

# BORD@NAMÓNA

## Naturally Driven

**Derryadd Wind Farm**

**Haul Route Assessment  
Preliminary Report**

July 2018  
Revision: A

TOBIN CONSULTING ENGINEERS



# REPORT

**PROJECT:**

Derryadd Wind Farm, Haul Rout Assessment  
Preliminary Report

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**DOCUMENT AMENDMENT RECORD**

<b>Client:</b>	Bord na Móna Powergen Ltd.
<b>Project:</b>	Derryadd Wind Farm
<b>Title:</b>	Derryadd Wind Farm Haul Route Assessment Preliminary Report

PROJECT NUMBER: 8057		DOCUMENT REF: TR01-HRA		
A	Issue	LG 08.11.2016	SC 11.11.2016	MMcD 26.07.2018
<b>Revision</b>	<b>Description &amp; Rationale</b>	<b>Originated/Date</b>	<b>Checked/Date</b>	<b>Authorised/Date</b>
		<b>TOBIN Consulting Engineers</b>		

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## 1 INTRODUCTION

Initial assessment has been undertaken for the Derryadd Wind Farm project in this report. Main access routes are to be via Motorways, National Roads and Regional Roads. The assessment is based on available width and clearance being available on the motorway sections. This assessment investigates the haul route options available to transport the maximum 65m length blade from the motorway to the site accesses at Derryadd.

The origin of the turbines has not been determined at this time, however, delivery from all parts of the county is anticipated to be via the 2 nearest motorway. These are the M6 / M4 from Dublin to Galway and Dublin to Correllstown respectively. The following haul routes have been assessed:

- Haul Route Option A – M6 / N6 / N61 / N63
- Haul Route Option B – M4 / N4 / N63
- Haul Route Option C - M6 / N6 / N55
- Haul Route Option D – M4 / N4 / N55

The assessment is based on origin to destination (i.e. port to site) with the assumption that the unloaded vehicle can return along the same route due to reduced profile following unloading of the turbine elements.

## 2 PRELIMINARY ASSESSMENT

The preliminary assessment was undertaken in two stage as discussed in the following sections:

- Overview assessment and
- Visual assessment.

### 2.1 OVERVIEW ASSESSMENT

Each of the haul routes national road networks identified have been assessed based on overview assessment of carriageway cross section and sinuosity<sup>1</sup> on the national routes.

#### 2.1.1 Haul Route Option A – Via N61 / N63

The N61 from Athlone to Roscommon has a typical cross section width of greater than 7.2m with low to moderate sinuosity. 3 sections of the route have high sinuosity at Lecarrow, between Voilet Hill and Newtown and at Carrowmore on approach to Roscommon town.

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<sup>1</sup> Sinuosity is a relative way of comparing the horizontal alignment / 'bendiness' of different road sections.

The N63 from Roscommon to the cross road junction with the L-1806 has a typical cross section width of greater than 7.2m with low sinuosity. From this junction to the site access on the N63, the cross section varies from below 6.5m to 7.2m with high, moderate and low sinuosity.

This route is feasible based on cross section and sinuosity and further visual assessment to identify constraints is undertaken.

### *2.1.2 Haul Route Option B – Via M4 / N4 / N5 / N63*

The N4 from Correllstown to Longford has a typical cross section width of greater than 7.2m with low to moderate sinuosity. 3 sections of the route have high sinuosity between the junction with the L-1015 and Ballinafid, at Edgeworthstown and north of Longford town.

The N63 from Longford to the site access has a varying cross section width typically less than 6.5m with varying sinuosity from high to low. 4 sections of the route have high sinuosity south of Longford town, at Cloonrollagh, at Killashee and approach to the site access.

This route is feasible based on cross section and sinuosity and further visual assessment to identify constraints is undertaken.

### *2.1.3 Haul Route Option C – Via M6 / N6 / N55*

As outlined for the previous haul routes access to the N55 is feasible from the N4 and N6. The N55 has a typical cross section width of less than 6.5m with varying levels of sinuosity. The N55 has 9 sections of high sinuosity and would require significant realignment as a feasible option. This route has not been visually assessed for constraints.

### *2.1.4 Haul Route Option D – Via M4 / N4 / N55*

This route has not been visually assessed for constraints as per the assessment in section 2.1.3.

## 2.2 VISUAL ASSESSMENT

The visual assessment was undertaken on each of the haul routes identified for assessment in section 2.1. This assessment was carried out by reviewing video footage of the national routes in the undertaken in early / mid 2016. For clarity of the national routes and for assessment of the regional routes Google Maps in conjunction with Google Street View was used.

### *2.2.1 Haul Route Option A – Via N61 / N63*

On exit from the M6 at Junction 12, from westbound carriageway, there are:

- a tight radii to negotiate,
- a T Junction onto the N61 and
- an overbridge.

Other likely constraints are signage and over run onto verges on exit from M6. Temporary closure of entry onto M6 will be required. Additional impacts include street furniture and signage at the T-Junction with temporary traffic management to close both lanes of the carriageway. The height of the loaded haul vehicle is to be determined and also the headroom clearance under the overbridge structure. Typically overbridges are designed with maximum clearance ranging from 5.0m to 5.3m for non-restricted height structures. The bridge constraint may require opening of the central median of the N6 to utilise the eastbound slip road to the N61.

On exit from the M6 at Junction 12, from eastbound carriageway a tight radii is to be negotiated with approach to the N61 roundabout. At the N61 roundabout adjustments may be required to signage on islands to allow overrun at entry / exit and through movement of the central island of the roundabout.

The N61 typical cross section is a 7.3m wide carriageway with hard shoulders to both side. Bends in the road alignment should be negotiable with some potential encroachment into oncoming traffic lanes requiring traffic management. A number of key locations are mentioned below with full details provided in the following section:

- At the Hodson Bay, approximately 3km north of Athlone is a physical constraint of gateway treatment with traffic calming islands.
- Prior to Killiaghan and Gort, there is a tight bend with the potential to encroach into oncoming traffic lane.
- South of Knockcroghery Level crossing of rail line, may require permission from Irish Rail.
- Knockcroghery has traffic calming buildouts with reduced road width between buildings to the north of the town. Temporary traffic management will be required with on-street parking suspended or restricted.
- Bends between the L1806 and the L2002 has the potential for encroachment into oncoming traffic / grass verges / adjacent lands. At a minimum temporary traffic management is required.
- Ballymurray has a level crossing, as above permission to be sought from Irish Rail.
- **Roscommon Roundabout with N63 / N61** see Figure 2-1. From the northbound approach, the vehicle will need to take a right turn. This will not be feasible within the existing carriageway and it is likely that part / all of the roundabout would need to be paved. Extents and whether even paving it would allow for this turning movement would need to be checked by swept path analysis and an alternative solution assessed if not feasible. Trees are present in the centre of this roundabout and will likely need to be moved, also, there are overhead lines at this location which that may be an issue.
  - An alternative to going through Roscommon town could be to travel via the L1810 to the south of the town. However, the width of this road would need to be

determined. It is envisaged that this road would need to be closed to other traffic while in use. Work would be required at entry and exit to widen to allow for turning circle of the vehicle.



**Figure 2-1** Roscommon Town northbound approach to the N61 – N63 roundabout junction

- Roscommon roundabout at Aldi Lidl, the route needs to continue straight through route here and paving of part of the roundabout may be necessary.
- In Lanesborough town, the urban streetscape is housing fronting onto street with footways to the single carriageway. On-street parking and a schools and churches are in the vicinity of the route. In the town centre to increase the restricted width, on-street parking to be suspended at pinch point.

The route also crosses the Shannon River in Lanesborough town and is not anticipated that the bridge width will be a constraint.

The N63 route continues by takes a sharp left in the town centre. In the vicinity of the junction are buildings with approximately 20m between gable ends. It is not anticipated that the vehicle will be able to perform this manoeuvre and swept path analysis is required to assess feasibility.

An alternative route would be to continue straight through onto the R392. The R392 has a typical straight alignment, however, available widths require confirmation.

- Existing and proposed access points to the Bord na Mona site are shown on 8057-Figure 1 from the N63 and the R392. Further analysis to determine the feasibility of the haul routes is required for identification of the exact location and size of the access to the site. Swept path analysis to determine additional widening of access points is required.
  - Alternative access points from the R398 are shown on 8057-Figure 1. To manoeuvre from the R392 to the R398 would require widened at the junction, however, this looks like it has been landscaped and may not get permission to pave over this even temporarily.



### 2.2.2 Haul Route Option B – Via M4 / N4 / N63

The M4 Dublin to Corralstown transitions into the N4 at junction 13. From this point, the route is designated as a national road, however, the cross section is a dual carriageway until just northwest of Junction 17 at Cullionbeg. The carriageway cross section of the N4 from Cullionbeg is typically a two-way carriageway, which varies in cross section from climbing lane on northbound carriageway to central reserve hatching with no hard shoulder, to typical cross section with hard shoulder. This section will be able to accommodate the vehicle.

A number of key locations are mentioned below with full details provided in the following section:

- At Ballinalack, there road cross section transitions from hard shoulders to footpaths to both sides of the carriageway. Traffic calming is present in the form of gateway treatment at both sides of the town. Clearance between the traffic calming for the vehicle requires clarification.
- Rathowen is the next town with similar characteristics as in Ballinalack.
- In Edgeworthstown there is the potential for two options
  1. Continue on the N4 into Longford or
  2. Take a left onto the N55 and continue to the R392. As discussed in the overview section the N55 has not been assessed.

The preferred option is to continue onto Longford.

- At Longford, there are a number of options, however, there are ones that will not work due to restrictions on road network.
  - N4 / RN63 route

The route commences at the roundabout junction to the east of Longford, taking the second exit northwest bound towards the second roundabout on the link road. At this roundabout take a left onto Ballinalee Road signposted for N63. At both of these roundabout the roundabout will potentially requiring paving in part. The Ballinalee road is wide straight road with hatch markings and a number of traffic calming buildouts. This route becomes more residential and urban with illegal parking on double yellow lines, this parking would need to be restricted. This road arrives in Longford town adjacent to a large pedestrian forecourt at Centra. Both the potential to turn right and left at this junction are feasible but the route is restricted by overhead powerlines and buildings with approximately 12m between gable ends. Swept path analysis is required to determine the extents of the impact to the buildings, pedestrian areas and street furniture. Additional restrictions are present on both potential routes to the N63 southbound from the town. South the roundabout junction is a restricted height rail overbridge. Due to alignment and restricted width and height it is not envisaged that the vehicle will be able to manoeuvre under this structure.

- N4 / N5 / Gleann Riada / N63  
At the second roundabout on the N4 link road go straight through staying on the N4, continue through the next roundabouts until the roundabout junction with the N5. These roundabout will require paving and additional modifications to facilitate the vehicle. Take the left onto the N5 at the roundabout and continue towards the Gleann Riada roundabouts to travel around Longford to the roundabout with the N63. At the last roundabout with the N63 turn right, this is quite restrictive and will likely require overrun on footways and cycle lanes to make this turn and possibly adjacent land.
- Approach to Killashee on the N63 has the next major restriction. There are two bends that the vehicle may not be able to negotiate and also a bridge with narrow width with an upward gradient which may result in grounding of the vehicle.
- The town of Killashee has a number of restrictions:
  - Sharp right left bends in Killashee village are restrictive and will require diversion.
  - Approximately 270m west of Killashee (at the graveyard) is the first bend to the left. Manoeuvring around this bend does not appear feasible and swept path is required. Diversion is an alternative option in conjunction with the above bends at Killashee.
  - Approximately 600m west of Killashee is the second bend to the right (prior to 50km/h zone at railway line crossing). The Bend will require widening, with available land to the north but the level difference may be an issue.

### 2.2.3 Haul Route Option C – Via M6 / N6 / N55

Visual inspection of this haul route was not undertaken.

### 2.2.4 Haul Route Option D – Via M4 / N4 / N55

Visual inspection of this haul route was not undertaken.

## 3 ROUTE CONSTRAINTS

### 3.1 INTRODUCTION

As discussed in the previous section, 2 no. haul routes have been visually assessed in further detail within this section. The assessment reviews the physical constraints on the routes horizontal alignment (i.e. road cross section, bends, turning movements, junctions etc). Vertical constraints have not been assessed in detail (i.e. overhead powerlines, overbridges, overhanging trees etc).

Further assessment on these routes will be required at the constraints identified. Additional detailed information including OS mapping, swept path analysis (i.e. AUTOTRACK analysis), bridge headroom and clearance widths, topographical surveys etc will be required.

## 3.2 SUPPORTING INFORMATION

The key constraints have been identified and tabulated in the following two paragraphs 3.3.1 and 3.3.2. Supporting photographic evidence has been appended to this document. The photos were screenshots from video surveys of the national routes undertaken in early to mid-2016. Additional supporting screenshots have been taken from Google Street View Images with associated reference dates. Refer to **Appendix A** for Haul Route A and **Appendix B** for Haul Route B.

## 3.3 CONSTRAINT DETAILS

### 3.3.1 Haul Route Option A

**Table 3-1 Haul Route Option A from N6 exit at Junction 12 to site access points on the N63, R392 & R398 via N61 (Athlone - Roscommon) & N63 (Roscommon -Longford)**

Item No.	Road Network	Location	Direction	Constraints	Impacts	Existing Lands	Constraint Ranking	Alternatives
1	N6 – N61	Athlone	N6 westbound to N61 northbound	Tight radii off ramp	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Delineators</li> <li>• Grass verge</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>5</b>	
2	N6 – N61	Athlone	N6 westbound to N61 northbound	T Junction to the N61	<ul style="list-style-type: none"> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>7</b>	
3	N6 – N61	Athlone	N6 westbound to N61 northbound	N6 overbridge	<ul style="list-style-type: none"> <li>• Bridge</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>2</b>	<ul style="list-style-type: none"> <li>• Remove central barrier on N6</li> <li>• Crane from overbridge to N61</li> </ul>
4	N6 – N61	Athlone	N6 westbound to N61 northbound	Roundabout Junction (at Ganly's)	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> </ul>	Within	<b>7</b>	

Item No.	Road Network	Location	Direction	Constraints	Impacts	Existing Lands	Constraint Ranking	Alternatives
					<ul style="list-style-type: none"> <li>• Roundabout</li> <li>• Tree &amp; vegetation</li> <li>• Temporary closure</li> </ul>			
5	N6 – N61	Athlone	N6 eastbound to N61 northbound	Tight radii off ramp	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Delineators</li> <li>• Grass verge</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>5</b>	
6	N6 – N61	Athlone	N6 eastbound to N61 northbound	Roundabout Junction to N61 (at Ganly's)	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> <li>• Roundabout</li> <li>• Tree &amp; vegetation</li> <li>• Temporary closure</li> </ul>	Within	<b>6</b>	
7	N61	Hodson Bay	N61 northbound	Traffic calming	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island with lighting</li> </ul>	Within	<b>6</b>	
8	N61	Killighan & Gort	N61 northbound	Right Bend	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> </ul>	Within	<b>7</b>	
9	N61	Lecarrow (Junction L-2007)	N61 northbound	Left Bend	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> </ul>	Within	<b>7</b>	
10	N61	Knockcroghery	N61 northbound	Left Bend	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> </ul>	Within	<b>7</b>	
11	N61	Knockcroghery	N61 northbound	Rail Crossing	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> </ul>	Within	<b>7</b>	
12	N61	Knockcroghery	N61 northbound	Left Bend with traffic calming	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> <li>• Encroach into oncoming traffic lane</li> </ul>	Within	<b>6</b>	
13	N61	Knockcroghery	N61 northbound	Urban Area with on-street parking	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> </ul>	Within	<b>7</b>	
14	N61	Knockcroghery	N61 northbound	Right Bend urban area	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> </ul>	Within	<b>7</b>	

Item No.	Road Network	Location	Direction	Constraints	Impacts	Existing Lands	Constraint Ranking	Alternatives
15	N61	Knockcroghery	N61 northbound	Urban area with direct building access to footway	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> </ul>	Within	<b>7</b>	
16	N61	Knockcroghery	N61 northbound	Traffic calming (on left bend)	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island with lighting</li> <li>• Encroach into oncoming traffic lane</li> </ul>	Within	<b>6</b>	
17	N61	Violet Hill	N61 northbound	Right Bend	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> </ul>	Within	<b>8</b>	
18	N61	Junction L-1806	N61 northbound	Left Bend	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> </ul>	Within	<b>7</b>	
19	N61	Junction L-2002	N61 northbound	Right Bend	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> </ul>	Within	<b>7</b>	
20	N61	Ballymurray	N61 northbound	Right Bend Rail Crossing	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> </ul>	Within	<b>7</b>	
21	N61 – N63	Roscommon	N61 northbound	Roundabout (at Casey's Centra Filling Station)	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> <li>• Roundabout</li> <li>• Street light (in central island east of junction)</li> <li>• Tree &amp; vegetation</li> <li>• Temporary two-way lane closure</li> </ul>	Within / Outside	<b>1</b>	Alternative route may be required.
22	N61	Roscommon	N61 north eastbound	Traffic calming	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> </ul>	Within	<b>6</b>	
23	N61	Roscommon	N61 north eastbound	Roundabout (to Dunnes Stores)	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Roundabout</li> <li>• Central island</li> <li>• Landscaping</li> </ul>	Within	<b>6</b>	
24	N61 / N63	Roscommon	N61 to N63 north eastbound	Roundabout (N61 with N63)	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Roundabout</li> <li>• Central island</li> </ul>	Within	<b>6</b>	

Item No.	Road Network	Location	Direction	Constraints	Impacts	Existing Lands	Constraint Ranking	Alternatives
					<ul style="list-style-type: none"> <li>• Landscaping</li> </ul>			
25	N63	Roscommon	N63 eastbound	Traffic calming	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> </ul>	Within	<b>8</b>	
26	N63	Roscommon	N63 eastbound	Gateway Treatment	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central Island</li> </ul>	Within	<b>8</b>	
27	N63		N63 eastbound	Reduced hard shoulder / strip	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Grass verge overrun</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>8</b>	
28	N63	N63 junction with L-6110 (Anratabeg)	N63 eastbound	End hard shoulder / strip	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>8</b>	
29	N63	Ballyleague	N63 eastbound	Right bend	<ul style="list-style-type: none"> <li>• Encroach into oncoming right turn traffic lane / hatch markings</li> </ul>	Within	<b>8</b>	
30	N63	Ballyleague	N63 eastbound	Urban area (i.e. footways)	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>8</b>	
31	N63	Ballyleague - Lanesborough	N63 eastbound	Urban area with right bend	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>8</b>	
32	N63	Lanesborough	N63 south eastbound	Bridge at R. Shannon	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>8</b>	
33	N63	Lanesborough	N63 south eastbound	Urban area	<ul style="list-style-type: none"> <li>• Suspend on-street parking</li> <li>• Encroach into oncoming traffic lane</li> </ul>	Within	<b>8</b>	

Item No.	Road Network	Location	Direction	Constraints	Impacts	Existing Lands	Constraint Ranking	Alternatives
					<ul style="list-style-type: none"> <li>• Temporary two-way lane closure</li> </ul>			
34	N63	Lanesborough	N63 eastbound	Urban area – left turn / bend to stay on N63	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Suspend on-street parking</li> <li>• Encroach into oncoming traffic lane</li> <li>• Mount footways</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>3</b>	Alternative to continue straight through onto the R392
35	N63	Lanesborough	N63 north eastbound	Urban area right bend	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> </ul>	Within	<b>8</b>	
36	N63	Clonboney	N63 north eastbound	Suburban area left to right bend	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>8</b>	
37	N63	Clonboney	N63 eastbound	Reduced hard shoulder / strip / soft verge	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Grass verge overrun</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>7</b>	
38	N63	T-junction with Barnacor Road	N63 eastbound	Overhead lines at road crest	<ul style="list-style-type: none"> <li>• Overhead Line</li> </ul>	Within	<b>8</b>	
39	N63 - Site	Site Access to North	N63 eastbound	Overhead Lines Site Access	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Grass verge overrun</li> <li>• Temporary two-way lane closure</li> <li>• Overhead line</li> </ul>	Within	<b>7</b>	Divert overhead line Widen junction
40	R392	Lanesborough	R392 southbound	Urban on-street parking	<ul style="list-style-type: none"> <li>• Suspend parking</li> <li>• Encroach into oncoming traffic lane</li> </ul>	Within	<b>8</b>	

Item No.	Road Network	Location	Direction	Constraints	Impacts	Existing Lands	Constraint Ranking	Alternatives
					<ul style="list-style-type: none"> <li>• Temporary two-way lane closure</li> </ul>			
41	R392	Lanesborough	R392 southbound	Rural - No hardshoulder / hard strip / soft verge	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Grass verge overrun (</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>8</b>	
42	R392	Lehery (L-1163 Crossroads)	R392 southbound	Bridge / culvert	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>8</b>	
43	R392	R392 to Site (north)	R392 southbound	No current access point	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>7</b>	Create access point Wide junction
44	R392	R392 to Site (north)	R392 southbound	Overhead Lines & culvert / bridge	<ul style="list-style-type: none"> <li>• Overhead line</li> </ul>	Within	<b>4</b>	Raise overhead lines Divert underground
45	R392 – R398	R392 T-junction to R398	R392 southbound to R398 north eastbound	Right bend with Left turn at junction to R398	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Grass verge overrun</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>6</b>	Widen junction
46	R392 – R398	R392 T-junction to R398	R392 southbound to R398 north eastbound	High amenity quality	<ul style="list-style-type: none"> <li>• Landscaping</li> </ul>	Within	<b>2</b>	
47	R398	Rail Crossing	R392 northbound	Bridge over rail line	<ul style="list-style-type: none"> <li>• Parapets</li> </ul>	Within	<b>8</b>	
48	R398	Site Access to North & South	R398 northbound		<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Grass verge overrun</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>8</b>	

Notes:

- 1) Ranking order from 0-10 with 0 least feasible and 10 most feasible.



- 
- 2) Vertical constraints such as OH powerlines have not been assessed for the full length of the route.
  - 3) Headroom clearance - new structures 5.3m and older structures 5.0m (UK TD27).
  - 4) Bridges to be identified on routes and loading assessed.

## 3.3.2 Haul Route Option B

**Table 3-2 Haul Route Option B from M4/N4 exit to site access points on the N63 via N4 (Kinnegad - Longford) & N63 (Longford - Roscommon)**

Item No.	Road Network	Location	Direction	Constraints	Impacts	Existing Lands	Constraint Ranking	Alternatives
1	N4	Ballinafid Clonhugh	N4 northwest bound	Bridge over rail line with no hardshoulder	<ul style="list-style-type: none"> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>9</b>	
2	N4	Ballinalack	N4 northwest bound	Gateway – traffic calming	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>6</b>	
3	N4	Ballinalack	N4 northwest bound	Urban reduced cross section	<ul style="list-style-type: none"> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>8</b>	
4	N4	Ballinalack	N4 northwest bound	Urban pedestrian crossing	<ul style="list-style-type: none"> <li>• Street lighting</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>7</b>	
5	N4	Ballinalack	N4 northwest bound	Urban traffic calming (extended central island)	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>6</b>	
6	N4	Ballinalack	N4 northwest bound	Gateway – traffic calming	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> <li>• Street lighting</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>5</b>	
7	N4	Rathowen	N4 northwest bound	Gateway – traffic calming (extended central island)	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> <li>• Street lighting</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>5</b>	
8	N4	Rathowen	N4 northwest bound	Urban pedestrian crossing	<ul style="list-style-type: none"> <li>• Street lighting</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>7</b>	

Item No.	Road Network	Location	Direction	Constraints	Impacts	Existing Lands	Constraint Ranking	Alternatives
9	N4	Rathowen	N4 northwest bound	Gateway – traffic calming with extended central island to gateway	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> <li>• Street lighting</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>5</b>	
10	N4	Edgesworthstown	N4 northwest bound	Gateway	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>9</b>	
11	N4	Edgesworthstown	N4 northwest bound	Traffic calming	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> <li>• Temporary lane closure</li> </ul>	Within	<b>6</b>	
12	N4	Edgesworthstown	N4 northwest bound	Roundabout (N4 / N55 northbound)	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> <li>• Roundabout</li> <li>• Landscaping</li> <li>• Temporary closure</li> </ul>	Within	<b>6</b>	
13	N4	Edgesworthstown	N4 northwest bound	Roundabout (N4 / N55 southbound)	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> <li>• Roundabout</li> <li>• Landscaping</li> <li>• Temporary closure</li> </ul>	Within	<b>6</b>	
14	N4	Prior to & after Cross roads at L-1093 / L-5158	N4 northwest bound	Rural - No hardshoulder with soft verge / adjacent lands level difference	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Grass verge overrun</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>8</b>	
15	N4	Longford	N4 northbound	Roundabout (N4 / N4 / R393)	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> <li>• Roundabout</li> <li>• Landscaping</li> <li>• Temporary closure</li> </ul>	Within	<b>6</b>	

Item No.	Road Network	Location	Direction	Constraints	Impacts	Existing Lands	Constraint Ranking	Alternatives
16	N4	Longford Roundabout (N4 / N4 / N63 / R194)	N4 northbound	Roundabout Left Turn (N4 / N63) Roundabout Straight Through (N4 / N4)	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> <li>• Roundabout</li> <li>• Landscaping</li> <li>• Temporary closure</li> </ul>	Within	<b>7</b>	
17	N63	Longford	N63 southbound	Traffic calming	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> <li>• Temporary lane closure</li> </ul>	Within	<b>6</b>	
18	N63	Longford T-Junction N63 with Oakvale	N63 southwest bound	Signalised T-Junction with traffic calming	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>7</b>	
19	N63	Longford N63 to New Street	N63 southwest bound	Traffic calming	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> <li>• Street Light</li> <li>• Belisha beacons</li> <li>• Street Furniture</li> <li>• Temporary lane closure</li> </ul>	Within	<b>4</b>	
20	N63	Longford N63 to New Street	N63 southwest bound	Longford Town on-street parking	<ul style="list-style-type: none"> <li>• Suspend parking</li> </ul>	Within	<b>8</b>	
21	N63	Longford N63 New Street to N5 Ballymahon Street	N63 southwest bound	Right turn / left turn from New Street to N5	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Suspend on-street parking</li> <li>• Central island</li> <li>• Street Lighting</li> <li>• Belisha beacons</li> <li>• Street Furniture</li> <li>• Centra front Courtyard</li> <li>• Temporary lane closure</li> </ul>	Within / Outside	<b>2</b>	
22	N5	Longford Town N5 Ballymahon Street to	N5 northwest bound	Left turn at traffic signals towards Roscommon	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Suspend on-street parking</li> <li>• Kerb / footway overrun</li> <li>• Traffic signals</li> </ul>	Within	<b>2</b>	

Item No.	Road Network	Location	Direction	Constraints	Impacts	Existing Lands	Constraint Ranking	Alternatives
		Killashee Street			<ul style="list-style-type: none"> <li>• Street Lighting</li> <li>• Street Furniture</li> <li>• Centra front Courtyard</li> <li>• Temporary lane closure</li> </ul>			
23	Kilashee Street	Longford Town Killashee Street to N63	Killashee Street southwest bound	Urban reduced road cross section	<ul style="list-style-type: none"> <li>• Suspend on-street parking</li> <li>• Kerb buildout overrun</li> <li>• Signage</li> </ul>	Within	<b>7</b>	
24	N5	Longford Town Ballymahon Street to N63	Ballymahon Street southeast bound	Right turn	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Suspend on-street parking</li> <li>• Kerb / footway overrun</li> <li>• Street Lighting</li> <li>• Street Furniture</li> <li>• Centra front Courtyard</li> <li>• Temporary lane closure</li> </ul>	Within	<b>4</b>	
25	N63	Longford Town N63 Market Square to Harbour Row (centra rear car park)	N63 northwest	Right Left right turn	<ul style="list-style-type: none"> <li>• Suspend on-street parking</li> <li>• Kerb / footway overrun</li> <li>• Street Lighting</li> <li>• Street Furniture</li> <li>• Centra car park overrun</li> <li>• Landscaping</li> <li>• Temporary lane closure</li> </ul>	Within / Outside	<b>2</b>	
26	N63	Longford Town N63 Harbour Row T-junction with Killashee Street	N63 northwest	Left bend	<ul style="list-style-type: none"> <li>• Kerb / footway overrun</li> <li>• Street Lighting</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>2</b>	
27	N63	Longford Town N63	N63 southwest bound	Rail Line overbridge – restricted height 4.39m with right bend	<ul style="list-style-type: none"> <li>• Bridge height</li> <li>• Bridge width</li> </ul>	Within	<b>2</b>	
28	N4	Longford	N4 westbound	Roundabout Straight Through (N4 / N4)	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> </ul>	Within	<b>7</b>	

Item No.	Road Network	Location	Direction	Constraints	Impacts	Existing Lands	Constraint Ranking	Alternatives
		Roundabout (N4 / N4 / R198 / R198)			<ul style="list-style-type: none"> <li>• Roundabout</li> <li>• Landscaping</li> <li>• Temporary closure</li> </ul>			
29	N4	Longford Roundabout (N4 / N5 / N4)	N4 northwest bound	Roundabout left turn (N4 / N5)	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> <li>• Roundabout</li> <li>• Landscaping</li> <li>• Temporary closure</li> </ul>	Within	<b>7</b>	
30	N5	Longford Roundabout (N5 / N5 / N5)	N5 southbound	Roundabout left turn (N5 / N5)	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> <li>• Roundabout</li> <li>• Landscaping</li> <li>• Temporary closure</li> </ul>	Within	<b>7</b>	
31	N5	Longford Roundabout (N5 / N5 / Gleann Riada)	N5 eastbound	Roundabout left turn (N5 / Gleann Riada)	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> <li>• Roundabout</li> <li>• Street Furniture</li> <li>• Landscaping</li> <li>• Temporary closure</li> </ul>	Within	<b>7</b>	
32	Gleann Riada	Longford Roundabout (Gleann Riada / Gleann Riada)	Gleann Riada southeast bound	Roundabout straight through	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> <li>• Roundabout</li> <li>• Temporary closure</li> </ul>	Within	<b>7</b>	
33	Gleann Riada	Longford Roundabout (Gleann Riada / Gleann Riada)	Gleann Riada southeast bound	Roundabout straight through	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> <li>• Roundabout</li> <li>• Temporary closure</li> </ul>	Within	<b>7</b>	
34	Gleann Riada	Longford Roundabout (Gleann Riada / N63)	Gleann Riada southeast bound N63 southwest bound	Roundabout Right turn or Straight through	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Central island</li> <li>• Roundabout</li> <li>• Landscaping</li> </ul>	Within	<b>7</b>	

Item No.	Road Network	Location	Direction	Constraints	Impacts	Existing Lands	Constraint Ranking	Alternatives
					<ul style="list-style-type: none"> <li>• Temporary closure</li> </ul>			
35	N63	Ballymacormick / Ballyloughan	N63 southwest bound	Right Bend	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Grass verge</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>9</b>	
36	N63	Junction with L-11274	N63 southwest bound	Rural - No hardshoulder with grass verge and adjacent lands level difference	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Grass verge overrun</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>8</b>	
37	N63	Junction with L-5248	N63 southwest bound	Right Bend	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Grass verge overrun</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>7</b>	
38	N63	Junction with L-5256	N63 southwest bound	Right Bend up-gradient to left bend	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Grass verge overrun</li> <li>• Temporary two-way lane closure</li> </ul>	Within / Outside	<b>3</b>	Possible land acquisition required. Autotrack required to confirm
39	N63	Bridge prior to Killashee	N63 southwest bound	Bridge followed by slight right bend	<ul style="list-style-type: none"> <li>• Parapets</li> <li>• Mature trees</li> <li>• Encroach into oncoming traffic lane</li> <li>•</li> </ul>		<b>1</b>	
40	N63	Between Bridge & Killashee	N63 southwest bound	Left Bend	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Footway overrun</li> <li>• Boundary walls</li> <li>• Street lighting</li> <li>• Temporary two-way lane closure</li> </ul>	Outside	<b>4</b>	Possible land acquisition required. Autotrack required to confirm

Item No.	Road Network	Location	Direction	Constraints	Impacts	Existing Lands	Constraint Ranking	Alternatives
41	N63	Approach to Killashee	N63 southwest bound	Narrow carriageway bounded by footway & stone wall to south & stone boundary wall to north	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Footway overrun</li> <li>• Boundary walls</li> <li>• Street lighting</li> <li>• Temporary two-way lane closure</li> </ul>	Within / Outside	<b>4</b>	
42	N63	Killashee	N63 southwest bound to northwest bound	Sharp right bend to sharp left bend	<ul style="list-style-type: none"> <li>• Building</li> <li>• Boundary walls</li> <li>• Adjacent lands</li> <li>• street lighting</li> <li>• Temporary two-way lane closure</li> </ul>	Outside	<b>1</b>	Land acquisition required as anticipate bends are not navigable
43	N63	Killashee at church / graveyard	N63 southwest bound	Sharp left bend to sharp left bend (no impact to graveyard)	<ul style="list-style-type: none"> <li>• Building</li> <li>• Boundary walls</li> <li>• Adjacent lands</li> <li>• Street lighting</li> <li>• Temporary two-way lane closure</li> </ul>	Outside	<b>1</b>	Land acquisition required as anticipate bend is not navigable
44	N63	Killashee (approx. 600m west)	N63 southwest bound	Right Bend	<ul style="list-style-type: none"> <li>• Boundary walls</li> <li>• Signage</li> <li>• Overrun grass verge to north</li> <li>• Adjacent lands</li> <li>• Temporary two-way lane closure</li> </ul>	Within / Outside	<b>6</b>	
45	N63	West of Killashee	N63 southwest bound	Level Crossing	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>9</b>	
46	N63	West of Killashee	N63 southwest bound	Left Bend to right bend with bridge parapet	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Grass verge overrun</li> </ul>	Within / Outside	<b>5</b>	Possible land acquisition required.



Item No.	Road Network	Location	Direction	Constraints	Impacts	Existing Lands	Constraint Ranking	Alternatives
					<ul style="list-style-type: none"> <li>• Parapet</li> <li>• Adjacent lands</li> <li>• Temporary two-way lane closure</li> </ul>			Autotrack required to confirm.
47	N63		N63 southwest bound	Left Bend	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Grass verge overrun</li> <li>• Safety barrier</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>8</b>	
48	N63	Site Access to north & south of carriageway	N63 southwest bound	Site Access	<ul style="list-style-type: none"> <li>• Encroach into oncoming traffic lane</li> <li>• Temporary two-way lane closure</li> </ul>	Within	<b>9</b>	Widen existing site access

Notes:

- 1) Ranking order from 0-10 with 0 least feasible and 10 most feasible.
- 2) Vertical constraints such as OH powerlines have not been assessed for the full length of the route.
- 3) Headroom clearance - new structures 5.3m and older structures 5.0m (UK TD27).
- 4) Bridges to be identified on routes and loading assessed.

## 4 CONCLUSIONS AND RECOMMENDATIONS

### 4.1 CONCLUSIONS

The conclusions to this report are as follows:

- Haul Route Option A:
  - Preliminary and visual assessment of the route determined this the most feasible option.
  - Key constraints are the N6 overbridge at Athlone and the Roundabout junction right turn from the N61 to N63 in Roscommon town.
  - A temporary haul route maybe required in Roscommon requiring acquisition of lands / assessment of local route linking the N61 to the N63 (e.g. L-1806).
- Haul Route Option B:
  - Preliminary and visual assessment of the route determined this the second most feasible option.
  - Key constraints are in Longford town (no. of roundabouts), diversion required around Killashee and bridge restrictions.
  - A temporary haul route will be required in Killashee requiring acquisition of lands.
- Haul Route Option C & D:
  - Preliminary assessment determined the route as the least feasible option due to road width and sinuosity
  - Visual assessment to identify constraints was not undertaken on this route.

### 4.2 RECOMMENDATIONS

This report recommends that the constraints identified on Haul Route Option A are assessed further. Additional information to be provided to include but not limited to:

- OS Mapping;
- Topographical survey including vertical constraints measurements;
- Swept path analysis (i.e. AUTOTRACK analysis) with haul vehicle supporting a 65m long blade or widest haul vehicle; and
- Dimensions of the blade, tower and nacelle in plan and profile.

Following assessment of Haul Route Option A, further information may be required through adjacent private lands / further assessment of Haul Route Option B.

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# Appendix A

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## Haul Route Option A Photos

**Haul Route Option A**  
**From N6 exit at Junction 12 to site access points on the N63, R392 & R398 via**  
**N61 (Athlone -Roscommon) & N63 (Roscommon -Longford)**



Photo Item No. 1A



Photo Item No. 1B



Photo Item No. 2

Haul Route Assessment – Haul Route Option A

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Photo Item No. 3



Photo Item No. 4A



Photo Item No. 4B

Haul Route Assessment – Haul Route Option A

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Photo Item No. 5A (Google Street View Image Sept 2012)



Photo Item No. 5B (Google Street View Image Sept 2012)



Photo Item No. 6



Photo Item No. 7A

Haul Route Assessment – Haul Route Option A

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Photo Item No. 7B



Photo Item No. 7C



Photo Item No. 7D

Haul Route Assessment – Haul Route Option A

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Photo Item No. 8A



Photo Item No. 8B



Photo Item No. 9A



Photo Item No. 9B



Haul Route Assessment – Haul Route Option A

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Photo Item No. 9C



Photo Item No. 10

Photo Item No. 11A



Photo Item No. 11B

Haul Route Assessment – Haul Route Option A

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Photo Item No. 12A (Google Street View Image)



Photo Item No. 12B



Photo Item No. 13



Photo Item No. 14 (Google Street View Image July 2011)

Haul Route Assessment – Haul Route Option A

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Photo Item No. 15A



Photo Item No. 15B (Google Street View Image July 2011)



Photo Item No. 16A

Haul Route Assessment – Haul Route Option A

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Photo Item No. 16B (Google Street View July 2011)



Photo Item No. 17



Photo Item No. 18A (Google Street View Image July 2011)



Haul Route Assessment – Haul Route Option A

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Photo Item No. 18B (Google Street View Image July 2011)



Photo Item No. 19A (Google Street View Image July 2011)



Photo Item No. 19B



Photo Item No. 20A

Haul Route Assessment – Haul Route Option A

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Photo Item No. 20B (Google Street View Image July 2011)



Photo Item No. 21



Photo Item No. 22

Haul Route Assessment – Haul Route Option A

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Photo Item No. 23



Photo Item No. 24



Photo Item No. 25A



Photo Item No. 25B

Haul Route Assessment – Haul Route Option A

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Photo Item No. 25C



Photo Item No. 26



Photo Item No. 27



Haul Route Assessment – Haul Route Option A

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Photo Item No. 28 (Photo & Google Street View Image July 2011)



Photo Item No. 29 (Photo & Google Street View Image July 2011)

Haul Route Assessment – Haul Route Option A

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Photo Item No. 30



Photo Item No. 31



Photo Item No. 32

Haul Route Assessment – Haul Route Option A

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Photo Item No. 33



Photo Item No. 34

Haul Route Assessment – Haul Route Option A

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Photo Item No. 34 ( Google Street View Image July 2011)



Photo Item No. 35



Photo Item No. 36A

Haul Route Assessment – Haul Route Option A

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Photo Item No. 36B



Photo Item No. 36C



Photo Item No. 37A



Photo Item No. 37B

Haul Route Assessment – Haul Route Option A

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Photo Item No. 37C



Photo Item No. 38 (Google Street View Image July 2011)



Photo Item No. 39A (Google Street View Image July 2011)

Haul Route Assessment – Haul Route Option A

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Photo Item No. 39B (Google Street View Image July 2011)



Photo Item No. 39C (Google Street View Image July 2011)



Photo Item No. 39D (Google Street View Image July 2011)

Haul Route Assessment – Haul Route Option A

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Photo Item No. 40 (Google Street View Image July 2011)



Photo Item No. 41 (Google Street View Image July 2011)



Haul Route Assessment – Haul Route Option A

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Photo Item No. 42 (Google Street View Image July 2011)



Photo Item No. 43 (Google Street View Image July 2011)



Photo Item No. 44 (Google Street View Image July 2011)



Photo Item No. 45 (Google Street View Image July 2011)

Photo Item No. 46 (Google Street View Image July 2011)

Haul Route Assessment – Haul Route Option A

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Photo Item No. 47 (Google Street View Image July 2011)



Photo Item No. 48 (Google Street View Image July 2011)

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# Appendix B

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## Haul Route Option B Photos

**Haul Route Option B**  
**M4/N4 exit to site access points on the N63**  
**via N4 (Kinnegad - Longford) & N63 (Longford - Roscommon)**



Photo Item No. 1



Photo Item No. 2



Photo Item No. 3

Haul Route Assessment – Haul Route Option B

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Photo Item No. 4



Photo Item No. 5A



Photo Item No. 5B



Photo Item No. 6

Haul Route Assessment – Haul Route Option B

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Photo Item No. 7



Photo Item No. 8



Photo Item No. 9A



Photo Item No. 9B

Haul Route Assessment – Haul Route Option B

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Photo Item No. 10 (Google Street View Image Sept 2014)



Photo Item No. 11A



Photo Item No. 11B (Google Street View Image Sept 2014)



Photo Item No. 11C (Google Street View Image Sept 2014)

Haul Route Assessment – Haul Route Option B

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Photo Item No. 11D (Google Street View Image Sept 2014)



Photo Item No. 12A



Photo Item No. 12B (Google Street View Image April 2009)



Photo Item No. 13A



Haul Route Assessment – Haul Route Option B

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Photo Item No. 13B (Google Street View Image September 2014)



Photo Item No. 14A (Google Street View Image September 2014)



Photo Item No. 14B



Photo Item No. 15A (Google Street View Image September 2014)

Haul Route Assessment – Haul Route Option B

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Photo Item No. 15B (Google Street View Image September 2014)



Photo Item No. 15C



Photo Item No. 16A (Google Street View September 2014)



Photo Item No. 16B

Haul Route Assessment – Haul Route Option B

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Photo Item No. 16C (Google Street View September 2014)



Photo Item No. 16D



Photo Item No. 17A (Google Street View Image July 2011)



Photo Item No. 17B (Google Street View Image July 2011)

Haul Route Assessment – Haul Route Option B

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Photo Item No. 17C (Google Street View Image July 2011)



Photo Item No. 17D (Google Street View Image July 2011)



Photo Item No. 18 (Google Street View Image July 2011)



Photo Item No. 19A (Google Street View Image July 2011)

Haul Route Assessment – Haul Route Option B

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Photo Item No. 19B (Google Street View Image July 2011)



Photo Item No. 20 (Google Street View Image July 2011)



Photo Item No. 21A (Google Street View Image August 2011)

Haul Route Assessment – Haul Route Option B



Photo Item No. 21B (Google Street View Image August 2011)



Photo Item No. 21C (Google Street View Image August 2011)



Photo Item No. 22A (Google Street View Image August 2011)

Haul Route Assessment – Haul Route Option B

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Photo Item No. 22B (Google Street View Image August 2011)



Photo Item No. 22C (Google Street View Image August 2011)



Photo Item No. 23A (Google Street View Image August 2011)

Haul Route Assessment – Haul Route Option B

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Photo Item No. 23B (Google Street View Image August 2011)



Photo Item No. 24 (Google Street View Image August 2011)



Photo Item No. 25A (Google Street View Image August 2011)



Photo Item No. 25B (Google Street View Image April 2011)



Haul Route Assessment – Haul Route Option B

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Photo Item No. 25C (Google Street View Image April 2011)



Photo Item No. 25D (Google Street View Image April 2011)



Photo Item No. 25E (Google Street View Image July 2011)



Photo Item No. 26 (Google Street View Image April 2011)

Haul Route Assessment – Haul Route Option B

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Photo Item No. 27A (Google Street View Image July 2011)



Photo Item No. 27B



Photo Item No. 21A



Photo Item No. 28B

Haul Route Assessment – Haul Route Option B

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Photo Item No. 28C



Photo Item No. 28D



Photo Item No. 28E



Photo Item No. 29A

Haul Route Assessment – Haul Route Option B

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Photo Item No. 29B

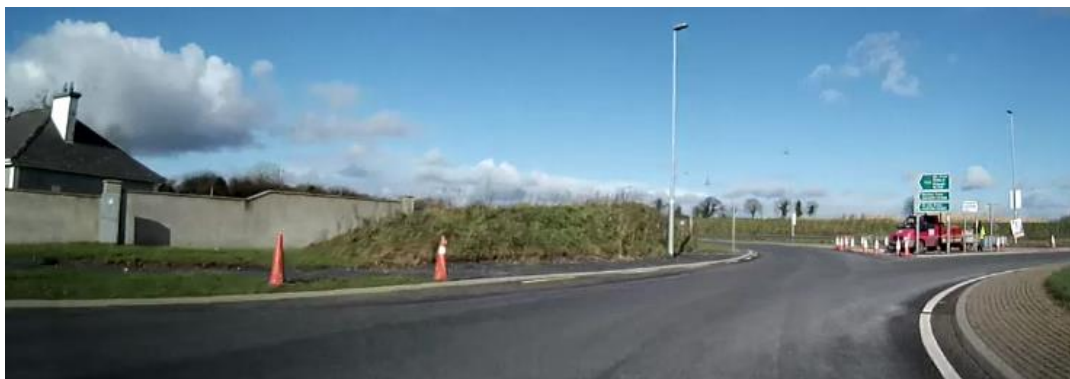


Photo Item No. 30A



Photo Item No. 30B



Photo Item No. 31A

Haul Route Assessment – Haul Route Option B

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Photo Item No. 31B (Google Street View Image August 2011)



Photo Item No. 32 (Google Street View Image April 2011)



Photo Item No. 33 (Google Street View Image April 2011)



Photo Item No. 34A (Google Street View Image April 2011)

Haul Route Assessment – Haul Route Option B

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Photo Item No. 34B



Photo Item No. 22 (Google Street View Image April 2011)



Photo Item No. 23A (Google Street View Image April 2011)



Photo Item No. 24B (Google Street View Image April 2011)

Haul Route Assessment – Haul Route Option B

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Photo Item No. 25 (Google Street View Image April 2011)



Photo Item No. 26A (Google Street View Image April 2011)



Photo Item No. 38B (Google Street View Image April 2011)



Photo Item No. 27A (Google Street View Image April 2011)

Haul Route Assessment – Haul Route Option B

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Photo Item No. 39B (Google Street View Image April 2011)



Photo Item No. 39C (Google Street View Image April 2011)



Photo Item No. 28 (Google Street View Image April 2011)



Photo Item No. 29



Haul Route Assessment – Haul Route Option B

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Photo Item No. 30 (Google Street View Image April 2011)



Photo Item No. 41



Photo Item No. 31A



Photo Item No. 42B (Google Street View Image April 2011)

Haul Route Assessment – Haul Route Option B

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Photo Item No. 42C (Google Street View Image April 2011)



Photo Item No. 42D



Photo Item No. 32A



Photo Item No. 43B (Google Street View Image April 2011)

Haul Route Assessment – Haul Route Option B

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Photo Item No. 43C (Google Street View Image April 2011)



Photo Item No. 33 (Google Street View Image April 2011)



Photo Item No. 34 (Google Street View Image April 2011)



Photo Item No. 35A (Google Street View Image April 2011)

Haul Route Assessment – Haul Route Option B

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Photo Item No. 46B (Google Street View Image April 2011)



Photo Item No. 46C (Google Street View Image April 2011)



Photo Item No. 36A (Google Street View Image April 2011)



Photo Item No. 47B



Photo Item No. 37



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