79.6m. Based on the assessment carried out at this location, once the entrances are constructed and the vegetation at the entrance removed the required sightlines should be achievable.

Figure 3.17: Existing access to Drehid Hortland cluster turbines T40 to T45

Figure 3.18: View east of existing access to Drehid Hortland cluster turbines T40 to T45

Figure 3.19: View west of existing access to Drehid Hortland cluster turbines T40 to T45

3.8 Derrybrennan Access to Turbines T27 and T28 from Private Road

Sightlines at the location of the proposed access to Derrybrennan turbines 4 & 5 as shown on Figure No. 13.1. Rev A of Volume 2a of the EIS have been assessed as outlined below. A private Bord na Móna road was assessed and a design speed of 80kph assumed (for the purposes of this assessment). The horizontal alignment of the road at this location is a straight on the approach to the proposed junction from the North and a straight on the approach from the South.

It was not possible to carry out an assessment of sightlines at the proposed junction location as there was currently no field entrance at this location, the sightlines assessment was therefore carried out at the edge of carriageway.

From the edge of the carriageway looking North the required visibility of 160m was achieved. The required visibility looking South of 160m was also achieved. Based on the assessment carried out at this location, once the entrances are constructed and the vegetation at the entrance removed the required sightlines should be achievable.

Figure 3.20: Proposed location of access road to Derrrybrennan cluster

Figure 3.21: View north from proposed location of access road to Derrrybrennan cluster

Figure 3.22: View south of proposed location of access road to Derrrybrennan cluster

3.9 Cloncumber Access to Turbines T29 to T39 from L-7004

Sightlines at the location of the proposed access from local road, L-7004, to Cloncumber as shown on Figure No. 13.1. Rev A of Volume 2a of the EIS was assessed as outlined below. The L-7004 was assessed assuming a design speed of 80kph. The horizontal alignment of the road at this location is a straight on the approach to the proposed junction from the North West and a straight with a junction on the approach from the South East.

It was not possible to carry out an assessment of sightlines at the proposed junction location as there was currently no field entrance at this location, the sightlines assessment was therefore carried out at an offset of 2.5m from the edge of carriageway. The visibility to the edge of the carriageway looking North West at a setback of 2.5m did not achieve the desirable sightline (for an 80 kph road) of 160m, the visibility achieved was 94m.

From a setback of 2.5m to the edge of the carriageway looking South East the available sightline was estimated to be 58m. As can be seen on the below figure this sightline is in the direction of the Glenaree Bridge over the Grand Canal and as such, traffic speed would be reduced as vehicles negotiate the tight bend over the canal bridge at this location.

Figure 3.23: Proposed access location to Cloncumber cluster

4 CONCLUSIONS

The above assessment indicates that reasonable sightlines can be achieved at most of the proposed entrances to the wind farm.

There are nine entrances in total. Seven entrances achieved the required visibility during the assessment or will achieve the required visibility by trimming the existing hedgerows.

The road geometry restricts the sightlines for the remaining two entrances. These entrances are to the Cloncumber cluster and the Drehid Hortland access to turbines T40 to T45.

At the proposed Cloncumber entrance, the available sightlines were found to be less than desirable. However, given the location of the adjacent Glenaree Bridge over the Grand Canal and the presence of a sharp bend in the road to the west of the proposed entrance, the traffic speed of road users travelling east should be significantly reduced as it approaches the entrance and therefore a reduced sightline is deemed to be acceptable in this case.

At the Drehid Hortland access to turbines T40 to T45, an existing entrance will be utilised. This entrance will also be upgraded as part of the works as a result the visibility sightlines will be further improved. . During construction, mitigation measures such as the provision of advance warning signage and the provision of flagmen during works operations could be adopted to further highlight the entrances to road users if required.