



APPENDIX 15-4

DN-GEO-DESIGN REPORT
FOR KNOCKSHANVO WIND
FARM

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DN-GEO-DESIGN REPORT FOR KNOCKSHANVO WIND FARM

PROPOSED TEMPORARY TRANSITION COMPOUND ON N69 FOR ABNORMALLY SIZED LOADS LOCATED IN COUNTY LIMERICK

Design Phase Procedure for Road Safety Improvement Schemes, Urban Renewal Schemes and Local Improvement Schemes

DN-GEO-03030 Design Report

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Client: Knockshanvo Wind Farm Development
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1 INTRODUCTION

An Environmental Impact Assessment Report (EIAR) has been prepared for the Proposed Knockshanvo Wind Farm Development, located in County Clare. It is proposed that the large turbine components will arrive at the Port in Foynes and then be delivered by road to the site, which is located approximately 3 km south of Broadford, 3.5 km southeast of Kilkishen, and 4 km northeast of Sixmilebridge, in County Clare. The site location is shown in Figure 15-1b of the EIAR, included as Appendix A of this report.

The proposed turbine delivery route from the port of Foynes to the proposed Wind Farm Site is also shown in Figure 15-1b of the EIAR. It is proposed that the turbine blades will be attached to standard superwing type trailers, which transport the blades in a horizontal position, at the Port of Foynes, and then transported to a proposed Temporary Transition Compound (TTC) located on the northside of the N69 at a point just to the east of the village of Kildimo, also indicated in Figure 15-1b. At the TCC it is proposed the blades will then be transferred from the superwing trailers onto blade adaptor trailers that lift the blades to an angle of 60° in order to significantly shorten the length of the vehicles in the horizontal plane. This is proposed in order to minimise the impacts on the remainder of the turbine delivery route (TDR), including through Limerick City, during the delivery of the turbine blades to the proposed Wind Farm Site.

As this proposed TTC is located on a Section of the N69 National Secondary Road where a 100 km/h speed limit applies this report is the **DN-GEO-03030 Design Report** for the proposed TCC and will be uploaded to Transport Infrastructure Irelands (TII) Departures portal in accordance with Departures from Standards Specifications **GE-GEN-01005-03**.

The layout of the proposed TTC is shown in Figure 1 appended to the rear of this report.

2 COLLISION HISTORY

There is no collision history available from the RSA website at present.

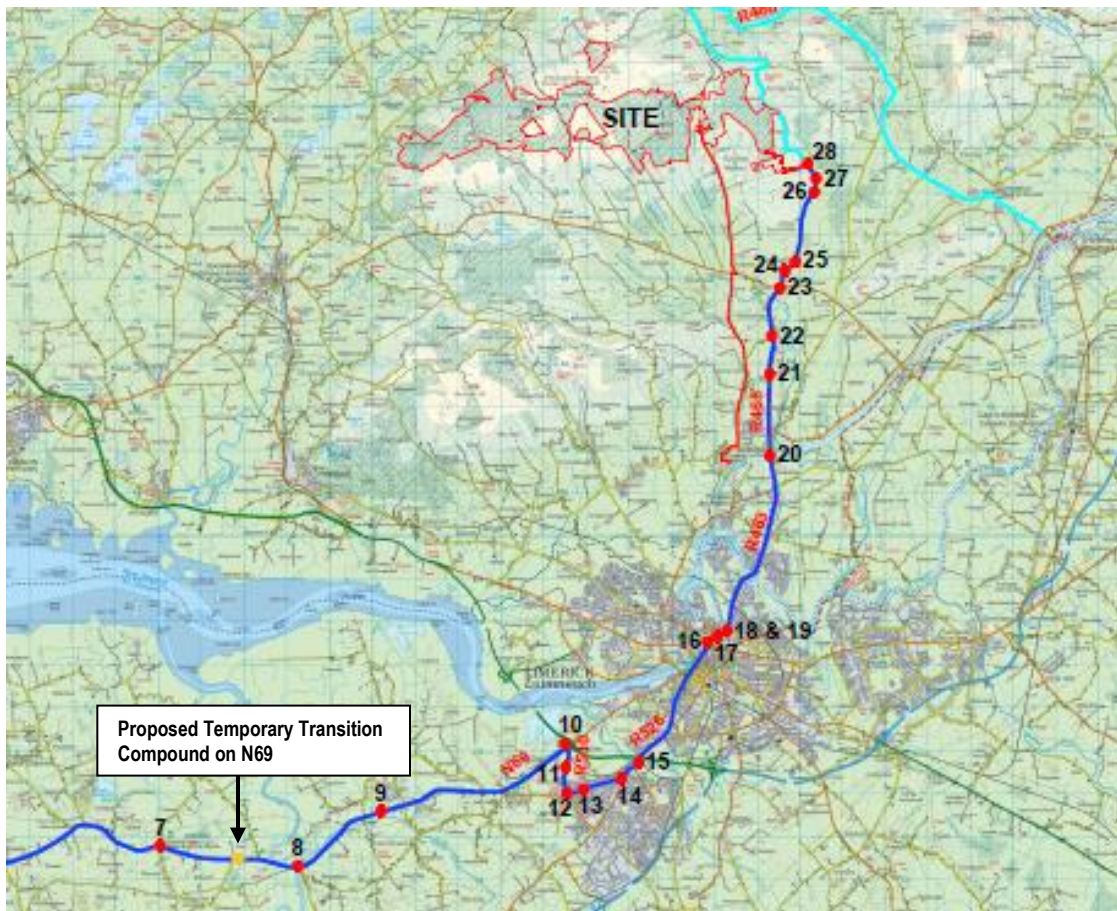
3 SAFETY OBJECTIVES

The safety objectives of the proposed TCC on the N69 are;

- To provide a safe environment for existing traffic, and construction traffic and staff, during the construction of the proposed TTC on the N69.

- To provide a safe environment for the transfer of turbine blades from standard superwing trailers onto trailers with blade adaptors.
- To provide a safe environment for background traffic on the N69 during the transportation of the abnormal loads (blades) to and from the proposed TCC on the N69 by means of transient traffic management measures provided by An Garda Síochána and the haulage company.

Extract of Figure 15-1b showing location of proposed Temporary Transition Compound on the N69



4 EXISTING CONDITIONS

4.1 Speed

The speed limit on the N69 in the proximity of the proposed TCC is 100km/hr.

4.2 Traffic Volumes

A summary of the traffic volumes observed on the N69 in the proximity of the proposed TTC are shown in Table 1. The counts were obtained from an automatic traffic count site maintained by TII. The figures show that in the year 2023 a 2-way daily traffic flow of 6,374 vehicles was observed on the N69. It is noted that in the proximity of the proposed TTC the N69 is a Type 2 single carriageway with a carriageway width of 7.0m and a daily capacity of 8,600 vehicles, which indicates that the N69 was operating at 74% of its capacity in 2023. A 2-way flow of 537 vehicles was observed during the busiest hour, which was observed to be the PM peak hour between 16:00 to 17:00.

During the night-time hours when the convoys of the abnormally sized loads will access and exit the proposed TTC, a 2-way flow of 31 vehicles was observed on the N69 during the hour of 00:00 to 01:00. Traffic volumes during night-time hours are therefore very low, which is the reason that these deliveries are made during this period.

Table 1 Observed 2-way traffic flows by road and time period, year 2023

Link	24 hour	Peak hour (16:00 to 17:00)	Typical turbine delivery hour (00:00 to 01:00)
N69	6,374	537	31

Source: TII Automatic Count Site between Askeaton and Foynes

4.3 Horizontal Alignment

The proposed access points off the N69 and the layout of the TTC are shown in Figure 1. The figure shows that the N69 is straight in the proximity of the proposed TTC. There are no changes proposed to the horizontal alignment as part of the proposed TTC.

4.4 Vertical Alignment

The vertical alignment of the N69 in the proximity of the proposed TTC is relatively flat. Over a 0.5km section of the N69 centred in the middle of the proposed TCC the N69 rises 1.2m travelling west to east, which is an average gradient of 0.25%. There are no changes proposed to the vertical alignment as part of the proposed TTC.

4.5 Cross Section, Crossfall & Super elevation

4.5.1 Cross Section and crossfall

In the proximity of the proposed TTC the N69 is a Type 2 single carriageway with a carriageway width of 7.0m and a daily capacity of 8,600 vehicles. There are no changes to the cross-section proposed on the N69.

There is no cross-fall on this straight section of the N69. There are no changes proposed to the crossfall on the N69.

4.5.2 Superelevation

There is no superelevation on this straight section of the N69. There are no changes proposed to the superelevation on this section of the N69.

4.6 Junctions & Accesses

As shown in Figure 1, in the proximity of the proposed TTC, there is an existing access on the north side of the N69 to the west of the proposed TTC site, that serves an existing dwelling. On the southern side of the N69 approximately 40m to the west of the proposed TTC the local L-8038 joins the N69 by means of a priority junction.

4.7 Facilities for Vulnerable Road Users

There are currently no facilities for vulnerable users at the location of the proposed TTC on the N69. Based on the nature of the temporary access for the delivery of abnormal loads, there are no facilities for vulnerable road users proposed as part of the proposed TTC.

4.8 Visibility & Sightlines

Based on the existing horizontal and vertical alignment on the N69, forward visibility along the N69 in the proximity of the proposed TTC is clear.

Currently there are trees and shrubs along the southern boundary of the proposed TTC site running parallel with the N69 and there is no existing access to the site.

5 ENVIRONMENTAL, ARCHAEOLOGICAL AND OTHER CONSTRAINTS

5.1 Appropriate Assessment

An Appropriate Assessment has been prepared by MKO as part of the EIAR.

5.2 Ecological Assessment

An Ecological assessment has been prepared by MKO as part of the EIAR.

5.3 Other Environmental Surveys

Not Applicable.

5.4 Archaeological Constraints

No National Monuments, Recorded Monuments, Protected Structures or National Inventory of Architectural Heritage (NIAH) structures are located within the footprint of the proposed TTC.

6 PROPOSED DESIGN

6.1 General

The layout of the proposed TTC is shown in Figure 1. The proposed trip generation and design is considered during the construction of the TTC, and during the delivery of the turbine blades.

During the construction of the proposed TCC

During the construction of the proposed TTC, as set out in the EIAR, a total of 27 truckloads of materials will be delivered to the site on 85 working days, resulting in a total of 2,280 loads being delivered to the site. On average this will result in 3 trucks accessing and exiting the site per hour for a 10 hour day. It is proposed that all materials will be gained from a quarry to the west of the proposed site so all deliveries will turn left into the site, and then after depositing the materials on site, turn right out of the site onto the N69 to return to the quarry. There will therefore be no right turning movements off the N69, and therefore no potential for stationary delivery vehicles waiting on the N69.

It is proposed that all deliveries during the construction of the TTC will be made to the site via the eastern access shown in Figure 1. The visibility splays that will be available once the shrubs and trees on the southern boundary of the site are trimmed are shown in Figure 2. The figure indicates that 220m visibility splays taken from a 3m setback from the carriageway edge are available in accordance with TII guidelines. While the full visibility splays are available it is proposed that during all times that traffic will require to access and exit the site during the construction of the proposed TTC, a comprehensive set of traffic management measures will be implemented to ensure a safe environment for all development generated traffic and for background traffic on the N69. All measures will be in accordance with the *“Traffic Signs Manual, Section 8 – Temporary*

Traffic Measures and Signs for Road Works” (DoT now DoTT&S) and “Guidance for the Control and Management of Traffic at Roadworks” (DoTT&S). It is proposed that construction staff (flagman) will be present at the site access during all delivery times. It is also proposed that an application will be made to TII / LC&CC for a temporary speed reduction on this section of the N69 for the 85 day construction period.

During the delivery of the turbine blades

Once constructed the sole purpose of the TTC will be to facilitate the delivery of the abnormally sized loads carrying the turbine blades only. It is proposed that the TTC will be opened temporarily and only on designated hours on the nights that the vehicle convoys carrying the blades on standard superwing trailers, and on the nights that vehicle convoys of blades exit the TTC on trailers with blade adapters. The access and the exit are not designed in accordance with TII Guidelines, and full visibility splays are not provided at the access as this is a temporary facility that will be used on the 6 nights when a convoy of 5 abnormally sized loads will be escorted into the TTC, and a further 6 nights when the same number of loads will be escorted out of the TTC. All of these movements will be accompanied by an escort provided by An Garda Síochána. On these nights, transient traffic management will also be provided on the N69 from the Port of Foynes and on the entire TDR to the proposed Site. At all other times during the construction period the temporary access points for the TTC will be closed by means of a gate. On the completion of the construction phase the boundaries on the TTC will re-instated to their original state with the temporary access points permanently closed.

A swept path analysis showing the abnormally sized loads accessing the TTC on a superwing trailer and exiting the site using a blade adapter is included as Appendix B

6.2 Land Acquisition

The land required to provide the TTC for the delivery of abnormal loads has been acquired by the Applicant.

6.3 Horizontal Alignment

There are no changes proposed to the horizontal alignment on the N69 in the proximity of the proposed TCC.

6.4 Vertical Alignment

It is confirmed that there are no changes proposed to the vertical alignment on the N69 in the proximity of the proposed TTC.

6.5 Cross Section Crossfall & Super elevation

6.5.1 Cross Section

There are no changes proposed to the cross section on the N69 in the proximity of the proposed TTC.

6.5.2 Crossfall

There are no changes proposed to the crossfall on the N69 in the proximity of the proposed TTC.

6.5.3 Super elevation

There are no changes proposed to the superelevation on the N69 in the proximity of the proposed TTC.

6.6 Facilities for Vulnerable Road Users

There are no proposals for vulnerable road users on the N69 in the proximity of the proposed TTC.

6.7 Junctions & Accesses

There are no permanent accesses or junctions proposed on the N69 as part of the TTC. The proposed temporary accesses are described in Section 6.1 of this report and shown in Figure 1.

6.8 Visibility and Sightlines

As set out in Section 6.1 and Figure 2, the full 3m x 220m visibility plays are available at the eastern junction along the N69 during the construction stage for the TCC. It is, however, proposed that all traffic movements generated during both the construction of the TCC and during the delivery of the abnormal loads will be undertaken using a comprehensive set of traffic management measures.

6.9 Drainage

Appropriate drainage will be put in place at the temporary access points on the N69.

6.10 Pavement

No changes are proposed relating to pavement design on the N69. The proposed TTC will comprise of compacted stone and gravel.

6.11 Safety Barrier Risk Assessment and Provision

There are currently no safety barriers on the N69 in the proximity of the junction with the L-1834. No changes are proposed.

6.12 Traffic Signs and Road Markings

No changes are proposed relating to the existing permanent traffic signs and markings on the N69 in the proximity of the proposed TTC. As set out in Section 6.1 a comprehensive set of traffic management measures will be in place during the construction of the proposed TTC. All measures will be in accordance with the *“Traffic Signs Manual, Section 8 – Temporary Traffic Measures and Signs for Road Works”* (DoT now DoTT&S) and *“Guidance for the Control and Management of Traffic at Roadworks”* (DoTT&S). It is proposed that construction staff (flagman) will be present at the site access during all delivery times. It is also proposed that an application will be made to TII / LC&CC for a temporary speed reduction on this section of the N69 for the 85 day construction period. All measures will be submitted to LC&CC and TII for agreement prior to the construction of the proposed TTC.

6.13 Accommodation Works

The accommodation works for the TCC will be constructed via the temporary eastern access off the N69, as shown in Figure 1. As set out previously temporary traffic management measures will be put in place on the N69 to ensure the safe operation of this temporary access.

6.14 Lighting

There is currently no lighting on the N69 in the proximity of the proposed TTC. No changes are proposed.

6.15 Departures from Standard

The proposed TTC for the purpose of the delivery of abnormally sized loads to the site is a temporary facility to be opened during its construction, which will be accompanied by temporary traffic management measures, and on the nights that the delivery of the turbine blades will take place, which will be accompanied by an escort provided by An Garda Síochána. There are no permanent changes proposed on the N69.

7 ROAD SAFETY AUDIT

A Stage 1 Road Safety Audit was commissioned by the Applicant for the Proposed Development, including the proposed TTC on the N69. The Stage 1 Road Safety Audit was undertaken by Traffico Ltd.

The following potential problem relating to the proposed TTC, together with the Design Teams response and whether the response was accepted by the Audit Team is set out below.

Problem 2.1 – Sightlines partially obscured by field boundary, Temporary Transition Compound, field boundary flanking accesses – The Audit Team notes sightlines to the left appear to be partially obscured by the existing field boundary, which includes a ditch foliage and some trees. This could lead to side impact type collisions within the access junction's conflict zone.

The Audit Team recommends that the ditch and boundary should be modified to ensure that an appropriate sightline is provided at the location.

The Design Team Response is as follows - It is acknowledged that visibility splays are constrained at the location of the proposed Temporary Transition Compound. Appropriate traffic management measures are set out in Section 15.1.2.3 of the EIAR. During the construction of the proposed TTC access to and from the site off the N69 will be controlled by traffic management measures, including temporary signage in accordance with the "*Traffic Signs Manual, Section 8 – Temporary Traffic Measures and Signs for Road Works*" (DoT now DoTT&S) and "Guidance for the Control and Management of Traffic at Roadworks" (DoTT&S). Construction staff (flagman) will be present at this location during all times that deliveries are made to and from the site. The site will be closed to all traffic by means of fencing at all other times.

It is also noted, as shown in Figure 2, that with minor trimming of existing hedges and trees that the full 3m x 220m visibility splays are available, although not required with the traffic management measures discussed above.

The Design Team response was accepted in in the Road Safety Audit Feedback Form included as Appendix A of the Audit Report.

The Stage 1 Road Safety Audit Report is included as Appendix 15-5 of the EIAR.

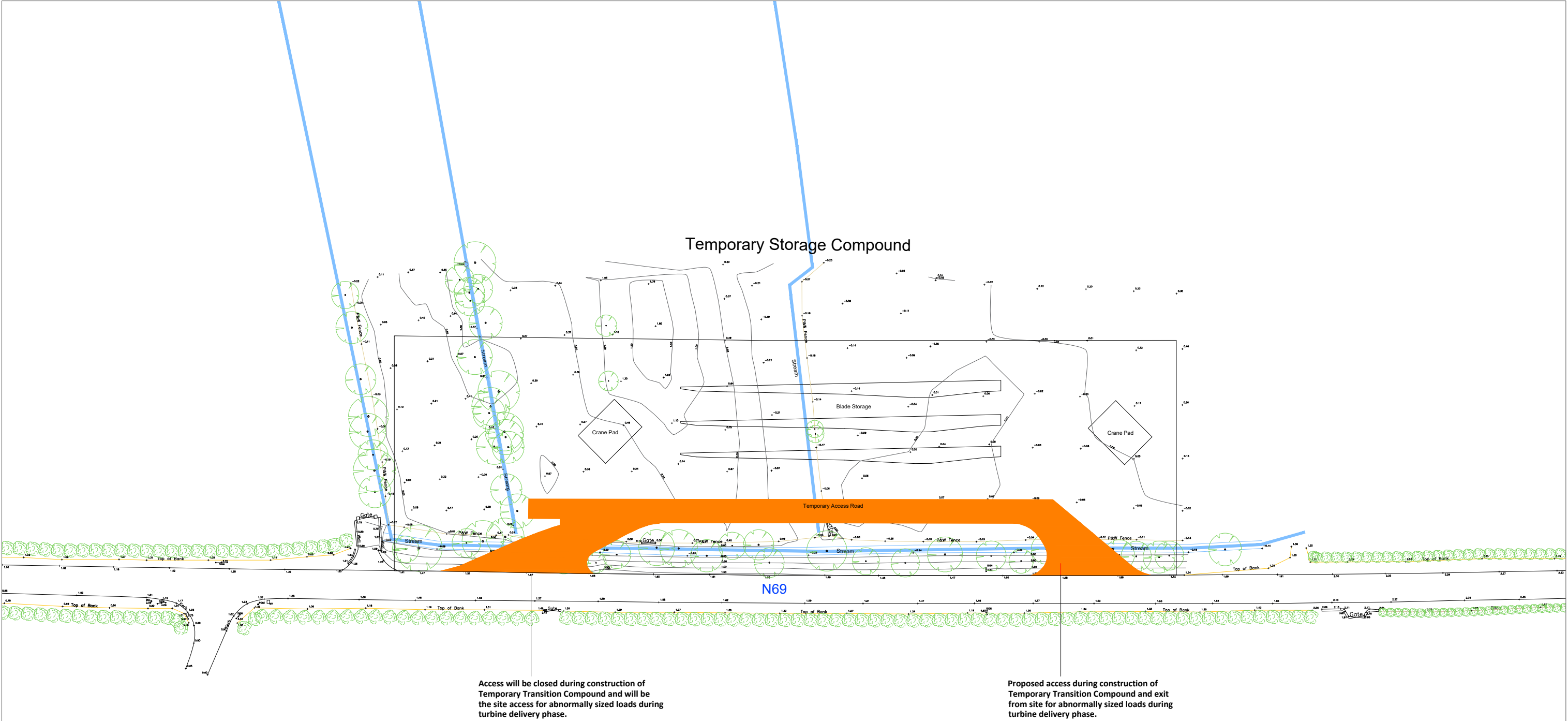
8 TOTAL SCHEME BUDGET

There are no cost estimates available at present.

9 PROPOSED NEXT STEPS

Subject to being granted planning permission the next steps will be to finalise construction drawings and compile construction tender package.

FIGURES



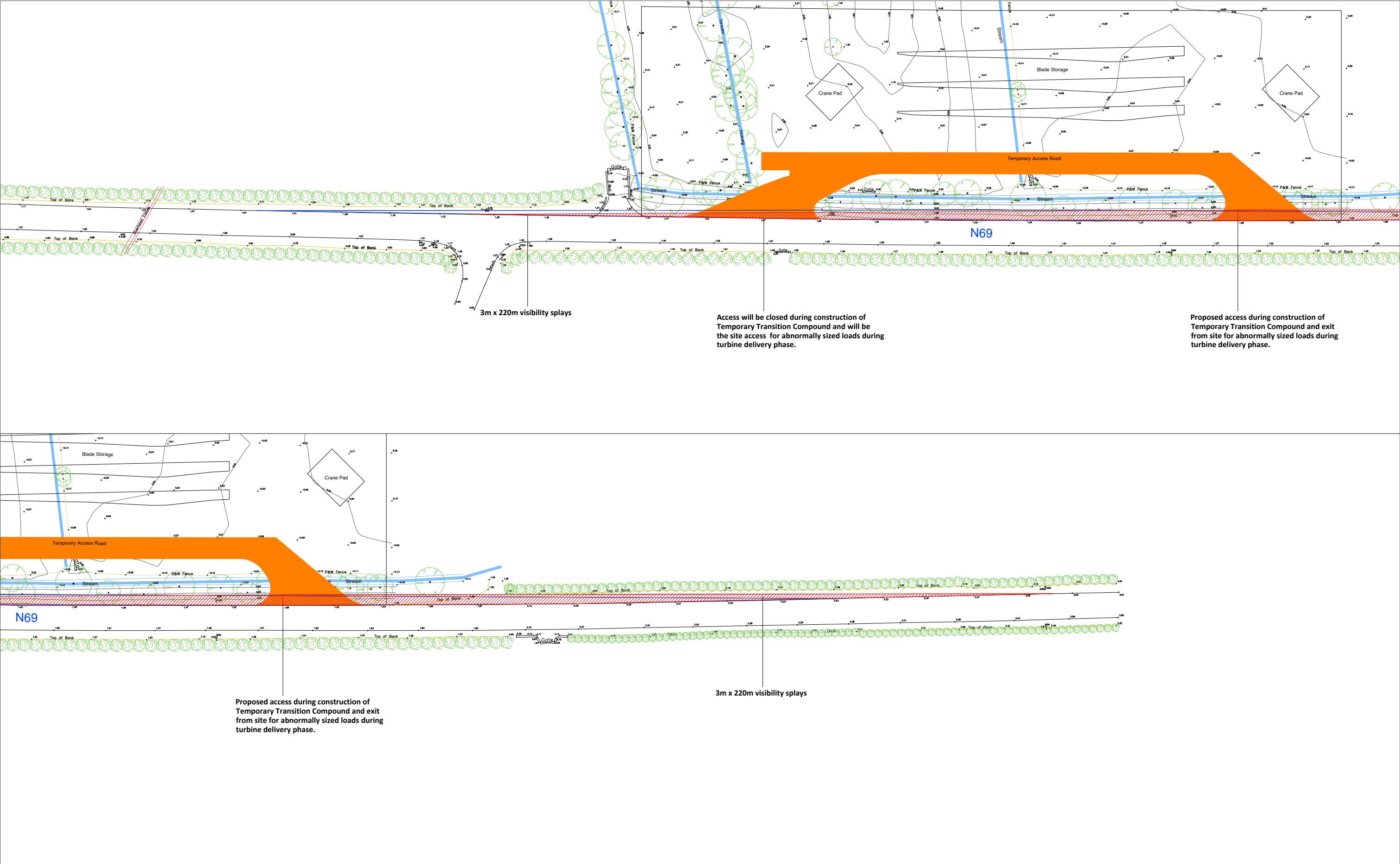
NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES -
DESIGN PREPARED BY FUTUREENERGY IRELAND

Figure 1 Layout of proposed Temporary Transition Compound

PROJECT: Knockshanvo Wind Farm Development		
CLIENT: Futureenergy Ireland		SCALE: 1:1000
PROJECT NO: 8880	DATE: 16.06.24	DRAWN BY: AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS



NOTES:

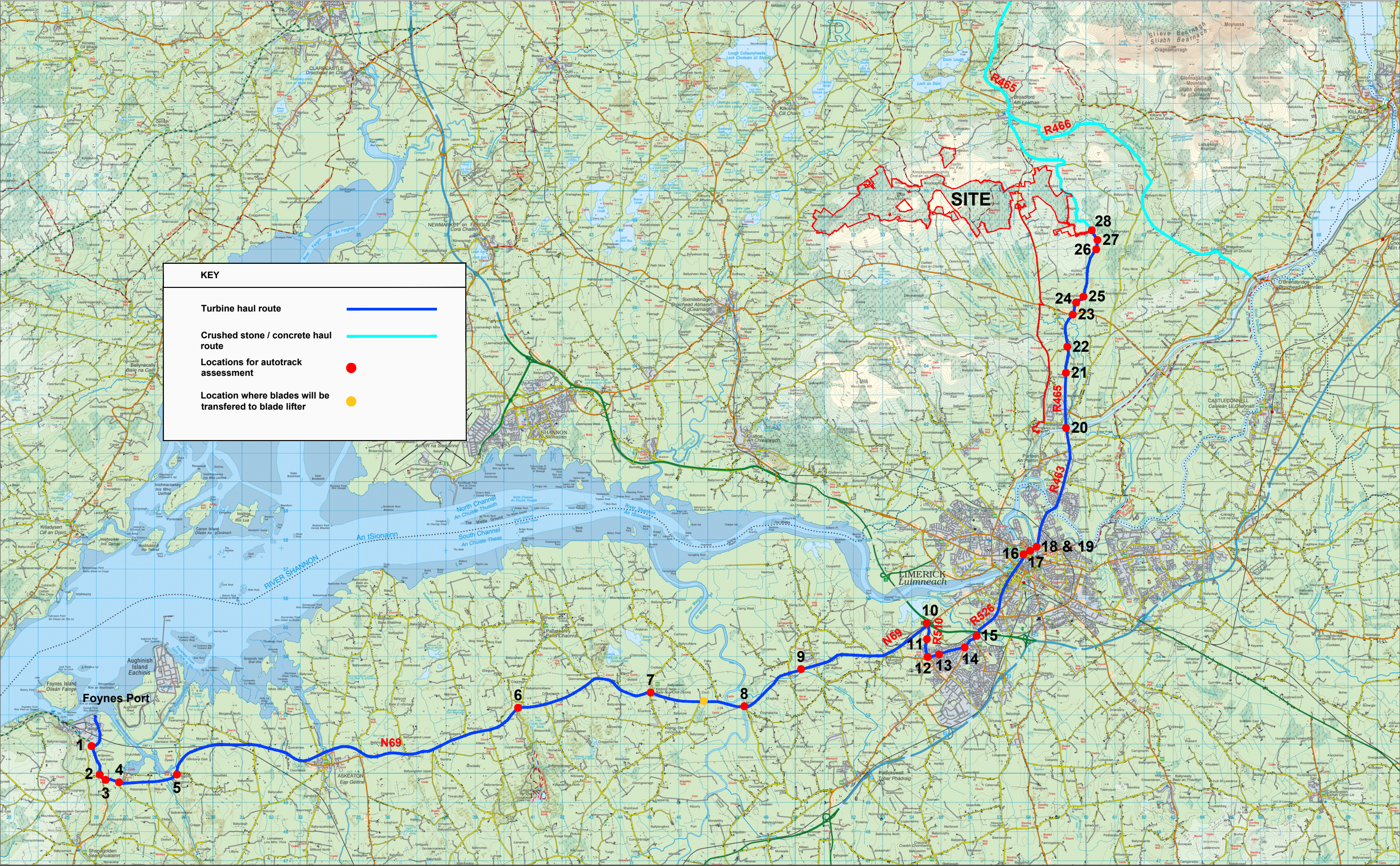
PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES -
DESIGN PREPARED BY FUTUREENERGY IRELAND

Figure 2 Layout of Proposed Temporary Transition Compound - 3m x 220m visibility splays

PROJECT: Knockshanvo Wind Farm Development		
CLIENT: Futureenergy Ireland	SCALE: 1:1000	
PROJECT NO: 8880	DATE: 16.06.24	DRAWN BY: AL

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Appendix A - EIAR Figure 15-1B



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Base mapping provided by MKO

Figure 15-1b Turbine delivery route autotrack assessment location plan

PROJECT: Knockshanvo Wind Farm Development

CLIENT: Futurenergy Ireland

PROJECT NO: 8880

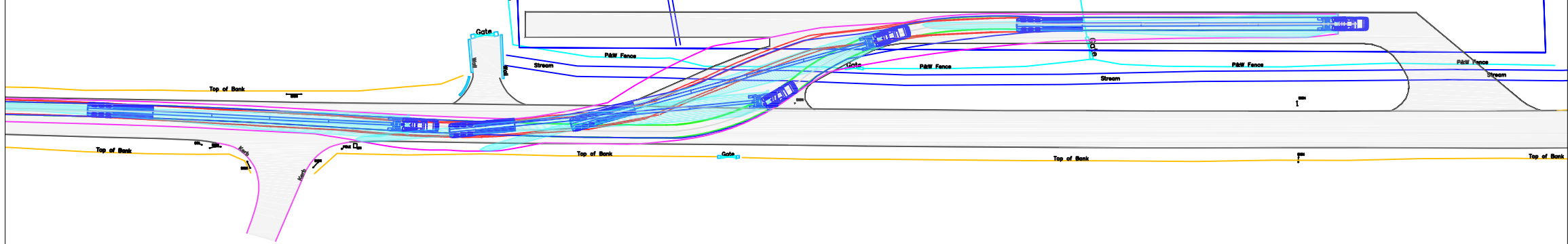
DATE: 07.08.24

SCALE: NTS

DRAWN BY: AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

Appendix B – Swept path analysis at proposed Temporary Transition Compound



UNIT 4, FIRST FLOOR, GLEN VIEW BUSINESS PARK,
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MOB: + 353(0)86 8044031
MOB: + 353(0)87 8323916
EMAIL: info@landsurveyors.ie

- Area within Magenta outline will be oversailed by vehicle load
- Area within Blue outline will be oversailed by vehicle body
- Tractor Axles outlined in Green
- Trailer Axles outlined in Red

ITM GRID REFERENCE: 546837 652493

- The Swept Path Analysis provided is produced from a transport oriented view only and does not consider any issues in terms of land ownership, or any other precincts that may otherwise be restrictive.
- This drawing has been created from data produced from Aerial Imagery and OSI mapping.
- All Swept Path diagrams, drawings and assessments are calculated for the movement of loaded trailer equipment carrying Wind Turbine components. These calculations are based on the turning circles and specification of the specified trailer equipment details in this SPA.
- Delivery vehicles can be right or left hand vehicles therefore due to driver interpretation it is assumed that each vehicle will not follow the same path. Consequently, a buffer zone will be required outside of the Swept Path Analysis.
- This SPA is a means of providing evidence of minimum clearance of any vehicle as a footprint and there is no margin or safety cordon included.
- In locations where modifications are required for road widening the road construction must be formed in strict accordance with the specification contained within the Turbine Manufacturers Transport Guidance document.
- The term Land Take refers to where land is required from Privately Owned Lands. The term Road Widening refers to where land is required within the carriageway boundaries. The boundaries between privately owned lands and the carriageway curtailment are assumed to be identified by walls/fence lines/hedges etc. Actual boundaries between private lands and the carriageway curtailment are not identified within this report and should only be authenticated by land searches.
- The minimum road width for the transport of components will be stated within the Turbine Manufacturers Transport Guidance document. Any road not conforming to this specification will require widening regardless of Swept Path Analysis not detailing any modifications.
- Permits and/or Garda escorts may be required for the movement of Wind Turbine components. Permits may also be required for the movement of vehicles shown in this Swept Path Analysis. Local Authorities issue permits and requirements differ from region to region. Before the capability to deliver these components are undertaken careful consideration should be given to the possible approval of 'Permits to Movement' by the relevant Local Authorities.
- All information contained within this document is privileged and confidential and is for the exclusive use of the client.
- Dimensions are in metres. Written dimensions only. Drawing not to be scaled.



Digital Land Surveyors Ltd

SWEPT PATH ANALYSIS SPECIALISTS