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APPENDIX 3

DESCRIPTION OF THE PROPOSED DEVELOPMENT

Appendix 3.1 – Landowner Agreement

Appendix 3.2 – Construction and Environmental Plan Management

Appendix 3.3 – ESB Specification

APPENDIX 3.1

Landowner Agreement

North Kildare Windfarm limited

Date: May 2025

POSTAL ADDRESS:
Building 3400
Cork Airport
Business Park
Cork
Ireland
T12 AE76

Att.:
The Secretary
An Bord Pleanála
64 Marlborough Street
Dublin 1 D01 V902

Re: Drehid Wind Farm. ABP Pre-App Ref. ABP 314463

To Whom it May Concern,

On behalf of North Kildare Wind Farm Limited, we wish to confirm that part of the proposed development that is the subject of this application (i.e. cabling under/alongside a public road) will be undertaken by a statutory undertaker having a right or interest to provide services in connection with the proposed development.

Yours sincerely,

Kevin Mac Mahon

Kevin Mac Mahon

Senior Project Manager

On behalf of North Kildare Wind Farm Ltd

COILLTE
GROW · TRANSFORM · SUSTAIN

SID Department
An Bord Pleanála
64 Marlborough Street
Dublin
D01 V902

Our Ref: CLS_ABP_LTR_646

4th June 2025

Re: Letter of Consent regarding the Planning Application by North Kildare Wind Farm Limited for the Drehid Wind Farm as relates to sections of Coillte CGA's Dunfierth and Kilmurry properties in Co. Kildare

Dear Sir/Madam,

This letter refers to the estate, right and title of Coillte CGA in the properties known as Dunfierth and Kilmurry which property is outlined in red on the indicative Map attached hereto (hereinafter called "**the Property**").

We refer to the proposal by North Kildare Wind Farm Limited to locate 4 turbines, a substation and associated roading requirements on the Property as part of the Drehid Wind Farm. The proposed locations of the above as it concerns the Property are shown on the Map attached hereto. We wish to advise that we have no objection in principle to the submission of a planning application which solely relates to the proposal to locate 4 turbines, a substation and associated roading requirements on the Property in the manner illustrated in the Map attached hereto and hereby furnish this letter for the purposes of consent only to the submission of this application by North Kildare Wind Farm Limited.

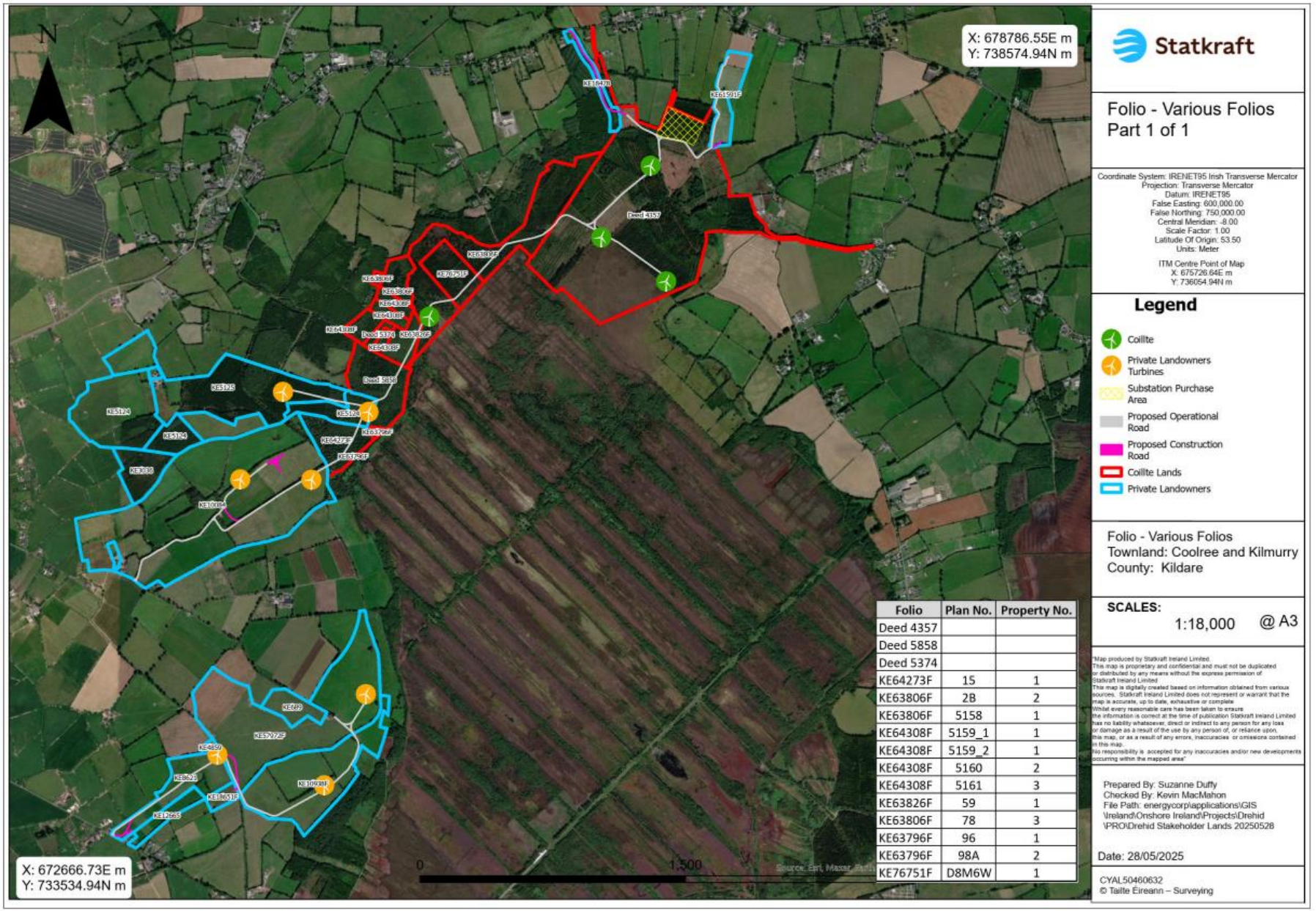
Please note that this letter is not and shall not constitute a note or memorandum in writing for the purposes of Section 51 of the Land and Conveyancing Law Reform Act, 2009.

We trust you will find the above in order. Should you have further queries, please do not hesitate to contact us.

Yours faithfully,

Brenda Molloy
Coillte CGA

Map illustrating proposed location of turbines, a substation and roading requirements as they concern Coillte Property (lands outlined in red) as part of the overall Drehid Wind Farm proposal



Folio	Plan No.	Property No.
Deed 4357		
Deed 5858		
Deed 5374		
KE64273F	15	1
KE63806F	2B	2
KE63806F	5158	1
KE64308F	5159_1	1
KE64308F	5159_2	1
KE64308F	5160	2
KE64308F	5161	3
KE63826F	59	1
KE63806F	78	3
KE63796F	96	1
KE63796F	98A	2
KE76751F	D8M6W	1

An Bord Pleanála,
64 Marlborough St,
Rotunda,
Dublin 1,
D01 V902.

February 2025

To whom it may concern:

Re: Letter of Consent for the proposed Drehid Wind Farm Development (Proposed Wind Farm) in the townlands of Ballynamullagh, Kilmurry, Killyon, Coolree, Mulgeeth and Drehid, Co. Kildare and 110 kV Substation Development (Proposed Substation) in the townland of Coolree.

Applicant: North Kildare Wind Farm Limited

I, Mark Walsh of Coolree, Enfield, Co.Meath wish to confirm that I am the full owner of Folio KE61591F in the townlands of Coolree, Timahoe East, Co.Kildare.

I hereby give consent to North Kildare Wind Farm Limited (A subsidiary of Statkraft Ireland Limited) to submit a planning application to An Bord Pleanala for the above referenced project.

I hereby give consent to North Kildare Wind Farm Limited (a subsidiary of Statkraft Ireland Limited) for full right of way access to the above-mentioned folio.

Yours Sincerely,

Mark Walsh

An Bord Pleanála,
64 Marlborough St,
Rotunda,
Dublin 1,
D01 V902.

February 2025

To whom it may concern:

Re: Letter of Consent for the proposed Drehid Wind Farm Development (Proposed Wind Farm) in the townlands of Ballynamullagh, Kilmurry, Killyon, Coolree, Mulgeeth and Drehid, Co. Kildare and 110 kV Substation Development (Proposed Substation) in the townland of Coolree.

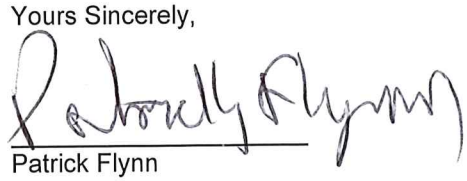
Applicant: North Kildare Wind Farm Limited

I, Patrick Flynn. of Connellstown, Enfield, Co.Meath wish to confirm that I am the full owner of Folio KE18478 in the townlands of Coolree, Timahoe East, Co.Kildare.

I hereby give consent to North Kildare Wind Farm Limited (A subsidiary of Statkraft Ireland Limited) to submit a planning application to An Bord Pleanala for the above referenced project.

I hereby give consent to North Kildare Wind Farm Limited (a subsidiary of Statkraft Ireland Limited) for full right of way access to the above-mentioned folio.

Yours Sincerely,



Patrick Flynn

An Bord Pleanála,
64 Marlborough St,
Rotunda,
Dublin 1,
D01 V902.

February 2025

To whom it may concern:

Re: Letter of Consent for the proposed Drehid Wind Farm Development (Proposed Wind Farm) in the townlands of Ballynamullagh, Kilmurry, Killyon, Coolree, Mulgeeth and Drehid, Co. Kildare and 110 kV Substation Development (Proposed Substation) in the townland of Coolree.

Applicant: North Kildare Wind Farm Limited

I, Oliver Morrinof Ballinamullagh, Enfield, Co.Meath wish to confirm that I am the full owner of Folios KE3036, KE5124 and KE5125 in the townlands of Bellynamullagh and Clonkeeran in Co. Kildare.

I hereby give consent to North Kildare Wind Farm Limited (A subsidiary of Statkraft Ireland Limited) to submit a planning application to An Bord Pleanala for the above referenced project.

I hereby give consent to North Kildare Wind Farm Limited (a subsidiary of Statkraft Ireland Limited) for full right of way access to the above-mentioned folio.

Yours Sincerely,

Oliver Morrin

An Bord Pleanála,
64 Marlborough St,
Rotunda,
Dublin 1,
D01 V902.

February 2025

To whom it may concern:

Re: Letter of Consent for the proposed Drehid Wind Farm Development (Proposed Wind Farm) in the townlands of Ballynamullagh, Kilmurry, Killyon, Coolree, Mulgeeth and Drehid, Co. Kildare and 110 kV Substation Development (Proposed Substation) in the townland of Coolree.

Applicant: North Kildare Wind Farm Limited

I, Patrick McKeon of Drehid, Carbury wish to confirm that we are the full owners of Folios KE10084 the townlands of Drehid in Co. Kildare.

I hereby give consent to North Kildare Wind Farm Limited (A subsidiary of Statkraft Ireland Limited) to submit a planning application to An Bord Pleanala for the above referenced project.

I hereby give consent to North Kildare Wind Farm Limited (a subsidiary of Statkraft Ireland Limited) for full right of way access to the above-mentioned folio.

Yours Sincerely,

Patrick McKeon
Patrick McKeon

An Bord Pleanála,
64 Marlborough St,
Rotunda,
Dublin 1,
D01 V902.

February 2025

To whom it may concern:

Re: Letter of Consent for the proposed Drehid Wind Farm Development (Proposed Wind Farm) in the townlands of Ballynamullagh, Kilmurry, Killyon, Coolree, Mulgeeth and Drehid, Co. Kildare and 110 kV Substation Development (Proposed Substation) in the townland of Coolree.

Applicant: North Kildare Wind Farm Limited

I, Annie Hanbidge of Drehid, Carbury County Kildare wish to confirm that I am the full owner of Folios KE57972F and KE4859 in the townland of Drehid, Co. Kildare.

I hereby give consent to North Kildare Wind Farm Limited (A subsidiary of Statkraft Ireland Limited) to submit applications for consent to An Bord Pleanala for the above referenced projects.

I hereby give consent to North Kildare Wind Farm Limited (a subsidiary of Statkraft Ireland Limited) for full right of way access to the above-mentioned folio.

Yours Sincerely,

Annie Hanbidge

An Bord Pleanála,
64 Marlborough St,
Rotunda,
Dublin 1,
D01 V902.

February 2025

To whom it may concern:

Re: Letter of Consent for the proposed Drehid Wind Farm Development (Proposed Wind Farm) in the townlands of Ballynamullagh, Kilmurry, Killyon, Coolree, Mulgeeth and Drehid, Co. Kildare and 110 kV Substation Development (Proposed Substation) in the townland of Coolree.

Applicant: North Kildare Wind Farm Limited

We, Adam and Annie Hanbidge of Drehid, Carbury County Kildare wish to confirm that we are the full owners of Folios KE689 and KE10938F in the townland of Drehid, Co. Kildare.

We hereby give consent to North Kildare Wind Farm Limited (A subsidiary of Statkraft Ireland Limited) to submit a planning application to An Bord Pleanala for the above referenced project.

We hereby give consent to North Kildare Wind Farm Limited (a subsidiary of Statkraft Ireland Limited) for full right of way access to the above-mentioned folio.

Yours Sincerely,

Adam and Annie Hanbidge

An Bord Pleanála,
64 Marlborough St,
Rotunda,
Dublin 1,
D01 V902.

February 2025

To whom it may concern:

Re: Letter of Consent for the proposed Drehid Wind Farm Development (Proposed Wind Farm) in the townlands of Ballynamullagh, Kilmurry, Killyon, Coolree, Mulgeeth and Drehid, Co. Kildare and 110 kV Substation Development (Proposed Substation) in the townland of Coolree.

Applicant: North Kildare Wind Farm Limited

I, Stanley Kane of Drehid, Carbury County Kildare wish to confirm that I am the full owner of Folio KE18651F in the townland of Drehid, Co. Kildare.

I hereby give consent to North Kildare Wind Farm Limited (A subsidiary of Statkraft Ireland Limited) to submit a planning application to An Bord Pleanala for the above referenced project.

I hereby give consent to North Kildare Wind Farm Limited (a subsidiary of Statkraft Ireland Limited) for full right of way access to the above-mentioned folio.

Yours Sincerely,

Stanley Kane

Stanley Kane

An Bord Pleanála,
64 Marlborough St,
Rotunda,
Dublin 1,
D01 V902.

February 2025

To whom it may concern:

Re: Letter of Consent for the proposed Drehid Wind Farm Development (Proposed Wind Farm) in the townlands of Ballynamullagh, Kilmurry, Killyon, Coolree, Mulgeeth and Drehid, Co. Kildare and 110 kV Substation Development (Proposed Substation) in the townland of Coolree.

Applicant: North Kildare Wind Farm Limited

I, Laurence Martin of Drehid County Kildare wish to confirm that I am the full owner of Folios KE16215, KE8621 and KE12665 in the townlands of Drehid, Co. Kildare.

I hereby give consent to North Kildare Wind Farm Limited (A subsidiary of Statkraft Ireland Limited) to submit a planning application to An Bord Pleanala for the above referenced project.

I hereby give consent to North Kildare Wind Farm Limited (a subsidiary of Statkraft Ireland Limited) for full right of way access to the above-mentioned folio.

Yours Sincerely,

Laurence Martin

APPENDIX 3.2

Construction and Environmental Management Plan

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) FOR THE PROPOSED DREHID WIND FARM AND SUBSTATION,CO. KILDARE

Construction and Environmental Management Plan (CEMP)

Prepared for:

North Kildare Wind Farm Ltd

Date: **June 2025**

Unit 3/4, Northwood House, Northwood Crescent,
Northwood, Dublin, D09 X899, Ireland

T: +353 1 658 3500 | E: info@ftco.ie

CORK | DUBLIN | CARLOW

www.fehilytimoney.ie

TABLE OF CONTENTS

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1. INTRODUCTION

1.1 General Introduction and Purpose

This document is the Construction and Environmental Management Plan (CEMP) for the Proposed Development and has been prepared by Fehily Timoney & Company (FT) on behalf of North Kildare Wind Farm Limited.

The CEMP will be a key construction contract document, and the appointed contractor will be obliged to implement it in full. It will be updated by the Contractor prior to construction to take account of any relevant conditions attached to the planning permission and will be implemented for the duration of the construction phase of the Proposed Development. The CEMP also includes measures for the operational and decommissioning phase of the Proposed Development. Decommissioning of the Proposed Wind Farm is intended to take place following its 35-year operational life; while the Proposed Substation is expected to remain in situ in perpetuity, and will be taken charge of by EirGrid. General guidance for the decommissioning of the Proposed Wind Farm is contained in Section 4.3.10 of this CEMP.

The CEMP will be a live document and will be subject to ongoing review through regular environmental auditing and site inspections. The measures in the CEMP will be implemented in full and further measures may be added as may be identified from the auditing and site inspections.

The CEMP sets out the key construction and environmental management issues associated with the Proposed Development , to ensure that the environment is protected and impacts on the environment are minimised.

The CEMP should be read in conjunction with the Environmental Impact Assessment Report (EIAR) and the Natura Impact Statement (NIS).

The document is divided into six sections:

Section 1: Introduction provides details on the existing site and the Proposed Development

Section 2: Existing Site Environmental Conditions provides details of the main existing geotechnical, hydrological, ecological and archaeological conditions onsite. These conditions will be considered by the contractor in the construction, operation and decommissioning of this Proposed Development.

Section 3: Overview of Construction Works, this section provides an overview of the construction works proposed, including drainage and sediment controls to be installed.

Section 4: Environmental Management Plan (EMP), this section outlines the main requirements of the EMP and outlines operational controls for the protection of the environment including soil management, habitat and species, site drainage control, archaeology, construction traffic, site reinstatement and decommissioning, waste management.

Section 5: Safety & Health Management Plan, this section defines the work practices, procedures and management responsibilities relating to the management of safety and health during the design, construction and operation of the Proposed Development.

Section 6: Emergency Response Plan contains predetermined requirements and procedures to ensure the safety, health and welfare of everybody involved in the project and to protect the environment during the construction phase of the Proposed Development.

1.2 Statement of Authority

This CEMP has been prepared by Brian Cronin of Fehily Timoney and Company.

Brian Cronin is a Senior Environmental Scientist with a BSc in Environmental Science from University College Cork and an MSc in Environmental Engineering from Trinity College Dublin. He is member of the Institution of Engineers of Ireland (MIEI). Brian has ten years of post-graduate experience including three years working in forestry and biomass research; four years working on contaminated land and land remediation projects, and EIARs; and three years working on renewable energy projects, project managing the preparation of EIAR for wind farms as well as writing the EIAR chapters himself.

This report was reviewed by Jim Hughes (BA, EIA/SEA Dip, MSc), Director Energy and Planning with Fehily Timoney and Company. Jim is a professional Town Planner with almost 20 years' experience in managing large complex infrastructure projects. Jim has extensive Strategic Infrastructure Development experience having being Project Director / Project Manager for the submission of numerous SID Wind Farm Projects and the submission of multiple no. SID applications for onshore electrical infrastructure under Section 182 of the P&D Act.

1.3 The Applicant

The applicant for the Proposed Development is North Kildare Wind Farm Ltd., which is a subsidiary of Statkraft Ireland Ltd.

1.4 The Site

The Proposed Development is located approximately 1.2km from Kilshanchoe, 2km from Johnstown Bridge and 5km from Carbury. The location of the Proposed Development is shown in Figure 1.1.

A site layout plan of the Proposed Development is shown in Figure 1.2. The Project

The Proposed Development consists of the Proposed Wind Farm, the Proposed Substation and the Turbine Delivery Route (TDR), as described in Chapter 3 of the EIAR.

The Proposed Wind Farm and all associated works are within the townlands of Ballynamullagh; Kilmurry, Killyon, Coolree, Mulgeeth and Drehid, Co. Kildare. The Proposed Substation and all associated works are within the townland of Coolree, Co. Kildare.

The Proposed Wind Farm consists of the erection of up to 11 no. wind turbines with a tip height of 147.9 to 167 m, access tracks including trackside drainage, development of site entrances, temporary compounds, internal collector circuit cabling, and a recreational amenity trail. Permission is sought for a period of 10 years and an operational life of 35 years from the date of commissioning of the entire wind farm.

The Proposed Substation consists of a new 110 kV substation which will connect into the existing Kinnegad-Rinawade 110 kV overhead line by way of a loop-in/loop out connection.

The TDR will require temporary minor alterations to the public road for the delivery of turbines to the site.

A detailed description of the Proposed Development is outlined in Section 3.1, and further detail is provided in chapter 3 of the EIAR.

The site is accessed from M4 motorway until Enfield, then along the R402 for ca. 7.7km and finally local road(L5025) to the entrance of the site. The nearest turbine lies c. 2.8km south of the motorway M4 at Enfield and 0.95km southeast of the regional road R402.

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Legend

Proposed Development Boundary

TITLE:	Site Location		
PROJECT:	Drehid Wind Farm and Substation		
FIGURE NO:	1.1		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:22,500	**REVISION:**	0
DATE:	01/05/2025	**PAGE SIZE:**	A3

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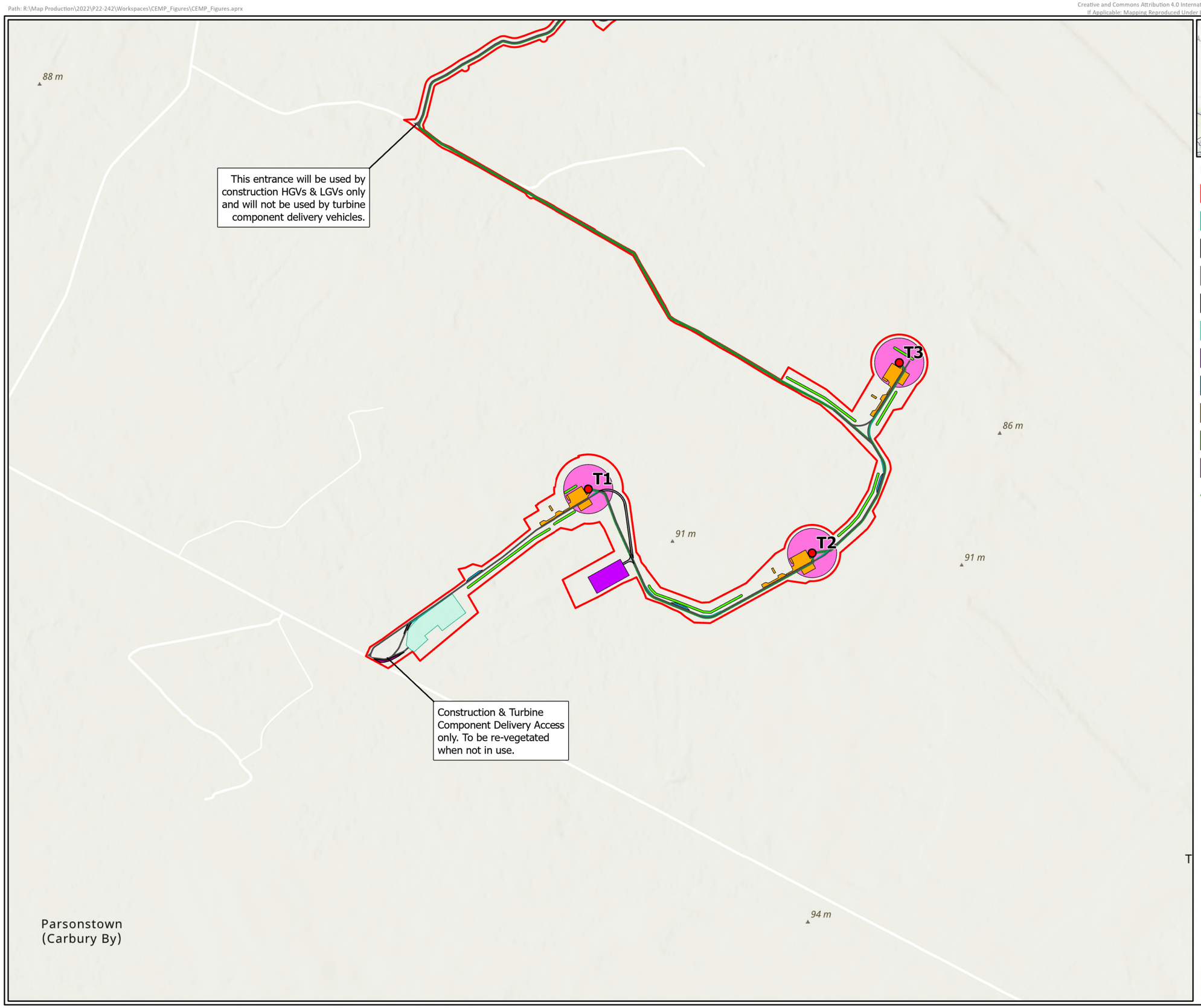

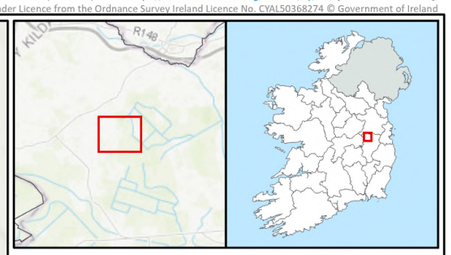

Legend

- Proposed Development Boundary
- Road widening - Access tracks
- Road widening - Temp. Access Tracks
- Access Track
- Temporary Access Track
- Blade Transfer Area
- Construction Compound
- Passing Bays
- Turbine Hardstanding
- Berms
- Turbine Swept Path
- Cable Route
- Turbines

TITLE:	Layout of the Proposed Development - Page 1		
PROJECT:	Drehid Wind Farm and Substation		
FIGURE NO:	1.2		
CLIENT:	North Kildare Wind Farm Ltd		
SCALE:	1:10,000	**REVISION:**	0
DATE:	11/06/2025	**PAGE SIZE:**	A3

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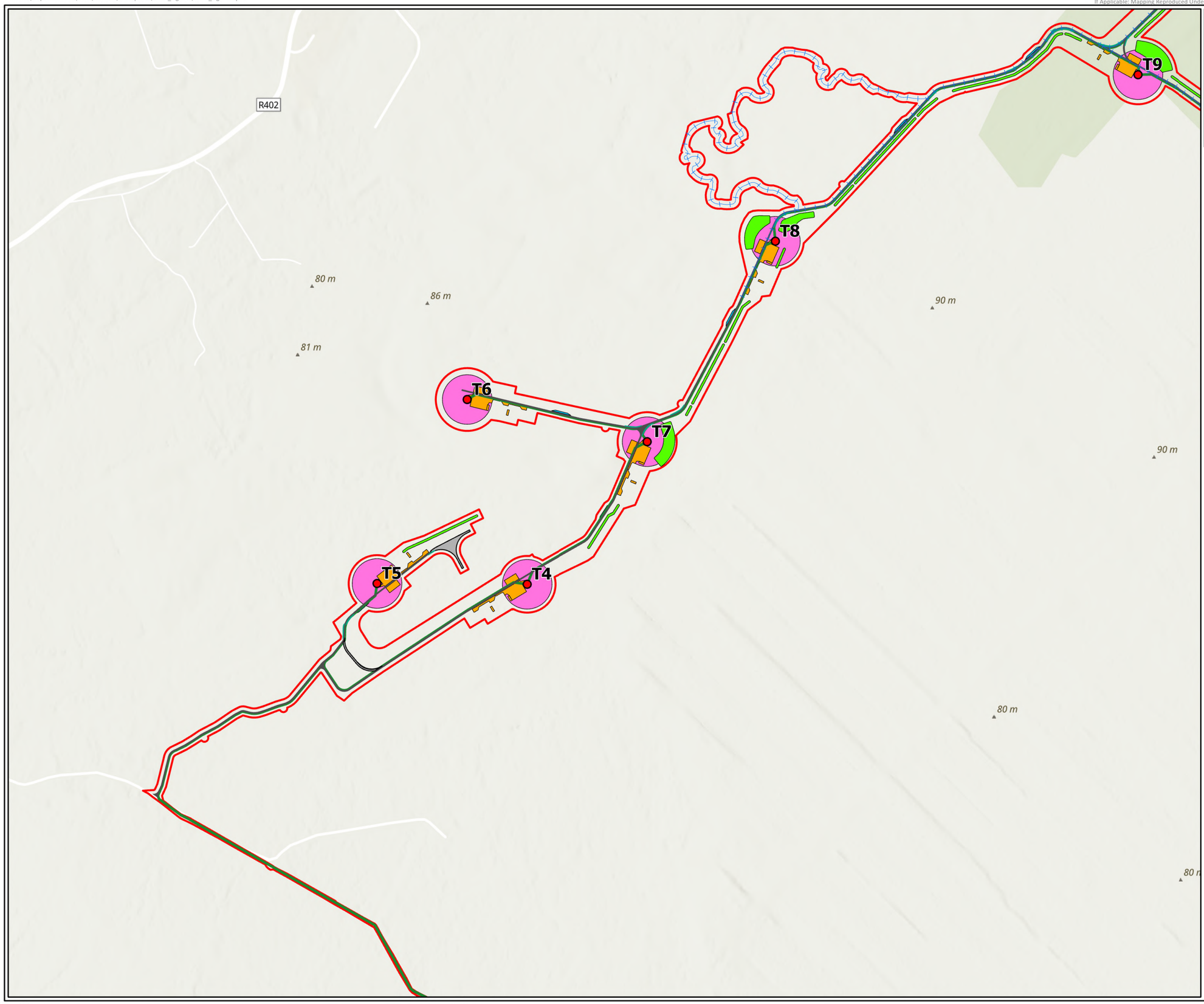

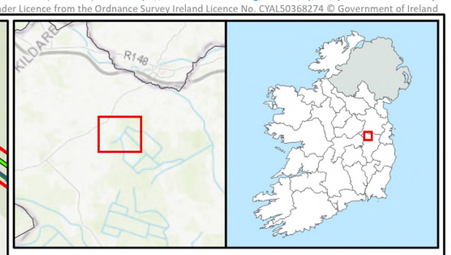

Legend

- Proposed Development Boundary
- Road widening - Access tracks
- Road widening - Temp. Access Tracks
- Access Track
- Temporary Access Track
- Passing Bays
- Turbine Hardstanding
- Berms
- Turbine Swept Path
- Cable Route
- Recreation and Amenity Trail
- Turbines

TITLE:	Layout of the Proposed Development - Page 2		
PROJECT:	Drehid Wind Farm and Substation		
FIGURE NO:	1.2		
CLIENT:	North Kildare Wind Farm Ltd		
SCALE:	1:10,000	**REVISION:**	0
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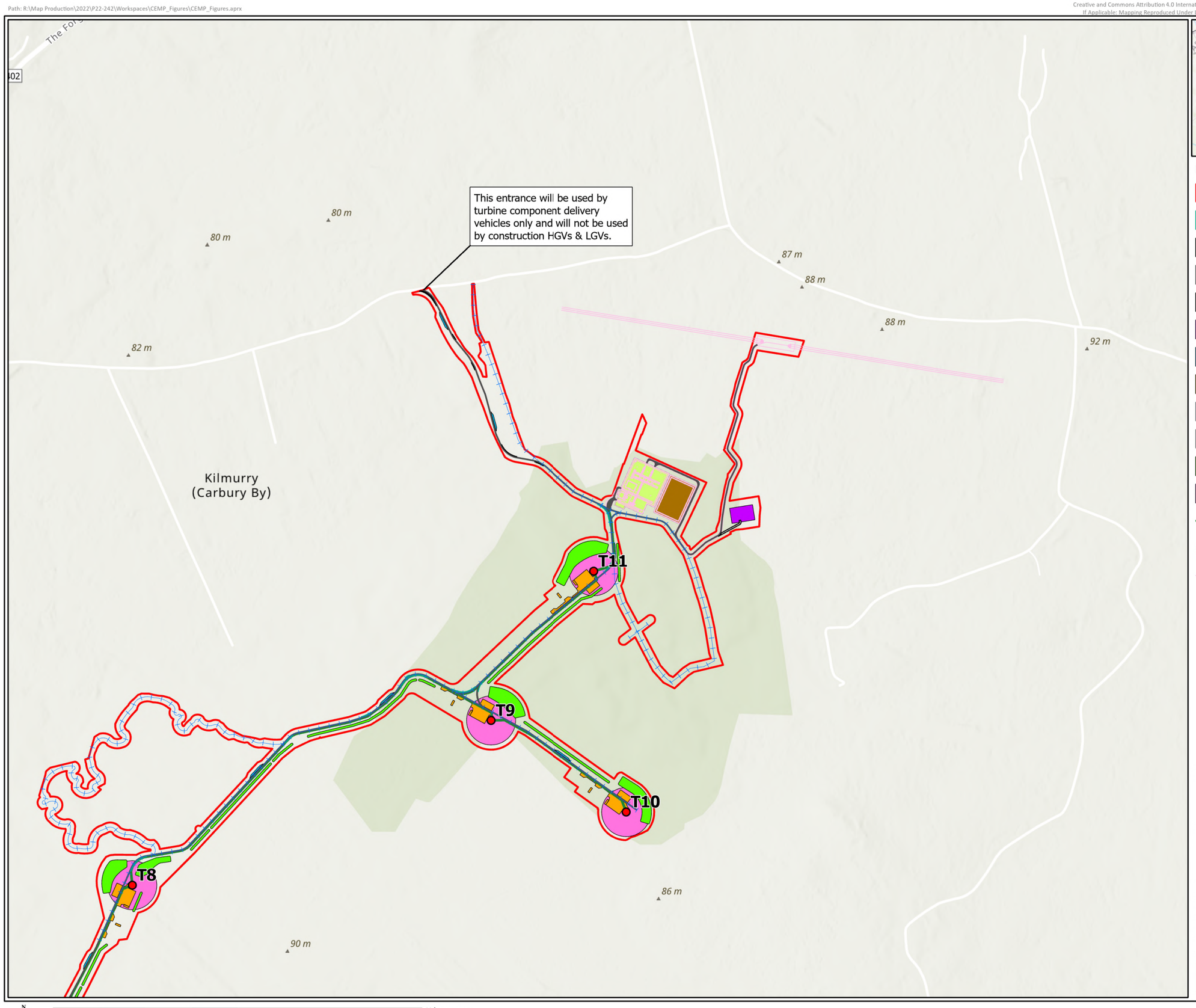

Legend

- Proposed Development Boundary
- Road widening - Access tracks
- Road widening - Temp. Access Tracks
- Access Track
- Temporary Access Track
- Construction Compound
- Passing Bays
- Turbine Hardstanding
- Peat Deposition Area
- Substation
- Berms
- Turbine Swept Path
- Cable Route
- Recreation and Amenity Trail
- Substation Detail
- Turbines

TITLE:	Layout of the Proposed Development - Page 3		
PROJECT:	Drehid Wind Farm and Substation		
FIGURE NO:	1.2		
CLIENT:	North Kildare Wind Farm Ltd		
SCALE:	1:10,000	**REVISION:**	0
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2. EXISTING SITE ENVIRONMENTAL CONDITIONS

2.1 Existing Site Description

2.1.1 The Site of the Proposed Development

The site of the Proposed Development is located in relatively low-lying but undulating land with the majority of proposed turbines located below the 80m contour. The landcover is classified by Tailte Eireann's National Land Cover map as improved grassland, treelines, hedgerows, transitional forest, coniferous forest, broadleaved forest and woodland, mixed forest, scrub, bare peat, bare soil and disturbed ground, and artificial surfaces (forest roads). The east of the site is adjacent to a cutover bog (Timahoe Bog). The Fear English River bisects the site, flowing south to north before it enters the Blackwater River at Johnstown Bridge. The landscape is classified as being of low sensitivity from a landscape perspective.

The Fear English River and the Kilcooney River, both of which are tributaries of the River Blackwater, flow through the site. The Kilcooney River rises near Carbury at approximately 95mOD and flows in a north-easterly direction through the site for approximately 1km before its confluence with the Fear English River. It joins the Fear English River to the south of Ballynamullagh.

The soil on the site of the Proposed Development is a diverse mix of subsoil types but predominantly comprises limestone tills, peat, and limestone sands and gravels. There are also significant deposits of lake sediment to the north of the site.

According to Eircode data 2025, within 1 km, there are only 91 no. receptors; with no receptors located within 4 times the tip height of any turbine. The closest occupied dwelling to the current proposed layout is located 642m from the nearest proposed turbine location.

2.1.2 Turbine Delivery Route (TDR)

The turbine delivery route is shown in Figure 2.1. A Delivery Route Selection and Assessment was carried out by Pell Frischmann to identify the optimum delivery route to site and is presented as Appendix 13.1 of this EIAR. It is proposed to deliver turbines to the site from the M4 motorway and then the R402 to the junction of the L402/L5025 and follow the L5025 to the main site entrance.

From the main site entrance, the components being delivered for turbines T01, T02 and T03 can be delivered directly to their respective hardstanding locations. However, an alternative delivery route is required for delivery of the components of the remaining turbines (T04 to T11).

The proposed access route is as follows:

- Loads will depart the M4 at Junction 9 and will join the R402, southbound;
- Loads will pass through Johnstown Bridge and Kilshancoe;
- All loads will turn off the R402 onto the L5025, turning left at The Sweep Crossroads junction;
- Loads will continue on the L5025 heading southeast to the site access junction. At the site access junction, loads will turn left into a purpose designed junction;
- Blade loads for the northern turbines will be transferred onto a blade lifting trailer. All other northern turbine loads (for T4 to T11) will undertake a U-turn and will rejoin the L5025, proceed northwest;
- Northern turbine loads will turn right onto the R402 and will proceed northbound;
- At the Raven Junction, loads will turn right onto Kilshanroe Road and will continue eastbound to the northern access junction.

Due to the oversized nature of the wind turbine components, some alterations will be required along the route. These points along the route are termed points of interest (POIs). There are fifteen POIs along the route which are listed below.

- POI 1: Loads will oversail the entry verge where two road signs should be removed. Loads will require an over-run surface on the central island of the roundabout where one chevron sign should be removed. On exiting the junction, loads will over-run the splitter island where three road signs should be removed. Verge vegetation trimming is required on the exit.
- POI 2: At the roundabout with Johnstown Road, loads will over-run the entry splitter island, central island and exit splitter island of the roundabout. Load bearing surfaces are required. Two road signs on the entry splitter island, two chevron signs on the central island and two signs on the exit splitter island should be removed.
- POI 3: Loads will oversail the inside of the junction where a left turn is made off the R402 onto the L5025. Two road signs and a barrier should be removed here. All overhead utilities on the L5025 should be lowered or relocated to enable the raised blade for the northern turbines to pass along the road.
- POI 4: Loads will oversail both verges on the L5025 at the first bend along this stretch. Tree canopy trimming will be required here. All overhead utilities on the L5025 should be lowered or relocated to enable the raised blade for the northern turbines to pass along the road.
- POI 5: Loads will oversail both sides of the road at the next bend along the L5025. Hedge trimming will be required on the western verge along with an area of load bearing surfacing. Tree canopy trimming is required. A minor area of load bearing surface is required in the eastern verge along with the removal of a utility pole. All overhead utilities on the L5025 should be lowered or relocated to enable the raised blade for the northern turbines to pass along the road.
- POI 6: Further along the L5025, north of the Kilooney Bridge, loads will oversail both verges. Tree canopy trimming will be required here. All overhead utilities on the L5025 should be lowered or relocated to enable the raised blade for the northern turbines to pass along the road.
- POI 7: Further along the L5025, south of the Kilooney Bridge, loads will oversail both verges. Tree canopy trimming will be required here. All overhead utilities on the L5025 should be lowered or relocated to enable the raised blade for the northern turbines to pass along the road.
- POI 8: At the main site entrance, the delivery will require the removal of a section of fence, access gate and hedge (to enable construction of the site entrance). All overhead utilities on the L5025 should be lowered or relocated to enable the raised blade for the northern turbines to pass along the road.
- POI 9: At Raven Junction on the R402, loads will oversail the inside of the junction where verge vegetation trimming will be required.
- POI 10: On Kilshanroe Road, loads will oversail both verges at the first bend along this road. Tree canopy trimming will be required here. All overhead utilities on Kilshanroe Road should be lowered or relocated to enable the raised blade for the northern turbines to pass along the road.
- POI 11: Further along Kilshanroe Road, loads will oversail both verges at the second bend. Tree canopy trimming will be required here. All overhead utilities on Kilshanroe Road should be lowered or relocated to enable the raised blade for the northern turbines to pass along the road.
- POI 12: Further along Kilshanroe Road, loads will oversail both verges at the third bend. Tree canopy trimming will be required here. A section of verge hedge should be trimmed on the northern verge. All overhead utilities on Kilshanroe Road should be lowered or relocated to enable the raised blade for the northern turbines to pass along the road.
- POI 13: Further along Kilshanroe Road, loads will oversail both verges at the fourth bend. Tree canopy trimming will be required here. Two lengths of hedge should be trimmed on the northern verge. All overhead utilities on Kilshanroe Road should be lowered or relocated to enable the raised blade for the northern turbines to pass along the road.

- POI 14: Further along Kilshanroe Road, loads will oversail both verges at the fifth bend. Tree canopy trimming will be required here. A minor area of load bearing surface is required in the northern verge. All overhead utilities on Kilshanroe Road should be lowered or relocated to enable the raised blade for the northern turbines to pass along the road.
- POI 15: Where the delivery route enters the northern, temporary site entrance, removal of a number of trees will be required to construct the temporary site entrance. The loads will oversail both verges and therefore tree canopy trimming will also be required. All overhead utilities on Kilshanroe Road should be lowered or relocated to enable the raised blade for the northern turbines to pass along the road.

The Turbine Delivery Route Assessment is presented in Appendix 1. There will be mainly minor works required along the Turbine Delivery Route, including minor modifications of roundabouts, which include removing shrubs and signs and filling roundabout island to load bearing. Hedges may have to be trimmed back on both sides of the road.

The turbine delivery route was examined, and a number of stream crossings were identified along the route, as follows:

- Structure over the River Blackwater at Johnstown Bridge on the R402
- Structure over the Togher River at Thomastown on the R402
- Structure over the Sweep River at Kilshanshoe on the R402
- Structure over the Kilcooney River at Collinstown

No works are proposed at the above crossing points.

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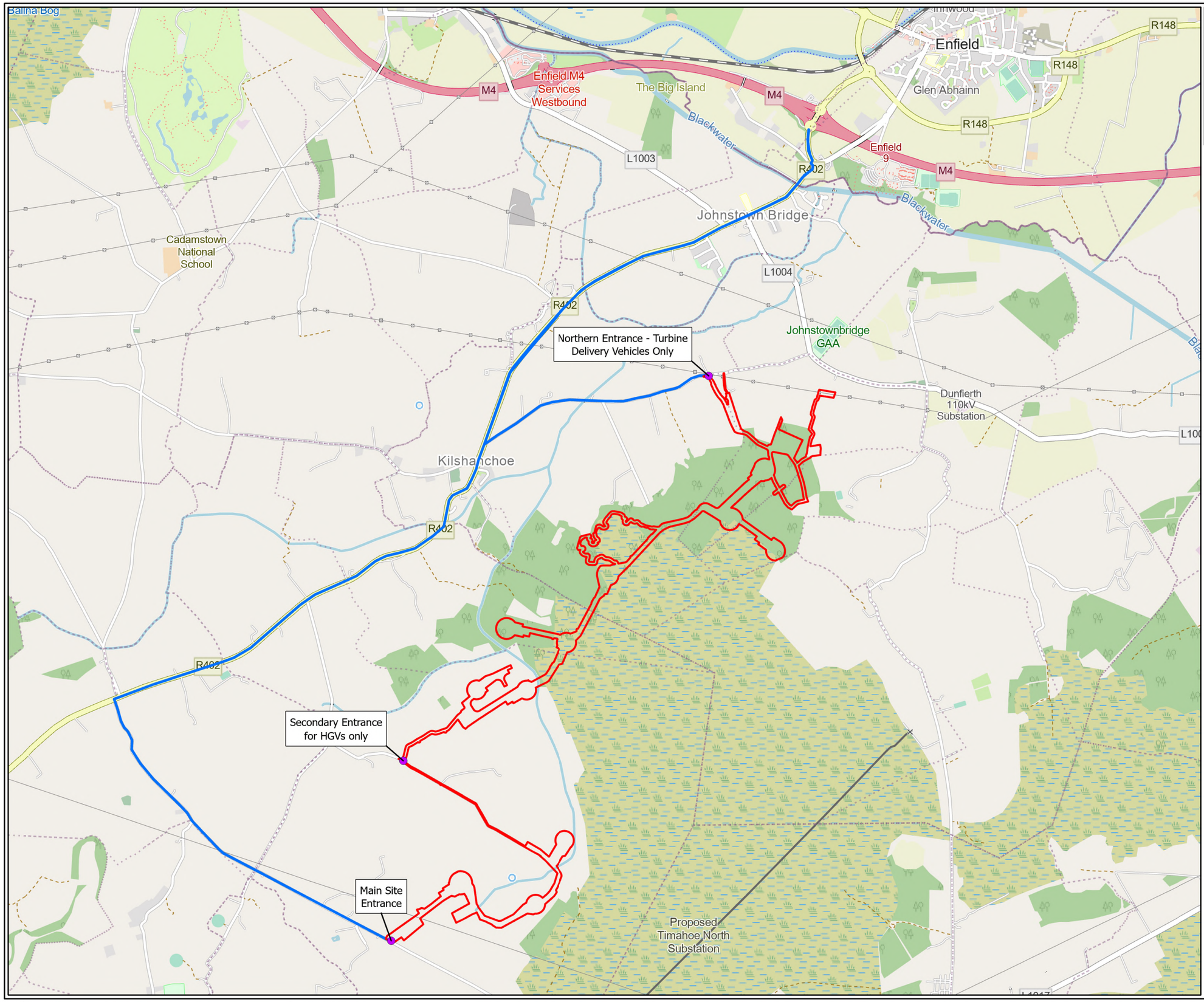

Legend

- Proposed Development Boundary
- Turbine Delivery Route
- Site Entrances

TITLE:	Turbine Delivery Route		
PROJECT:	Drehid Wind Farm and Substation		
FIGURE NO:	2.1		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:30,000	**REVISION:**	0
DATE:	09/05/2025	**PAGE SIZE:**	A3

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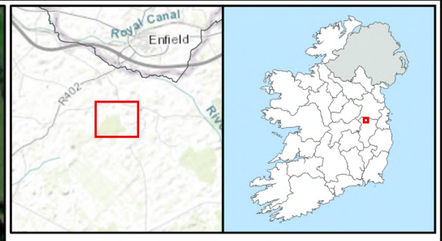

Legend

- Proposed Development Boundary
- Peat Deposition Area
- Substation
- Existing 110kV Overhead Line
- Grid Connection Route
- Substation Detail

N
W E
S

0 50 100 200 Meters

TITLE:	Proposed Substation		
PROJECT:	Drehid Wind Farm and Substation		
FIGURE NO:	2.2		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:5,500	**REVISION:**	0
DATE:	09/05/2025	**PAGE SIZE:**	A3

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3. OVERVIEW OF CONSTRUCTION WORKS

3.1 Description of the Proposed Development

North Kildare Wind Farm Ltd. is proposing to construct a wind farm and substation in County Kildare, which will comprise of 11 no. turbines with a total installed capacity (TIC) of up to 52.8MW. It is anticipated that the Proposed Wind Farm will connect to the national grid via the Proposed Substation .

The Proposed Development for which consent is being sought will consist of two planning applications as mentioned above.

The Proposed Wind Farm will consist of the following:

- Construction of 11 no. wind turbines, each with a rotor diameter of 133 m. 10 no. turbines will have a hub height of 100.5 m and a tip height of 167 m; while one turbine (T1, closest to the site entrance) will have a hub height of 81.4 m and a tip height of 147.9 m;
- Construction of permanent turbine foundations and crane pad hardstanding areas and associated drainage;
- Construction/upgrade of 1. no. main site entrance (off local road L5025), and 1 no. additional site entrance (off local road L50242);
- Construction of 1. no. site entrance (off local road L5012) to accommodate the delivery of large turbine components;
- Use of 1 no. existing Coillte entrance (off local road L5012) for pedestrian/cyclist access to an amenity trail;
- Construction of 9.67 km of new internal access tracks and associated drainage infrastructure;
- Upgrading of 951 m of existing tracks and associated drainage infrastructure;
- Establishment of 2 no. temporary construction site compounds and associated ancillary infrastructure including parking;
- Establishment of 1. No. temporary blade set down area;
- Construction of drainage and sediment control systems;
- 3 no. Watercourse Crossings;
- Upgrade and extension to an existing recreation amenity trail and installation of signage, picnic tables and bicycle stands;
- All related site works and ancillary development including signage, berms, culverts, drain crossings, landscaping, and soil excavation;
- Forestry felling (both permanent and temporary) to facilitate construction and operation
- All associated underground electrical and communications cabling connecting the wind turbines to the proposed Substation including the laying of underground cabling along the local road L50242 which traverses the site.

The Proposed Substation will consist of the following:

- Construction of a 110 kV Substation and associated works within the townland of Coolree The Substation includes a total compound footprint of 1.32 hectares. , enclosed by palisade fencing. The Substation Compound will include :
- 1 No. single storey substation control building (450 m2);
- 1 No. single storey customer MV Building (160 m2);
- Switchgear, Arc Suppression Coil, Cable Sealing Ends, Cable Chair, Circuit Breakers, Current Transformers, Disconnects, Post Insulators, Surge Arrestors, Grid Code Compliance Equipment and Voltage Transformers; and all associated ancillary works necessary to facilitate the development;

- 9 No. lightning masts to a height of 20 m;
- 2.6m high palisade guard railing with perimeter boundary fencing will be erected around the periphery of the compound for security and protection measures;
- Lighting will be provided by 9 no. lighting columns, approximately 3m in height as well as exterior wall mounted lights on the control buildings;
- Erection of 2 no. line-cable interface masts to enable a loop-in/loop-out connection to the existing Kinnegad-Rinawade 110 kV overhead line. The steel lattice masts will extend to heights of 16m above existing ground level;
- Laying of 110 kV underground cabling between the proposed substation and the proposed loop-in/loop-out masts;
- Permanent access road (ca. 7.3 km in length) which traverses the townlands of Ballynamullagh, Kilmurry, Coolree and Mulgeeth to allow access to the substation including a short spur (ca. 0.9 km) off the main access track to access the 2 no. line-cable interface masts. The entrance to the local road (L5025) and local road (L50242) will be shared with the proposed Drehid Wind Farm;
- 3 no. stream crossings;
- Associated construction works and drainage infrastructure;
- Peat deposition area immediately adjacent to the proposed substation.

Certain temporary accommodation works associated with the Turbine Delivery and the provision of passing opportunities along the local road network are subject to this EIA but for which planning consent is not being sought within the current application. These works to facilitate the delivery of turbine components and haulage to Site are detailed further in Section 3.4.4.1 of the EIAR and include hedge or tree cutting; temporary removal of signage and street furniture and street lighting; and temporary filling of roundabout islands to load bearing. For these locations, works associated with road infrastructure have been identified and assessed in the EIAR. However, permission for these works will be sought separately with the local Planning Authority (Meath County Council and Kildare County Council) if the need arises, through consultation and agreement with ESB and also through road opening license as necessary.

3.2 Site Layout

The site layout of the Proposed Development is shown in Figure 1.2.

3.3 Construction Period

The construction period for the entire project is estimated to take approximately 18 months.

The layout of the site lends itself to clearly defined phases (civil construction, cables, turbines, on-site substation) where the various work elements can overlap without a significant increase in local traffic movements or congestion on site. There is likely to be some overlap with civil works and turbine erection, and also with turbine erection and commissioning.

It is estimated the civil and electrical works will include the following:

- Temporary site compounds;
- Site entrances;
- New stream crossings;
- New site roads & drainage;

- Upgrade to local roads;
- Turbine foundations and hardstands;
- Electrical compound and substation building;
- Cable trenching and ducting (internal cables only);
- Cable pulling (internal cables only);
- Turbine delivery and installation;
- Grid connection cable ducting;
- Grid connection cable pulling;
- Break existing 110kV overhead line, erect masts and establish new loop-in connection;
- Testing, commissioning and energisation.

The final programme will be developed post planning in consultation with the turbine manufacturer and the main construction contractor, based on projected turbine delivery dates.

A construction programme for an 18-month construction period is shown in Chapter 3 of Volume 2 of the EIAR.

3.4 Overview of the Construction Sequence

The construction of a wind farm project and a new loop-in substation is a major infrastructural project. The construction of this project will involve many inter-related, inter-dependent and overlapping elements of a complex nature.

The following section outlines the construction methodology for the Proposed Development. Upon mobilisation for the construction of the development, peat excavation (where required), upgrading of existing site tracks and the provision of new site tracks will precede all other activities. Construction stage drainage infrastructure will be constructed in parallel with the track construction, elements of which will be adopted into and will accord with the site's operational drainage as set out in the Planning Drawings . This will be followed by the construction of the turbine foundations and the provision of the hardstanding areas. In parallel with these works the on-site electrical works; substation and internal cable network will be constructed. The electrical works are anticipated to commence during month 5 in parallel with the wind farm works.

The proposed construction programme is presented below:

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Main Construction Element																		
Site Establishment																		
Site Roads																		
Hardstands 11no																		
Foundations 11no																		
Internal Collector System																		
Substation Construction and LILO connection																		
WTG Delivery 11no																		
WTG Install 11no																		
Comissioning																		
Site Reinstatment and Demob																		

Plate 3-1: Proposed construction works programme

3.4.1 Overview of the Construction Methodology

Method statements are presented below for the key elements of the construction process. The contractor for the main construction works will, following appointment, take ownership, expand upon and generally develop these method statements appropriately for the construction stage, in accordance with this CEMP.

The proposed construction methodology is summarised under the following headings:

- Site Entrances;
- Temporary Site Compounds;
- Felling;
- Concrete Washout Area and Wheel Washing;
- Upgrade of Existing Internal Access Tracks ;
- New Site Access Tracks;
- Cable Works;
- Drainage and Watercourse Crossings;
- Crane Hardstands;
- Turbine Foundations;
- Substation Compound;
- Electrical Works;
- Turbine Erection;
- TDR temporary accommodation works.

3.4.1.1 Site Entrances

During construction, the site will be accessed by the main site entrance on the L5025. There will also be a site entrance constructed off the L5012, immediately west of the existing Coillte entrance, for the purposes of turbine delivery only. However, this site entrance will be decommissioned after turbine delivery, and all other construction traffic will be via the main site entrance.

During operation, turbines T01, T02 and T03 will be accessed by the main site entrance off the L5025, while turbines T04 to T11 and the Proposed Substation will be accessed via the alternative site entrance off the L50242.

Both the main site entrance and the alternative site entrance will be of a bellmouth design, with the main site entrance achieving sight lines of 160m to the north and a sightline of 155m to the south; and the alternative site entrance achieving sight lines of 90 m. More details of the site entrances can be seen on the site entrance drawings P22-242-0300-0015 to P22-242-0300-0018.The access point has been selected with consideration for safety of public road users and construction staff and to ensure they can be constructed to comply with TII design requirements for direct accesses. Each of the access points are presented in the Planning Drawings accompanying the application and include designs and minimum visibility splays.

Site entrances will be constructed using the same methodology as the construction of the wind farm tracks as described in section 3.4.1.5.

Site entrances will be secured and locked when not in use. Where required, the entrances will be controlled by flagmen to assist traffic movements.

3.4.1.2 Temporary Site Compounds

During the construction phase, it will be necessary to provide temporary facilities for construction personnel. There will be 2 no. temporary compounds, one located in the southern portion of the site near T1 and T2; and one located adjacent to the proposed on-site substation. These will include temporary self-contained welfare facilities (e.g. ecopod type) and offices. The location of the two temporary site compounds is shown on planning drawing P22-242-0100-0001 (copied into Appendix 2 for ease of viewing). Layout plans of each of these are shown in Planning drawings P22-242-0300-0019 and P22-242-0300-0020 which can also be found in Appendix 2.

Facilities to be provided in the temporary site compounds will include the following:

- Site offices to include meeting rooms, canteen and welfare facilities complying with latest legislation, of Portacabin type construction
- Portable container toilets
- Areas for storage of materials and fuel including bunded fuel storage
- Waste management areas
- Aggregate stores
- Storage sheds
- Footpaths
- Employee parking
- Potable water supply
- A water tanker to supply water used for other purposes
- Contractor lock-up facility
- Temporary power and lighting

The compounds will be constructed as follows:

- The area to be used as the compound will be marked out at the corners using ranging rods or timber posts.
- Drainage runs and associated settlement ponds will be installed around the perimeter.
- Temporary, modular, containerised offices welfare units will be delivered to site using articulated lorry and lifted into place using a suitable crane.
- A concrete bunded area with an associated oil interceptor will be provided within the main compound for the storage of lubricants, oils and site generators and coalescing media oil water separator will be installed to mitigate against any hydrocarbon spillages.
- The compound will be fenced all round and secured with locked gates.
- Self-contained portaloos with an integrated wastewater holding tank will be used maintained by the providing contractor and removed from site on completion of the construction works. These will be located in the temporary compounds, as well as in several areas throughout the site due to the dispersed nature of the site.
- Potable water will be delivered to site in suitable canisters on a daily basis for drinking.
- Upon completion of the projects the compounds will be decommissioned, and the material will be removed off-site for recovery or disposal by a proposed waste contractor. The hardcore stone and geo-grid will be removed from site and the area will be reinstated by backfilling with the material arising during excavation, landscaping with topsoil as required.

3.4.1.3 *Felling and Site Clearance*

Felling of approximately 28.4 ha of woodlands dominated by or mainly comprised of conifers is required in the northern portion of the site to create 'bat buffers' around turbines T6 to T11, as well as felling a corridor for the access tracks plus trackside drainage and berms. It should be noted that the clear-felling of trees in the State requires a felling licence. The Forest Service of the Department of Agriculture, Food & the Marine is Ireland's national forest authority and is responsible for all forest licensing which is governed by the Forestry Act 2014 as amended and the Forestry Regulations 2017 (S.I. No. 191 of 2017). A felling licence will include the provision of relevant replant lands (afforestation area) to be planted in consideration for the proposed tree felling on the Site. The associated afforestation of alternative lands equivalent in area to those lands being permanently clear-felled is also subject to licensing ('afforestation licensing').

The area of trees to be felled will be minimised to only that required to accommodate the Proposed Development.

The contractor will not commence tree removal on site until both felling and afforestation licences are in place

Tree felling, trimming and site clearance will not be carried out during the bird breeding season which commences on March 1st and finishes on August 31st. All site clearance / enabling works will be preceded by survey and inspection by an Ecological Clerk of Works for the presence of any species or habitats protected by Law in accordance with the TII's "Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes". The following confirmatory surveys, as specified within the Biodiversity chapter, will be undertaken by the Ecological Clerk of Works (who will be suitably qualified and competent to undertake such surveys) in accordance with the methodologies set out in the EIAR, prior to the commencement of Construction, in order for the Contractor to ensure the most relevant mitigation measures are included in the Design and Construction:

a) An otter survey 200m upstream and downstream of the footprint of all watercourse crossings to identify holt / couch locations and need for mammal passage/mitigation;
b) A bat survey of trees to be felled in accordance with the NRA Guidelines for the Treatment of Bats Prior To the Construction of National Road Schemes (a visual inspection of the tree during daylight hours followed by a night time detector survey);
c) A badger survey within 150m of all works areas;
d) A common frog surveys along all drain crossings (and spawn survey) during the breeding season of common frog (approximately January – midsummer). Spawn translocation may be required under licence where active breeding drains are within the development footprint during the construction phase.
e) An invasive plant species survey of all watercourses and lands within the footprint of the Works.

If any such species or habitats are found, as a result of such survey and inspection, the Contractor will undertake the following:

- Record and report the ecological data in accordance with the requirements of the National Biodiversity Data Centre (NBDC);
- If mitigation measures for such species or habitats have not been identified in the EIAR for that area of the Site, the Contractor will, consult with the National Parks and Wildlife Services and the Inland Fisheries Ireland as appropriate to determine and implement appropriate mitigation for the species / habitat.

3.4.1.4 Concrete Washout Area and Wheel Washing

All concrete will be delivered to site via ready-mix trucks from a local supplier.

Concrete trucks will not be washed out on Site, this will only be permitted in the designated concrete wash-out area. Where chutes, hoppers/skips and equipment (e.g. vibrating wands) associated with concrete works need to be washed down this will be done into a sealed mortar bin / skip with the appropriate capacity and which has been examined in advance for any defects. The location of wash down areas will be set back as far as practically possible from any drain or watercourse, and a minimum of 50m. The residual liquids and solids will be disposed of off-site at an appropriate licenced waste facility.

The concrete wash-out area will be constructed as follows:

- The topsoil and subsoil, if necessary, will be stripped out and placed adjacent to the temporary compound area
- An impermeable membrane will be installed directly onto the subsoil, and or subsoil, to form the impermeable concrete wash-out settlement lagoon
- A designated truck wash-down concrete apron shall be constructed next to this settlement lagoon
- Impermeable lined drains will direct the wash-out flow to the wash-out settlement lagoon
- The residual liquids and solids will be disposed of off-site at an appropriate licenced waste facility.

Upon completion of the projects the concrete wash-out area and settlement lagoon will be decommissioned by removing the impermeable membrane and backfilling the area with the material arising during excavation. The removed material will be recovered or disposed off-site at an appropriate facility.

A wheel wash facility will be located at the main site entrance to reduce construction traffic fouling public roads. The wheel wash will come with an additional water tank which will be filled regularly. These units will be self-contained and will filter the waste for ease of disposal. Waste will be removed from each unit and from site by a proposed contractor.

3.4.1.5 New Site Access Tracks

Drainage runs, and associated settlement ponds will be installed. All site tracks will be designed taking account of the loadings required by the turbine manufacturer and will consist of a compacted stone structure.

New roads within the site will be floated on both mineral soils and on peat soils. Floating roads are constructed without excavating the existing ground. They will consist of a layer of combined geotextile and geogrid laid directly on the existing surface. Layers of stone will then be placed on top with additional geogrid reinforcement as required. A layer of compacted Cl 804 material will be placed on top to provide a suitable running surface.

The stone required for the construction of the internal access roads will be sourced from quarries in the vicinity.

The track formation will consist of a minimum 500mm hardcore on geo-textile membrane. The construction methodology for newly constructed tracks will be as follows:

- The formation will be prepared to receive the geotextile membrane.
- Stone will be placed and compacted in layers to minimum 500 mm depth.
- A drainage ditch will be formed along sides of the track.

- Surplus excavated material will be placed along the side of the track where suitable and dressed to blend in with surrounding landscaping and partially obscure sight of the track.

3.4.1.6 Upgrade of Existing Internal Access Tracks

It is proposed to utilise the existing road network as much as possible within the site. It will be required to widen existing agricultural and forestry tracks on site by 1.5 m to 4.5m, with some additional local widening at bends in the tracks. This will involve the slight re-location of existing roadside swales to allow for widening.

Some of the existing piped drain crossings will need to be extended due to the widening of the tracks.

Existing agricultural and forestry drains will be retained along their existing routes and only slight diversions are anticipated to be required to provide for track widening.

Existing track upgrades shall follow the same methodology as for new access tracks.

The road construction details of new and upgrades to existing access tracks are detailed on planning application drawing P22-242-0300-0026 which can be found in Appendix 2.

3.4.1.7 Watercourse Crossings

There will be three new stream crossings required as a result of the development. The route of the access tracks will not cross existing stream crossings. The locations of the stream crossings are shown on planning application drawing P22-242-0101-0004, P22-242-0101-0007 and P22-242-0101-0018 in Appendix 2.

The sizes of the stream crossings required throughout the site to cross tributaries of the River Boyne and the River Blackwater were estimated as part of the flood risk assessment. The crossings are sized to convey a 1 in 100-year flood with a 20% allowance for climate change, while maintaining a minimum freeboard of 300 mm.

In accordance with the consultation responses received from the IFI it is proposed to provide clear spans in place of culverts.

The IFI has provided detailed specifications on the design of temporary and permanent stream crossings in fisheries sensitive streams. Bridge foundations will be designed and positioned at least 2.5 metres from the river bank so as not to impact on the riparian habitat.

A Section 50 application will be required to obtain the consent of the OPW for the design of the three new stream crossings. The IFI will also be consulted at the detailed design stage.

For the construction of the watercourse crossings, the following methodology shall apply:

- All environmental mitigation measures will be implemented locally in advance of the works, in accordance with the measures outlined in Section 4 of this CEMP.
- Bank protection will be installed as necessary to ensure that the existing stream banks are not disturbed during construction.
- The line of the access track and crossing will be marked out on site by a site engineer.
- On approach to the crossing, flow connectivity cross drains will be installed at 50m centres in accordance with the final drainage design.
- The extent of the excavation for bridge supports will be marked out and will include an allowance for trimming the sides of the excavation to provide a safe working area and slope batter. Bridge foundations will be designed and positioned at least 2.5m from the river bank.

- The excavated material will be stored at agreed locations within the site in accordance with the Soil Management Plan.
- A layer of concrete blinding will be laid directly on top of the newly exposed formation, tamped and finished with a screed board to leave a flat level surface, followed by placement of the concrete blinding layer for the bridge supports.
- Steel reinforcement will be fixed in accordance with the designer's drawings & schedules and the supports will be shuttered.
- Concrete will be placed and compacted to the levels and profile indicated on the construction drawings.
- Upon completion of the concreting works the bridge supports will be covered from the elements and left to cure for a sufficient period in accordance with the design specification.
- The bridge supports will be backfilled using the material arising during the excavation and landscaped using the top-soil set-aside during the excavation. The suitability of backfill material is to be approved by the project geotechnical engineer.
- Following curing, appropriate pre-cast bridge beam sections will be lifted into place by a crane or HIAB truck in accordance with an approved lifting plan.
- The bridge parapets will be steel-fixed, shuttered and poured to tie in with the pre-cast bridge deck beams and the upper section of the bridge deck will be poured and finished using ST1 concrete.
- Ductwork will be installed within the bridge deck in accordance with the design to carry the grid connection cables across the watercourse.
- A timber post and rail fence will be installed, affixed to the bridge parapets, to run the length of the bridge deck.

3.4.1.8 Drain Crossings

Access tracks and hardstanding areas pass through multiple land drains and Arterial Drainage Scheme Channels that connect or discharge to the Fear English River (River waterbody code - IE_EA_07B020100). The following table shows the list of proposed culverts, their sizes, and the associated catchments.

Table 3-1: Proposed Culverts

Culvert/ Structure Name	Culvert Type	Catchment Area (km2)	Culvert Length (m)	Culvert Diameter (mm)	Culvert Coordinates	
					Easting (ITM)	Northing (ITM)
CV-01	Circular	0.140	10.50	1050	673870.087	734342.270
CV-02	Circular	0.050	10.50	900	673844.294	735701.550
CV-03	Circular	0.060	54.13	1050	674670.598	736201.296
CV-04	Circular	0.012	10.50	900	674892.787	736543.629
CV-05	Circular	0.265	10.50	1200	675250.928	736980.500
CV-06	Circular	0.428	10.50	1500	675417.454	737158.857
CV-07	Circular	0.047	58.00	1350	676347.116	737844.516
CV-08*	Temp.	0.138	12.70	1200	676084.970	737970.987
CV-09	Circular	0.028	10.80	1050	676049.766	737993.457
CV-10*	Temp.	0.059	10.50	1050	675993.515	738103.549
CV-11	Circular	0.026	13.00	900	675904.469	738301.134

Culvert/ Structure Name	Culvert Type	Catchment Area (km2)	Culvert Length (m)	Culvert Diameter (mm)	Culvert Coordinates	
					Easting (ITM)	Northing (ITM)
CV-12	Circular	0.176	36.00	1200	674336.666	735914.252

*Temporary Culverts

Some drain clearing will be required at existing crossings, where they have become blocked, to maintain the continuity of flows. These existing pipes may need replacing if they are found to be in a collapsed state.

For a drain crossing using a piped culvert, the following methodology will be used.

- The access track construction will finish at least 10m from the nearside bank of the drain.
- All environmental mitigation measures will be implemented locally in advance of the works, in accordance with the measures outlined in Section 4 of this CEMP.
- Pipe culvert installation will only take place during dry periods.
- The bed of the drain will be prepared using a mechanical digger and hand tools to the required levels accordance with the design.
- A bedding layer will be laid in the base of the watercourse using Class 6 aggregate material and blinding to the desired levels in accordance with the design.
- The pipe is laid in one lift or in sections using a crane in accordance with an approved lift plan.
- Bedding material is placed and compacted around the pipe to the desired levels in accordance with the design.
- Where appropriate a 500mm of suitable bedding material in the form of clean round gravel between 10-100mm diameter, shall be laid in the base of the pipe in accordance with the recommendations set out in Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Watercourses from Inland Fisheries Ireland.
- The pipe is covered using compacted Class 6N fill material in accordance with the design up to the levels required by the access track sub formation.
- Rock armour headwalls will be constructed where necessary to protect pipe ends and the base of slope embankments on either side of the track.
- The access track construction continues over the crossing in accordance with the methodology outlined in Section 3.4.1.5.
- For small drain crossings, pipes of suitable diameter will be laid directly into the bed of the drain.

3.4.1.9 Cable Works

The specification for cable trenches will vary slightly depending on cable voltage, location and existing land use. Cable trench construction details can be found on drawing P22-242-0300-0028 Grid Connection Trench Details, located in Appendix 2, which shows construction details for electricity cables beside internal site access tracks.

All electrical and fibre-optic cabling on site between the wind turbines and the substation building will be buried in trenches of 0.6m wide by 1m deep located directly adjacent to the internal tracks.

Internal site cables will be direct buried or ducted as per the specification outlined in Appendix 2.

The following describes the construction methodology for cable installation works inside the wind farm site.

For direct buried cables, the following methodology shall apply:

- All environmental mitigation measures will be implemented locally in advance of the works, in accordance with the measures outlined in Section 4 of this CEMP.
- The line of the cable trench will run beside the site access tracks until it exits to the public road.
- The ground will be excavated using a mechanical digger. The top layer of soil will be removed and placed to one side. It will be used for landscaping the top of the backfilled cable trench following the laying of the cables. The remaining subsoil, excavated to the required depth, will be placed separately and used as backfill.
- Safe ladder access/egress to trenches will be provided into the trench.
- The cables will be laid directly onto a bed of suitable material, free from sharp stones and debris*.
- A suitable material will be placed over the top of the cables to protect them during backfilling*.
- Warning tape and plates will be installed by hand in accordance with the trench design and ESBN/Eirgrid specifications and the engineer's design.
- On completion, the ground will be reinstated, and marker posts will be positioned at agreed centres to the side of the trench highlighting the presence of cables below.
- Trenches will vary in width depending on the number of cables in the circuit. Where there is more than one set of cables they will be separated as per cable manufacturers and ESB/ EirGrid requirements.

Where ducting is required within the Site (i.e., for areas where cables will be laid under access tracks or other loaded surfaces), suitable ducting will be required to protect the cables. In this scenario, tasks marked by an asterisk (*) in the above methodology will be replaced by the following steps:

- Ducts will be placed into the trench manually, having been delivered to road side embankment/verge by tractor and pipe trailer and then offloaded by hand.
- Approved bedding material will be used to surround the ducts. It will be delivered straight from a concrete truck or by skid steer along the route.
- Approved fill material will be compacted above and below the power cable ducting as per the engineer's design.
- Exposed duct ends will be capped.
- A 12mm Draw rope will be blown through the ducting at later date.
- Small jointing pits will be located along the route of the trench which will be left open until jointing takes place. A protective handrail/ barrier will be placed around each pit for health and safety reasons.
- Once the cables are joined and sealed the jointing container will be removed and the cables at the joint-bay locations will be back-filled in the same manner as the rest of the cable trench.
- The cables will be terminated on the switchgear terminals at each turbine location and at the substation switchboard. Ducts will be cast into each foundation to provide access for the cables into the turbine. Likewise, at the substation, ducts will be cast through the building foundation to provide access for the cables.
- There are no existing buried services expected within the site however the appointed contractor will be responsible for carrying out pre-construction survey ahead of construction. Prior to commencement of the works, records of services such as watermains, sewers, gas mains and other power cables will be obtained from the relevant service providers.

- Cable detection tools, ground penetrating radar and slit trenches will be used, as appropriate, to find the exact locations of existing services. The final locations of the cable trenches will be selected to minimise conflicts with other services.
- Trenches where ducts are laid will be back filled every evening. During excavation works signage will be erected local to the works warning of the dangers.

3.4.1.10 Turbine Hardstands

All crane pads and associated splays will be designed taking account of the loadings provided by the turbine manufacturer and will consist of a compacted stone structure in accordance with the detailed engineering designs and employer's requirements.

All crane pads will be formed on a suitably stiff layer and the finished crane pad surface will provide a minimum bearing capacity of 260kN/m^2. Where excavations beyond 5m below ground level are required to reach a suitable bearing, pile foundations will be required (only expected for turbines T8, T9 ad T10).

Crane pad and associated splay formation will consist of either 1 or 2 layers of suitable fill material depending on the properties of the underlying load bearing layer. Where the underlying layer is soft soil, 2 layers of suitable fill formation are used and the stone capping layer.

The crane hardstands will be constructed in one of two following ways:

- Typical excavation method;
- Piled hardstand method.

A piled construction method will be required for the hard standings of T8, T9 and T10. All other hardstandings will be constructed with the typical excavation method.

The excavation method can be summarised as follows:

Excavation Method:

- All environmental mitigation measures will be implemented locally in advance of the works, in accordance with the measures outlined in Section 4 of this CEMP.
- Establish alignment of the hardstands from the construction drawings and mark out the corners with ranging rods or timber posts.
- Drainage runs and associated settlement ponds will be installed.
- The excavated material will be stored close to the hardstand. Topsoil and subsoil stockpiles will be formed, and the side compacted to prevent silt run off during heavy rain or air bourn dust during dry periods.
- The soil will be excavated down to a suitable formation layer of either firm clay or rock.
- Suitable granular fill will be spread and compacted in layers to provide a homogeneous running surface.
- Batters to have a slope of between 1:1 and 1:5 (depending on depth and type of material) and will be left as cut to re-vegetate naturally with local species.

Piled Hardstand Method:

This system involves:

- Construction of a temporary piling platform to facilitate the installation of the piles. This platform will comprise a geogrid reinforced platform using one or two layers of reinforcing geogrid with suitable granular fill. Piles will be installed through this reinforced platform to the required depth.
- Piles will be positioned to match the outrigger pads of the turbine crane and as agreed with the turbine supplier. Geotechnical analysis of the site investigation information will dictate the type of pile to be used. There are several methods however the most likely will either be pre-cast driven piles and auger bored piles.
- Construction of a floating hardstand across the full extent of the hardstand comprising a geogrid reinforced platform using one or two layers of reinforcing geogrid with suitable granular fill.
- A reinforced concrete pad will be constructed on top of the piles. Shuttering will be used lined with polythene and an antibleeding admixture used to prevent any concrete leachate occurring.

3.4.1.11 Turbine Foundations

The wind turbine foundations will be constructed using standard reinforced concrete construction techniques. Reinforced concrete piled foundations will be required for turbines T8, T9 and T10. The foundations for all other turbines will be standard excavated reinforced concrete base.

Turbine foundations will be designed to Eurocode Standards. Foundation loads will be provided by the wind turbine supplier, and factors of safety will be applied to these in accordance with European design regulations. The turbine will be anchored to the foundation as per the turbine manufacturer's guidelines which will be incorporated in the civil foundation design.

The turbine foundations will be constructed as follows:

Standard Excavated Reinforced Concrete Base:

a) The extent of the excavation will be marked out and will include an allowance for trimming the sides of the excavation to provide a safe working area and slope batter.
b) The excavated material will be stored at agreed locations close to the base. Topsoil and subsoil stockpiles will be formed, and the side compacted to prevent silt run off during heavy rain or airborne dust during dry periods. A portion of the subsoil material will be used as backfill and the topsoil will be used for landscaping around the finished turbine post construction.
c) No material will be removed from site and storage areas will be stripped of vegetation prior to stockpiling in line with best working practises.
d) Around the perimeter of the foundation formation a shallow drain will be formed to catch surface water entering the excavation. The drain will direct the water to a sump if required where it will be pumped out to a settlement pond away from the excavation.
e) A layer of concrete blinding will be laid approximately 75mm thick directly on top of the newly exposed formation, tamped and finished with a screed board to leave a flat level surface. If required, geogrid and soil replacement will be laid according to the foundation design, followed by placement of the concrete blinding layer.
f) If soil replacement is required, the aggregate used must be tested and approved by the project geotechnical engineer.
g) High tensile steel reinforcement will be fixed in accordance with the designer's drawings & schedules. The foundation anchorage system will be installed, levelled and secured to the blinding using steel box section stools.

h) Ductwork will be installed as required, and formwork erected around the steel cage and propped from the backside as required.
i) The foundation anchorage system will be checked both for level and line prior to the concrete being installed in the base.
j) Concrete will be placed using a concrete pump and compacted using vibrating pokers to the levels and profile indicated on the construction drawings.
k) Upon completion of the concreting works the foundation base will be covered from the elements that could cause hydration cracking and or delay setting in any way.
l) Steel shutters will be used to pour the upper plinth section.
m) The foundation will be backfilled with a cohesive material, where possible using the material arising during the excavation and landscaped using the top-soil set-aside during the excavation. The suitability of backfill material is to be approved by the project geotechnical engineer.
n) A gravel footpath will be formed from the access track to the turbine door and around the turbine for maintenance.

Reinforced Concrete Piled Foundations:

Piling will be required for the foundations of turbines T8, T9 and T10.

Follow Items (a) to (c) as above, then for piled foundations:

Auger bored piles will be used for piled foundations.

- A piling platform for the piling rig will be constructed. This can be done in two ways depending on the bearing capacity of the underlying soil.
- The first method is to lay geogrid on the existing surface and a stone layer will then be placed on top of the geogrid by an excavator and compacted in order to give the platform sufficient bearing capacity for the piling rig.
- The second method is to excavate the soils to a suitable intermediate mineral subsoil and backfill to the formation level.
- The piling rig, fitted with an auger, will then bore through the soft material with casing fitted around the auger to prevent the sidewalls of the peat from collapsing. The borehole is then extended to a suitable depth into the subsoil/bedrock.
- When the auger is removed high tensile steel cages will be lowered into the boreholes. These steel cages will extend above the level of the top of the concrete pile.
- As the auger is removed concrete is pumped into the borehole.
- Reinforcing steel on the top of the pile will tie to the foundation base steel.

Base construction is then undertaken as per items (e) to (n) above.

3.4.1.12 Turbine Erection

The turbine will be supplied and installed with a blade tip height of 147.9 m for T1 and 167 m for T2 to T11. The turbines will be delivered in sections to the site as follows:

- Foundation anchors x 1
- Towers x 3/4
- Blades x 3
- Hub x 1
- Nacelle x 1
- Switchgear Components x 1

A lift plan will be developed for each turbine location detailing the storage positions for each component, crane size and lifting sequence. It is anticipated that each turbine will take 3 to 4 days to erect with two cranes set up at each turbine - one main crane and a tailing/ support crane. The support crane will assist in the assembly of the main crane and also in the initial lift of the tower sections and hub and blade assembly. Components will be delivered using specially adapted heavy load trailers set up specific to the turbine supplier requirements. Upon completion of the erection, all sections will be tightened to the correct torque and the internal fit out of the turbine undertaken. Finally, the turbines will be commissioned and tested.

3.4.1.13 Substation Compound

The substation will comprise an EirGrid compound and an Independent Power Producer (IPP) compound as shown in the planning drawing 23727-MWP-00-00-DR-C-0101. The EirGrid compound will measure 96.3 m x 94.8 m; and the IPP compound will measure 72.0 m x 34.1 m. The substation will provide a connection point between the wind farm and the proposed grid connection point to the existing 110kV Kinnegad-Rinawade overhead line.

The IPP building's main function is to provide housing for switchgear, control equipment and monitoring equipment necessary for the proper functioning of the substation and wind farm. The building will be constructed by the following methodology:

- The area of the control buildings and compound will be marked out using ranging rods or wooden posts and the vegetable soil stripped and removed to the nearby storage area for later use in landscaping. No material will be removed from site and storage areas will be stripped of vegetation prior to stockpiling in line with best working practises.
- Drainage runs and associated settlement ponds will be installed.
- The dimensions of the Building and Compound area are set to meet the requirements of EirGrid and the necessary equipment to safely and efficiently operate the wind farm.
- The foundations will be excavated down to the level indicated by the designer and concreted.
- The blockwork walls will be built up from the footings to DPC level and the floor slab constructed, having first located any ducts or trenches required by the follow on mechanical and electrical contractors.
- The blockwork will then be raised to wall plate level and the gables & internal partition walls formed. Scaffold will be erected around the outside of the building for this operation.
- The concrete roof slabs will be lifted into position using an adequately sized mobile crane.

- The wooden roof trusses will then be lifted into position using a telescopic load all or mobile crane depending on site conditions. The roof trusses will then be felted, battened, tiled and sealed against the weather.

The remainder of the substation compound will be brought up to the agreed formation and approved stone imported and graded to the correct level as per the detail design and constructed using the same methodology as the construction of the wind farm tracks as described in section 3.4.1.5.

Equipment plinths will be marked out, excavated and constructed using in-situ reinforced concrete or pre-cast concrete. Provision will be made in each plinth for earth connection.

Following the construction of the equipment plinths an earth mat will be installed throughout the compound. This will be connected to each plinth and the buildings as per the electrical earth protection design.

3.4.1.13.1 Electrical Works

Substation Fit Out and Switchgear Installation

The substation will have a domestic electrical system including lights, sockets, fire alarm and intruder alarm. The high voltage switchgear is installed through the following method.

- The switchboard units are delivered to site on a truck and unloaded using a forklift, front end loader or HIAB crane.
- Suitable task specific RAMS and lifting plans will be in place prior to the commencement of all works.
- The switchgear will be unloaded on to a concrete plinth directly outside the substation building.
- The units will be moved inside the substation building using a hand driven forklift and positioned over the internal trench supports, prepared previously.
- The switchgear is then secured as per manufacturer's instructions, by bolting directly to steel support bars over the trench.
- The building is fitted out with small light and power and ancillary wind farm control equipment such as SCADA computer, remote telemetry units, metering etc.
- All equipment and fittings are then connected, wired tested and commissioned in accordance with the Electrical Contractor's commissioning plan.

Transformers

- The turbine transformers will be placed directly onto the turbine foundation upon delivery to site, prior to the installation of the turbine towers.
- The transformers will be of the sealed type and will be inspected for any damage prior to offloading. It is likely that the units will be installed using a small mobile all-terrain crane and will be tested, commissioned and energised by suitably trained and authorised persons.
- The accessible sections of the transformer will be protected within an enclosure which shall be locked at all times displaying appropriate warning signs.
- Transformers and ancillary plinth-mounted equipment required in the substation compound will be delivered to site and unloaded directly in place by HIAB crane or similar.

- Suitable task specific RAMS and lifting plans will be in place prior to the commencement of all works and adequate hard standings will be provided prior to delivery to facilitate safe unloading.

3.5 Construction Working Hours

Heavy vehicle access and noisy construction activities will be from 07:00 hours to 19.00 hours Monday to Saturday. This restriction will apply to the delivery of the majority of materials to site. Any working outside of these hours will be agreed with Kildare County Council.

Delivery of the nacelles and blades will require the use of abnormally-sized and slow-moving vehicles. These vehicles may require a Garda Síochána escort; the timing of these deliveries will be agreed with Kildare County Council and the Garda Síochána where necessary. It is possible that, in order to minimise inconvenience to other road users, some of these deliveries will be made during the evening or at night.

4. ENVIRONMENTAL MANAGEMENT PLAN

4.1 Introduction

This Environmental Management Plan (EMP) defines the work practices, environmental management procedures and management responsibilities relating to the construction of the Proposed Development.

This EMP describes how the Contractor for the main construction works will implement a site environmental management system (EMS) on this project to meet the specified contractual, regulatory and statutory requirements and environmental impact statement mitigation measures. This plan will be further developed and expanded following the grant of planning and appointment of the Contractor for the main construction works. Please note that some items in this plan can only be finalised with appropriate input from the contractor who will actually carry out the main construction works and once the planning conditions attached to any grant of planning are known. It is the contractor's responsibility to implement an effective environmental management system to ensure that the environmental requirements for the construction of this project are met.

All site personnel will be required to be familiar with the environmental management plan's requirements as related to their role on site. The plan describes the project organisation, sets out the environmental procedures that will be adopted on site and outlines the key performance indicators for the site.

- The EMP is a controlled document and will be reviewed and revised as necessary.
- A copy of the EMP will be located on the site H&S notice board.
- All employees, suppliers and contractors whose work activities cause/could cause impacts on the environment will be made aware of the EMP and its contents.

This section includes the mitigation measures to be employed by the contractor and client during the construction, operation and decommissioning of the proposed development as per the Environmental Impact Assessment Report.

4.2 Project Obligations

In the construction of the Proposed Development there are a number of environmental management obligations on the developer and the contractor. As well as statutory obligations, there are a number of specific obligations set out in the Wind Farm EIAR. These obligations are set out below. The final CEMP which will be produced by the main contractor following appointment will incorporate these obligations. The contractor and all of its sub-contractors are to be fully aware of and in compliance with these environmental obligations.

4.2.1 EIA Obligations

The EIAR identified mitigation measures that will be put in place to mitigate the potential environmental impacts arising from construction of the project. These mitigation measures are set out in full in Section 4.3.

4.2.2 Planning Permission Obligations

All planning conditions associated with the project's planning permission shall be adhered to. All pre-commencement planning conditions shall be discharged fully by the project owner prior to site start.

4.2.3 Felling Licence

Any tree felling and vegetation clearance will be carried out outside of the bird nesting season (March 1st to August 31st inclusive).

Felling of coniferous forestry is required within and around the wind farm infrastructure to accommodate the construction of some turbine foundations, hard stands, crane pads, access tracks and substation. Turbines T6, T7, T8, T9, T10 and T11 are all located within forestry and consequently tree feeling will be required as part of the project.

The estimated maximum area of woodland tree felling required is ca. 28.4 ha, which will be subject to agreement with the Forest Service prior to construction.

Tree felling will be the subject of a Felling Licence from the Forest Service and will be in accordance with the conditions of such a licence. A Limited Felling Licence will be in place prior to any felling works commencing on site. The licence will include the provision of relevant replant lands to be planted in lieu of the proposed tree felling on the site.

To ensure a tree clearance method that reduces the potential for sediment and nutrient runoff, the construction methodology will follow the specifications set out in the Forest Service Forestry and Water Quality Guidelines (2000) and Forest Harvesting and Environmental Guidelines (2000).

Before any harvesting works commence on site all personnel, particularly machine operators, will be made aware of the following and will have copies of relevant documentation, including:

- The felling plan, surface water management, construction management, emergency plans and any contingency plans;
- Environmental issues relating to the site;
- The outer perimeter of all buffer and exclusion zones;
- All health & safety issues relating to the site.

4.2.4 Other Obligations

The developer and/or contractor for the main construction works will liaise directly with the County Council and An Garda Síochána in relation to securing any necessary permits to allow the works to take place including for example (non-exhaustive list):

1. Commencement notice
2. Special Permits in relation to oversized vehicles on public roads
3. Temporary Road Closures (if required)
4. Road Opening Licence (if required)

The developer will also liaise closely with the local residents, especially homeowners and landowners along the local access routes in relation to works and all reasonable steps will be taken to minimise the impact of the development on such persons.

4.3 Environmental Management Programme

This section outlines the EMP associated with the Proposed Development. The Management Plans should be read in conjunction with the EIAR. The contents of the management plans will be updated for the construction phase in line with any planning conditions that may apply.

4.3.1 Dust Management Plan

This Dust Management Plan (DMP) outlines the sources of dust during the works, identifies measures to minimise dust during the works and the complaints procedure for dust.

The principal sources of potential air emissions during the construction of the Project will be from: dust arising from earthworks, tree felling activities, trench excavation along cable routes, construction of the new access tracks, the temporary storage of excavated materials, the construction of the proposed substation, the movement of construction vehicles, loading and unloading of aggregates/materials and the movement of material around the site.

The following dust control measures will be put in place during construction and decommissioning works:

Construction Stage Mitigation Measures

Construction stage mitigation measures to minimise dust and emissions are as follows:

- The internal access roads will be constructed prior to the commencement of other major construction activities. These roads will be finished with graded aggregate which compacts, preventing dust;
- A water bowser will be available to spray work areas and haul roads, especially during periods of excavations works coinciding with dry periods of weather, in order to suppress dust migration from the site;
- All loads which could cause a dust nuisance will be covered to minimise the potential for fugitive emissions during transport;
- Earthworks and exposed areas/soil stockpiles will be re-vegetated to stabilise surfaces as soon as practicable;
- The access and egress of construction vehicles will be controlled and directed to designated locations, along defined routes, with all vehicles required to comply with onsite speed limits;
- Construction vehicles and machinery will be serviced and in good working order;
- Wheel washing facilities will be provided at the entrance/exit point of the proposed development site;
- The developer in association with the contractor will be required to develop and implement a dust control plan as part of this CEMP. This plan will address aspects such as excavations and haul roads, temporary stockpiling and restoration works. The plan will be prepared prior to any construction activities and will be established and maintained through the construction period. In the event the Planning Authority decides to grant permission for the Proposed Development, the final CEMP will address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned by the Planning Authority;
- Ensure all vehicles switch off engines when stationary – no idling vehicles; and

- Exhaust emissions from vehicles operating within the site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by ensuring that emissions from vehicles are minimised through regular servicing of machinery.

Decommissioning Stage Mitigation Measures

Mitigation measures for the removal of wind turbines and all other site works from the Proposed Development site will be the same as the construction phase with respect to dust control and minimisation. The proposed access tracks across the Proposed Wind Farm site will likely be left in situ and utilised as farm tracks and forest roads following decommissioning and no mitigation measures are proposed. In terms of the Proposed Substation, this will be left in situ and taken over by EirGrid and so no mitigation measures are proposed.

4.3.2 Noise and Vibration Management

A detailed study of noise and vibration generated as a result of project activities has been carried out as part of the EIAR.

The EIAR construction noise model appraised a number of tasks with the potential to generate noise. These tasks included: deliveries and/or removal of material to and from site, preparation of access roads and drainage, piling of foundations, concrete mixing and pouring of foundations, preparation of hardstands and drainage, installation of wind turbines and works associated with construction of the Proposed Substation and grid connection. A number of the tasks were found to potentially result in temporary elevated noise levels, prior to mitigation.

The potential for vibration at neighbouring sensitive locations during construction is typically limited to piling works, excavation works, rock-breaking operations and lorry movements on uneven road surfaces.

Noise associated with the operational wind farm turbines and associated electrical equipment has been assessed. The predicted operational noise levels were compared against the noise limits derived using the envelope based on the lowest average baseline noise levels. The operational predicted noise levels are compliant with the daytime and night-time noise limits at all receptors.

Upon decommissioning of the proposed wind farm, the wind turbines would be disassembled in reverse order to how they were erected. All above ground turbine components would be separated and removed off-site for recycling. Turbine foundations would remain in place underground and would be covered with earth and reseeded as appropriate. These activities would be undertaken during daytime hours, and noise, which would be of a lesser impact than for construction, will be controlled through the relevant guidance and standards in place at the time of decommissioning.

Site access tracks could be in use for purposes other than the operation of the wind farm by the time the decommissioning of the project is to be considered, and therefore it may be more appropriate to leave the site access tracks in situ for future use. If the roads were not required in the future for any other useful purpose, they could be removed where required. This would involve removing hard core material and placement of topsoil. The impact is expected to be less than that during the construction stage.

A detailed description of the potential noise impacts associated with the Proposed Development can be found in Chapter 7 of the EIAR.

The following mitigation measures will be implemented to manage potential noise effects from the Proposed Development.

Construction Stage Mitigation Measures

The noise impact for construction works traffic will be mitigated by generally restricting movements along access routes to the standard working hours and exclude Sundays, unless specifically agreed otherwise. For example, during turbine erection, an extension to the working day may be required, i.e. 05:00 to 21:00, but this would be necessary only on a relatively small number of occasions. Where turbine deliveries are required at night it will be ensured that vehicles on local roads do not wait outside residential properties with their engines idling, and that the local residents will be informed of any activities likely to occur outside of normal working hours.

Consultation with the local community is important in minimising the likelihood of complaints and therefore construction will be undertaken in consultation with the local authority as well as the residents being informed of construction activities through the Community Liaison Officer.

The construction works on site would be carried out in accordance with the guidance set out in BS 5228:2009+A1:2014, and the noise control measures set out in the Construction Environmental Management Plan (CEMP). Proper maintenance of plant will be employed to minimise the noise produced by any site operations. All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the project. Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use.

The hours of construction activity will be limited to avoid unsociable hours where possible. Construction operations shall generally be restricted to between 07:00 hours and 19:00 hours Monday to Saturday. However, to ensure that optimal use is made of fair weather windows, or at critical periods within the programme, it could occasionally be necessary to work outside these hours. Any such out of hours working would be agreed in advance with the local planning authority.

As discussed in section 7.5.1 of the EIAR, during the construction of the road for the turbine delivery route to the north of the site, there is potential for the noise limit to be exceeded at properties near the northern site entrance. Noise mitigation at this property could be provided by a combination phasing works and installation of a noise barrier between the turbine delivery route and the properties which are east and west of the access track. The noise barrier should just block the line of sight between the source and the receiver (highest window overlooking the construction works.

There is also a potential for the daytime noise limits to be exceeded during construction of the access track close to a family member of an involved landowner (R134), located east of the main southern site entrance. In addition, at this location, when the southern site entrance is used by HGV movements during all construction activities, there is potential for the daytime noise limit to be exceeded marginally (by up to 2dB). Note as a mitigation measure, access track layout has been moved eastwards to mitigate the construction noise impact at a property west of the site entrance. During the access track construction, the noise limits have the potential to be exceeded by up to 10 dB at location R134. Mitigation would be required both in terms of phasing works when close to the property and installing a noise barrier. A barrier will be installed on each side of the site entrance, and should extend from the site entrance northeastwards for approximately 80m, next to the proposed access track, in order to screen R134 and the property to the west of the site entrance. The height of the barrier should be 2.5m.

Barriers should have a minimum mass per unit surface area of greater than 7kg/m^2, with no gaps at the joints.

The predicted noise levels at other noise sensitive properties in this area are predicted to be below the construction noise limit.

With mitigation measures, the construction and decommissioning noise levels are predicted to be below the relevant noise limit of 65 dB LAeq,1hr for operations exceeding one month, and therefore construction noise impacts are not considered to be significant. However, there is potential for temporary elevated noise levels due to the grid connection works. However, these works will be for a short duration (i.e. less than 3 days) and where the works are required over an extended period, a temporary barrier or screen will be used to reduce noise levels below the noise limit where required. The noise impact will also be minimised by limiting the number of plant items operating simultaneously where reasonably practicable.

Operational Phase Mitigation Measures

The results of the noise predictions presented in Section 7.5.2 of the EIAR and Appendix 7.4 (Volume 3 of the EIAR) show that operational noise levels meet the derived daytime and night-time noise limits at all residential properties (including mobile homes and planning applications) surrounding the wind farm. Therefore, no mitigation is required for windfarm operational noise. Appendix 7.3 (Volume 3 of the EIAR)provides full details on octave band spectra for standardized 10m wind speeds ranging from 3 m/s to cut out.

Decommissioning Stage and Mitigation Measures

The noise impact for construction works traffic would be mitigated by generally restricting movements along access routes to the standard working hours and exclude working on Sundays, unless specifically agreed otherwise with the local authority. In addition any noise barrier mitigation identified during the construction phase would need to be considered, if noise sensitive locations are similar distances from the decommissioning works.

The decommissioning works, which will be at a lower impact than construction works, will be carried out in accordance with the policies and guidance required at the time of the works, and restricted to normal working hours, typically 07:00-19:00 hours Monday to Saturday.

4.3.3 Biodiversity Management Plan

This section outlines the measures that will be put in place to protect flora and fauna species, in addition to natural and semi-natural habitats at the proposed development and describes how these areas will be managed during the lifetime of the project. This plan should be read in conjunction with the EIAR.

4.3.3.1 Objectives

The primary objectives of the management plan over the construction, operation and reinstatement phases of the project are as follows:

- Promote the conservation of habitats on site through the establishment of management and/or mitigation;
- Provide management and mitigation for aquatic habitats and water quality;
- Provide management and mitigation for avifauna;
- Provide management and mitigation for bats and terrestrial mammals;
- Monitor the usage of the wind farm site by birds post construction;
- Monitor for any collision by birds at the wind farm site post construction;
- Monitor for any collision by bats at the wind farm site post construction.

4.3.3.2 Current Site Status and Management

Existing ecological conditions are outlined in EIAR Chapter 8-1 (Biodiversity) and Chapter 8-2 (Ornithology).

4.3.3.3 Habitat and Species Mitigation and Management Requirements

The mitigation measures for ecology at the site are listed in Chapter 8-1 (Biodiversity) and Chapter 8-2 (Ornithology) of the EIAR. These include mitigation measures to prevent impacts on watercourses, to prevent disturbance to breeding birds, to limit habitat disturbance and limit impacts on terrestrial mammals and bats.

In addition, monitoring methods proposed to monitor bird and bat usage of the wind farm post construction are described, as well as fatality monitoring.

Further mitigation is also included in the NIS to prevent adverse effects on European Sites.

4.3.3.4 Mitigation by Avoidance and Design

The following measures were undertaken to reduce impacts on designated sites, flora and fauna through avoidance and design:

- The hard-standing areas of the wind farm have been kept to the minimum necessary, including all site clearance works to minimise land take of habitats and flora.
- Larger turbines have been utilised to minimise the number of turbines, reducing the total rotor envelope (less turbines) and footprint of the proposed development.
- Site design and layout deliberately avoided direct effects on designated sites and sensitive habitats such as raised bog, wet heath and mature broadleaved woodland.
- Care has been taken to ensure that sufficient buffers are in place between wind farm infrastructure and hydrological features such as rivers, lakes and streams. Access roads were the exception to the rule in that river crossings will have to take place; however, where possible, existing stream crossings have been utilised. Clear span bridges are to be used at the three stream crossing points on site to reduce the potential effect on stream beds and to avoid instream works (foundations will be located 2.5m from the river edge).
- Any works in or around watercourses will adhere to best practice as per NRA and IFI guidance for works potentially affecting watercourses.
- The use of floating road construction for access tracks in the vicinity of raised bog habitats will minimise potential for indirect drainage effects on these habitats.
- The use of piled foundations in areas near raised bog habitats will minimise foundation excavation volumes, thereby minimising potential indirect drainage effects on raised bog habitats.
- The hard-standing areas of the Proposed Substation has been kept to the minimum necessary including all site clearance works to minimise land take of habitats and flora.
- Site design and layout deliberately avoided direct effects on designated sites and sensitive habitats. Specifically, the design avoided encroachment on the adjacent mature broadleaved woodland habitats to the east of the substation compound.
- All cabling with the exception of the locations of the high voltage line loop-in is to be placed underground; this significantly reduces collision risk to birds over the lifetime of the wind farm and is in line with best practice recommendations for mitigation measures in regard to birds and wind farms as recommended by statutory bodies such as English Nature and the Royal Society for the Protection of Birds (Drewitt and Langston, 2006).

4.3.3.5 Construction Stage EIAR Mitigation Measures

4.3.3.5.1 Project Ecologist

A Project Ecologist/Ecological Clerk of Works (ECoW) with appropriate experience and expertise will be employed for the duration of the construction phase to ensure that all the mitigation measures outlined in relation to the environment are implemented. The Project Ecologist/ECoW will be awarded authority to stop construction activity if there is potential for significant adverse ecological effects to occur.

This mitigation measure is applicable to the Proposed Wind Farm, Proposed Substation, Grid Connection and TDR.

4.3.3.5.2 Proposed Mitigation Measures for Habitats

The area of the proposed works will be kept to the minimum necessary, including all site clearance works, to minimise disturbance to habitats and flora. In this case, the footprint of the Proposed Wind Farm and Proposed Substation have been kept to the minimum necessary, including the use of layout design methods to minimise excavation works.

No disturbance to habitats or flora outside the Proposed Wind Farm and Proposed Substation works areas will occur. All works and temporary storage of material will be restricted to the immediate footprint of Proposed Wind Farm and Proposed Substation works areas, which will be wholly within their respective site boundaries. Designated access points will be established within the site and all construction traffic will be restricted to these locations.

A Habitat and Species Management Plan (HSMP) is included in Chapter 8.1 of the EIAR. This details habitat restoration measures which are designed to avoid/minimise any potential conflicts between the Proposed Wind Farm and Proposed Substation and the positive effects of increasing habitat diversity in close vicinity to operational turbines. An appropriately qualified and experienced ecologist will review, implement/supervise and, where required, amend the proposed Habitat and Species Management Plan.

<u>Protection of Raised Bog (Proposed Wind Farm)</u>

In order to protect the existing raised bog and nearby groundwater wells from the effects of dewatering, groundwater cut-off techniques (such as sheet piling) will be used in preference to lowering of the water table (dewatering) during excavation and construction works in the vicinity of raised bog areas. This will avoid the possibility of significant drainage of the adjacent peat bogs. It should also be noted that the majority of excavations close to peat bogs will not extend much deeper than the existing drainage network. Any dewatering will be temporary, during construction only and will not have time to cause drainage of the peat, which due to the low permeability of the peat would result in very slow drainage. It is also proposed, following landowner agreement that drain blocking is carried out in the remnant area of raised bog to improve its condition; this would be a slight beneficial effect.

<u>Hedgerow and Treeline Reinstatement (Proposed Wind Farm)</u>

Any re-instated habitats such as Hedgerows will utilise native species suitable for the area.

Hedgerow and treeline planting will be carried out for the Proposed Wind Farm. This will reinstate or replace linear habitat loss to ensure no net loss of these habitats occurs.

New hedgerows will be planted along the outer perimeter of turbine buffers at T1, T2, T4 and T5 within the proposed wind farm site to mitigate linear wooded habitat loss and enhance and maintain connectivity in the agricultural landscape. Ash is not currently proposed to be used due to its vulnerability to ash dieback disease (ADB). However, if proven ADB resistant varieties of ash are available at the time of planting they can be used, in addition to other large-growing native species such as Alder and Oak. Smaller thicket-forming species such as elder, hazel and blackthorn will also be planted. Semi-mature specimens (heavy standard size) of native provenance will be included to accelerate establishment of new linear wooded habitats.

4.3.3.5.3 Proposed Mitigation Measures for Invasive Species

The following measures are applicable to the Proposed Wind Farm and Proposed Substation.

Prior to works, an invasive species survey will be undertaken in the area to reconfirm the findings of the EIAR.

The invasive species plan and management plan (ISMP) (EIAR Appendix 8.1-8) will be adhered to for works in any areas where invasive species are present.

Halting the spread of non-native invasive species can be achieved via prevention, containment, treatment and eradication.

Prevention

Proposed Wind Farm

The Schedule III species *Rhododendron ponticum* was recorded in within the Proposed Wind Farm boundary in mixed broadleaved/conifer woodland adjacent to a section of proposed access track south of T8 (c. 15m from proposed T8 hard standing/20m from access track felling corridor), and also recorded in conifer plantation c. 170m north-east of T9 (outside Proposed Wind Farm boundary). Snowberry is present c. 15m from a section of proposed access track. Cherry laurel is present at two TDR POIs (1 & 3).

Where feasible, interaction with invasive species and surrounding areas potentially containing vector material will be prevented. If baseline conditions persist, prevention of the spread of invasive species by avoidance may be feasible. If this is not feasible then containment, treatment and eradication as detailed below will be required.

Proposed Substation

No invasive species are present within the Proposed Substation footprint. As such, if baseline conditions remain unchanged, interaction with proposed works is avoidable. Due to the possibility of spread of invasive species in the intervening period, a preconstruction invasive species survey is required as part of the invasive species management plan (ISMP) (EIAR Appendix 8.1-8). Containment and eradication measures are detailed in the ISMP which will be used as required in the event of changes to the invasive species baseline.

Containment, Treatment, Eradication

The presence sycamore and butterfly bush within the Proposed Wind Farm footprint, in addition to their tendency to spread reproductively means that containment measures will be required for these species. The following measures are also applicable to *Rhododendron ponticum,* cherry laurel and snowberry in the event that preconstruction surveys detect any risk of spread due to new growths becoming established within or in close proximity to the proposed works footprint.

- Cordoning off the area – this shall include a buffer of 5m surrounding the area of infestation to ensure that seeds are not transported to other sections of the site via vehicular traffic, equipment or PPE.
- No machinery or personnel shall be allowed within this restricted area. Similarly, there shall be no storage of materials within or adjacent to this restricted area.
- There shall be no vegetation clearance or trimming within the cordoned area (except where undertaken in accordance with the invasive species management plan) as this can lead to the species recolonising other areas via the wind, water if displaced into drains, or soil and vegetation attached to machinery, vehicles or personnel.
- If Schedule III species are present, no soil or vegetation shall be removed from this area unless it is securely contained and is transported under licence to a suitably licenced facility for treatment.
- For non-schedule III species, no soil or vegetation shall be removed from this area unless it is securely contained and is to be disposed of appropriately onsite or transported to a suitably licenced facility for treatment.
- A wheel wash, draining to a secure waste receptacle will be implemented at the site entrance to prevent the possible spread of any invasive species via vehicular movements.
- All site machinery will be inspected for the presence of potential invasive plant vector material and where required will be washed down before entering the site to prevent inadvertent transport of invasive plant species vector material.

- Any site machinery intended for use in or near aquatic habitats will be washed down and sterilised before entering the site to prevent inadvertent transport of invasive species vector material.
- Site machinery working in areas with potential for invasive species to occur will be checked and washed down prior to exiting these areas and moving to other parts of the proposed site.
- Informing all site staff through toolbox talk as part of site inductions.
- Any new sightings of the species shall by relayed to construction staff and the developer via the project ecologist/ECoW. These areas shall follow the same protocol as described above.
- Reporting sighting(s) to the NPWS and NBDC and liaising with the NPWS.

Treatment and eradication options for each species are detailed in the ISMP. The eradication of the area of *Rhododendron ponticum* recorded near T8 is proposed in order to remove this reservoir which if left untreated would continue to pose an ongoing risk of site-wide infestation over the long term. Removing this source of infestation at construction stage will prevent more arduous control measures later on if this species was left unchecked and spread throughout the site. Physical removal of mature plants outside the flowering season, followed by targeted herbicide stump treatment and annual follow-up spraying of any new emergent shoots is considered to be the optimal eradication strategy.

The other area of *Rhododendron ponticum* (100m east of Proposed Wind Farm/c. 170m north-east of T9) will require monitoring during the operational phase.

4.3.3.5.4 Proposed Mitigation Measures for Terrestrial Mammals

An ecologist will supervise areas where vegetation, scrub, treeline and hedgerow removal will occur prior to and during construction as appropriate (e.g., an ecologist may be required during some clearance works of areas where vegetation is too dense to check beforehand). This will ensure that any site-specific issues in relation to wildlife not currently present (e.g. badger setts) on site will be confirmed prior to commencement of works so as to allow appropriate mitigation measures to be put in place.

In the event that an issue arises, the NPWS will be updated, consulted with and the relevant guidelines will be implemented as appropriate (e.g. NRA guidelines).

Construction operations within the proposed development will take place predominantly during the hours of daylight to minimise disturbances to faunal species at night. Some works along the cable route may occur at night but the project ecologist/ECoW shall limit night-time works to sections of the route which avoid sensitive features (e.g. mature treelines).

Where possible tree felling in forestry areas will be limited to time periods outside which pine martens may have young in dens (March and April). If this is unavoidable than areas to be clear felled will be surveyed in advance by a suitable qualified ecologist to determine whether any occupied pine marten dens are present. A necessary license under the wildlife act will be applied for should any sites have to be disturbed.

Where possible any required tree felling of trees in forestry areas will be limited to time periods outside which red squirrel may have young in dreys (peak period January to March).

If this is unavoidable than areas to be clear felled will be surveyed in advance by a suitable qualified ecologist to determine whether any occupied dreys are present. A necessary license under the Wildlife Act will be sought.

4.3.3.5.5 Proposed Mitigation Measures for Badgers

A pre-construction mammal survey including a reconfirmatory survey for any new badger setts will be undertaken within the potential zone of influence of the Proposed Wind Farm and Proposed Substation in order to reconfirm the existing environment as described in the EIAR. In the event that a new badger sett should be encountered at any point, then NPWS will be informed and *Guidelines for the Treatment of Badgers Prior To the Construction of National Road Schemes* (NRA, 2008c) and will be followed.

A total of 21 badger setts were observed within the study area during current surveys. Mitigation proposed for these setts is detailed in Table 4-1, and additional details on specific locations are included in the confidential badger mitigation report which accompanies this application. The presence of four additional badger setts in the surrounding hinterland is also noted. All of these setts are over 150m from proposed infrastructure and construction activities and as such they do not require detailed assessment or mitigation. Their presence is noted as they are relevant when assessing the local badger population at the landscape scale.

A total of two subsidiary setts (Setts 1 & 2) are located within 30m of proposed infrastructure but are separated by a deep drainage channel, screened by vegetation and face away from works. As such, it is proposed to keep these setts open during construction (with monitoring) since they are unlikely to be damaged or disturbed, and would not be used for breeding. A total of two setts (Setts 4 & 7) are overlapped by proposed works to the degree that controlled destruction following exclusion or hard blocking is required. It is proposed to excavate within 30m of one sett (Sett 5) under ecological supervision following exclusion or hard blocking, but to retain the remainder of the sett and re-open it following construction. This course of action is proposed due to potential for the majority of the sett to remain intact, and to avoid additional tree felling which would be required to excavate the whole sett.

A total of two setts: Setts 19 (main sett) and Sett 20 (subsidiary) require hard blocking for the duration of construction, following exclusion as required. One sett (Sett 21) requires screening to provide a noise/visual barrier for the duration of construction.

The remainder of setts require monitoring or no mitigation measures. All main setts will be retained, and will be kept open in the majority of territories.

The exception to this is Sett 19. This main sett requires exclusion outside the breeding season followed by hard blocking for the duration of construction, however the presence of a nearby large Annex sett (Sett 21) located 120m from Sett 19 within the same densely vegetated field boundary provides an adequate alternative resting and breeding place while Sett 19 is hard blocked. A noise/visual barrier will be erected along the north-west and south-west edges of the site compound to screen Sett 21 from the site compound during construction.

No requirement for an artificial sett has been identified due to retention of the majority of setts, and availability of suitable alternative setts which will remain open and undisturbed near areas where setts are required to be excluded/hard blocked during construction. The option to create an artificial sett will be retained nonetheless (see confidential badger report).

The specific measures proposed for each sett are summarised in Table 4-1. Detailed procedures and requirements for implementation of mitigation for disused and inactive setts, active setts, vegetation clearance, prevention of injury to badgers and sett destruction are detailed in EIAR Chapter 8.1 Section 8.10.1.6.1.

Table 4-1: Proposed Badger Mitigation

Sett No.	Type	Closest Infrastructure/Activities	Mitigation
1	Subsidiary	Proposed northern access track (27m) Proposed northern access track felling buffer (20m)	Monitoring. This sett is separated from proposed works by a deep drain, vegetation cover and faces away from works.
2	Subsidiary	Proposed northern access track (21m) Proposed northern access track felling buffer (14m)	Monitoring. This sett is separated from proposed works by a deep drain, vegetation cover and faces away from works.
3	Main	Existing access track to form part of northern site access route (115m) Substation compound (250m)	Monitoring
4	Annex	T6-T7 access track (0m) Overlapped by access track and access track felling buffer.	If inactive - hard blocking/if active - exclusion during non-breeding season. Followed by controlled destruction prior to access track construction.
5	Annex	T6-T7 access track (12m) Access track felling buffer (5m)	If inactive - hard blocking/if active - exclusion during non-breeding season. Preconstruction check, ecological supervision and controlled excavation of road footprint within 30m of sett. Monitoring. Reopen following construction.
6	Main	T6-T7 access track (158m)	Monitoring
7	Annex	T5 hard stand (overlaps sett)	If inactive - hard blocking/if active - exclusion during non-breeding season. Followed by controlled destruction prior to hard stand construction.
8	Subsidiary	T5 hard stand (83m) T5 felling buffer (20m)	Monitoring
9	Subsidiary	T4 (590m)	None Required

Sett No.	Type	Closest Infrastructure/Activities	Mitigation
10	Main	T3 (623m)	None Required
11	Annex	T3 (607m)	None Required
12	Subsidiary	T3 (461m)	None Required
13	Outlier	T3 (252m)	None Required
14	Outlier (potential)	T2 felling buffer (76m) Access track (89m)	Monitoring
15	Main	Access track (89m) T2 felling buffer (147m)	Monitoring
16	Subsidiary	Access track (137m) T2 (186m)	Monitoring
17	Subsidiary	Access track (101m) T2 (126m)	Monitoring
18	Annex	Access track (127m) T2 (155m)	Monitoring
19	Main	Access track (10m) Site compound (24m)	If inactive - hard blocking/if active - exclusion during non-breeding season. Monitoring. Reopen following construction.
20	Subsidiary	Site compound (27m)	If inactive - hard blocking/if active - exclusion during non-breeding season. Monitoring. Reopen following construction.
21	Annex	Site compound (38m)	Erect noise/visual barrier during non-breeding season to screen sett from site compound. Monitoring.

4.3.3.5.6 Proposed Mitigation Measures for Otter

A pre-construction mammal survey will be undertaken within the footprint of the development to reconfirm the existing environment as described in the EIAR. In the event that a new otter holt should be encountered at any point, then NPWS will be informed and *Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes* (NRA, 2008d) will be followed.

Works will be restricted to the Proposed Wind Farm and Proposed Substation footprints, ensuring no activities are undertaken in areas which could potentially result in disturbance to otters.

Due to the distance separating Holt 1 from proposed infrastructure (over 150m), no mitigation other than trail camera monitoring is required.

In the case of the low-potential inactive Holt 2, due to unsuitability for breeding otter, no mitigation other than trail camera monitoring is required. Similarly, the burrow north of T6 which could potentially be used as a holt but currently lacks any signs of use by otter will require trail camera monitoring.

A report detailing the results of monitoring surveys will be submitted to the planning authority.

A toolbox talk shall be provided to all construction workers accessing the site to raise the awareness of the species. If otters do attempt to reoccupy the site all works shall cease within 30m of this area and the project ecologist/ECoW shall consult with NPWS. The area shall be treated as an active holt and the procedure outlined above shall apply in full.

Vegetation clearance

If new holts are discovered during vegetation clearance works. Care will need to be taken during this early stage of the development and a competent ecologist will be required on-site for these works.

If a new holt is discovered all works within 30m of the holt shall be ceased including vegetation clearance. NPWS shall be contacted and a derogation licence shall be sought for the new holt.

An activity survey shall be carried out to assess the potential for the holt to be used by otters and whether or not it is a breeding female. Any measures undertaken following discovery of a new holt will be in accordance with *Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes* (NRA, 2008d) and licensing requirements.

Measures to prevent the injury of otter during proposed mitigation measures

In the event that an otter is found injured during the implementation of mitigation measures, it is important to realise that an otter is a wild animal so if injured it is highly likely to be frightened and can inflict injury. As a wild otter is not used to being handled, do no attempt to touch an injured otter, as this could result in workers being bitten. NPWS shall be contacted along with ISPCA and potentially a vet specified by NPWS capable of treating the species.

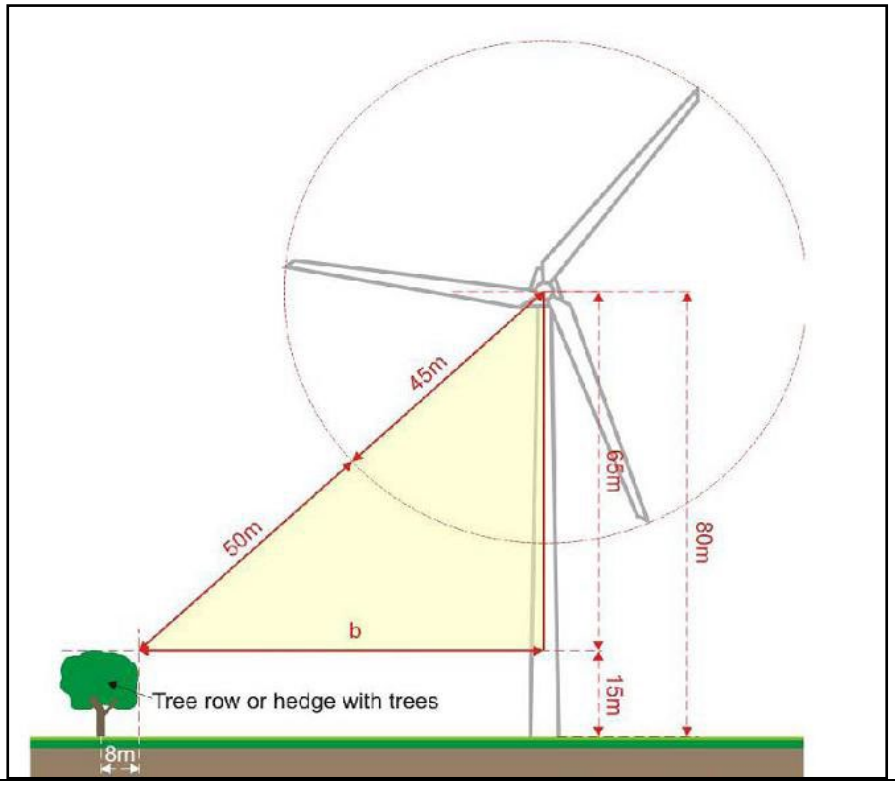
4.3.3.5.7 Proposed Mitigation Measures for Bats

Vegetation Buffer

According to SNH (2021) guidance:

> *"The Eurobats guidance recommends a 200m buffer around woodland areas. There is, however, currently no scientific evidence to support this distance in the UK and it is recommended that a distance of 50m between turbine blade tip and nearest woodland (or other key habitat features such as wetlands etc.) is adequate mitigation in most, lower risk situations. Exceptionally, larger buffers may be appropriate, e.g. near major swarming and hibernation sites. The longevity of wind farms should also be taken into account and the maximum growth, or management, of woodland and other relevant habitat features considered in their planning. "*

These distances were taken into account during the design phase of the development. The following formula was used to calculate the required felling buffer for each turbine (taking into account the height of surrounding woodland/plantations at each turbine location):



$b = \sqrt{(50 + \mathrm{bl})^2 - (\mathrm{hh} - \mathrm{fh})^2}$

where:
b = the distance on the ground between the edge of the canopy and the turbine (m)
bl = blade length (m)
hh = hub height (m)
fh = tree/hedgerow height

Each of the locations of the eleven turbines was surveyed and the vegetation height informed the application of the dimensions of the blade tip buffer at turbine locations, dependant on the surrounding habitat and turbine specification. The likely growth of hedgerow/treeline/forestry was taken into account for the calculation. Surrounding habitats, height of surrounding trees and felling buffer calculated using the above equation are included in Table 4-2 below.

It should be noted that the proposed hub height for T1 is 81.4m for T1, versus 100.5 for all other turbines, resulting in a larger felling buffer for T1 compared to other turbines with the same height of surrounding vegetation.

To minimize risk to bat populations, a buffer zone is recommended around any treeline, hedgerow, woodland feature, into which no part of the turbine should intrude. The buffers recommended for each turbine are presented in Table 4-2.

Table 4-2: Assessment of potential turbine/bat conflict zones [1]

Turbine number	Habitats Requiring Felling	Surrounding Tree/Hedgerow Height (fh/m)	Felling Buffer Radius (m)
T1	Hedgerow/Treeline Mosaic	12	93.5
T2	Hedgerow/Treeline Mosaic	12	75.8
T3	Hedgerow/Treeline Mosaic	12	75.8
T4	Hedgerow/Treeline Mosaic	12	75.8
T5	Hedgerow/Treeline Mosaic	12	75.8
T6	Conifer Plantation	20	84.2
T7	Conifer Plantation, Mixed Broadleaved/Conifer woodland, Bog Woodland	15	79.1
T8	Mixed Conifer Woodland, Mixed Broadleaved/Conifer woodland, Bog Woodland, Scrub	12	75.8
T9	Conifer Plantation	15	79.1
T10	Conifer Plantation	6	68.1
T11	Conifer Plantation, Mixed Broadleaved/Conifer Woodland, Bog Woodland	20	84.2

[1] Based on turbine hub-height and blade length which for T1 is 81.5 and 66.5 m respectively and 100.5m and 66.5m respectively for all other turbines.

Existing trees / scrub will be cleared around ten proposed turbines, T1, T2, T4, T5, T6, T7, T8, T9, T10 and T11 to provide a vegetation-free buffer zone around each turbine. The minimum distance has been taken into consideration for felling of conifer plantation around wind turbines. All buffers will be maintained throughout the lifetime of the wind farm. Due to sufficient existing separation from treelines, T3 does not require any felling to achieve the required 75.8m buffer.

It is noted that an enlarged buffer using a 90m distance from turbine blade tips to surrounding vegetation was recommended to be implemented in the 2019 bat assessment. This was based on high Ecobat activity levels for Leisler's bat for a number of turbines. Since the current assessment indicates none of the turbine locations are above low/moderate risk for Leisler's bat, this precautionary extension of the felling buffers is not required.

The following mitigation measures for bats are recommended:

Supervision of vegetation clearance

An ecologist/ECoW will supervise areas where vegetation, scrub and hedgerow removal will occur prior to and during construction as appropriate (e.g., ecologist may be required during some clearance works of areas where vegetation is too dense to check beforehand).

It is recommended to complete clearance work during the autumn and spring months. Complete clearance work at least 6 months prior to installation of wind turbines. Studies have shown that bats are attracted to clear felled forestry areas due to increase insect loading. This has been shown to occur for a period of 3-6 months before the insect loading reduces to precleared felled levels.

Diversion from turbines via Hedgerows and Treelines

Linear features such as hedgerows and treelines serve as commuting corridors for bats (and other wildlife). Vegetation buffer clearance around turbines will alter commuting and foraging routes associated with existing hedgerows and woodland edges to avoid bats entering the rotor sweep zone of turbines. Hedgerow and treeline planting will be carried out for the Proposed Wind Farm. This will reinstate or replace linear habitat loss to ensure no net loss of these habitats occurs.

Where hedgerows and treelines are affected by turbine clearance buffers, bats will be directed away from tree-free buffers along an alternative commuting route. Where bat buffers are applied, the surrounding hedgerows and treelines should act as commuting corridors, leading bats away from the turbine location, and these hedgerows should not end abruptly at the bat buffer zones. This will be achieved by planting new pollinator-friendly hedgerows, connecting existing hedgerows onsite, around the bat buffers. Willow and Alder will be included in these hedgerows due to their rapid growth. It is proposed to create double lines of hedgerow, with Willow on one side, and pollinator-friendly hedgerow species listed below on the other. Planting of these species will be staggered to prevent excessive shading and aid establishment of the hedgerows.

All hedgerow planting is required to use plants of native provenance. The landscaping contractor is required to be informed well in advance to allow the acquisition of suitable native stock. 2–3-year-old alder and willow trees are required for hedgerows to help accelerate establishment. These will be supplemented with planting of whips.

The following fast-growing damp tolerant species are to be planted along the inner edges of these hedgerows: grey willow *Salix cinerea* and alder *Alnus glutinosa*. The following native fruiting hedgerow species are to be planted along the outer edges of these hedgerows: blackthorn (*Prunus spinosa)*, elder (*Sambucus nigra)*, Holly *(Ilex aquifolium)* and rowan *(Sorbus aucuparia)*.

Tightly cut hedgerows with flat tops provide little benefit to wildlife; taller and bulky hedgerows are required as this provides more shelter for wildlife. When the hedgerows are maintained, stems will be cut a little above the last cut as cutting back to the exact same point depletes the energy of the hedgerow, forms a build-up of scar tissue which discourages new growth.

Light annual cutting of hedgerows is not good for wildlife as it limits the production of flowers and fruit. The sites hedgerows will be cut every three to four years in rotation if cutting is required, as this will leave areas of undisturbed hedgerows. Cutting equipment used will be sharp so as not to shatter or fray the hedge. Shattering and fraying allows for disease to enter plants and can lead to decay and weaken the vigour of the hedgerow. A finger-bar cutter is recommended as the most appropriate tool to minimise fraying and smashing of branches (Heritage Council, 2017). A flail-type hedge cutter is unsuitable for hedge trimming in situations where hedgerow health is a priority.

Hedgerow maintenance will not be carried out between the 1st of March and 31st of August as this is the nesting period for birds and any maintenance at this time will disturb breeding; this is in keeping with the Wildlife Act 1976 (as amended).

Lighting restrictions

In general, artificial light creates a barrier to bats so lighting should be avoided where possible. Brown Long-eared Bat and Whiskered Bat are highly averse to artificial night lighting. Artificial night lighting will be avoided throughout the site. Construction operations within the wind farm site will take place during the hours of daylight where possible to minimise disturbances to faunal species at night. Where lighting is required, directional lighting (i.e. lighting which only shines on work areas and not nearby countryside) will be used to prevent overspill.

This can be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvers and shields to direct the light to the intended area only.

It is understood that flashing red aviation lights will be provided on perimeter turbines. These will not negatively effect bats (Bennett and Hale, 2014).

Pre-construction Surveys

If three years lapse from between planning-stage surveys in 2023 and installation of the wind turbines, it will be necessary to repeat one season of surveys during the activity period prior to construction. Future survey work will be completed according to best practice guidelines available (SNH, 2019/ 2021; Hundt, 2012 & Collins, 2023).

A survey of trees proposed to be felled to search for potential bat roosts prior to construction.

Based on current surveys, a total of 12 trees with potential for use by individual or small numbers of bats are present within turbine felling buffers and will require felling if the wind farm is granted permission. This will result in the loss of potential or actual bat roosting (and foraging) opportunities. Best practice in tree-felling with respect to protection of potential bat roosts should be employed, including pre-felling emergence surveys and hiring a climbing specialist with bat training and licensing to check roost features with an endoscope for bats where necessary.

The eight trees with PRFs or potential for PRFs along the TDR potentially subject to effects from vegetation trimming will require similar measures (pre-trimming works emergence surveys and where required inspection at height).

If new bat roosts are present in areas affected by proposed felling, a bat derogation license will be sought from the National Parks and Wildlife Service.

Relocation/Retention of Bat Boxes and PRFs

Bat boxes 4 and 5 adjacent to the proposed/existing access route will be replaced with new boxes (4a and 5a) located directly north along the woodland edge bordering agricultural fields (approx. location ITM 676282 737906). This will mitigate any direct effects to these bat boxes associated with upgrade works to this section of access track, in addition to providing boxes in optimal condition for use by bats.

Following confirmation that bats are absent prior to felling, the tree PRF (knothole in trunk) of tree C will be retained and relocated to the riparian zone along the Fear English River North of T4. This will be achieved by cutting out the section of trunk containing the PRF following felling, and strapping it to a suitable mature tree along the Fear English riparian zone at similar height (3m or higher). If this is not feasible, a bat box will be provided along the Fear English riparian zone.

4.3.3.5.8 Other Species

Pre-construction surveys for breeding frog will be undertaken within the development footprint to reconfirm the findings of the EIAR and account for the potential time lag between EIAR surveys and the proposed construction phase. These will consist of searching suitable areas for spawn clumps during February as per NRA guidelines. In the event that frog spawn is found within the development footprint, this will be translocated under licence to suitable receptor sites outside the Proposed Wind Farm footprint. Where breeding ponds could potentially be indirectly affected, measures to prevent effects (alternative drainage routing, control of contaminants) will be implemented where feasible. Where effects cannot be avoided, construction will not take place in these areas during frog breeding season (January to June). These restrictions shall be localised to the areas were frog spawn is found. There is potential for an indirect effect on frogs and smooth newt due to water quality changes from erosion/sediment or pollutants. Weekly inspections of the erosion and sediment control measures on site will be required during the construction period, triggering remedial measures in the event of reduced efficacy. All measures to protect aquatic ecology and prevent reductions in water quality will also protect frogs and smooth newt.

For common lizard, vegetation will be felled and removed near the proposed turbine locations outside of the peak breeding season (July-August) to displace any lizards present and reduce the risk of effects and injury to individuals. This measure will be implemented in areas of suitable habitat as per the findings of the lizard report (Appendix 8.1-6) (Triturus, 2023) (i.e. proposed grid connection and turbine T11 but also T6, T8 & T9 based on previous findings). Furthermore, targeted pre-construction surveys, and where required relocation will be conducted at the proposed works locations known to support common lizard, with trapping methodologies employed to maximise lizard capture and minimise risk to overall lizard populations.

Preconstruction surveys for marsh fritillary (habitat appraisal, and if any change to the baseline suitable habitat is detected also a follow-up larval web survey) will be undertaken to reconfirm the findings of the EIAR. If optimal habitat establishes and marsh fritillary larvae are found within the Proposed Wind Farm footprint prior to construction, translocation of turves and larval webs to suitable receptor areas outside the footprint will be undertaken. This will be achieved by marking the location of pupae/larvae, and carefully excavating the surrounding sod under ecological supervision. Translocated sods will be placed in receptor sites which have been excavated to receive the sods. Receptor sites will be located nearby in similar habitat with abundant *S. pratensis*. If required, translocation will be carried out immediately following the survey during September to ensure pupae/larvae can be relocated.

A pre-construction reconfirmatory survey for key ecological receptor bee species requiring mitigation (Barbut's cuckoo bee, Barbut's Cuckoo Bee, gipsy cuckoo bee, large red tailed bumble bee and patchwork leafcutter bee) will be carried out within the development footprint during other pre-construction surveys (mammal, amphibian and reptile surveys). In the event that a colony is found within the footprint, the structure will be left in situ until the bee's breeding cycle is complete, and then translocated prior to construction works.

4.3.3.5.9 Aquatic Ecology

IFI advice arising from consultation has been taken into account in design of watercourse crossings, and mitigation measures contained in this section.

A Surface Water Management Plan is included in the CEMP, and has regard to guidelines included in 'Guidelines for the crossing of watercourses during the construction of national road schemes' (NRA, 2008b) and 'Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters' (IFI, 2016). This is considered to be the key mitigation measure for the protection of aquatic species located in downstream receiving waters. The Surface Water Management Plan will set out measures to avoid siltation, erosion, surface water run-off and accidental pollution events which all have the potential to adversely affect water quality within the site during the construction phase. It will also include preparatory works on the site, including installation of silt fences and bunds.

A CEMP has been prepared and this will be distributed to all parties involved in the construction of the wind farm site (including any sub-contractors) in order to protect aquatic interests within the study area.

All access tracks have been designed to minimise excavation on the site and reduce the risk of sediment runoff. A sealed silt fence will be placed at both sides of the crossing points and to a minimum of 10m upstream and downstream of each crossing at both sides of the road. Swales for turbine bases and hard standings will be constructed.

All infrastructure shall have a setback 50 m away from all streams within the site except for the watercourse crossings and the southern temporary compound which is within 15m of the Fear English River. Where site tracks are existing rather than a new site track, this buffer will not apply. Any access tracks crossing watercourses will be constructed as clear span bridges, where instream works are not permitted.

Where access tracks pass close to watercourses, silt fencing will be used to protect the streams. The maintenance and monitoring of such silt fences will be subject to an on-site quality management system set out in the CEMP.

Spoil heaps from the excavations for the turbine bases and trenches (where cables are to be buried) will be covered with geotextile and surrounded by silt fences to filter sediment from the surface water run-off from excavated material. Berms will be compacted and planted with native species seed mixes to promote soil stabilisation and minimise sediment runoff; the berm north-east of T5 will be surrounded by silt fencing until vegetation has been established in the following growing season to minimise potential for sediment runoff into the adjacent drainage ditch. If cables will be installed in trenches, they will be located underneath and directly adjacent to access tracks as far as possible. Trenches will be excavated during dry periods where possible in short sections and left open for minimal periods to avoid acting as a conduit for surface water flows. Clay bunds will be constructed within any cable trenches at intervals.

An Emergency Erosion and Silt Control Response Plan is included as a contingency in the CEMP, which details the required measures for the Contractor to implement in the event of an emergency on the site. Timing of the proposed works will also take account of the fisheries constraints within the study area, where no works will be undertaken in the instream environment during the salmonid close season (October–March annually), which also avoids the lamprey spawning season, as a precautionary measure.

Secure concrete washout areas have been designated on site and are detailed in the CEMP. Standing water in the excavations at the turbine bases will contain an increased concentration of suspended solids. The excavations will be pumped into temporary settlement basins as necessary which will be lined, and which will drain into existing or proposed drainage channels on site. The settlement basins will be constructed in advance of any excavations for the turbine bases.

A wheel washing facility will be provided at the main site entrance. The wheel wash will come with an additional water tank which will be filled regularly. These units will be self-contained and will filter the waste for ease of disposal. Waste will be removed from each unit and from site by a proposed contractor.

Additional silt fencing will be kept on site for the ongoing maintenance of the structures provided. Portaloos will be used to provide toilet facilities for site personnel. Sanitary waste will be removed from site via a licensed waste disposal contractor and will not be discharged on site.

Any diesel or fuel oils stored on site will be bunded to 110 % of the capacity of the storage tank. Such facilities will not be located near any drain or watercourse. Design and installation of fuel tanks will be in accordance with best practice guidelines. Refuelling of plant during construction will be carried out in designated areas within site the site compound 50m away from watercourses, draining to an oil interceptor. A 100m buffer from watercourses shall apply for any refuelling carried out using mobile bowsers. Drip trays and spill kits will be kept available on site. Appropriate containment facilities will be provided to ensure that any spills from the vehicle are contained and removed off site for disposal at an appropriately licensed facility.

Appropriate preventative measures have been detailed within the CEMP to ensure that non-native aquatic/riparian species are not introduced into the site. These measures follow the relevant manual 'The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads' by NRA (2010). While no high threat non-native aquatic invasive species were recorded at the survey sites during the current survey, the potential for the introduction of aquatic invasive species onto the site from other areas remains.

Strict biosecurity measures will be implemented if plant and machinery working in areas with invasive species along the grid route is used at the wind farm site. All machinery shall be disinfected and visually inspected before leaving works areas where invasive species are present.

To reduce the risk of invasive species and pathogen introduction (e.g. Crayfish plague), all equipment intended for use within or in the vicinity of aquatic habitats will be thoroughly checked, cleaned and dried in accordance with best practice as specified in the CIRIA C532, C648 and C741 guidelines below. Furthermore, plant machinery which has worked within riparian corridors or come in to contact with water will be steam-cleaned and dried in advance of works commencement in the Blackwater catchment.

Works will adhere to the guidelines set out in the best practice documents as listed below:

- CIRIA (2001). Control of water pollution from construction sites - Guidance for consultants and contractors (C532). Construction Industry Research and Information Association, London.
- CIRIA (2006). Control of Pollution from Linear Construction Project; Technical Guidance (C648). Construction Industry Research and Information Association, London.
- CIRIA (2015a). Manual on scour at bridges and other hydraulic structures, second edition (C742). Construction Industry Research and Information Association, London.
- CIRIA (2015b). Environmental Good Practice on Site (4th edition) (C741). Construction Industry Research and Information Association, London.
- CIRIA (2019). Culvert, screen and outfall manual (C786). Construction Industry Research and Information Association, London.

- DHPLG (2019). Draft Revised Wind Energy Development Guidelines. Department of Housing, Planning and Local Government. December 2019
- Enterprise Ireland (unknown). Best Practice Guide (BPGCS005) Oil storage guidelines.
- IFI (2016). Guidelines on Protection of Fisheries during Construction Works in and adjacent to waters. Inland Fisheries Ireland, Dublin.
- IFI (2019) Windfarm scoping document (draft). Inland Fisheries Ireland, Dublin.
- IWEA (2012). Best Practice Guidelines for the Irish Wind Energy Industry. Guidance prepared by Fehily Timoney and Company for the Irish Wind Energy Association.
- Kilfeather, P.K. (2007). Maintenance and protection of the Inland Fisheries resource during road construction and improvement works. Requirements of the Southern Regional Fisheries Board. Southern Regional Fisheries Board, Clonmel, Co. Tipperary
- Murphy, D.F. (2004). Requirements for the Protection of Fisheries Habitat During Construction and Development Works at River Sites. Eastern Regional Fisheries Board, Dublin.
- NRA (2008). Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes. National Roads Authority.
- PPG1 - General Guide to Prevention of Pollution (UK Guidance Note);
- PPG5 – Works or Maintenance in or Near Watercourses (UK Guidance Note);
- SNH (2012). Assessing the cumulative impact of onshore wind energy developments. Scottish Natural Heritage, March 2012.
- SNH (2019b). Good Practice during Wind Farm Construction (4th edition). Scottish Natural Heritage.

In addition to the above, all mitigation measures to protect water quality detailed in Chapter 10 Hydrology and Water Quality shall apply.

4.3.3.5.10 Proposed Mitigation Measures for Avifauna

Subject to other environmental concerns (e.g., run-off), the removal of vegetation and scrub as well as trimming of trees to facilitate the proposed development will be undertaken outside of the bird breeding season (March 1st to August 31st inclusive). This will help protect nesting birds.

Where vegetation removal is required outside this period, vegetation will be inspected for nesting birds by a suitably qualified Ecologist. In the event of birds nesting within areas required to be felled, suitable mitigation including implementation of buffer zones and/or seasonal constraints (based on known breeding cycle of species) and nest monitoring will be put in place. Similarly for swallow, the shed within the proposed northern access track footprint will be checked for evidence of re-occupation by swallows and if any are present, a seasonal restriction on demolition will be implemented. It is noted that nest buffer zones required for different bird species can vary widely. Birds which could be encountered during vegetation clearance include small passerines, woodcock and raptors. On a precautionary basis, a minimum buffer of 10m will be implemented around any active small passerine nests. A 500m buffer will be applied for nests of higher sensitivity raptor species such as kestrel, peregrine or merlin if any become established within the ZoI prior to construction. A 200m buffer will be applied in the same category for lower sensitivity species such as sparrowhawk and buzzard. (Goodship and Furness, 2022). A buffer of 250m is specified for woodcock nests.

A re-confirmatory survey (March/April) will be conducted of the proposed infrastructure to assess any evidence of target species activity or occupation of new territories (e.g. in the case of breeding Snipe or Woodcock). Should any nesting locations be recorded, works at these locations will be restricted to outside the breeding season (March 1st to August 31st inclusive) or until chicks are deemed to have fledged (following monitoring). A 500m buffer is required for breeding snipe. A buffer of 250m is specified for woodcock nests.

Grazing whooper swans using the fields near T1-T3 will be monitored prior to and during construction to detect if any disturbance/displacement occurs, and also to investigate whether habituation to construction disturbance occurs. In the event that wintering whooper swan are regularly using areas within or in close proximity to the proposed wind farm prior to construction, or if significant disturbance/displacement occurs (as determined by the ECoW/Ornithologist), a 600m exclusion zone around winter grazing areas will be implemented until wintering whooper swans have left in spring.

Based on the established absence of breeding kingfisher and poor suitability of riverbank soils along the Fear English River for kingfisher nesting, it is unlikely that breeding kingfisher will move into the ZoI prior to construction. A preconstruction kingfisher survey will be undertaken to reconfirm the baseline. In the event that breeding kingfisher did become established in the ZoI prior to construction, a 50-100m (buffer size dependent on occurrence of existing screening features) exclusion zone will be implemented around active kingfisher nests during the kingfisher breeding season (March - August inclusive), with ecological monitoring to confirm the start and end of the exclusion period.

Construction operations will take place during the hours of daylight to minimise disturbances to roosting birds, or active nocturnal bird species. This is in line with best practice recommendations for mitigation measures in regard to birds and wind farms as recommended by statutory bodies such as English Nature and the Royal Society for the Protection of Birds (Drewitt and Langston, 2006). Limited operations such as concrete pours, turbine erection and installation of the grid connection may require night-time operating hours; these works will be supervised by the project ecologist/ECoW.

Toolbox talks will be undertaken with construction staff on disturbance to key species during construction. This will help minimise disturbance.

Where removed or altered, re-instated hedgerows will be planted with native species of native provenance. This will result in habitat enhancement for local species of conservation importance such as yellowhammer. Further information relating to hedgerow planting are included in Sections 8.10.1, 7.3 and 8.12.5 in Chapter 8-1 Biodiversity.

The measures to protect water quality described in Chapter 8-1 Biodiversity and Chapter 10 Hydrology and Water Quality will benefit kingfisher through protection of aquatic habitats and associated aquatic prey resources.

The use of “white lights” on the turbines will not occur as these can attract night flying birds such as migrants, and insects, which in turn can attract bats. Certain turbines will be illuminated with medium intensity fixed red obstacle lights of 2000 candelas where required by the IAA Lighting will be fitted with baffles to ensure that the light is directed skywards and will not be discernible from the ground.

The above measures are in line with best practice recommendations for mitigation measures in regard to birds and wind farms as recommended by statutory bodies such as English Nature and the Royal Society for the Protection of Birds (Drewitt, A. L. and Langston, R. H., 2006).

4.3.3.5.11 Habitat & Species Management Plan (HMP)

A Habitat and Species Management Plan (HSMP) has been prepared for the Proposed Development, as detailed in Section 8.12 in Chapter 8-1 Biodiversity. Within this plan, the following measures are applicable to avifauna;

Revegetation of access track buffers and berms in wooded areas through natural recolonisation and targeted planting will offset the potential effect of wooded habitat loss for woodcock and other species. Within wooded areas, bog woodland bare root whips (60-90cm in height), sourced from native stock and disease free will be planted on selected berms outside bat felling buffers. Whips will be planted at 1m centres with the following mix: 20% downy birch (*Betula pubescens*), 10% holly (*Ilex aquifolium*), 15% rowan (*Sorbus aucuparia*), 20% scots pine (*Pinus sylvestris*), 10% pedunculate oak (*Quercus robus*), 10% sessile oak (*Q. petraea*) and 15% willow (*Salix cinerea*). Rabbit/hare protection will be put in place alongside weed suppressing leaf mulch. Any whips that die will be replaced (during the operational phase).

Berms in open agricultural habitats will be planted with native pollinator-friendly species. This will also provide benefits for foraging birds in the form of seeds and insect prey.

Bird boxes (5 No.) will be placed within the limited treelines within the site. This will help to provide further breeding habitat for birds on the site.

Proposed Mitigation Measures for Water Quality

Under Section 173 of the Fisheries (Consolidation) Act, 1959, it is an offence to 'obstruct the passage of the smolts or fry of salmon, trout, or eels or injure or disturb the spawn or fry of salmon, trout or eels or injure or disturb any spawning bed, bank or shallow where the spawn or fry of salmon, trout or eels may be'.

Under Section 3 of the Local Government (Water Pollution) Act, 1977 (as amended by Sections 3 and 24 of the 1990 Act) it is an offence to cause or permit any polluting matter to enter waters.

Section 171 of the Fisheries (Consolidation) Act 1959 creates the offence of throwing, emptying, permitting or causing to fall onto any waters deleterious matter. Deleterious matter is defined as any substance that is liable to injure fish; to damage their spawning grounds; or the food of any fish; or to injure fish in their value as human food; or to impair the usefulness of the bed and soil of any waters as spawning grounds or other capacity to produce the food of fish.

Under the European Community (Surface Water) Regulations, 2009, it is noted under Part III, Section 33 that 'Failure to achieve good ecological status, or where relevant, good ecological potential or to prevent deterioration in the status of a body of surface water resulting from new modifications or alterations to the physical characteristics of a surface water body, or failure to prevent deterioration of a body of surface water from high status to good status resulting from new sustainable human development activities shall not be a breach of these Regulations when all the following conditions are met:

All practicable steps are taken to mitigate the adverse impact on the status of the body of surface water.

The reasons for those modifications or alterations are specifically set out and explained in the river basin management plan required under Article 13 of the 2003 Regulations and the objectives are reviewed every six years.

The reasons for those modifications or alterations are of overriding public interest and/or the benefits to the environment and to society of achieving the objectives established by Article 28 of these Regulations are outweighed by the benefits of the new modifications or alterations to human health, to the maintenance of human safety or to sustainable development, and

The beneficial objectives served by these modifications or alterations of the water body cannot for reasons of technical feasibility or disproportionate cost be achieved by other means, which are a significantly better environmental option'.

It is therefore imperative that no significant impacts (direct, indirect or cumulative) occur on the streams on the site or the downstream catchment areas during the construction, operation of decommissioning phases of the Proposed Development.

Proposed drainage measures to reduce and protect the receiving waters from the potential impacts during the construction of the proposed development are as outlined in Section 4.3.5. These include measures to prevent runoff erosion from vulnerable areas and consequent sediment release into the nearby watercourses to which the proposed development site discharges.

4.3.3.6 Operational Phase EIAR Mitigation Measures

Mitigation measures outlined in section 10.9.3 and Chapter 10 - Hydrology and Water Quality of the EIAR, will be implemented, in addition to those described in the NIS to minimise and prevent the identified indirect effects on water quality as outlined previously.

4.3.3.6.1 Ecological walkover check - bat felling buffers

An ecological walkover survey covering the bat felling buffers will be undertaken prior to mechanical vegetation clearance to maintain these buffers as tree and scrub-free zones. This survey will ensure any potentially sensitive receptors which may establish in the buffers during the operational phase are detected prior to clearance, allowing significant effects to be avoided via avoidance/timing and other suitable mitigation as required. Species-specific surveys encompassed within the general ecological walkover survey are discussed further where applicable below (Chapter 8.1 Sections 4.3.3.6.2 to 4.3.3.6.6).

4.3.3.6.2 Habitats, Flora & Invasive Species

Mitigation measures outlined in section 10.9.3 and Chapter 10 - Hydrology and Water Quality of this EIAR, will be implemented, in addition to those described in the NIS, to ensure that there will be no contamination of water bodies due to siltation or contaminated run-off during the operational phase.

A post-construction Annex I survey and habitat assessment will be carried out on the intact raised bog adjacent to T9 and T10 to determine the habitat condition and monitor the effectiveness of design/avoidance mitigation measures in preventing drying out of this habitat.

Invasive species will continue to be monitored, and where required, treated within the project area according to the invasive species management plan for as long as they persist within the site. Monitoring will entail site-wide checks, and will also focus specifically on the Rhododendron growth 100m east of Proposed Wind Farm/c. 170m north-east of T9, and checking for invasive species in bat felling buffers prior to periodic mechanical clearance works.

In the event that any invasive species are detected during the operational phase in areas where they could potentially interact with/be spread by operational activities, the procedures and control measures detailed in the ISMP (Appendix 8.1-8) will be followed.

4.3.3.6.3 Mammals

In the event that a new badger sett is discovered during maintenance of bat felling buffers (vegetation trimming), NPWS will be informed and the relevant guidance *Guidelines for the Treatment of Badgers Prior To the Construction of National Road Schemes* (NRA, 2008c) and will be followed.

The bat buffer pre-clearance badger survey shall extend 50m beyond the bat felling buffers.

4.3.3.6.4 Bats

Feathering of Blades

Turbines will operate in a manner which restricts the rotation of the blades as far as is practicably possible below the manufacturer's specified cut-in speed (SNH 2021). This is usually achieved by feathering the blades during low wind speeds; the angle of the blades is rotated to present the slimmest profile possible towards the wind, ensuring they do not rotate or 'idle' when not generating power.

Turbine blades spinning in low wind can kill bats, however bats cannot be killed by feathered blades which are not spinning (Horn et al., 2008). The feathering of turbine blades combined with increased cut-in speeds have been shown to reduce bat fatalities by up to 50% (SNH 2021). As such, the feathering of blades to prevent 'idling' during low wind speeds is proposed for all turbines.

Cut-in Speeds/Curtailment

While bat activity varied by species, no locations had activity for any species higher than low/moderate levels (based on Ecobat median percentile scores).

Therefore, increased cut-in speeds are not required from commencement of operation, but will rather be reserved for implementation where required based on operational monitoring (see Sections 0 and 0).

Post Construction Surveys

Monitoring of bat activity at turbine locations using static detectors will take place for at least three years after construction, providing sufficient data to detect any significant change in bat activity relative to pre-construction levels. It will assess changes in bat activity patterns and the efficacy of mitigation to inform any changes to curtailment requirements.

During years one to three of operation bat activity will be measured during monitoring periods between April and mid-October at each turbine location, in combination with carcass surveys. In addition, wind speed and temperature data will be continuously recorded at the nacelle height of each turbine.

Modern, remotely-operated wind turbines as proposed here allow cut-in speeds to be controlled centrally/automatically, facilitating an operation regime designed to minimise harmful effects to bats.

The feathering of turbine blades combined with increased cut-in speeds have been shown to reduce bat fatalities from 30% and up to 90% (Adams et al., 2021, Arnett et al., 2011, 2013; Baerwald et al., 2009). The most recent of studies showed a 63% decrease in fatalities (Adams et al., 2021).

Operational Curtailment

Monitoring will be carried out for the first three years of operation, and an annual review at the end of each of these years will determine whether increased cut-in speeds should be implemented.

If, following any of the initial three years of post-construction surveys, bat activity increases above the baseline and/or remains consistently high and carcass searches indicate fatalities are occurring (refer below), increased cut-in speeds will be implemented.

Alternatively, if it is found that the results of bat activity surveys and fatality searches reconfirm the level of bat activity at turbine locations remains low or low/moderate then curtailment will not be required.

Bat activity will subsequently be monitored in years 5, 10, 15, 20, 25 and 30 with further review after each monitoring period.

Where post construction acoustic surveys are undertaken, they will utilise full spectrum automatic detectors deployed, as a minimum, for one complete bat activity season.

Acoustic monitoring will be supplemented with thermal imaging cameras etc. to provide more detailed information on bat activity in the vicinity of turbines.

An assessment of static data gathered during operational surveillance will be completed using the online analysis tool Ecobat as recommended by SNH (2021) as a minimum, or other equivalent guidance as dictated by up-to date standards and practices.

If the requirement for curtailment is identified following the initial 3-year monitoring period, the following measures will be implemented:

Increasing the cut-in speed above that set by the manufacturer can reduce the potential for bat/turbine collisions. A study by Arnett et al. (2011) showed a 50% decrease in bat fatality can be achieved by increasing the cut-in speed by 1.5 m/s.

Species with elevated risk of collision (Leisler's bat, soprano and common pipistrelle) in particular could benefit from increasing the cut-in speed of turbines, as dictated on a case-by case basis depending on the activity levels recorded at each turbine.

If required based on operational monitoring results, cut-in speeds should be increased to 5.5 m/s during the bat activity season (April-October) or where temperatures are optimal for bat activity, from 30 minutes prior to sunset and to 30 minutes after sunrise at turbines where surveillance shows high bat activity levels for High and Medium-Risk species and/or if bat carcasses are recorded.

The duration required depends on the level of mitigation required for each individual turbine i.e. a full bat activity season or only spring and autumn (duration will be determined by the first year of surveillance).

Cut-in speed restrictions will be operated according to specific weather conditions:

- When the air temperature is greater than 7°C (as bat activity does not usually occur below this temperature).
- Generally, bat activity peaks at low wind speeds (<5.5m/s). As such, it has been shown that curtailing the operations of wind turbines at low wind speeds can reduce bat mortality dramatically, particularly during late summer and the early autumn months.

Due to the considerable unnecessary down time resulting from the "blanket curtailment" and the advances in smart curtailment a focused curtailment regime is further proposed as an optional means of achieving the level of curtailment indicated as required by operational monitoring.

This will focus on times and dates, corresponding with periods when the highest level of bat activity occur within the Site. This includes the use of the SCADA (Supervisory Control and Data Acquisitions) operating system (or equivalent) to only pause/feather the blades below a specified wind speed and above a specified temperature within specified time periods.

Post-construction surveys will be undertaken for the first three years of operation to confirm if curtailment is required in line with post-construction activity levels. The post construction surveys will be used to update the curtailment regime (blanket curtailment) designed around the values for the key weather parameters and other factors that are known to influence collision risk. This will include all of the following:

- Wind speed in m/s (measured at nacelle height)
- Time after sunset
- Month of the year
- Temperature (ºC)
- Precipitation (mm/hr)

Buffer Zones

The vegetation-free buffer zones around the identified turbines will be managed and maintained during the operational life of the development.

Due to mitigation by design, turbines will be sited at a suitable separation distance from treelines/hedgerows and trees or vegetation will be removed to ensure a woodland-free buffer zone.

The immediate surroundings of individual turbines will be managed and maintained so that they do not attract insects (i.e. the concentration of insects in the wind turbine vicinity should be reduced as much as possible, but not such that insect abundancies affected elsewhere on the site). This should be achieved through physical management of habitats without the use of toxic substances.

The radius of each buffer zone as determined by the height of surrounding vegetation is listed in Table 4-2 above.

It is noted that no trees are present within the T3 buffer, and are also absent from other turbine buffers within agricultural land (apart from existing hedgerows). Currently, no management other than removal of trees within these buffers is required, due to ongoing agricultural management limiting vegetation within these buffers to low-growing grassland or cropland. However, vegetation management encompassing the entire extent of the buffers identified in Table 4-2 will apply in the case that regular grazing or tillage of these buffers ceases, and targeted intervention is required to keep vegetation short.

Monitoring of Mitigation Measures

The success of the implemented mitigation measures for bats on the project will be monitored for a period of three years post construction, with further monitoring in years 5, 10, 15, 20, 25 and 30. Appropriate measures will be taken to enhance prescribed mitigation if and where required. A recommended schedule for monitoring is given in Table 4-3 below.

Bat Fatality Monitoring

Whilst no significant residual effects on bats are predicted, the development could provide an opportunity to gain baseline data on bat/turbine interaction and it is recommended that the scheme be monitored for bat fatalities for the first three years of operation (post construction surveys) and subsequently in years 5, 10, 15, 20, 25 and 30 as part of the additional curtailment monitoring schedule. A comprehensive onsite fatality monitoring programme is to be undertaken following published best practice (e.g. SNH 2021 or equivalent at the time of operation).

The primary components of the mortality programme are outlined below:

1. Carcass removal trials to establish levels of predator removal of possible fatalities. This should be done following best recommended practice and with due cognisance of published effects such as predator swamping, whereby excessive placement of carcasses increases predator presence and consequently skews results. No turbines which are used for carcass removal trials should be used for subsequent fatality monitoring.
2. Turbine searches for fatalities should be undertaken following best practice in terms of search area (focusing on hard standing) and at intervals selected to effectively sample fatality rates as determined by carcass removal trials in (1.) above. [2]
3. A standardised approach with a possible control group and/or variation in search techniques such as straight line transects/ randomly selected spiral transects/ dog searches will be undertaken. This will provide a means of robustly estimating the post construction collision fatality effect (if any).
4. Recorded fatalities should be calibrated against known predator removal rates to provide an estimate of overall fatality rates.

[2] Suitably trained dogs with handlers are significantly more efficient and faster than humans in locating carcasses and should preferably be used to achieve more robust results. Dog searches are, however, resource-demanding and may not always be necessary to identify if a problem exists.

Monitoring schedule

Table 4-3: Monitoring schedule recommended for bat mitigation measures

Mitigation measure	Monitoring required	Description	Duration
Bat boxes / PRFs	Monitor bat use	Bat boxes and PRFs to be placed at/moved to locations removed from wind turbines as determined by project ecologist/ECoW at least 1 season before construction start. These shall be examined by a licensed bat specialist according to NPWS recommendations. Records should be submitted to Bat Conservation Ireland for inclusion in its bat distribution database. Re-site if necessary. Annual cleaning required if well used by bats or if used by birds. Replacement if damaged/lost.	From mounting to 3 years post construction.
Mortality study	Fatality monitoring	Corpse searches beneath turbines to assess the effect of operation on bats.	From initial operation conducted during years 1, 2, 3, 5, 10, 15, 20, 25 and 30 post construction.
Activity monitoring	Bat activity monitoring	Static detector surveys at detector locations during the bat activity season (between April and mid-October). Assessment of activity levels using Ecobat or other currently accepted analysis methods.	From initial operation conducted during years 1, 2, 3 post construction. Additional years to be surveyed if requirement is indicated by fatality monitoring.

Table 4-4: Summary of Operational-phase mitigation measures for bats

Moderate and Moderate-High Level Bat Mitigation Applies to XX Turbines
Operate the wind turbines in a manner that reduces the movement of the blades below the cut-in speed (e.g. by feathering the blades).
Implement a monitoring programme for the first three years of operation to ensure that bat activity is at a low level in vicinity of these turbines. Review monitoring results to determine if further bat mitigation measures are required.
Continue monitoring for 3 years post operation of the wind farm to determine whether a higher cut-in speed of the blades is required. The requirement for the continuation of monitoring across subsequent monitoring years (5, 10, 15, 20, 25 & 30) will be reviewed in consultation with NPWS.
Undertake a carcass search for 3 years post operation of the wind farm to determine whether a higher cut-in speed of the blades is required. Repeat searches in years 5, 10, 15, 20, 25 & 30.
Clear and maintain buffer zone free of woodland/trees within 50m of turbine blade tips.
Maintain buffer zones around wind turbines in a manner that does not attract insects.

4.3.3.6.5 Other Species

Maintenance of bat felling buffers (vegetation trimming), will be undertaken outside the bird breeding season (March- August inclusive). This measure will also avoid potential disturbance to common lizard and bee species during breeding periods.

The pre-clearance bat buffer ecological survey shall include a marsh fritillary habitat appraisal, followed if necessary by a larval web survey. This will ensure that suitable mitigation and avoidance measures can be implemented in the event that marsh fritillary establish in the bat felling buffers during the operational phase.

There is potential for an indirect effect on frogs or smooth newt due to water quality changes from erosion and sediment. Periodic inspections of sediment and erosion control measures will be undertaken until the risk of erosion or siltation has declined following the successful establishment of vegetation during the operational phase.

4.3.3.6.6 Aquatic Ecology

The operational wind farm will have a negligible effect on aquatic ecological receptors and fisheries, as there are no further potential effects on surface water run-off or watercourses within the site. During the operation phase, oils will be required for cooling the transformers giving rise to the potential for oil spills within the site. However, the transformers will be bunded to over 110 % of the volume of oil within them.

It is not envisaged that maintenance will involve any significant effects on the hydrological regime of the area. Periodic inspections of sediment and erosion control measures will be undertaken until the risk of erosion or siltation has declined following the successful establishment of vegetation during the operational phase.

Access to the site will be controlled using a gate to prevent harmful activities such as illegal dumping, unlicensed timber or peat extraction, or recreational use of off road vehicles.

4.3.3.6.7 Avifauna

A post construction monitoring programme is to be implemented at the proposed wind farm in order to confirm the efficacy of the mitigation measures; the results of this will be submitted annually to the competent authority and NPWS. Published guidance on assessing the impacts of wind farms on birds from English Nature and the Royal Society for the protection of birds recommends the implementation of an agreed post development monitoring programme as a best practice mitigation measure (Drewitt and Langston, 2006).

In addition, published recommendations on swans and wind farms (Rees, 2012) suggests that systematic post construction monitoring; adapted to quantify collision, barrier, and displacement, be conducted over a period of sufficient duration to allow for annual variation or in combination effects. The following individual components are proposed:

5. Fatality Monitoring (to be conducted during years 1, 2, 3, 5, 10 and 15 post construction)- A comprehensive fatality monitoring programme is to be undertaken following published best practice (Shawn et al., 2010; Fijn et al., 2012 and Grunkorn, 2011); the primary components are as follows:
    a) Initial carcass removal trials to establish levels of predator removal of possible fatalities.
    b) This is to be done following best recommended practice and with due cognisance to published effects such as predator swamping, whereby excessive placement of carcasses increases predator presence and consequently skews results (Shawn et al., 2010).
    c) Turbine searches for fatalities are to be undertaken following best practice (Fijn et al., 2012 and Grunkorn, 2011) in terms of search area (minimum radius hub height) and at intervals selected to effectively sample fatality rates based on carcass removal rates (e.g. 1 per month). To be conducted during years 1, 2, 3, 5, 10 and 15 post construction to allow for annual variation and cumulative effects. Dependant on results further monitoring to be agreed with NPWS.
    d) A standardised approach with a possible control group and/or variation in search techniques such as straight line transects/ randomly selected spiral transects/ dog searches will be undertaken. This will provide a means of robustly estimating the post construction collision fatality impact (if any).
    e) Recorded fatalities to be calibrated against known predator removal rates to provide an estimate of overall fatality rates.

Reports will be submitted to the competent authority and NPWS following each round of surveys.

6. Flight Activity Survey (to be conducted during years 1, 2, 3, 5, 10 and 15 post construction) - A flight activity survey is to be undertaken during the summer and winter months to include both vantage point and hinterland surveys as Per SNH (2017) guidance:
    a) Record any barrier effect i.e. the degree of avoidance exhibited by species approaching or within the wind farm (Drewitt and Langston, 2006). Target species to be all raptors and owls, all wild goose and duck species, all swan species, and all wader species.
    b) Record changes in flight heights of key receptors post construction.

Reports will be submitted to the competent authority and NPWS following each round of surveys. This survey is to be conducted during years 1, 2, 3, 5, 10 and 15 post construction to allow for annual variation and cumulative effects. Dependant on results further monitoring requirements will be agreed with NPWS.

7. Monthly Wildfowl Census (to be conducted during years 1, 2, 3, 5, 10 and 15 post construction). A monthly wildfowl census, following the methods utilised for the baseline survey, is to be repeated on a monthly basis during the winter period in the monitoring years listed above. This aims to:
   c) Assess displacement levels (if any) of wildfowl such as swans post construction
   d) Assess overall habitat usage changes within the vicinity of the Proposed Wind Farm post construction.

This survey is to be conducted during years 1, 2, 3, 5, 10 and 15 post construction to allow for annual variation and cumulative effects. Dependant on results further monitoring requirements will be agreed with NPWS. Reports will be submitted to the competent authority and NPWS following each round of surveys.

8. Breeding Bird Survey (to be conducted during years 1, 2, 3, 5, 10 and 15 post construction). A breeding bird survey (Common Bird Census), following methods used in the baseline survey to be repeated in each monitoring year listed above between early April to early July. This aims to:
   a) Assess any displacement effects such as those recorded on breeding birds. Overall density of breeding birds to be annually recorded.

9. Breeding Wader Survey (to be conducted during years 1, 2, 3, 5, 10 and 15 post construction). A breeding bird survey, following methods used in the baseline survey to be repeated in each monitoring year listed above during April-May-June.
10. Breeding Woodcock Survey (to be conducted during years 1, 2, 3, 5, 10 and 15 post construction). A breeding bird survey, following methods used in the baseline survey to be repeated in each monitoring year listed above during April-May-June.

The above surveys are to be conducted during years 1, 2, 3, 5, 10 and 15 post construction to allow for annual variation and cumulative effects. Dependant on results further monitoring requirements will be agreed with NPWS.

4.3.3.6.8 **Designated Nature conservation sites**

Implement mitigation measures outlined in Chapter 9 'Land, Soils & Geology', and Chapter 10 'Hydrology and Water Quality' of the EIAR, in addition to the NIS to minimise and prevent the identified indirect impacts on water quality as outlined previously.

4.3.3.7 Decommissioning EIAR Stage Mitigation Measures

4.3.3.7.1 Designated Sites

The same mitigation measures will apply for the decommissioning phase as for the construction phase.

4.3.3.7.2 Habitats

Following removal of the turbines, the bat felling buffers will be allowed to succeed to woodland. Pending landowner agreement, targeted removal of non-native species (e.g. conifers) (if they are overly dominant) will be undertaken to favour the establishment of semi-natural woodland. A small proportion of conifers can be retained to maintain a food source for red squirrel.

An appropriately qualified and experienced ecologist will review and, where required, amend the proposed Habitat and Species Management Plan and consult with NPWS to seek their views on the implementation of the proposed measures.

Any re-instated habitats such as Hedgerows will utilise native species suitable for the area.

4.3.3.7.3 Terrestrial Mammals

Similar mitigation measures will apply for the decommissioning phase as for the construction phase.

4.3.3.7.4 Bats

The same mitigation measures will apply for the decommissioning phase as for the construction phase.

4.3.3.7.5 Other Taxa

The same mitigation measures will apply for the decommissioning phase as for the construction phase.

4.3.3.7.6 Aquatic Ecology

In the event of decommissioning of the proposed wind farm, activities will take place in a similar fashion to the construction phase.

Due to the proposed retention of the roads, hard standings and electrical infrastructure, potential for effects on water quality and aquatic ecology will be reduced in comparison to construction. The only potential sources of siltation will be the areas of soil used to cover the turbine foundations. The mitigation measures outlined above for the construction phase will also be implemented as relevant for the protection of aquatic ecological interests during the decommissioning phase.

4.3.3.7.7 Avifauna

The same mitigation measures will apply for the decommissioning phase as for the construction phase.

Decommissioning operations will take place during the hours of daylight to minimise disturbances to roosting birds, or active nocturnal bird species. This in line with best practice recommendations for mitigation measures in regard to birds and wind farms as recommended by statutory bodies such as English Nature and the Royal Society for the Protection of Birds (Drewitt, A. L. & Langston, R. H., 2006). Turbines components will be broken up onsite prior to removal, and as such vegetation trimming requirements to facilitate turbine removal will be minimal (reduced in comparison to construction stage) or not required.

Toolbox talks shall be held with construction staff on disturbance to key species during decommissioning. This will help minimise disturbance. This in line with best practice recommendations for mitigation measures in regard to birds and wind farms as recommended by statutory bodies such as English Nature and the Royal Society for the Protection of Birds (Drewitt, A. L. & Langston, R. H., 2006).

Any re-instated habitats will include native species where possible to enhance diversity of birds. This in line with best practice recommendations for mitigation measures in regard to birds and wind farms as recommended by statutory bodies such as English Nature and the Royal Society for the Protection of Birds (Drewitt, A. L. & Langston, R. H., 2006).

4.3.3.8 Habitat & Species Management Plan

The Proposed Wind Farm seeks to further enhance biodiversity (separate from mitigation) where opportunities present themselves.

Drain Blocking

The perimeter drain running to the south-west of T10 located within the Dunfierth Coillte Biodiversity area will be blocked in order to further increase water retention within the intact raised bog. Drainage of a bog to facilitate peat harvesting lowers water levels, killing the peat forming community and drying up bog pools.

The installation of dams will be undertaken by an experienced ecologist. Drains will be dammed using plastic drain piling which is an alternative to peat dams. Plastic drain piling is chosen over peat as peat may not be freely available within the site. Plastic drain piling is light, sturdy, easy to transport and impermeable and has been used extensively used in Irish Peatland Conservation Council's (IPCC) Lodge Bog Nature Reserve, Co. Kildare and by Coillte[3].

Plastic pilling sheets will adhere to that used by the IPCC; 3m lengths, 30cm wide with interlocking tongue and groove system and can be installed using a mallet (see Plate 4-1 below for more information).

Plate 4-1: Plastic pilling being installed within IPCC bog

Sourced from Irish Peatland Conservation Council (IPCC)

Planting of berms

As part of the construction phase, excavated peat will be reused to construct berms. In order to further enhance site biodiversity, berms located in wooded areas outside bat felling buffers will be planted with native bog woodland whips. These planted berms will add to the existing linear habitats in the area and will provide further foraging, cover and commuting habitat for mammals and other fauna.

[3] Irish Peatland Conservation website; Restoration of Drained Peatlands: http://www.ipcc.ie/advice/peatland-management-diy-tool-kit/restoration-of-drained-peatlands/ Website visited November 2018.

Within wooded areas, bog woodland bare root whips (60-90cm in height), sourced from native stock and disease free will be planted on selected berms outside bat felling buffers. Whips will be planted at 1m centres with the following mix: 20% downy birch (*Betula pubescens*), 10% holly (*Ilex aquifolium*), 15% rowan (*Sorbus aucuparia*), 20% scots pine (*Pinus sylvestris*), 10% pedunculate oak (*Quercus robus*), 10% sessile oak (*Q. petraea*) and 15% willow (*Salix cinerea*). Rabbit/hare protection will be put in place alongside weed suppressing leaf mulch. Any whips that die will be replaced (during the operational phase).

Berms in open agricultural habitats will be planted with native pollinator-friendly species.

Bee Banks

Bee banks will be incorporated within the proposed berms. These will be created and maintained by periodic scraping of vegetation from sections of the berms facing access tracks.

It is important to avoid heavily compacting bee banks with machinery. The road-facing sections of banks will be required to be kept clear of vegetation using mechanical means only. This can be carried out in winter as required (frequency depends on rate of re-vegetation) by scraping away vegetation.

Bird and bat boxes

Bird boxes (5 No.) will be placed within the limited treelines within the site. This will help to provide further breeding habitat for birds on the site.

Bat boxes (5 No.) will be placed in marginal areas with minimal connectivity to the Proposed Wind Farm. This will help to provide further roosting for bats while reducing ready-made commuting and foraging routes leading towards the turbine locations via the access track network. See Appendix 8.1-4 of the EIAR for details.

Within selected areas, bat boxes (see Plate 4-2) will be installed in suitable locations selected by an experienced ecologist.

Plate 4-2: Example of a Bat Box

Source: Paul van Hoof

Within selected treelines, kestrel (no. 2) and barn owl (no. 3) bird boxes (see Plate 4-3 and Plate 4-4) will be installed in suitable locations selected by an experienced ecologist. In the event that the selected treelines are not appropriate for bird box installation, trees within hedgerows where appropriate will be selected and bird boxes installed by an experienced ecologist.

(Source: RSPB)

Plate 4-3: Example of a Kestrel Box

(Source RSPB)

Plate 4-4: Example of a Barn Owl Box

Removal of non-native trees from Raised Bog/Scrub Mosaic

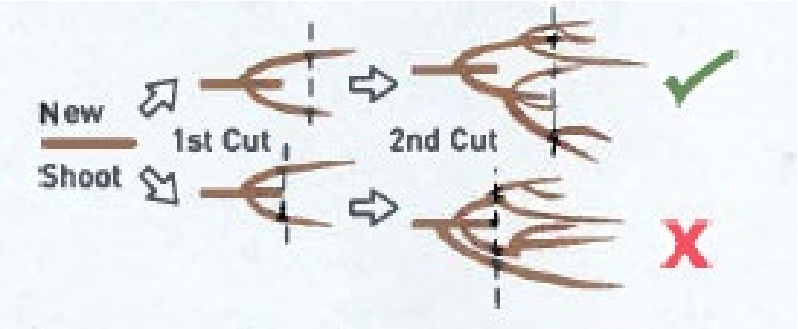
The clearance of the bat felling buffer for T8 will have the effect of enhancing this habitat mosaic by removing tree and scrub including non-native species which are colonising this area of drained degraded raised bog. Removal of these trees, along with periodic maintenance of the felling buffer will return this area to a more semi-natural state.

Enhancement of site hedgerows

In order to enhance hedgerows for biodiversity it is important to maintain hedgerows appropriately; allowing them to become tall and bulky so as to provide shelter and foraging habitat for wildlife. It is also important to fill gaps as they weaken the hedgerows role as wildlife corridors especially for bats.

Where practical, gaps in hedgerows will be filled via laying which is a method of rejuvenating hedgerows. Laying involves cutting hedgerow stems partly through near ground level and bending the stem to the required position to fill a gap. New growth then is produced from the cut which thickens the hedge base and rejuvenates it. Where gaps are too large and to enhance the diversity of the hedgerow, native seed and fruit bearing whip species will be planted.

Site hedgerows will also be allowed to grow bulky where practical; optimum hedgerow dimensions are 4-5m tall x 2-3m wide. The hedgerow will be cut every three to four years in rotation so that some hedgerows are left undisturbed. Cutting equipment used will be sharp so as not to shatter or fray the hedge. Shattering and fraying allows for disease to enter plants and can lead to decay and weaken the vigour of the hedgerow. When the hedgerow is cut, stems will be cut a little above the last cut (see Plate 4-5) as cutting back to the exact same point depletes the energy of the hedgerow and forms a build-up of scar tissue which discourages new growth.



Source:Teagasc

Plate 4-5: Hedgerow level of cut

Pine Marten Den Boxes

Den boxes are used to provide artificial breeding sites for pine martens, in areas where there is an absence of natural tree cavities. Five (5 No.) den boxes will be installed within the conifer plantation at the site.

(Source: NHBS)

Plate 4-6: Example of a Pine Marten Den Box

Insect Hotels

Insect hotels shall be installed at 6 locations within the site. The insect hotels will be made from recycled materials such as pallets, bamboo, old carpet, wire mesh (see Plate 4-7 for example). Each hotel will consist of several different sections that provide insects with nesting facilities – particularly during winter, offering shelter or refuge for many types of insects. Insect hotels are used as nest sites by insects including solitary bees and solitary wasps. These insects drag prey to the nest where an egg is deposited. Sections of these hotels will be specifically designed to allow the insects to hibernate, notable examples include ladybirds and butterflies. This shall also provide additional habitat for the Barbut's Cuckoo Bee.

(Source: www.bbcwildlife.org.uk)

Plate 4-7: Example of an Insect Hotel

Lizard Refuges

Artificial lizard refuges, for basking, shall be installed at four locations within the site. Examples of such refuges include corrugated iron sheets, carpet tiles, planks of wood, roofing felt or dark coloured mats. As lizards are cold-blooded, the dark coloured refuges will attract them because it soaks up the heat and it will be warmer than the surrounding ground.

(Source: ebay)

Plate 4-8: Example of a lizard basking platform

Refugia piles/ hibernacula

These provide sheltering locations for a wide range of wildlife; including reptiles, amphibians, small mammals and invertebrates. Refugia piles are produced by piling natural materials; such as logs, sticks and leaves; that can be supported by additional materials such as rubble and bricks to form a structure with many cracks and crevices for sheltering. Hibernacula are produced in a similar way, but often require setting into the ground in a shallow pit and topping with soil to enclose the structure and creating a more stable microclimate suitable for hibernating species. These refugia piles will also offer potential habitat for the larva of the micromoth *Nemapogon koenigi* which is reported to feed on fungus, especially bracket fungus, as well as on decaying wood, especially on birch.

These structures will be installed near hedgerows and in areas of woodland within the site, where they are less likely to be disturbed.

Plate 4-9: Refugia Piles

Retention of felled birch logs

Birch trees and logs felled during site clearance will be retained across the proposed development site in the form of log piles to provide a food source for the rare Micromoth *Nemapogon koenigi*, which has been reported to utilise rotting birch wood as a larval food source.

4.3.3.9 NIS Mitigation Measures

With regard to the proposed development, the following measures were undertaken to reduce impacts on designated sites through avoidance and design:

- The hard-standing areas of the wind farm have been kept to the minimum necessary, including all site clearance works to minimise land take of habitats and flora.
- Larger turbines have been utilised to minimise the number of turbines, reducing the total rotor envelope (less turbines) and footprint of the proposed development.
- Site design and layout deliberately avoided direct impacts on designated sites.
- All cabling with the exception of the locations of the high voltage line loop in is to be placed underground; this significantly reduces collision risk to birds over the lifetime of the wind farm and is in line with best practice recommendations for mitigation measures in regard to birds and wind farms as recommended by statutory bodies such as English Nature and the Royal Society for the Protection of Birds (Drewitt and Langston, 2006).

- Care has been taken to ensure that sufficient buffers are in place between proposed development infrastructure and hydrological features such as rivers, lakes and streams. Access roads were the exception to the rule in that river crossings will have to take place. However, where possible, existing crossings have been utilised. Clear span brides are to be used at the three stream crossing points on site to reduce the potential impact to the stream beds and to avoid instream works (foundation will be located 2.5m from the river edge).
- Any works in or around watercourses will adhere to best practice as per NRA and IFI guidance for works potentially affecting watercourses.
- The grid connection route has been selected with cognisance to ecological features. The cable route will utilise private agricultural grassland, and areas of forestry plantation, thereby minimising land take of potentially sensitive habitats.
- Floating roads will be utilised to minimise impact on the peat, particularly peat hydrology. As there is no excavation required for floating roads, no peat arisings are generated.
- It is proposed to construct clear span bridges at the 3 no. watercourse crossings required within the Proposed Development site to minimise the environmental impacts and avoid any instream works.
- So as not to interfere in any way with the bed or bank of the watercourse, bridge foundations will be designed and positioned at least 2.5 m from the river bank.

Further mitigation measures prescribed to reduce and/or avoid the potential for the proposed works to have an adverse effect on the integrity of the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA are prescribed hereunder.

The NIS mitigation measures are detailed in Table 4-5.

Table 4-5: NIS Mitigation Measures

No.	Mitigation Measure	How Measure Will Avoid/Reduce Adverse Effects	Implementation of Mitigation Measure and Level of Success	Monitoring Scheme to Prevent Mitigation Failure
MITIGATION MEASURES TO BE IMPLEMENTED PRIOR TO CONSTRUCTION (AND DECOMMISIONING)				
1	Adherence to the mitigation measures and methodologies specified in the Construction Environmental Management Plan (CEMP) (Appendix 2)	This measure will ensure the mitigation, methodologies and procedures prescribed for the prosed development are implemented correctly at construction stage.	Mitigation measure will be implemented in full by the Developer. High probability of success.	The developer will ensure the CEMP is provided to the contractor. The ECoW will monitor implementation of the CEMP to ensure all measures are carried out correctly and effectively.
2	A preconstruction otter survey will be completed prior to construction.	Reconfirm the baseline conditions relating to otter, informing avoidance and/or implementation of mitigation measures as necessary. Monitoring of all holts located within 150m of works will be undertaken to reconfirm their status prior to construction.	A suitably qualified ecologist will undertake surveys and holt monitoring. The ecologist shall report their findings, in addition to coordinating and communicating with the developer to keep them informed of conditions onsite. High probability of success.	The developer will ensure these surveys are completed prior to construction. The ECoW will confirm these surveys have been completed as a prerequisite for initiation of construction works.
3	Preconstruction ornithological surveys shall be carried out during the winter season to record the presence of whooper swan within the site. In the event that whooper swan is recorded as roosting within the site an exclusion zone for works within 500m of a winter roost shall be maintained for the winter period (Oct - the end of March).	Prevent disturbance of roosting whooper swans if present.	A suitably qualified ecologist will undertake surveys. The ecologist shall report their findings, in addition to coordinating and communicating with the developer to keep them informed of conditions onsite. High probability of success.	The developer will ensure these surveys are completed prior to construction. The ECoW will confirm these surveys have been completed as a prerequisite for initiation of construction works.

No.	Mitigation Measure	How Measure Will Avoid/Reduce Adverse Effects	Implementation of Mitigation Measure and Level of Success	Monitoring Scheme to Prevent Mitigation Failure
4	An invasive species survey will be carried out to confirm the baseline prior to treatment measures and determine the specific volumes and extents of invasive species material requiring treatment.	This measure will provide the detailed information and site familiarisation required by the invasive species contractor to implement the ISMP prior to construction.	A suitably qualified ecologist or invasive species contractor will undertake the surveys and holt monitoring. The ecologist/invasive species contractor shall report their findings, in addition to coordinating and communicating with the developer to keep them informed of conditions onsite. High probability of success.	The developer will ensure these surveys are completed prior to construction. The ECoW will confirm these surveys have been completed as a prerequisite for initiation of construction works.
5	A suitably qualified Ecological Clerk of Works (ECoW) will be appointed to supervise works, undertake monitoring and reporting as required, and carry out water sampling. The ECoW will have full stop-works authority at all times to ensure immediate action can be taken in the event of mitigation failure.	Ensure the effective operation and maintenance of drainage and other mitigation measures during the construction process; supervise works in sensitive areas; undertake water sampling to monitor water quality in the receiving environment during construction.	An Ecological Clerk of Works (ECoW) will be engaged prior to invasive species management and for the duration of construction. All mitigation will be implemented in full. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.
6	Invasive species management shall be undertaken by a suitably qualitied contractor in accordance with the invasive species management plan (ISMP) (Appendix 9). This shall include as required the control and removal of invasive species from the works area and adjacent areas, in addition to any measures required to	Remove invasive species from the area of proposed works to allow works to proceed without the risk of causing or accelerating the spread of invasive species to European sites.	The ECoW shall supervise and inspect invasive species management activities, ensuring adherence to the ISMP and protection of sensitive ecological receptors. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP.

No.	Mitigation Measure	How Measure Will Avoid/Reduce Adverse Effects	Implementation of Mitigation Measure and Level of Success	Monitoring Scheme to Prevent Mitigation Failure
	prevent re-infestation prior to and during construction. Cordons and signage will be erected to highlight areas which have been treated, in order to facilitate ongoing monitoring and to aid in implementation of any additional restrictions required for these areas during construction. Disposal of any plant material arising from invasive species management will be disposed of in accordance with the ISMP and in a manner which prevents further spread. Any Schedule III material proposed to be disposed of site will only be transported and disposed of under the required licenses.			Regular reporting to developer and contractor as per each management plan.
7	A further invasive species survey/check covering treated areas will be completed prior to construction to reconfirm if control measures need to be reapplied.	Confirm that invasive species have been removed from all works areas prior to construction.	The ECoW or a suitably qualified ecologist under their supervision shall carry out the survey and report their findings, in addition to coordinating and communicating with the developer/construction contractor to keep them informed of conditions onsite. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.

No.	Mitigation Measure	How Measure Will Avoid/Reduce Adverse Effects	Implementation of Mitigation Measure and Level of Success	Monitoring Scheme to Prevent Mitigation Failure
8	The ECoW will establish contact with IFI & NPWS staff, and facilitate any site inspections they wish to carry out.	Facilitate site access and communication with key stakeholders, and provide additional oversight of mitigation implementation.	ECoW will open lines of communication upon appointment. High probability of success.	ECoW to provide reports of communication and/or site visit findings to update the developer and contractor of input from key stakeholders.
9	As part of a detailed water quality monitoring programme, turbidity meters will be installed prior to construction at five locations within the watercourses draining the site. Levels of turbidity will be monitored pre-construction (post planning) to determine existing levels in the water bodies. These levels will be used to set trigger levels for each location. Should these trigger levels be exceeded during construction, the source of the turbidity will be identified, and immediate action will be taken to identify, contain and eliminate siltation/pollution at the source. See Figure 4-3 for more information.	This measure will reduce the risk of sediment runoff or pollutants reaching the waterways within the catchment of the proposed development site. This in turn will avoid adverse impacts on the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA downstream.	A suitably qualified person will be appointed by the developer to ensure the effective operation and maintenance of drainage and other mitigation measures during the construction process. High probability of success.	Mitigation measures will be implemented by the developer through the mechanism of its contract with the Contractor. All required mitigation measures will be included as a contractual obligation on the contractor, in combination with competent supervisory staff overseeing the works.
10	The ECoW will establish representative water quality monitoring points up and downstream and undertake baseline physico-chemical water quality sampling.	This will define monitoring locations and establish baseline conditions for construction phase monitoring.	Mitigation measure will be implemented in full by the Developer. High probability of success.	This measure will be a prerequisite to be signed off on by the Developer prior to initiation of construction.

No.	Mitigation Measure	How Measure Will Avoid/Reduce Adverse Effects	Implementation of Mitigation Measure and Level of Success	Monitoring Scheme to Prevent Mitigation Failure
11	Baseline Q sampling will be completed at suitable representative water quality monitoring points up and downstream.	This will establish a baseline for further periodic monitoring during construction. The use of Q sampling is included to detect any potential longer-term changes to water quality which may not be evident from physico-chemical water quality sampling.	Mitigation measure will be implemented in full by the Developer. High probability of success.	This measure will be a prerequisite to be signed off on by the Developer and ECoW prior to initiation of construction.
12	A suitably qualified Environmental Manager will be engaged to ensure successful implementation of all mitigation measures for water control and management, and to oversee the day-to-day implementation of mitigation measures onsite.	A suitably qualified Environmental Manager (competent in the implementation and management of environmental mitigation measures for construction sites) will be appointed to ensure the effective operation and maintenance of drainage and other mitigation measures associated with water control and management during the construction process. The operations management of the proposed development will include regular monitoring of the drainage system and maintenance in line with all management plans within the CEMP (Appendix 2). The Environmental Manager will be awarded the authority to stop construction activity if there is potential for adverse effects to water control and/or management.	An environmental manager will be engaged by the Developer through the Contractor appointed to construct the proposed development . High probability of success.	The Environmental Manager in co-operation with the ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP ensuring successful implementation. Regular reporting to developer and contractor as per each management plan.

No.	Mitigation Measure	How Measure Will Avoid/Reduce Adverse Effects	Implementation of Mitigation Measure and Level of Success	Monitoring Scheme to Prevent Mitigation Failure
13	Prior to vegetation clearance, secure (dug in) double silt fencing and check dams will be installed in or around any drains which could receive runoff or where surface flows may occur during vegetation clearance and subsequent construction, and will remain in place subject to monitoring and maintenance until revegetation is complete The ECoW will survey the site and specify as required where these silt arrest measures are to be placed, and will supervise their installation.	Prevent the escape of silt to European sites via drains or overland flow during vegetation clearance.	Mitigation measure will be implemented in full by the Environmental Manager, subject to supervision and sign-off by the ECoW. High probability of success.	This measure will be a prerequisite to be signed off on by the Developer and ECoW prior to initiation of construction.
14	The ECoW will conduct pre-clearance checks and supervise vegetation clearance. In the event that a new holt is discovered during vegetation clearance, works will cease, applicable guidance will be followed and NPWS will be notified.	Ensure clearance is carried out in accordance with ecological requirements and avoid disturbance to areas outside the construction zone and avoid activities which risk causing indirect effects (e.g. excessive soil disturbance and siltation). Ecological supervision is also required in case sensitive features such as holts are discovered in densely vegetated areas during clearance works.	Mitigation measure will be implemented in full by the by the ECoW. High probability of success.	This measure will be a prerequisite to be signed off on by the Developer and ECoW prior to initiation of construction.
15	Toolbox Talks Toolbox talks will be undertaken with construction staff on the sensitivity of the receiving environment, central role of	Toolbox talks will ensure all staff working on site are aware of mitigation procedures and potential hazards and will be able to comply with measures.	Toolbox talks will be provided to all staff upon induction and at site meetings thereafter. High probability of success.	The ECoW, Environmental Manager and Project Manager will deliver talks as required.

No.	Mitigation Measure	How Measure Will Avoid/Reduce Adverse Effects	Implementation of Mitigation Measure and Level of Success	Monitoring Scheme to Prevent Mitigation Failure
	ecological supervision, and implementation and maintenance of mitigation measures.			
MITIGATION MEASURES TO BE IMPLEMENTED DURING CONSTRUCTION				
16	Monitoring of construction activities and mitigation measures by ECoW.	The ECoW will carry out weekly inspections of the site to ensure mitigation measures are functioning as intended. In addition to weekly inspections, the ECoW will attend the site as required for the following: -Supervise construction of bridges to ensure potential effects on water quality are minimised.	The ECoW in conjunction with the developer will ensure that the contractor implements all mitigation measures in full. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.
17	Water quality monitoring	Physico-chemical water quality monitoring will be undertaken on a weekly basis during the site clearance and earthworks stage of the construction period. Following site clearance and earthworks stage of the construction period, sampling will be taken on a monthly basis for the remainder of the construction period.	The ECoW will ensure that this measure is carried out in full and report their findings, in addition to coordinating and communicating with the developer/construction contractor to keep them informed of conditions onsite. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.

No.	Mitigation Measure	How Measure Will Avoid/Reduce Adverse Effects	Implementation of Mitigation Measure and Level of Success	Monitoring Scheme to Prevent Mitigation Failure
18	Q Sampling/Biological water quality sampling	Biological water sampling will be carried out during the site clearance and earthworks stage of the construction period on a monthly basis during the construction phase. Following site clearance and earthworks stage of the construction period, samples will be taken on a quarterly basis, until full re-vegetation has occurred or unless otherwise directed by the planning authority or IFI.	The ECoW will ensure that this measure is carried out in full and report their findings, in addition to coordinating and communicating with the developer/construction contractor to keep them informed of conditions onsite. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.
19	Weekly reports detailing the results of water sampling and operation of on-site mitigation measures will be sent to all stakeholders including the client, contractor and (if requested) IFI and NPWS.	Allow any potential water quality or general mitigation issues to be flagged to determine remedial action.	The ECoW will ensure that this measure is carried out in full to facilitate coordination and communication with the developer/construction contractor. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.
20	The ECoW will establish contact with IFI & NPWS staff, and facilitate any site inspections they wish to carry out.	Maintain communication with IFI & NPWS, facilitate site inspections.	The ECoW will ensure that this measure is carried out in full to facilitate communication with these stakeholders. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP.

No.	Mitigation Measure	How Measure Will Avoid/Reduce Adverse Effects	Implementation of Mitigation Measure and Level of Success	Monitoring Scheme to Prevent Mitigation Failure
				Regular reporting to developer and contractor as per each management plan.
21	Existing silt fencing and check dams will be inspected on a daily basis and maintained/repaired as required. Any additional sediment control measures identified by the site manager and/or ECoW during construction will be installed as required as works progress across the site. Additional silt fencing will be kept on site in case of an emergency break out of silt laden run-off and for repairs. All silt protections will remain in place subject to monitoring and maintenance until revegetation is complete.	Prevent the escape of silt to European sites via drains or overland flow during construction.	Mitigation measure will be implemented in full by the Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.
22	Where access tracks pass close to drainage ditches, double silt fencing will be used to protect these features by retaining silt runoff within the access corridor.	Prevent the escape of silt to the river network via drains or overland flow during construction.	Mitigation measure will be implemented in full by the Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.

No.	Mitigation Measure	How Measure Will Avoid/Reduce Adverse Effects	Implementation of Mitigation Measure and Level of Success	Monitoring Scheme to Prevent Mitigation Failure
23	Weather forecasts will be reviewed daily, and earthworks will not be undertaken during periods of heavy rainfall (>10mm/hour). A regular review of weather forecasts of heavy rainfall is required.	This measure will minimise the generation of suspended solids, dust and any other contaminant mobilisation which may be washed towards sensitive receptors via surface runoff.	Mitigation measure will be implemented in full by the Environmental Manager. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.
24	Drains and rivers receiving runoff from the proposed development and outfalls will be visually inspected on a daily basis. Any indication of elevated sediment levels, pollution, or evidence of defective sediment control measures will trigger remedial measures, and if required, works will cease until all issues have been resolved.	This measure will monitor the effectiveness of mitigation measures to protect water quality, by ensuring any changes in water quality in the receiving environment which could potentially indicate requirement for remedial action are detected.	Mitigation measure will be implemented in full by the Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.
25	All access tracks will be capped as soon as possible with material with low content of fines.	Prevent silt generation arising from vehicular disturbance of soil, ensure track capping material does not act as a source of sediment.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP.

No.	Mitigation Measure	How Measure Will Avoid/Reduce Adverse Effects	Implementation of Mitigation Measure and Level of Success	Monitoring Scheme to Prevent Mitigation Failure
				Regular reporting to developer and contractor as per each management plan.
26	Stilling ponds will be put in place in advance as construction progresses across the site.	The stilling ponds will have a diffuse outflow and will mitigate any increase in run-off. This will prevent reaching the waterways within the catchment of the proposed development site. This in turn will avoid adverse impacts on the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA downstream.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP.
27	The site drainage has been designed to complement existing overland flow and existing bog, agricultural and forestry drainage. A three-stage treatment train (swale – stilling pond – diffuse outflow) is proposed to retain and treat the discharges from hard surface areas.	This measure will reduce the risk of sediment runoff or pollutants reaching the waterways within the catchment of the proposed development site. This in turn will avoid adverse impacts on the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA downstream.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	Regular reporting to developer and contractor as per each management plan.
28	The increase in the rate of run-off along the route of the site access roads and hard-standing areas will be mitigated by the proposed drainage system which includes the provision of stilling ponds to reduce the	Reduce the rate of runoff from hard surfaces, reduce concentration of suspended solids in collected runoff. This will limit silt/contaminant laden runoff reaching the waterways	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any	Regular reporting to developer and contractor as per each management plan.

No.	Mitigation Measure	How Measure Will Avoid/Reduce Adverse Effects	Implementation of Mitigation Measure and Level of Success	Monitoring Scheme to Prevent Mitigation Failure
	concentration of suspended solids in the run-off from these areas, and the addition of silt fencing where deemed necessary. Drains around hard-standing areas will be shallow to minimise the disturbance to sub-soils. Cross-drains of 450mm diameter will be provided to prevent a risk of clogging for crossings conveying flows from bog drains, agricultural drains and forestry drains across the access roads.	within the catchment of the proposed development site. This in turn will avoid adverse impacts on the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA downstream.	corrective actions required by the ECoW. High probability of success.	
29	During excavation of drains , gravel check dams with silt barrier material will be placed in the swales at 50m intervals. These will be left in place until soils within the swales have stabilised.	This measure will provide an additional layer of protection during and immediately after excavation of drains.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	Regular reporting to developer and contractor as per each management plan.
30	Interceptor cut-off drains will be provided on the upslope side of the site access roads. These interceptor drains will discharge diffusely over land.	Reduce the rate of runoff from hard surfaces, reduce concentration of suspended solids in collected runoff. This will limit silt/contaminant laden runoff reaching the waterways within the catchment of the proposed development site.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW.	Regular reporting to developer and contractor as per each management plan.

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		This in turn will avoid adverse impacts on the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA downstream.	High probability of success.	
31	Additional protection will be provided in the form of silt fencing downslope where required and at existing stream crossings during construction.	Reduce the rate of runoff from hard surfaces, reduce concentration of suspended solids in collected runoff. This will limit silt/contaminant laden runoff reaching the waterways within the catchment of the proposed development site. This in turn will avoid adverse impacts on the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA downstream.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	Regular reporting to developer and contractor as per each management plan.
32	Where access tracks pass close to watercourses, silt fencing will be used to protect the streams. Silt traps will also be provided at outfalls from roadside swales to existing drains. Silt traps will be kept upstream of outfalls. to allow a buffer zone to the outfall.	Will reduce the concentration of suspended solids being conveyed in the surface water run-off into watercourses.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	Regular reporting to developer and contractor as per each management plan.

No.	Mitigation Measure	How Measure Will Avoid/Reduce Adverse Effects	Implementation of Mitigation Measure and Level of Success	Monitoring Scheme to Prevent Mitigation Failure
33	Bank protection will be installed as necessary during construction of watercourse crossings to ensure that the existing stream banks are not disturbed during construction.	Will ensure that stream banks are not disturbed during construction.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.
34	The excavated material generated during construction of watercourse crossings will be stored at agreed locations within the site in accordance with the Soil Management Plan.	Will ensure that excavated material is stored in a manner and location which prevents siltation of watercourses.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.
35	Trenches for installation of underground cables will be excavated and re-covered in short sections. During installation, (where required) berms will be formed in open sections of the trench to prevent the trench acting as a conduit for flows of water and to prevent large accumulations of water at the downslope end.	These measures will ensure that trenches excavated for installation of underground cables do not act as drainage channels conveying silted runoff towards the hydrological network.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP.

No.	Mitigation Measure	How Measure Will Avoid/Reduce Adverse Effects	Implementation of Mitigation Measure and Level of Success	Monitoring Scheme to Prevent Mitigation Failure
				Regular reporting to developer and contractor as per each management plan.
36	Any water pumped out of excavations will be directed to the onsite settlement ponds for treatment before being discharged to the surface drainage network.	Prevent sediment arising from de-watering of excavations from being discharged into the hydrological network.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.
37	Where necessary, temporary pumps and sumps may be required to maintain a dry, clean formation during installation of gravity foundations.	Prevent washout of foundation materials during construction thus avoiding/minimising potential pollution at the source.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.

No.	Mitigation Measure	How Measure Will Avoid/Reduce Adverse Effects	Implementation of Mitigation Measure and Level of Success	Monitoring Scheme to Prevent Mitigation Failure
38	Where the appointed geotechnical engineer or engineering geologist for the works deems that there is a risk of concrete wash-out into the environment during piling, the bored pile will be cast within a permanent casing or geotextile sock/bag to prevent the loss of concrete or drilling fluids such as bentonite and vinyl-polymer.	Prevent potential pollutants arising from piling of excavations from being discharged into the hydrological network.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.
39	Earthworks and exposed excavation surfaces will be compacted to minimise potential for washout of loose material.	Reduce potential for washout of sediment from exposed soils.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.

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40	Where immediate erosion prevention is required for exposed soils, hessian coverings will be installed to minimise potential for erosion.	Reduce potential for washout of sediment from exposed soils.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.
41	Where existing drains will be covered with hardcore or infilled, the surface water will be diverted into new drains which will connect to the existing drainage system.	Prevent flooding and introduction of pluvial water contaminated with silt laden water from entering nearby watercourses.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.
42	No excavation work will be undertaken during or immediately after heavy rainfall.	Will mitigate against erosion and the production of silt laden run-off. This in turn will avoid adverse impacts on the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA downstream	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP.

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			High probability of success.	Regular reporting to developer and contractor as per each management plan.
43	Where appropriate and necessary, temporary cuts and excavations will be protected against the ingress of water or erosion by covering during adverse weather. Where necessary sheet piling or other measures will be used to provide integrity for unstable excavations, particularly within peat, alluvial, gravel or for excavations below the water table.	To protect against the ingress of water or erosion and resulting silt runoff. This in turn will avoid adverse impacts on the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA downstream	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.
44	Surplus soil, peat or rock excavated during the course of the works will be temporarily stored in a level area and will be re-used on site in the form of landscaping and berms (during construction). Temporary storage within the site may also be required after excavation and prior to transportation within the site.	Will reduce silt run-off reaching the waterways within the catchment of the proposed development site. This in turn will avoid adverse impacts on the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA downstream.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.

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	Temporary material storage areas will be covered with impermeable sheeting and surrounded with silt fencing, which will be monitored to manage any potential loss of suspended solids to surface waters. Temporary material storage areas will be a minimum of 50m from the bank edge of any watercourse.			
45	No spoil stockpiles will be left on site after construction.	Will reduce silt run-off reaching the waterways within the catchment of the proposed development site. This in turn will avoid adverse impacts on the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA downstream.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.
46	All exposed soil within 50m of watercourses will be planted with a native grass seed and wildflower mix of native provenance to accelerate revegetation and stabilise the soil.	Accelerate revegetation of bare soil, minimising potential for washout of sediment from exposed soils, while also encouraging the growth of native species including plants of value to pollinators.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP.

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				Regular reporting to developer and contractor as per each management plan.
47	No construction lighting shall be left on overnight during the construction period.	To minimise the disturbance to nocturnal species including otter.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.
48	Compact surface of stored soils during works	This measure will minimise the generation of suspended solids, dust and any other contaminant mobilisation which may be transported to sensitive receptors via wind, surface water runoff or groundwater movement.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.

No.	Mitigation Measure	How Measure Will Avoid/Reduce Adverse Effects	Implementation of Mitigation Measure and Level of Success	Monitoring Scheme to Prevent Mitigation Failure
49	Temporary silt fences will be installed around soil stockpiles, and stockpiles will be covered to prevent washout of fine sediment. A twin layer of silt fencing will be installed at all locations. Additional silt fencing will be kept on site in case of an emergency break out of silt laden run-off and for repairs. A buffer zone will remain between silt trap(s) and watercourses with natural vegetation left intact so as to assist silt interception.	This measure will minimise movement of suspended solids via surface water runoff.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.
50	No soil or any material containing sediment may be stored within 50m of drains.	This measure will minimise the risk of discharges of silted water from stored materials to storm and surface water drains.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.
51	Branches, logs or debris from tree felling will not be allowed to accumulate in aquatic zones and will be removed as soon as possible. Additional silt fencing will be erected along the banks of any streams at the location of proposed tree felling to provide additional protection to the watercourses.	Prevent leachate from tree felling entering nearby waterbodies. This in turn will avoid adverse impacts on the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA downstream.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP.

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				Regular reporting to developer and contractor as per each management plan.
52	Brash mats will be topped up in sections when they become heavily used or worn. Where damage or serious rutting has started to occur, extraction will be suspended immediately. Relocation of the extraction rack or additional brash will be used to remedy the situation.	To avoid extraction racks acting as a conduit for surface water flows. This in turn will avoid adverse impacts on the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA downstream.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.
53	A risk assessment will be prepared by the contractor prior to any wet concrete operations being carried out. All concreting works are fully detailed in the CEMP and will be minimised, particularly adjacent to the aquatic environment. Pre-cast concrete will be used whenever possible to reduce the risk to all forms of aquatic life. Concrete mixing and pours onsite will be timed to occur during periods where no rainfall (0mm/hour) would be expected.	This measure will prevent washout of concrete into the surrounding environment.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.

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	A regular review of weather forecasts is required (weather forecasts will be checked at least 24 hours in advance of works).			
54	Washout of concrete chutes will only take place in a designated washout area within the site compound which will be self-contained. A designated concrete wash-down area will be constructed 100m away from waterbodies (streams and drainage ditches). Every concrete truck delivering concrete to the site must use this facility prior to leaving the site. Chutes will be washed out, at a designated washout pit. A settlement lagoon will be provided to receive all runoff from the concrete wash down area (to be located no closer than 100m away from waterbodies. Details of settlement lagoons are as follows: • Topsoil and subsoil, where necessary, will be stripped out and placed adjacent to the temporary compound area; • An impermeable membrane will be installed directly onto the topsoil and or subsoil, to form the impermeable concrete wash-out settlement pond;	This measure will prevent washout of concrete into the surrounding environment.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.

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	• A designated truck wash-down concrete apron shall be constructed next to this settlement pond; • Impermeable lined drains will direct the wash-out flow to the wash-out settlement pond; and • The wash water and solids will be disposed of off-site at an appropriate licenced facility. Following construction, any solids, the liner and any remaining wash water in will be removed and disposed of/recycled appropriately and the settlement lagoon will then be reinstated.			
55	Refueling of plant will be carried out at the designated refueling station which will be located in the temporary site compound. The station will be fully equipped for a spill response and a specially trained and dedicated environmental and emergency spill response team will be appointed before commencement on site. On demand refueling of plant during construction will only be carried out by trained personnel. Any on-demand refueling of machinery/ plant outside of the designated refueling station will be carried out using a mobile double skinned fuel bowser.	This measure will minimise ingress of hydrocarbons into groundwater.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.

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	Drip trays and spill kits will be kept available on site, to ensure that any spills from vehicles are contained and removed for licensed disposal off-site.			
56	Any diesel, fuel or hydraulic oils stored at the site compound will be stored in bunded storage tanks – the bund area will have a volume of at least 110 % of the volume of such materials stored.	This measure will reduce the risk of hydrocarbons reaching the groundwater within the groundwater body of the proposed remediation works.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.
57	Appropriate spill control equipment, such as oil soakage pads, will be kept within the construction area and in each item of plant to deal with any accidental spillage.	This measure will reduce the risk of hydrocarbons reaching the groundwater within the groundwater body of the proposed remediation works.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.
58	Portaloos and/or containerised toilets and welfare units will be used to provide toilet facilities for site personnel at the site	This measure will ensure that no sanitary waste enters the groundwater within the	Mitigation measure will be implemented in full by the Project manager and Environmental Manager,	The ECoW will monitor the implementation of the mitigation measures detailed herein and in

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	compound. Sanitary waste will be removed by a licensed waste disposal contractor.	groundwater body of the proposed remediation works.	subject to inspection and any corrective actions required by the ECoW. High probability of success.	accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.
59	Daily road sweeping and maintenance of roads in the vicinity of site access points will prevent soil and mud from earthworks from accumulating on the local road network.	This measure will minimise the potential for sediment to be deposited on the road network where it would constitute a source of silt ingress via roadside storm drains.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.
60	Wheel cleaning will prevent soil from earthworks accumulating on the local road network. It will also prevent vegetative material of invasive plant species leaving site. Wash water and any material washed off will be removed to a licensed waste facility.	This measure will minimise generation of suspended solids and dust. It will also prevent the spread of invasive species.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.

No.	Mitigation Measure	How Measure Will Avoid/Reduce Adverse Effects	Implementation of Mitigation Measure and Level of Success	Monitoring Scheme to Prevent Mitigation Failure
61	In order to remove the remote chance of the transmission of biohazards/invasive species during the construction of culverts over drainage ditches: • All previously used tools, equipment, PPE are to be visually checked for mud, plant matter, animal mater and invertebrates – if found they are to be removed prior to the construction of culverts. • All tools, equipment, PPE that have been previously used in an area of invasive species or within a waterbody are to be sanitised prior to the construction of culverts.	Prevent the introduction of invasive species/biohazards into the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA downstream.	Mitigation measure will be implemented in full by the Project manager and Environmental Manager, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer and contractor as per each management plan.
OPERATIONAL PHASE MITIGATION MEASURES				
62	Site inspections to check revegetation/soil erosion measures. Revegetation will be monitored by an ecologist in the growing season(s) following construction. If monitoring indicates the need for any remedial measures such as additional planting or additional hessian sacking erosion protection, these will be actioned in accordance with the specifications of the ecologist carrying out the inspections.	This measure will ensure that revegetation and long-term soil stabilisation are implemented successfully.	This survey will be carried out by a suitably qualified ecologist who will report their findings to the developer and if required will specify and supervise any necessary remedial measures. High probability of success.	The planning authority will seek confirmation that this mitigation measure has been completed as a condition of planning.

No.	Mitigation Measure	How Measure Will Avoid/Reduce Adverse Effects	Implementation of Mitigation Measure and Level of Success	Monitoring Scheme to Prevent Mitigation Failure
63	Quarterly visual inspections of outfalls/drains/rivers will be continued during the operation period until satisfactory vegetation is established on site.	Ensure that any potential sources of siltation or pollution are identified. This in turn will avoid adverse impacts on the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA downstream.	Mitigation measure will be implemented in full by the Developer, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer.
64	Substation transformers, oil storage tanks, diesel generator and any diesel or fuel oils stored at the substation will be bunded. The bund capacity will be sufficient to contain 110% of the tank's maximum capacity. Where there is more than one tank within the bund, the capacity will be sufficient to accommodate 110% of the largest tank's maximum capacity or 25% of the total maximum capacities of all tanks, whichever is the greater. Design and installation of fuel tanks will be in accordance with best practice guidelines BPGCS005 (Oil Storage Guidelines)	Prevent fuel laden runoff reaching the waterways within the catchment of the proposed development site. This in turn will avoid adverse impacts on the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA downstream.	Mitigation measure will be implemented in full by the Developer, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer.
65	During the operational period, quarterly physico-chemical water sampling will be undertaken until full re-vegetation has occurred, unless otherwise directed by the Planning Authority or Inland Fisheries Ireland (IFI).	Ensure that any potential water quality issues arising post-construction are identified. This in turn will avoid adverse impacts on the River Boyne and River Blackwater SAC and the River Boyne	Mitigation measure will be implemented in full by the Developer, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP.

No.	Mitigation Measure	How Measure Will Avoid/Reduce Adverse Effects	Implementation of Mitigation Measure and Level of Success	Monitoring Scheme to Prevent Mitigation Failure
		and River Blackwater SPA downstream.		Regular reporting to developer.
66	Biological water quality samples will be taken on a quarterly basis until full re-vegetation has occurred or unless otherwise directed by the planning authority or IFI.	Ensure that any potential water quality issues arising post-construction are identified. This in turn will avoid adverse impacts on the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA downstream.	Mitigation measure will be implemented in full by the Developer, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer.
67	A petrol and oil interceptor will be installed to deal with all substation surface water drainage.	Will reduce the concentration of fuel/oil contaminated run-off. This in turn will avoid adverse impacts on the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA downstream.	Mitigation measure will be implemented in full by the Developer, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer.
68	The conceptual drainage has been designed to operate effectively during the operation period. The stilling ponds will be a permanent feature and will continue to be effective in filtering the run-off from the site should any accidental release of silt	To limit silt laden runoff from reaching the waterways within the catchment of the proposed development site. This in turn will avoid adverse impacts on the River Boyne and River Blackwater SAC and	Mitigation measure will be implemented in full by the Developer, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP.

No.	Mitigation Measure	How Measure Will Avoid/Reduce Adverse Effects	Implementation of Mitigation Measure and Level of Success	Monitoring Scheme to Prevent Mitigation Failure
	combine with the surface water run-off during operational activities.	the River Boyne and River Blackwater SPA downstream.		Regular reporting to developer.
69	During the operation period the swales will have vegetated and will serve to attenuate flows and remove suspended solids from run-off.	To limit soil erosion and resulting silt laden runoff from entering the Blackwater River and tributaries. This in turn will avoid adverse impacts on the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA downstream.	Mitigation measure will be implemented in full by the Developer, subject to inspection and any corrective actions required by the ECoW. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer.
70	During operation, wastewater generated at the substation compound will be collected in a storage tank for disposal offsite. Only waste collectors holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007, will be employed to transport wastewater away from the site. The proposed wastewater storage tank will be fitted with an automated alarm system that will provide sufficient notice that the tank requires emptying. The wastewater storage tank alarm will be part of a continuous stream of data from the site's turbines, wind measurement devices and electricity substation that will be monitored remotely.	Prevent wastewater pollution at the proposed development and any wastewater generated during operation is stored, transported and treated in a manner which prevents negative effects on the environment.	Mitigation measure will be implemented in full by the Developer. High probability of success.	The ECoW will monitor the implementation of the mitigation measures detailed herein and in accordance with the relevant management plans within the CEMP. Regular reporting to developer.

No.	Mitigation Measure	How Measure Will Avoid/Reduce Adverse Effects	Implementation of Mitigation Measure and Level of Success	Monitoring Scheme to Prevent Mitigation Failure
DECOMMISSIONING PHASE MITIGATION MEASURES				
All construction phase mitigation will be implemented during the decommissioning phase				

4.3.4 Peat and Spoil Management Plan

This Soil Management Plan (or Peat and Spoil Management Plan) has been prepared for the Proposed Development.

As for all construction projects, a detailed engineering construction design must be carried out by the appointed construction stage designer prior to any construction work commencing on site. This must take account of the consented project details and any conditions imposed by that consent.

The contents of the peat and spoil management plan will be updated in the Construction & Environmental management Plan (CEMP) for the construction phase in line with any planning conditions that may apply.

The peat and spoil management plan contains drainage guidelines for construction works and for management of peat on site. It should be noted that the control of water quality and drainage measures for site is outlined in detail in Chapter 10 of the Environmental Impact Assessment Report (EIAR).

The peat depth data was recorded by FT during the site walkovers between 2018 and 2025. It should be noted that the depth of peat at the site varied between 0.0 m(no peat on agricultural lands) to 5.4 m in proximity to the proposed turbine T8. A peat stability analysis was completed and is appended to Chapter 9 of the EIAR.

It is intended to maintain an earthworks balance on site, with all excavated material re-used within the site and minimising the need for removal of any materials for off-site disposal. This will minimise the amount of construction traffic on local roads and reduce the need for off-site disposal. This will in turn lead to the reduction of noise and dust associated with construction traffic.

Aggregate (structural Fill) required for construction will be imported from a local, licensed quarry.

Potential Impacts

The main characteristics of the Proposed Development that could impact on land, soils, and geology are:

- Construction of wind turbine foundations and hardstanding areas
- Construction of access tracks
- Construction of onsite substation
- Cable trench and grid connection construction
- Soil and rock excavation/reuse
- Temporary Material storage areas
- Drainage
- Vehicular movement
- Construction of temporary site compounds

It is considered there will be very few direct impacts during the operational phase of the Proposed Development. The potential impacts associated with decommissioning will be similar to those associated with construction but of reduced magnitude.

Mitigation Measures

One of the primary mitigation measures employed at the preliminary design stage is the minimisation of volumes of soil excavation and lengths of track and trench construction. The minimisation of earthworks volumes is achieved as follows:

- All excavated overburden will be retained on-site. The surplus that cannot be used as backfill material will be stored in berms along access tracks and clearfell areas around Turbines T7, T8, T9, T10 and T11, which are designed for that purpose. Permanent storage areas will be landscaped to minimize erosion and visual impact;
- All the access tracks will be floated, excluding the entrance from public road to T1 (0.4m of average excavation depth) and the Overhead line platform (0.3m of average excavation depth);
- Turbine foundations for turbines T8, T9 and T10 and related hardstands will be piled;
- No borrow pits will be used and all fill and aggregate will be imported from local quarries.

Surplus overburden deposits excavated during the course of the works will be temporarily stored in a level area adjacent to the construction phase excavations prior to reuse as backfill or store in the above-mentioned berms and clearfell areas.

Some temporary stockpiles (not exceeding 2m in height) of material will be necessary adjacent to the excavation areas prior to reinstatement, however no long-term stockpiles of material will remain after construction and no surplus/waste soil or rock will be removed from the Proposed Development site. Temporary stockpiles will be shaped and sealed to prevent the ingress of water from rainfall and placed away from open excavations, sloping / soft ground as not to create an instability risk during temporary works.

To mitigate against the compaction of soil at the site, prior to the commencement of any earthworks, the work corridor will be pegged, and machinery will stay within this corridor so that soils outside the work area are not damaged. Excavations will then be carried out from access tracks as they are constructed in order to reduce the compaction of soft ground.

To mitigate against erosion of the exposed soil, all excavations will be constructed and backfilled as quickly as possible. Excavations will stop during or prior to heavy rainfall events (>10mm/hour). To mitigate against possible contamination of the exposed underlying soils, refuelling of machinery and plant will only occur at designated refuelling areas.

All temporary cuts/excavations will be carried out such that they are stable or adequately supported. Gravel fill will be used to provide additional support to drains where appropriate. Where appropriate and necessary, temporary cuts and excavations will be protected against the ingress of water or erosion by covering during adverse weather. Where necessary sheet piling or other measures will be used to provide integrity for unstable excavations, particularly within peat, alluvial, gravel or for excavations below the water table.

Support may also be required to support elevated floating roads which are being excavated for the installation of cable trenches. The stability of all excavations will be assessed in advance by an experienced geotechnical engineer. Temporary works will be such that they do not adversely interfere with existing drainage channels/regimes by the provision of silt traps and silt fencing as required (refer to Chapter 10 of the EIAR – Hydrology and Water Quality).

The proposed turbine locations have been carefully selected in areas of the site which are relatively close to the existing access tracks to minimise the length of new access tracks required. Drainage will be towards the existing drainage network.

Any contaminated soils will be handled, removed and disposed of in accordance with the requirements of the local authority and/or EPA and waste management legislation. In particular, the following measures will be implemented:

- Contaminated material will be left in-situ and covered, where possible until such time as the classification and assessment of waste at the site is undertaken in accordance with the appropriate technical guidance;
- Prior to removal of material from site for disposal WAC (Waste Acceptance Criteria) testing should also be undertaken in accordance with recommended standards and in-line with the acceptance criteria at a suitably licenced landfill or treatment facility;
- Where materials are removed from site for disposal, materials will be transported by a contractor with a valid waste collection permit and recovered/disposed of at an appropriately licensed facility.

Unregulated drainage will not be permitted within the Proposed Development. Any pumping of excavations will be directed into existing drainage networks via settlement ponds and will not be allowed to discharge directly to the ground except under licence.

All fuel and liquids will be stored on site in fully bunded areas as described in detail in Chapter 10 – Hydrology and Water Quality of the EIAR. In addition, an effluent holding tank along with other protection measures will be used at the substation in order to protect the Source Protection Zone and prevent any discharges to ground. These are detailed in Chapter 10 of the EIAR - Hydrology and Water Quality.

Long range weather forecasts should be examined, and the construction phases planned taking cognisance of expected weather conditions. Regular meetings should be held to re-assess construction phases with weather conditions as the project progresses. Excavations will stop during or immediately after heavy rainfall.

Regular meetings should be held between the Geotechnical Engineer appointed by the contractor and the contractor's Project Manager.

Excavation for hardstands will precede the turbine, cable trench and access track construction, whereby topsoil and soft soils will be excavated and replaced with granular fill where required. Excavation will be carried out from access tracks where possible in order to reduce the compaction of topsoil.

The proposed turbine locations have been carefully selected in areas of the site which is relatively close to the existing access tracks to minimise the length of new access tracks required. Drainage will be collected in the proposed grassy swales, and directed towards the existing drainage network.

Natural re-vegetation is the preferred method of restoration, however, if this is not possible, the re-vegetation process can be encouraged with the use of native grass seed or other suitable planting measures during the growing season. No spoil stockpiles will be left on site after construction is completed. Areas disturbed during construction will be landscaped using locally recovered topsoil to merge with the contours of the existing topography.

Due to the possibility of soil-borne diseases, all topsoil received from each farm property will remain on site. Topsoil will be used for landscaping berms alongside existing and new access tracks where suitable and will also be used for reinstatement purposes around turbine bases and hardstandings.

The contractor's project manager will be responsible for ensuring that the earthworks are done in accordance with the requirements of this plan. The temporary storage areas and the restoration of vegetative material will be inspected regularly from an ecological and water quality perspective.

With regard to slope stability issues, detailed design best practice will be implemented as follows:

- The works will be designed and checked by a suitably qualified and experienced geotechnical engineer or engineering geologist, and hydrologist or drainage engineer;
- Identified risks will be minimised by the application of the principles of avoidance, prevention and protection;
- A detailed method statement for each element of the works will be prepared prior to any element of the work being carried out;
- Details of the relevant assumptions, relating to methods and sequencing of work are provided in this CEMP. This will be reviewed and updated prior to commencement of construction;
- No amendments to the designed works will be made without the prior approval of a suitably qualified and experienced engineering geologist or geotechnical engineer familiar with wind farm construction works;
- Prior to construction, a site-specific environmental management plan for construction will be prepared, which will incorporate all measures set out in this CEMP, in consultation with the relevant statutory bodies, including the planning authority, Waterways Ireland and the NPWS;
- The environmental management plan for construction will provide for the checking by suitably qualified and experienced staff of equipment, materials storage and materials transfer areas, as well as drainage structures and their attenuation ability, on a regular basis;
- Excavation works will be monitored by suitably qualified and experienced geotechnical personnel;
- The programming of the works will be such that earthworks are not scheduled to be carried out during severe weather conditions.

Other mitigation measures relating to soils and geology include the following:

- Internal haul roads will be capped as soon as practicably possible to cover exposed subsoils and as such reduce the concentration of suspended solids in the run-off;
- A suitably qualified person will be appointed by the developer to ensure the effective operation and maintenance of drainage and other mitigation measures during the construction process;
- Due to the dispersed nature of the site, refuelling of plant during construction will be carried out at a number of dedicated refuelling station locations on site, typically at each compound or at least 100m from a watercourse using mobile double-skinned fuel bowsers;
- Each station will be fully equipped for a spill response and a specially trained and dedicated environmental and emergency spill response team will be appointed before commencement on site. Drip trays and spill kits will be kept available on site, to ensure that any spills from the vehicle are contained and removed off site. Only emergency breakdown maintenance will be carried out on site and appropriate containment facilities will be provided to ensure that any spills from breakdown maintenance vehicles are contained and removed off site;
- Portaloos and/ or containerised toilets and welfare units will be used to provide toilet facilities for site personnel during construction. Sanitary waste will be removed from site via a permitted waste contractor.

In addition, an effluent holding tank along with other protection measures will be used at the substation in order to protect the Source Protection Zone at and prevent any discharges to ground. Other measures include:

- The bunding of the transformer, oil storage tanks, diesel generator and any diesel or fuel oils stored at the substation. The bund capacity will be sufficient to contain 110% of the tank's maximum capacity. Where there is more than one tank within the bund, the capacity will be sufficient to accommodate 110% of the largest tank's maximum capacity or 25% of the total maximum capacities of all tanks, whichever is the greater. Design and installation of fuel tanks will be in accordance with best practice guidelines BPGCS005 (Oil Storage Guidelines)
- A petrol and oil interceptor will be installed to deal with all substation surface water drainage.

Operational Phase Mitigation Measures

Mitigation measures for soils and geology during the operational phase are outlined below:

- The use of aggregate from offsite authorised quarries for use in road and hardstand maintenance;
- The substation transformer and oil storage tanks will be in a concrete bund capable of holding 110% of the oil in the transformer and storage tanks as described above. Turbine transformers will be located within the turbines, ensuring any leaks would be contained;
- Fuels, lubricants and hydraulic fluids for equipment used on the site will be carefully handled to avoid spillage;
- Any spillage of fuels, lubricants or hydraulic oils will be immediately contained, and the contaminated soil removed from the site and properly disposed of;
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or recycling; and
- Appropriate spill control equipment, such as oil soakage pads, will be kept within the refuelling areas and in each item of plant to deal with any accidental spillage.

Due to the reduced magnitude of the impacts, no additional mitigation measures are required for the maintenance and operation of the wind farm, over and above those incorporated into the design of the substation transformer, which will be bunded to protect soils against accidental leakages of oil.

Decommissioning Stage Mitigation Measures

Mitigation measures applied during decommissioning activities will be similar to those applied during construction where relevant.

Some of the impacts associated with reinstatement of the site (excavation of turbine bases, access tracks etc.) will be avoided by leaving these in place. The bases will be rehabilitated by covering with local topsoil in order to regenerate vegetation which will reduce runoff and sedimentation effects. Access tracks which are not required for farm use will also be covered with topsoil and rehabilitated in a similar manner.

It is considered that leaving the turbine foundations, access tracks and hardstanding areas in-situ will cause less environmental damage than removing and recycling them. Removal of this infrastructure would result in considerable disruption to the local environment in terms of increased sedimentation, erosion, dust, noise, traffic and an increased possibility of contamination of the local water table. However, if removal is deemed to be required by the respective local authority all infrastructure will be removed with mitigation measures similar to those during construction being employed.

Consent for the Proposed Substation is sought in perpetuity and will not be decommissioned with the Proposed Wind Farm.

Mitigation measures to avoid contamination by accidental fuel leakage and compaction of soil by on-site plant will be implemented as per the construction phase mitigation measures described above.

4.3.5 Surface Water & Drainage Management Plan

This Surface Water and Drainage Management Plan should be read in conjunction with the EIAR. The Surface Water and Drainage Management Plan shall be finalised in accordance with this plan, incorporating any potential requirements of planning conditions, following the appointment of the contractor for the main construction works. The potential impacts on surface waters have been detailed in Chapter 10 of the EIAR.

4.3.5.1 Drainage of the Proposed Development

Sustainable Drainage Systems (SuDS)

The proposed layout of the drainage system is provided in Planning Drawings Series 0101. The drainage strategy within internal areas of the Site will incorporate three main components of Sustainable Drainage Systems (SuDS):

- Interceptor Drains
- Cross Drains
- Diffuser in gravel and stones
- Swales
- Settlement Ponds

Where required, on the upslope side of new sections of access track and hardstanding areas, overland flows will be intercepted in new drainage channels (interceptor drains). The flow will then be discharged diffusely over vegetated areas or diverted to a nearby drain/stream within the existing catchment. The roadside drains (swales) will therefore only carry the site access track runoff. This will ensure that there will be no mixing of 'clean' and 'dirty' water as shown on Figure 4-1. Thus, erosion risks will be reduced and the quantity of water requiring treatment will be minimised.

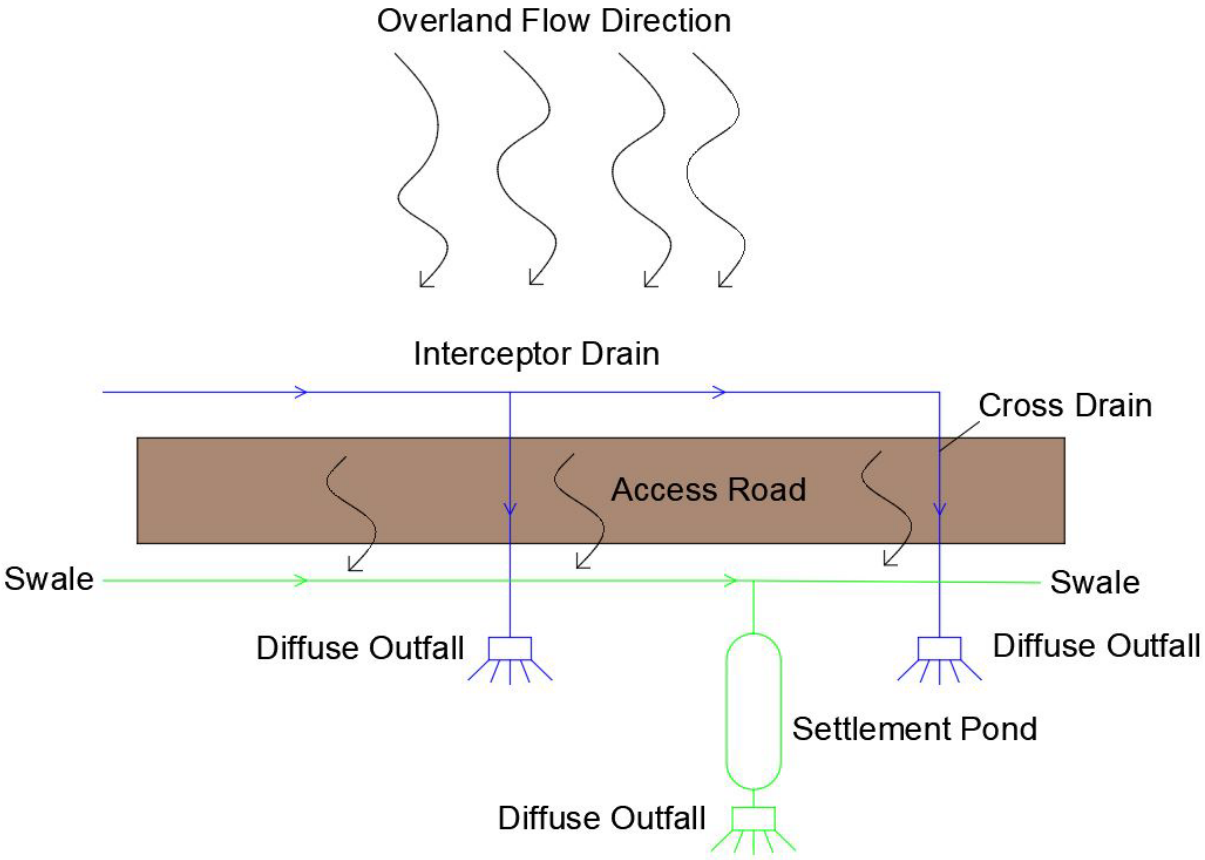


Figure 4-1: Drainage Design Principles

The drainage system outlined below provides for a multi-stage treatment train of the discharges from the development, as recommended in the SUDS manual:

grassed swales removing some of the sediment borne contaminants,

settlement ponds providing retention and treatment of discharges,

diffuse outflow from settlement ponds providing for further retention and settlement of suspended solids by reducing the velocities of flows and increasing the flow path of discharges,

continuation of flows by natural flow paths over vegetated areas before entering the watercourse, providing further retention and treatment of discharges.

The grassed swales will also treat the surface water run-off, removing some of the sediment borne contaminants. These grassed swales will serve to detain flows and reduce the velocities of surface water flows. The swales will be 0.15 m in depth with a bottom width of 0.9 m and side slopes of 1 in 3 (see swale detail in Figure 4-1). The swales will be constructed in accordance with CIRIA C698 Site Handbook for the Construction of SUDS.

Stilling ponds will be put in place in advance as construction progresses across the site (see planning drawing P22-242-0300-0030 [included in Appendix 2] for stilling pond details, and photograph example of stilling pond in Figure 4-2 below).

The stilling pond design is based on primary settling out of suspended solids from aqueous suspension. The theory behind the design of the settlement ponds is the application of Stoke's Law. The settlement ponds will be designed to provide sufficient retention time and a low velocity environment to allow suspended solids of a very small particle size to fall out of suspension prior to allowing the water to outfall to the receiving environment. Flow rates for storm events will be maintained at or below greenfield run-off rates.

For the preliminary design Stokes' law is used in combination with the Rational Method. The inflow to stilling pond is calculated using Modified Rational Method:

$$Q = 2.78 \times c \times I \times A \text{ (l/s)}$$

C = coefficient runoff, for hardstanding area the value of 0.50 is used.
I = intensity (mm/h) for 1 in 10 years storm event, duration 1h, as pet CIRICA C48
A = contributing area (ha)

According to the CIRIA 648 a pond volume is defined by inflow and retention time:

$$V = Q \times t$$

Drainage stone will be placed at the inlet to the ponds to filter the flows before they enter the ponds. After passing through the stilling ponds, the concentration of suspended solids in the surface water run-off due to the excavations will be reduced to within acceptable levels in accordance with Directive 2006/44/EC – European Communities (Quality of Fresh Waters Needing Protection or Improvement to Support Fish Life). In the event of an emergency, the stilling ponds will provide a temporary holding area for any accidental spills on site as it will be possible to block off the outflow from these ponds for a limited period. The stilling ponds will be fenced off for safety. A diffuse outflow will mitigate any increase in run-off. Erosion control and retention facilities, including stilling ponds will be regularly maintained during the construction phase.

Figure 4-2: Grassed Swale along access track

Figure 4-3: Swale draining to Stilling pond

The drainage system including some of the stilling ponds will remain operational and will be utilised for the decommissioning phase to treat any surface water from exposed areas as a result of decommissioning at the site. During decommissioning the turbine base, hardstanding areas and access tracks should remain in place and be covered with local soil/topsoil to minimise disturbance to soils. Removal of this infrastructure would result in considerable disruption to the local environment in terms of increased sedimentation, erosion, dust, noise, traffic and an increased possibility of contamination of the local water table. However, if removal is deemed to be required all infrastructure will be removed with mitigation measures similar to those during construction being employed.

Drainage of Temporary Site Compounds

Drains around the hard-standing areas of the site compound will be in the form of shallow grassed swales to minimise the disturbance to sub-soils.

Filter drains may be used where trafficking by site staff is required to access the temporary site compound. The filter drains/swales will drain to a suitably designed stilling pond.

The stilling pond will be backfilled at the temporary compounds following the construction period and the vacation of the temporary site compounds.

Refuelling of plant during construction will be carried out at refuelling station in the temporary compound, to be located a minimum of 50m from any watercourse. The refuelling station will be fully equipped for a spill response and a specially trained and dedicated environmental and emergency spill response team will be appointed before commencement on site. In addition to the above, onsite re-fuelling of machinery will be carried out at least 100m from watercourses using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled off site or at the designated refuelling area and will be towed by a 4x4 jeep to designated re-fuelling areas near to where machinery is located but at distances of greater than 100m from watercourses. Drip trays and spill kits will be kept available on site, to ensure that any spills from vehicles are contained and removed off site.

Concrete washout will be carried out in a dedicated area of the temporary compound or at a designated washout pit on site. Only the washing of chutes will be permitted. Every concrete truck delivering concrete to the site must use the concrete washout facility prior to leaving the site. Chutes will be washed out at the designated area with a settlement lagoon provided to receive all run-off.

Any diesel or fuel oils stored at the temporary site compound will be bunded. The bund capacity will be sufficient to contain 110% of the tank's maximum capacity. Where there is more than one tank within the bund, the capacity will be sufficient to accommodate 110% of the largest tank's maximum capacity or 25% of the total maximum capacities of all tanks, whichever is the greater. Design and installation of fuel tanks will be in accordance with best practice guidelines BPGCS005 (Oil Storage Guidelines).

Portaloos and/ or containerised toilets and welfare units with storage tanks will be used to provide toilet facilities for site personnel during construction. The sanitary waste will be removed from site by a licensed waste disposal contractor. All portaloo units located on site during the construction phase will be operated and maintained in accordance with the manufacturer's instructions and will be serviced under contract with the supplier. All such units will be removed off-site following completion of the construction phase.

Temporary petrol and oil interceptors will be installed at the temporary site compounds and at all locations dedicated for plant repairs/storage of fuel/temporary generator installation. Surface water run-off from the compound will be directed through a Class 1 Full Retention Oil Interceptor before discharge to the dirty water drainage system for the site. This dirty water drain flows to a stilling pond before final discharge over land. A trained and dedicated environmental and fuel spill emergency response team will be set up on site before commencement of construction on-site.

Drainage of Overland Flows

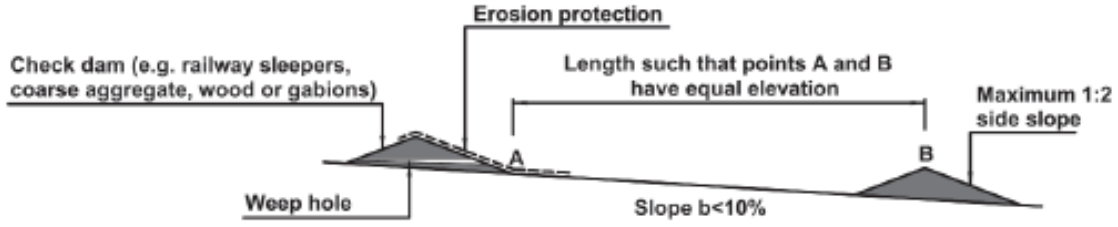
Existing overland flow channels will be maintained, and cross-drains provided in the access tracks to allow continuity of flow. Where required, on the upslope side of new sections of access track and hardstanding areas, overland flows will be intercepted in channels. The flow will then be discharged diffusely over vegetated areas. Cross-drains will be provided where required at a minimum of 200m intervals. The roadside drains will therefore only carry the site access track run-off. This will ensure that there will be no mixing of clean and dirty water and will avoid a large concentration of flows. Thus, erosion risks will be reduced and the quantity of water requiring treatment will be minimised.

Proposed culvert locations have been identified for the Proposed Development and have been sized to convey the appropriate flows, as calculated in Appendix 10.1 of the EIAR (Volume 3).

Drainage of Site Access Tracks

As discussed above, the permitted new site access tracks will be drained via roadside grassed swales with stilling ponds at the end of the swale run. The proposed layout of the drainage system for Proposed Development can be seen in the Planning Application layout Drawings (0101 series) which accompany this application. A cross-section through the proposed site access road construction is shown in Appendix 3.

At slopes greater than 2%, check dams will be required in the swales and interceptor drains to slow down the velocities of flows and prevent erosion occurring, as shown in Figure 4-3.



Elevation

Figure 4-4: Check Dam Details

The roadside swales will drain to stilling ponds before discharging diffusely overland. A portion of the stilling ponds will remain in place following the construction period, as determined by the detailed design.

Silt traps will be provided in swales which will consist of geotextile staked across the swale at regular intervals with clean filter stone weighted across the upstream side of the geotextile to provide further filtration and stability to the silt trap, as shown in Figure 4-4 to Figure 4-6.

Silt fencing will be kept on site and erected at the locations across the site and as required during construction to provide further protection to prevent the ingress of silt into the watercourses. The silt fencing will be kept in place until the natural vegetation has been re-established. Details of the proposed silt fencing are included in the EIAR.

Site drainage, including silt traps and stilling ponds, will be put in place in parallel with or ahead of construction, such that excavation for new infrastructure will have a functioning drainage system in place.

This would be in addition to the measures required in the guidance document 'Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Watercourses' by Inland Fisheries Ireland (IFI).

Figure 4-5: Silt Trap across Grassed Swale

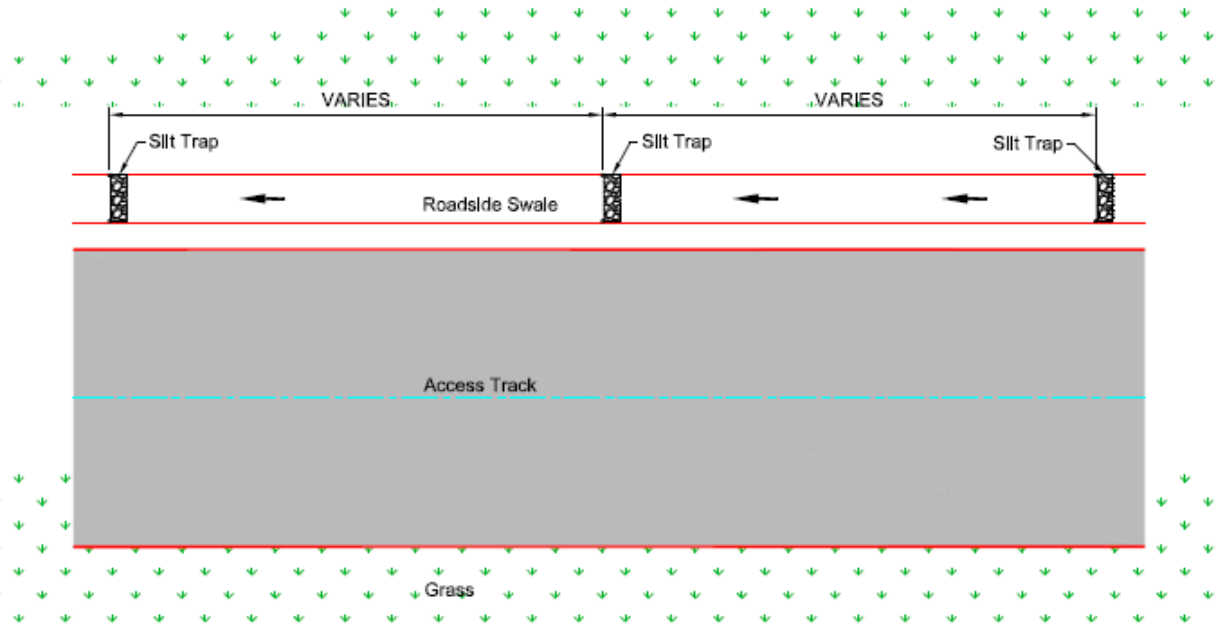


Figure 4-6: Plan of Silt Trap in Swale

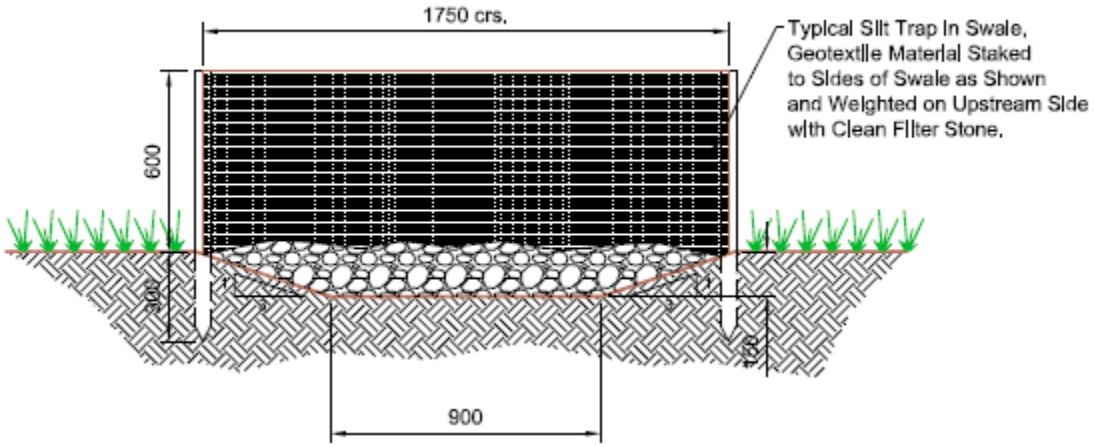


Figure 4-7: Silt Trap Details

Drainage of Turbine Bases and Hardstanding

The excavations for turbines will be pumped into the site drainage system (including stilling ponds), which will be constructed at site clearance stage, in advance of excavations for the turbine bases.

As discussed above, the new turbine hard-standing areas will be drained via shallow swales with suitably designed stilling ponds. The stilling ponds will remain in place following the construction period.

Drainage of Cable Trenches

Cables running throughout the wind farm site will be installed in trenches adjacent to site access tracks, where possible. Cable trenches will be excavated using a mechanical excavator and the excavated materials placed in small bunds adjacent to the trenches for back filling, as shown in Figure 4-7.

The seed bank is to be retained for placing back as the top layer of backfill to the trench, to aid successful restoration of vegetation in disturbed areas.

Cable trenches will be excavated during dry periods where possible, in short sections and left open for minimal periods, to avoid acting as a conduit for surface water flows. Clay bunds will be constructed at up to 10m intervals within the cable trench.

Figure 4-8: Backfill over Cable Trench

Procedure for Dewatering of Excavations

Standing water, which could arise in excavations, has the potential to contain an increased concentration of suspended solids as a result of the disturbance to soils. Water in the excavations for turbines will be pumped into the site drainage system which will be constructed at site clearance stage, in advance of excavations for the turbine bases.

Drainage of Substation

The Proposed Substation is located within a forested area and peat lands which is drained locally by forestry drainage, including a large drain on the western boundary of the substation footprint which forms part of the OPW Arterial Drainage Network. The substation will be drained by a network of piped stormwater drains to a full retention interceptor. Foulwater will be directed to a holding tank as described in Section 4.3.4. A drainage layout drawing for the substation is presented as planning drawing 23727 MWP 00 00 DR C 2100.

Drainage of Stockpiled Material

During the construction period, the excavated material will be used to reinstate the turbine bases.

All excavations shall be constructed and backfilled as quickly as possible. Excavation will stop during or immediately after heavy rainfall.

Excavation will precede the turbine base construction, cable trench and access track construction. Soil will be excavated and replaced with granular fill where required. Excavation will be carried out from access tracks where possible in order to reduce the compaction of topsoil.

During the construction period, spoil heaps from the excavations for the turbine bases will be stored temporarily. These temporary spoil heaps will be covered if required and surrounded by silt fences to filter sediment from the surface water run-off from excavated material.

Surplus soil or rock excavated during the course of the works will be used on site in the form of landscaping including low berms, where appropriate. No spoil stockpiles will be left on site after construction is completed.

Material will only be stockpiled on the site where there will be immediate backfilling of the excavation with the excavated material e.g. cable laying etc., or material will be stockpiled temporarily at the excavation point ready for collection off site. In an emergency such as flash flooding, these spoil heaps will be covered and surrounded by silt fences to filter sediment from the surface water run-off from excavated material.

It should be noted that any stockpiling will be short-term and temporary and will occur only within the site boundary as the construction proceeds. The site drainage system will be put in place prior to excavation, therefore the discharge routes from any temporary stockpiling will be via the site drainage system as detailed in the planning drawings. A minimum buffer of 50m will be provided between temporary stockpiles and the nearest watercourse. There will be no permanent or long-term stockpiling of material on the site.

Reinstated areas and berms will by preference re-vegetate naturally, and further measures will be undertaken in the form of erosion control matting, for example, if deemed to be required.

Watercourse Crossings

Existing stream crossings will be protected using silt fencing.

Minor drains such as manmade agricultural and bog drains will be crossed using suitably designed pipe culverts per the locations and specifications set out in Section 3.4.1.8.

Turbine delivery will not take place during extreme weather conditions.

Climate Change

To accommodate the effect of future climate change in Ireland, the 100-year peak flow values for stream crossing designs have been multiplied by 1.2 to obtain the design 100-year flood value for the crossing. The bridge designs presented within the planning drawings for the Proposed Development have been designed with sufficient freeboard accordingly, as detailed in Appendix 10.1 of the EIAR (Volume 3).

Wash Down from Concrete Trucks and Cement Mixers

Concrete washout will be carried out in a dedicated area of the temporary compound or at a designated washout pit on site. Only the washing of chutes will be permitted. Every concrete truck delivering concrete to the site must use the concrete washout facility prior to leaving the site. Chutes will be washed out at the designated area with a settlement lagoon provided to receive all run-off.

An adequately designed settlement lagoon will be provided to receive all run-off from the concrete wash down area. Regular inspections of the wash down areas and associated settlement lagoons shall be carried out and adequate records kept.

The settlement lagoon shall be lined using a 1mm LDPE impermeable liner. A sump will be provided at this location which will collect the wash water from the concrete trucks. The excavated material will be kept on site for reinstatement following the construction period.

During construction, wash water and any solids in the sump will be removed periodically to an appropriate licensed facility. The sump can be emptied daily if required. Following construction, any solids, the liner, and any remaining wash water in the sump will all be removed to an appropriate licensed facility for disposal. The sump will then be reinstated.

4.3.5.2 Mitigation Measures for Flooding

Increase in run-off as a result of the Proposed Development has been calculated and it has been determined that there is no significant flood risk posed to downstream sites as a result of this increase in run-off. Furthermore, the three-stage treatment train (swale – stilling pond – diffuse outflow) proposed to retain and treat the discharges from hard surface areas as a result of the development will reduce any risk of flooding downstream.

To mitigate against the potential for flood events impacting on the T6 turbine as outlined in Section 10.7 of the EIAR, the ground will be raised locally at the T6 location, so that the turbine foundation and hardstanding has a finished level that is at least 300 mm above the modelled flood level. The finished level of the hardstanding will be 79.5 mOD as can be seen on P22-242-0300-0006, which exceeds the 300 mm above the modelled flood level.

Raising the ground locally to elevate the T6 foundation and hardstanding will displace a volume from the flood capacity in the area, and therefore flood "compensation" must be provided to return the flood capacity to the same as pre-development. This will be achieved by providing a "flood compensation area" immediately adjacent to the T6 hardstanding, as shown on planning drawing P22-242-0101-0033 (included in Appendix 2). The flood compensation area will comprise a depression in the local ground, excavated to 1.5 m below existing ground level, to cover an area as shown in the planning drawing P22-242-0101-0033 which will provide a compensation of flood capacity to cancel the volume displaced by raising the T6 foundation and hardstanding. The result of this is that flood extents in the local area are unchanged for a given flood event, as the capacity for the land to absorb flood water remains the same post-development.

4.3.5.3 Mitigation Measures for Pollution Control to Protect Water Quality in Downstream Receptors

All personnel working on site will be trained in pollution incident control response. An emergency response procedure is prepared in Section 4.3.5.4 which will ensure that appropriate information will be available on site outlining the spillage response procedure and a contingency plan to contain silt.

Silt Protection Controls (SPCs) are proposed at the location of watercourse crossings and where haul roads pass close to watercourses, silt fencing will be used to protect the streams.

Silt traps will also be provided at outfalls from roadside swales to existing drains. Silt traps will be kept upstream of outfalls to allow a buffer zone to the outfall. Additional silt fencing will be kept on site in case of an emergency break out of silt laden run-off.

Stilling ponds will be put in place in advance as construction progresses across the site. The stilling ponds with a diffuse outflow detail will mitigate any increase in run-off and treat suspended solids in the surface water run-off. Erosion control and retention facilities, including stilling ponds will be regularly maintained during the construction phase.

In the unlikely event of accidental break out of silt, this will be dealt with in the Emergency Response Procedures, included herein.

All stockpile material will be bunded adequately and protected from heavy rainfall to reduce silt run-off, where necessary.

Adequate security will be provided to prevent spillage as a result of vandalism.

Drains around hard-standing areas will be shallow to minimize the disturbance to sub-soils.

Suitably sized cross-drains will be provided for drainage crossings to convey flows from agricultural drains and forestry drains across the access tracks, to prevent a risk of clogging. Culverts have been located and sized as detailed in Appendix 10.1 of the EIAR (Volume 3).

Tracks will be capped as soon as practicably possible to cover exposed subsoils and as such reduce the concentration of suspended solids in the run-off.

All open water bodies adjacent to proposed construction areas will be protected by fencing, including the proposed stilling ponds.

Additional protection will be provided in the form of silt fencing downslope where required and at existing stream crossings during construction, to further ensure that there is no impact from the development to streams and rivers crossing the site.

During the construction period an emergency facility will be provided to control the discharge from the stilling ponds. This will mitigate the risk of any accidental spillage on site affecting watercourses.

Where internal haul roads pass close to watercourses, silt fencing will be used to protect the streams. Silt traps will also be provided at outfalls from roadside swales to existing drains. Silt traps will be kept upstream of outfalls to allow a buffer zone to the outfall.

Refuelling of plant during construction will be carried out at a designated station within the temporary compound, which will be located a minimum of 50m from any watercourse. The refuelling station will be fully equipped for a spill response and a specially trained and dedicated environmental and emergency spill response team will be appointed before commencement on site. In addition to the above, onsite re-fuelling of machinery will be carried out 100m from watercourses using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled off site or at the designated refuelling area and will be towed by a 4x4 jeep to designated re-fuelling areas near to where machinery is located but at distances of greater than 100m from watercourses. Drip trays and spill kits will be kept available on site, to ensure that any spills from vehicles are contained and removed off site.

Concrete washout will be carried out in the dedicated washout area of the temporary compound. Only the washing of chutes will be permitted. Every concrete truck delivering concrete to the site must use the concrete washout facility prior to leaving the site. Chutes will be washed out at the designated area with a settlement lagoon provided to receive all run-off.

Any diesel, fuel or hydraulic oils stored at the temporary site compound will be bunded with a bund capacity as described earlier in Section 4.3.5.1.

Vehicles entering the site should be in good working order, free from leakage of fuel or hydraulic fluid.

A wheel wash will be provided at the site entrance. The wheel wash will come with an additional water tank which will be filled regularly. These units will be self-contained and will filter the waste for ease of disposal. Waste will be removed from each unit and from site by a proposed contractor. Additional silt fencing will be kept on site in case of an emergency break out of silt laden run-off.

Portaloos and/or containerised toilets and welfare units will be used to provide toilet facilities for site personnel during construction. Sanitary waste will be removed from site via a licenced waste disposal contractor.

Silt fencing will be erected at the location of stream crossings along the cable route. Silt curtains and floating booms will also be used where deemed to be appropriate, in consultation with IFI and this will be assessed separately at each individual location.

4.3.5.4 Emergency Silt Control and Spillage Response Procedures

All personnel working on site will be trained in pollution incident control response. The emergency response plan will be expanded upon to account for any relevant planning conditions, post consent; which will ensure that appropriate information will be available on site outlining the spillage response procedure and a contingency plan to contain silt. A regular review of weather forecasts of heavy rainfall is required, and a contingency plan will be prepared for before and after such events. A record will be kept of daily visual examinations of watercourses which receive flows from the permitted development, during and for an agreed period after the construction phase. Procedures for particular accidental spillages, from leaking or damaged fuel lines or a break out of silt are outlined below.

Oils, Fuels and Site Vehicles

Refuelling of plant during construction will be carried out at the temporary compound, or at least 100 m from any watercourse, as described earlier in Section 4.3.5

Details of tests to be carried out on Storage tanks to a recognised standard together with a secondary containment system to provide at least 110% of the maximum tank capacity are as follows:

All tank and drum storage areas shall, as a minimum, be bunded, either locally or remotely, to a volume not less than the greater of the following:

a. 110% of the capacity of the largest tank or drum within the bunded area; or

b. 25% of the total volume of substance which could be stored within the bunded area.

Detail of oil spill protection measures adjacent to a watercourse are outlined above. Procedures for particular accidental spillages, from leaking or damaged fuel lines are outlined below.

Accidental spillage from leaking or damaged fuel lines

Emergency drip trays and spill kits will be kept available on site for use in emergencies to ensure that any spills from vehicles are contained and removed off site.

Each refuelling station will be fully equipped for a spill response and a specially trained and dedicated environmental and emergency spill response team will be appointed before commencement on site.

In the event of pollution or potential risk of pollution Kildare County Council will be informed immediately. In the case of water pollution in addition to the Local Authority, Inland Fisheries Ireland should also be informed immediately.

In the event of an accidental spillage from leaking or damaged fuel lines, the spillage will be cleaned up with absorbent material e.g. sand or turf mould and placed in a designated bunded location while awaiting removal offsite to a licensed facility.

In the event of an emergency, the stilling ponds will provide a temporary holding area for any accidental spills on site as it will be possible to block off the outflow from these ponds for a limited period.

Accidental break out of silt

A suitably qualified person will be appointed by the developer to ensure the effective operation and maintenance of drainage and other mitigation measures during the construction process. The operations management of the Proposed Development will include regular monitoring of the drainage system and maintenance as required.

Additional silt fencing will be available on site for use in emergencies.

An emergency preparedness and response procedure is required to prevent environmental pollution incidents.

Maintenance of Site Drainage Systems

The drainage system for the Proposed Development should be maintained regularly to keep it operating effectively. The maintenance should include the following:

- inspection and maintenance of swales;
- inspecting cross-drains for any blockages;
- inspecting stilling ponds and outfalls;
- inspecting the stream crossings and piped crossings for obstructions;
- inspecting the progress of the re-establishment of vegetation;
- implementing appropriate remedial measures as required after the above inspections.

4.3.5.5 Construction Stage Mitigation Measures

As mentioned in Section 4.3.4, long range weather forecasts should be examined, and the construction phases planned taking cognisance of expected weather conditions. The Drainage Engineer should have the authority to suspend the works if weather conditions are deemed too extreme for the effective protection of receiving watercourses. Regular meetings should be held to re-assess construction phases with weather conditions as the project progresses and to establish an operational drainage system in advance of the progression of the works. Regular meetings should be held between the Drainage Engineer appointed by the contractor and the contractor's Project Manager. The planning of traffic routes through the site should be agreed in advance, in order to plan appropriate construction drainage management. Mitigation measures to protect receiving watercourses will be put in place as directed by the Drainage Engineer in advance of extreme forecasts.

The following construction drainage management elements are to be implemented in advance of and during construction:

- A suitably qualified person will be appointed by the developer to ensure the effective operation and maintenance of drainage and other mitigation measures during the construction process. The operations management of the wind farm will include regular monitoring of the drainage system and maintenance as required. The increase in the rate of run-off along the route of the site access roads and hard-standing areas will be mitigated by the proposed drainage system which includes the provision of stilling ponds to reduce the concentration of suspended solids in the run-off from these areas, and the addition of silt fencing where deemed necessary.

- As mentioned in Section 4.3.5.1, stilling ponds will be put in place in advance as construction progresses across the site. The stilling ponds with a diffuse outflow detail will mitigate any increase in run-off. Erosion control and retention facilities, including stilling ponds will be regularly maintained during the construction phase. The three-stage treatment train (swale – stilling pond – diffuse outflow) proposed to retain and treat the discharges from hard surface areas as a result of the development will reduce any risk of flooding downstream.
- As mentioned in Section 4.3.5.1, standing water, which could arise in excavations, has the potential to contain an increased concentration of suspended solids as a result of the disturbance to soils. The excavations for turbines will be pumped into the site drainage system (including stilling ponds), which will be constructed at site clearance stage, in advance of excavations for the turbine bases. As the majority of turbine excavations will be within low permeability peat or glacial till, groundwater inflow is expected to be small.
- In areas of higher permeability soils, flows may be higher and exclusion techniques such as sheet piles may be required to control groundwater flow and stabilize excavations, particularly close to the river where a higher water table is expected.
- The excavated subsoil material will be removed, either to the designated material storage areas or stockpiled close to the excavation and used as backfill material if suitable. Temporary material storage areas will be covered with impermeable sheeting and surrounded with silt fencing, which will be monitored to manage any potential loss of suspended solids to surface waters. Temporary material storage areas will be a minimum of 50 m from the true bank edge of any watercourse.
- As mentioned in Section 4.3.5.3, drains around hard-standing areas will be shallow to minimise the disturbance to sub-soils.
- Cross-drains will be provided at the locations, and sized as per the calculations completed in Appendix 10.1 of the EIAR (Volume 3).
- All tracks will be surfaced with clean well graded stone with the minimum of fines which will be imported, to mitigate the conveyance of silt-laden run-off in the track drainage.
- Silt fencing will be used as an additional protection to watercourses where deemed necessary, where floating roads are to be constructed.
- As detailed in Section 4.3.5.1, interceptor cut-off drains will be provided on the upslope side of the site access roads to prevent the mixing of overland flows with the drainage for the proposed development. These interceptor drains will discharge diffusely over land.
- As mentioned in Section 4.3.5.1, cables will be installed in trenches adjacent to the site access roads, or laid within the access road line, where required. Trenches will be excavated during dry periods where possible in short sections and left open for minimal periods, to avoid acting as a conduit for surface water flows. Clay bunds will be constructed within the cable trench at regular intervals.
- The routes for the proposed access tracks are laid out to follow the existing tracks where practicable. Site access roads have been laid out to reduce the longitudinal slope of roadside drains and to follow natural flow paths where possible. Where roadside drains are laid at slopes greater than 2%, check dams will be provided. This is unlikely to occur as the slopes on the site are flat, however the check dams, if required, will reduce the effective slope and run-off velocities and any consequent potential for erosion.
- Culverts have been sized in accordance with CIRIA C689 Culvert Design and Operation Guide, the Office of Public Works (OPW) guidance and the guidance provided by IFI in the design of the proposed stream crossings. A Section 50 Application will be prepared for all new stream crossings to obtain the consent of the OPW at detailed design stage.

- Where agricultural tracks, bog tracks and forestry tracks will be used to access the development, the roadside drains alongside these roads will be cleared of obstructions, should it be found that debris and vegetation are impeding flows. Silt traps will be provided at regular intervals to reduce the concentration of suspended solids in the surface water run-off being conveyed in the existing drains, which may result from vehicles trafficking these roads from the construction areas.
- All open water bodies adjacent to proposed construction areas will be protected by fencing, including the proposed stilling ponds.
- The conceptual site drainage has been designed to complement existing overland flow and existing bog, agricultural and forestry drainage.
- Additional protection will be provided in the form of silt fencing downslope where required and at existing stream crossings during construction, to further ensure that there is no impact from the development to streams and rivers crossing the site.
- As mentioned above in this Section, all personnel working on site will be trained in pollution incident control response. Emergency Silt Control and Spillage Response Procedures contained within the Site Drainage Management Plan of the Construction Environmental Management Plan (CEMP) will ensure that appropriate information will be available on site outlining the spillage response procedure and a contingency plan to contain silt. A regular review of weather forecasts of heavy rainfall is required, and a contingency plan will be prepared for before and after such events. A record will be kept of daily visual examinations of watercourses which receive flows from the proposed development, during and for an agreed period after the construction phase. Water samples will be taken, and water quality will be monitored in accordance with a water monitoring programme, which will be agreed with Kildare County Council.
- The developer will ensure that erosion control, namely silt-traps, silt fencing and swales are regularly maintained during the construction phase.
- As mentioned in Section 4.3.5.1, existing overland flow channels will be maintained, and cross-drains provided in the access roads to allow continuity of flow. Interceptor drains will be constructed upslope where there are no existing channels, with cross-drains provided at regular intervals. The roadside drains will therefore only carry the site access road run-off and so avoid carrying large volumes of water and concentrating flows.
- During the construction period, an emergency facility will be provided to control the discharge from the stilling ponds. This will mitigate the risk of any accidental spillage on site affecting watercourses.
- As detailed in Section 4.3.5.3, roads will be capped as soon as practicably possible to cover exposed subsoils and as such reduce the concentration of suspended solids being conveyed in the run-off into the drainage system.
- As mentioned in Section 4.3.5.3, where access tracks pass close to watercourses, silt fencing will be used to protect the streams by reducing the concentration of suspended solids being conveyed in the surface water run-off into watercourses. Silt traps will also be provided at outfalls from roadside swales to existing drains. Silt traps will be kept upstream of outfalls to allow a buffer zone to the outfall.
- Wheel wash facilities will be located at the main site entrance to reduce construction traffic fouling public roads. The wheel wash will come with an additional water tank which will be filled regularly. These units will be self-contained and will filter the waste for ease of disposal. Waste will be removed from each unit and from site by a permitted contractor. Additional silt fencing will be kept on site in case of an emergency break out of silt laden run-off.
- Silt traps and silt fencing for the proposed wind farm development are proposed and will be put in place in advance as construction progresses across the site.

- Tree felling will be undertaken in accordance with the specifications set out in the Forest Service Forestry and Water Quality Guidelines (2000) (1) and Forest Harvesting and Environmental Guidelines (2000) (2), to ensure a tree clearance method that reduces the potential for sediment and nutrient runoff. This is further detailed below in the Tree Felling Plan in Section 4.3.6
- Roadside swales will serve to attenuate any increase in surface water run-off due to new hardcore tracks or existing track widening.
- Refuelling of plant during construction will only be carried out at dedicated refuelling station locations on site or at least 100m from a watercourse using mobile, double-skinned bowsers. This will reduce any risk of pollutants being conveyed in the surface water run-off, into the drainage system and subsequently into watercourses. Each station will be fully equipped for a spill response and a specially trained and dedicated environmental and emergency spill response team will be appointed before commencement on site. Only emergency breakdown maintenance will be carried out on site. Drip trays and spill kits will be kept available on site, to ensure that any spills from the vehicle are contained and removed off site.
- Temporary petrol and oil interceptors will be installed at the site compound and at all locations dedicated for plant repairs/storage of fuel/temporary generator installation. Surface water run-off from the compound will be directed through a Class 1 Bypass Separator before discharge to the potential silt laden water drainage system for the site. This dirty water flows to a stilling pond before final discharge over land.
- As detailed in Sections 4.3.5.1 and 4.3.5.3, to avoid any risk of groundwater contamination resulting from the foul drainage for the site, portaloos and/ or containerised toilets and welfare units will be used to provide toilet facilities for site personnel. Sanitary waste will be removed from site via a licenced waste disposal contractor.
- Where existing drains will be covered with hardcore as part of modifications for road widening to facilitate the turbine delivery route, the surface water will be temporarily culverted beneath the fill material to maintain the existing drainage regime.
- A buffer zone will remain between silt traps and watercourses with natural vegetation left intact so as to assist silt interception.
- Clear span bridge structures shall be used for the crossings of the Fear English River in accordance with planning drawings drawings P22-242-0300-0021 to P22-242-0300-0023 (included in Appendix 2). The extent of the excavation for bridge supports will be marked out and will include an allowance for trimming the sides of the excavation to provide a safe working area and slope batter. Bridge foundations will be designed and positioned at least 2.5m from the river bank

A detailed water quality monitoring programme will be undertaken during the construction phase of the proposed development, as detailed below in Section 4.3.5.5.1, so as to ensure the effective implementation of the proposed mitigation measures.

4.3.5.5.1 Water Quality Monitoring Plan

A monitoring programme will be established to ensure that the water quality is maintained and to ensure the effectiveness of designed control and other mitigation measures. The details of this programme are outlined below.

- Daily visual inspections of drains and outfalls will be performed during the construction period to ensure suspended solids are not entering the streams and rivers of the site, to identify any obstructions to channels, and to allow for appropriate maintenance of the drainage regime. If excessive suspended solids are noted, construction work will be stopped, and remediation measures will be put in place immediately.
- Fortnightly visual inspections will be continued during the operation period until satisfactory vegetation is established on site.
- Prior to construction, turbidity monitors will be put in place downstream of the site and a baseline will be formed of existing levels in the water bodies. These levels will be used to set trigger levels for each location. Should these trigger levels be exceeded during construction, works in the area of the effected watercourse will be stopped until the source of the turbidity can be identified. Any additional mitigation will be implemented if necessary to reduce turbidity to acceptable levels.
- Chemical water quality sampling will be undertaken from a representative number of locations upstream and downstream to provide a baseline against which samples taken during the construction stage can be assessed. Trigger values will be defined based on the pre-construction monitoring results however maximum guideline values are provided in below; and are based on S.I. No. 293/1988 - European Communities (Quality of Salmonid Waters) Regulations, 1988.
    - Chemical water sampling will be taken from several sample sites; both up and downstream of watercourses. Water samples will be analysed via a licensed laboratory for the following parameters: pH, dissolved oxygen, suspended solids, total ammonia, nitrites, biochemical oxygen demand (BOD), total ammonium and total residual chlorine.
    - Chemical water sampling will be taken on a weekly basis during the site clearance and earthworks stage of the construction period.
    - Following site clearance and earthworks stage of the construction period, sampling will be taken on a monthly basis until full re-vegetation has occurred, unless otherwise directed by the Planning Authority or Inland Fisheries Ireland (IFI).
- Biological water sampling will be undertaken from the same representative number of locations upstream and downstream to provide a baseline against which samples taken during the construction stage can be assessed.
    - Biological sampling will be undertaken via kick sampling, using Q-Value or Small Stream Risk Assessment (whichever is the most appropriate for the available habitat). Macroinvertebrates will be identified where possible on the banks of sample site.
    - Biological water sampling will be carried out during the site clearance and earthworks stage of the construction period on a monthly basis during the construction phase.
    - Following site clearance and earthworks stage of the construction period, samples will be taken on a quarterly basis, until full re-vegetation has occurred or unless otherwise directed by the planning authority or IFI.

Table 4-6: Water Quality Monitoring Parameters

Parameter	Maximum Guideline Value
pH	≥6 ≤9
Dissolved Oxygen (mg/litre O_2)	50% ≥ 9

Parameter	Maximum Guideline Value
Suspended Solids (mg/l)	≤25
Total Ammonia (mg/l N)	≤0.02
Biochemical Oxygen Demand BOD (mg/l O_2)	≤5
Nitrites (mg/l NO_2)	≤0.05
Total Ammonium (mg/l NH_4)	≤1
Total residual Chlorine (mg/l HOC1)	≤0.005
pH	≥6 ≤9
Dissolved Oxygen (mg/litre O_2)	50% ≥ 9

The grab samples will be taken on a monthly basis during the site clearance and earthworks stage of the construction period. Following this stage, the samples will be taken on a quarterly basis, unless otherwise directed by the planning authority or IFI.

4.3.5.6 Operational Phase Mitigation Measures

It is not envisaged that the operation of the Proposed Development will result in significant impacts on the hydrological regime or water quality of the area, as there will be no further disturbance of soils post-construction, and only a minimum of traffic movement.

The conceptual drainage has been designed to operate effectively during the operation period. A portion of the stilling ponds will be a permanent feature and will continue to be effective in filtering the run-off from the site should any accidental release of silt combine with the surface water run-off during operational activities.

During the operation period the swales will have vegetated and will serve to attenuate flows and remove suspended solids from the run-off.

Oil used in transformers (at the substation and within each turbine) and storage of oils in tanks at the substation could leak during the operational phase and impact on groundwater quality. The substation transformer and oil storage tanks will be in a concrete bunded with a holding capacity as detailed in Section 4.3.5.1. Turbine transformers are located within the turbines, so any leaks would be contained.

A monitoring programme will be established to ensure that the water quality is maintained. The details of this programme are outlined above. This programme will ensure that designed measures are working to ensure water quality is not affected.

Visual inspections will be continued during the operational period until satisfactory vegetation is established on site at intervals to be agreed with Kildare County Council/IFI.

4.3.5.7 Decommissioning Stage and Mitigation Measures

As in the construction phase silt protection controls would again be put in place. The drainage system will remain operational during the decommissioning phase and will serve to treat any sediment laden surface water run-off due to a renewed disturbance of soils. Revegetation following the backfilling of hardstanding areas will be monitored. If it is deemed necessary, erosion control matting will be used to assist in the re-establishment of vegetation.

4.3.6 Tree Felling Plan

A total area of 28.4 ha of wooded habitats will be subject to tree felling as part of the proposed development. The proposed area of tree felling will be limited to:

- Areas adjacent to turbines T6, T7, T8, T9, T10 and T11 so that the required infrastructure can be facilitated at these locations;
- Minimal trimming along existing access tracks to ensure that the widened footprint of these access tracks can be accommodated;
- Corridors along the proposed new access tracks to ensure that the footprint of these can be accommodated;

This tree felling will be the subject of a Felling Licence from the Forest Service (as described in Section 4.2.3) and will be in accordance with the conditions of such a licence. The planting of trees in replant lands in considered in the replanting impact assessment.

To ensure a tree felling method that reduces the potential for sediment and nutrient runoff, the construction methodology will follow the specifications set out in the Forest Service Forestry and Water Quality Guidelines (2000) and Forest Harvesting and Environmental Guidelines (2000).

Before any felling commences on site all personnel, particularly machine operators, will be made aware of the following and will have copies of relevant documentation, including:

- The surface water management plan, the construction environmental management plan and any contingency plans;
- Environmental issues relating to this project and the site of the proposed development;
- The outer perimeter of all buffer and exclusion zones; and
- All health & safety issues relating to the site.

The harvester represents the first point of contact between machinery and the ground and therefore the layout of the extraction racks is critical.

The layout of extraction racks or routes will be designed to:

- Avoid streams or other watercourses;
- Be as short as possible;
- Avoid any areas of poor crop or bare areas; and
- Generally, extract to access tracks with the extraction racks laid out at right angles to the road to prevent water flowing down wheel ruts.

Brash management will include the immediate removal of loosed material. In addition, dense, fresh brash mats will be utilised in order to minimise soil damage, erosion and sedimentation during felling.

These will be designed and installed to protect the underlying soil from damage and will be maintained throughout the felling operation. Their purpose is to prevent breaking of the ground surface thus preventing silt or nutrient run-off.

Brash mats will be topped up in sections when they become heavily used or worn. Where damage or serious rutting has started to occur extraction will be suspended immediately. Relocation of the extraction rack or additional brashing will be used to remedy the situation.

Extraction routes will be as short as possible and will avoid the crossing of watercourses. Trees will be felled away from aquatic zones. Branches, logs or debris will not be allowed to accumulate in aquatic zones and will be removed immediately to mitigate against nutrient losses, particularly phosphorus. Additional silt fencing will be erected along the banks of any streams at the location of the proposed tree felling to provide additional protection to the watercourses in this area. To ensure a tree clearance method that reduces the potential for sediment and nutrient runoff, the construction methodology will follow the specifications set out in the Forest Service Forestry and Water Quality Guidelines (2000) and Forest Harvesting and Environmental Guidelines (2000).

The brash will be bundled and recovered from the site as felling progresses in a process known as forest residue recovery. Double-wheeled machinery and corduroy rafts (close poling) will be used as necessary to maximise the recovery of brash and where the bearing capacity of the ground is poor. Extraction and cutting will be suspended during and following heavy rainfall periods.

No significant increase in the rate of run-off is anticipated as a result of felling nor is the risk of downstream flooding or sedimentation due to erosion increased. Mitigation measures for the protection of surface water during felling are detailed in Section 4.3.5.

4.3.7 Archaeological Management Plan

The Proposed Development will have no direct impact on any UNESCO World Heritage Site, National Monument, protected structures, NIAH sites or features, NIAH garden survey sites or on Architectural Conservation Areas. There are no protected structures located within the proposed wind farm boundaries and few sites of recorded architectural interest or significance are within the surrounding area.

The Proposed Development will have no setting impacts on any UNESCO World Heritage Sites or candidate sites on the tentative list. During the operational phase the wind farm could potentially affect the setting of 6 heritage assets, level of impacts ranges from not significant to slight for these sites.

As with any developments proposed within a greenfield environment, there is a potential that previously unknown below ground remains of an archaeological interest will be revealed as a result of earthmoving activity associated with the development. The following are areas of archaeological potential:

- Dryland/ Wetland interface potential
- Former bogland
- Forest plantation on former dryland
- River Crossings

Mitigation Measures

The following mitigation measures will be carried out at the earliest stages of construction/ during the site preparation phase. All archaeological works will take place under licence to the National Monuments Service of the Department of Housing, Local Government and Heritage (DHLGH).

Archaeological monitoring of all earth-moving works will be undertaken at all earthmoving/excavation works associated with the development of:

- Turbine foundations
- Access tracks
- Hardstands
- Internal cables
- Temporary construction compounds
- Earthen berms and landscaping along the access tracks and around the turbines

The purpose of monitoring is to determine if any archaeological material or features are uncovered during ground disturbance works. In the event of the discovery of archaeological finds or remains, the DHLGH and the NMI will be notified immediately. Provision will be made to allow for, and fund any, archaeological work that may be needed if any remains are noted. If features are revealed, the immediate area will be investigated, allowing no further development to take place until the site is fully identified, recorded and excavated or alternatively avoided to the satisfaction of the statutory authorities. In accordance with best practice and legislative requirements this provision would include the production of written reports on the findings, with post-excavation analyses and publications of the results of the works, where appropriate.

Turbine Delivery Routes

As a best practice measure a baseline condition survey will be carried out at Johnstown Bridge (RPS B04-25). This will be undertaken to record baseline data which will be monitored during construction phase.

Indirect effects on setting mitigation

There is no mitigation possible for this potential impact; instead, mitigation by design was actively carried out during the EIAR process. Using a GIS spatial data, the archaeological, architectural and cultural heritage features identified during the baseline study and field survey work were used as a tool by all consultants. Arriving at the final proposed layout was through a series of iterative phases and interaction with all of the technical consultants.

General

Attention is drawn to National Monuments Acts (as amended) which still active, and the Historic and Archaeological Heritage and Miscellaneous Provisions Act (2023) (Appendix 14, Section 14.1), which states that in the event of the discovery of archaeological finds or remains, the Department of Housing, Local Government and Heritage and the National Museum of Ireland should be notified immediately. In such a scenario, the archaeological finds or remains will need to be investigated, and no further development will take place in that area until the finds or remains are resolved in agreement with the relevant authorities.

During the construction phase all mitigation measures will be undertaken in compliance with national policy guidelines and statutory provisions for the protection of the archaeological, architectural and cultural heritage.

4.3.8 Waste Management Plan

It will be the objective of the Developer in conjunction with appointed contractor to prevent, reduce, reuse and recover as much of the waste generated on site as practicable and to ensure the appropriate transport and disposal of residual waste off site. This is in line with the relevant National Waste Management Guidelines and the European Waste Management Hierarchy, as enshrined in the Waste Management Act 1996, as amended.

Any waste generated during the development construction phase will be collected, source separated and stored in dedicated receptacles at the temporary compounds during construction.

This Construction Waste Management Plan has been prepared for the Proposed Development in line with the" Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects" (2006) as published by the Department of the Environment, Community and Local Government and supported by the Eastern-Midlands Region Waste Management Plan 2015-2021.

The Waste Management Plan shall be finalised in accordance with this plan following the appointment of the contractor for the main construction works and will take cognisance of any planning conditions attached to the consent. This plan should be read in conjunction with the EIAR.

Assignment of Responsible Personnel

It will be the responsibility of the contractor for the main construction works (when appointed) to nominate a suitable site representative such as a Project Manager, Site Manager or Site Engineer as Waste Manager who will have overall responsibility for the management of waste. The waste manager will have overall responsibility to instruct all site personnel including sub-contractors to comply with on-site requirements. They will ensure that at an operational level that each crew foreman is assigned direct responsibility.

Waste Generated

It is envisaged that the following categories of waste will be generated during the construction of the project:

- municipal solid waste (MSW) from the office and canteen
- construction and demolition waste
- waste oil/hydrocarbons
- paper/cardboard
- timber
- steel

A fully authorised waste management contractor will be appointed prior to construction works commencing. This contractor will provide appropriate receptacles for the collection of the various waste streams and will ensure the regular emptying/and or collection of these receptacles.

Waste Minimisation/Reduction

All efforts will be made by site management to minimise the creation of waste throughout the project. This will be done by:

- material ordering will be optimised to ensure only the necessary quantities of materials are delivered to site
- material storage areas will be of a suitable design and construction to adequately protect all sorted materials to ensure no unnecessary spoilage of materials occurs which would generate additional waste
- all plant will be serviced before arriving on site. This will reduce the risk of breakdown and the possible generation of waste oil/hydrocarbons on site
- all operators will be instructed in measures to cut back on the amount of wastage for trimming of materials etc. for example cutting of plywood, built into the amount ordered
- educating foremen and others to cut/use materials such as ply wisely for shutters etc.
- prefabrication of design elements will be used where suitable to eliminate waste generation on site
- where materials such as concrete are being ordered, great care will be practiced in the calculation of quantities to reduce wastage.

Waste Reuse

When possible, materials shall be re used onsite for other suitable purposes e.g.

- re-use of shuttering etc. where it is safe to do so
- re-use of rebar cut-offs where suitable
- re-use of excavate materials for screening, berms etc.
- re-use of excavated material etc. – where possible will be used as suitable fill elsewhere on site for the new site tracks, the hardstanding areas and embankments where possible.

Waste Recycling & Recovery

In accordance with national waste policy, source separation of recyclable material will take place. This will include the provision of receptacles for the separation and collection of dry recyclables (paper, cardboard, plastics etc.), biological waste (canteen waste) and residual waste.

Receptacles will be clearly labelled, signposted and stored in dedicated areas.

The following sourced segregated materials container will be made available on site at a suitable location:

- timber
- ferrous metals
- aluminium
- dry mixed recyclables
- packaging waste
- food waste.

The materials will be transported off-site by a licensed contractor to a proposed recovery centre and these materials will be processed through various recovery operations.

Waste Disposal

Residual waste generated on-site may require disposal. This waste will be deposited in dedicated receptacles and collected by the licensed waste management contractor and transported to an appropriate facility. All waste movements will be recorded, of which records will be held by the waste manager on-site.

Contaminated Material

Any contaminated soils will be handled, removed and disposed of in accordance with statutory requirements for the handling, transportation and disposal of waste. In particular, the following measures will be implemented:

- Contaminated material will be left in-situ and covered, where possible until such time as WAC (Waste Acceptance Criteria) testing is undertaken in accordance with recommended standards and in-line with the acceptance criteria at a suitably licenced landfill or treatment facility. This will determine firstly the nature of the contamination and secondly the materials classification i.e. inert, non-hazardous or hazardous,
- If the material is deemed to be contaminated, consultation will take place with the respective local authority and/or EPA on the most appropriate measures. Such materials will be excavated, transported by a contractor with a valid waste collection permit and recovered/disposed of at an appropriate facility.

Training

Copies of the project waste management plan will be made available to all relevant personnel on site. All site personnel and sub-contractors will be instructed about the objectives of the Plan and informed of the responsibilities that fall upon them as a consequence of its provisions.

It will be the responsibility of the contractors appointed (Waste Manager) to ensure that all personnel are made aware of their responsibilities under the plan via a toolbox talk or otherwise.

4.3.9 Traffic Management Plan

This document is the Construction Traffic Management Plan (TMP) for the Proposed Development site. The Construction Traffic Management Plan shall be finalised in accordance with this plan following the appointment of the contractor for the main construction works and the turbine supply contract.

Please note that some items in this plan can only be finalised with appropriate input from the contractor who will actually carry out and schedule the works. Furthermore, it is appropriate that the Project Supervisor Construction Stage (PSCS), when appointed, should have an active role in the preparation/review of the Traffic Management Plan.

This plan should be read in conjunction with Chapter 13 of the EIAR.

The contractor is required to prepare the necessary Site-Specific Traffic Management Plans prior to the construction works commencing in accordance with Chapter 8 of the Traffic Signs Manual and subject to load permits.

The contractor will be responsible for the implementation of all agreements between the developer and Kildare County Council with the objective that the transportation needs for the proposed development will have a minimal impact on the road network and local communities.

As with any construction development project, the transport of materials onto the site will give rise to increased traffic and associated impacts. However due to the very nature of construction these impacts will be temporary.

Construction traffic will require regular access to the site at varying times throughout the construction phase.

The aim of this TMP is to put in place procedures to manage traffic effectively on site and in the immediate vicinity of the proposed development, to ensure the continued movement of traffic on the public roads and to minimise disturbance during transportation of materials particularly oversize loads.

The correct implementation of this TMP will ensure that appropriate procedures are in place to minimise any effects on the safety and movement of the general public.

Prior to the commencement of construction, the TMP will be reviewed by the main contractor (and any sub-contractors) and will be updated as necessary.

General Traffic Management Measures

General measures that shall be addressed in the TMP shall include:

1. **Traffic Management Coordinator** - A dedicated competent Traffic Management Coordinator will be appointed for the duration of the project and this person will be the main point of contact for all matters relating to traffic management on the project.
2. **Road Pre- Construction Condition Survey** - A pre-condition survey will be carried out in advance of any construction works on the public roads that will be agreed to be used as haul routes in connection with the works to record the condition of the road. The specification and timing of the pre-construction survey will be agreed with Kildare County Council and TII as appropriate. A joint survey shall be undertaken if required by the relevant roads authority.
3. **Site Inductions** - All workers will receive a comprehensive site induction which shall include, as appropriate, a section on traffic management and clear guidance on the routes which should and should not be used.
4. **Public Consultation** - Subject to agreement with the planning authority, a letter drop will be carried out to notify members of the public living near the proposed site/route/roadworks, to advise them of any particularly significant upcoming traffic related matters e.g. temporary lane/road closures, delivery of turbine components at night.
5. **Signage** - A system of clear signage relating to the project, both temporary and permanent, will be agreed with the planning authority. These signs will also identify those roads to be used (and not to be used) for accessing the site in line with the objectives of the Construction TMP.
6. **24 Hour Emergency Phone Number** - A 24-hour emergency phone number will be maintained for the duration of the construction works and the number will be noted on temporary signage at each works area (for cable works) and at the site entrance at a minimum.
7. **On-Site Vehicle Cleaning** - Temporary wheel washing facilities will be located at the site entrance, subject to agreement with the planning authority, to prevent soil/dirt from being transported onto the public road network.
8. **Road Cleaning and Maintenance** - Road sweepers will be utilised to maintain the public roads in a clear condition. This will apply especially during the earthworks stages of the project.

9. **Road Opening Licensing** - Road works associated with the cabling on the public road will be undertaken in line with the requirements of the road opening licence, the terms of which will be set out by Kildare County Council.

10. **Adjacent Dwellings** - A number of mitigation measures shall be put in place so as to reduce the impact on the residential dwelling (family member of involved landowner) adjacent to the site entrance during construction. These include the following:

    a. All construction traffic shall follow the identified haul route, as such, any temporary noise from construction will be moving away from the dwelling on entering the site.

    b. A noise attenuation barrier will also be put in place along the boundary of the site to reduce any further temporary noise impacts on the dwelling. This can be done in consultation/agreement with the neighbouring residents if permitted.

    c. A commitment is given that no construction traffic vehicles will loiter outside the dwelling.

    d. The residents will be kept informed of the traffic movements during construction by way of leaflet drops so they are aware of different stages of development/construction.

    e. Commitment to keep speed below 20-30kph beside the dwelling to reduce noise/vibration from passing trucks.

    f. Dust monitoring will take place at the site entrance and there will be done daily visual checks for dust deposition. Dust screens or other suitable measures will be put in place , as required.

11. **Local Access** - Reasonable access to local dwellings, farms, and businesses is to be maintained at all times during any road closure associated with the cable works. The details of this will be agreed with the roads authority in advance of the works, in consultation with the local residents in so far as is practicable. The section of local road impacted during cable works is a cul de sac and therefore diversions are not suitable. Reasonable access will be retained and the works will be short term in duration for the impact owing to the cabling works.

12. **Road Safety Assessment Stage 1 of 2** - A Road Safety Assessment has been carried out by an independent consultancy JB Barry & Partners Ltd. in March 2019 for the proposed development, specifically, to consider the suitability of the haul routes indicated in the previous 2018 EIAR for use. The findings of this RSA resulted in a number of local roads in the site vicinity being removed as potential haul routes (the L5024, L5017, L5011). The RSA also advised that, where possible, bypass routes of urban centres should also be used (for example, the urban centres of Prosperous, Clane, Enfield, Naas, etc. should be avoided by haul traffic where possible).

    The Road Safety Assessment has been carried out to confirm the suitability of the existing road network, from a safety point of view, to accommodate the proposed construction traffic. The following paragraphs identify the links on the road network surrounding the proposed development. The findings and recommendations of the RSA have been incorporated into current the approach.

M4

The M4 is a dual carriageway motorway, designed and constructed in compliance with NRA/TII guidelines. Road Safety Audits are carried out on all motorways as part of the various stages of the design and construction process. The M4 will be used for transporting materials as well as turbine components to the site. This road carries large volumes of traffic and functions as a strategic national route. It is therefore suitable for use by HGV traffic for material deliveries to the site. The Turbine Delivery Report (TDR), which is included in Appendix 13.1 of the EIAR (Volume 3), assesses the suitability of a route for abnormal load delivery, such as turbine blades or tower sections for the turbines. This TDR report also outlines accommodation works required to facilitate these deliveries on the preferred route. The M4 was selected as the preferred route as alternatives would require vehicles to pass through areas of soft ground or towns such as Edenderry. Accommodation works are not required on the M4 itself. The Enfield Interchange (Junction 9 on the M4) requires minor accommodation works but these do not raise any safety concerns. Any signs to be removed to facilitate deliveries will be reinstalled immediately following the delivery, and deliveries will be coordinated in conjunction with An Garda Síochána.

R402

The R402 is a regional road which will be used for HGVs and general traffic to and from the proposed development, as well as forming part of the turbine delivery route. It forms the main road between Edenderry and the M4. This is generally a wide and flat road with one lane in each direction, approx. 7m wide, with good visibility. There are a number of bends on the road, but it is reasonably heavily trafficked, and no safety concerns are anticipated for use by general traffic, including HGVs. This section of the R402 was upgraded in recent years and the junction of the R402/L5025 was widened and upgraded to include left-turn and right-turn pockets. This junction is considered to provide sufficient visibility and geometry to allow HGV movements in all directions. Minor accommodation works are required to facilitate turbine delivery; however, these are generally limited to temporary removal of signage and a street light, which will be reinstated immediately following the deliveries. As with the M4, turbine deliveries will be coordinated in conjunction with An Garda Síochána.

R403

The R403 is a regional road connecting Carbury and Allenwood. It is proposed to use this for HGV traffic approaching the site from the south. Similar to the R402, it is a single carriageway road with generally good visibility. It is not proposed to route turbine deliveries via the R403.

L5025

The L5025 is a local road which provides the access route to the site itself from the R402. It will therefore be used by all traffic entering and exiting the site.

Turbine deliveries via this route will require accommodation works including paving an area of verge on the southern side of the road, and potential trimming of hedgerows. Turbine deliveries will be coordinated in conjunction with An Garda Síochána to ensure safe navigation of this stretch of road.

The L5025 is narrower than the regional roads and carries lower volumes of traffic. Visibility is good and there are locally widened areas. It should be noted that this road passes through a rural area and therefore is regularly used by agricultural vehicles, with approx. 60 HGVs currently passing along it in both directions each day. HGVs and site traffic will therefore use this road in both directions and it is not anticipated that there will be any particular safety concerns on this section of road for delivery vehicles. Prior to construction, the appointed contractor will liaise with Kildare County Council with regard to the Construction-stage Traffic Management Plan, including any construction stage speed limits that may be required on the L5025.

L50242

The L50242 local road is a cul de sac located in a central location of the proposed development site. The L50242 will be utilised for cable installation so as to connect the northern and southern section of the site. The road will also be utilised as a connection between the southern and northern sections of the site throughout construction with a secondary construction entrance on the L50242.

L5012

Prior to construction, the appointed contractor will liaise with Kildare County Council with regard to the Construction-stage Traffic Management Plan, including any construction stage speed limits that may be required on the L50242 and the L5012.

Mitigation Measures –Turbine Delivery Route

1. **Programme of Deliveries** – As agreed with Kildare County Council, a programme of deliveries will be submitted to Kildare County Council in advance of deliveries of turbine components to site. The programme will include details of the dates and times of each turbine component delivery along with the weight of each load, the route to be taken and details on support vehicles.
2. **Reinstatement** – Any areas affected by the works to facilitate turbine delivery will be fully reinstated to their original condition.
3. **Consultation** with the local authorities should be included in the contractor's traffic management plan to manage turbine component deliveries where necessary.
4. **Detailed Structural Surveys of Crossings -** Visual inspections indicate that all existing crossings along the TDR between the M4 and the proposed site entrance are capable of safely carrying the expected loads. Where required structural surveys of selected crossings along the TDR can take place during the detailed design phase prior to commencement.

Mitigation Measures – Operational Phase

No mitigation measures required.

Mitigation Measures – Decommissioning

All decommissioning works are to be carried out in accordance with a decommissioning plan (including details of traffic management) to be agreed with the planning authority in advance of the works.

Construction Staging

The approximate period of construction for completion of the total scheme is estimated to take 18 months. Once the bulk civil works are completed, grid connection works will take place, followed by an element of testing and commissioning of the wind farm and substation. It is anticipated that traffic associated with this element of the works will be minimal, with between 2 and 4 crew vans accommodating the movement of staff to and from the different WTG sites within the wind farm site.

The construction of Proposed Development will generally include a sequence of distinct construction activities:

- Construction of main road access, site entrances and amenity trail.
- Initial installation of on-site access tracks and fence lines.
- Development of the construction compounds and other temporary works.

- On-site tracks and drainage.
- Preparation of crane hard standings.
- Construction of foundations.
- Installation of cabling within wind farm.
- Installation of Wind Turbine Generators (WTGs).
- Installation of cabling, substation and control building.
- Grid connection works.
- Land reinstatement.

Construction Plant and Vehicles

The typical construction plant and vehicles used as part of the construction of a wind farm site are as follows (non-exhaustive):

- Hydraulic Excavators
- Dump Trucks
- General construction delivery vehicles (e.g. steel reinforcement bar, electrical components etc.)
- Concrete trucks and pumps
- Cranes of various lifting capacities (up to 1000 tonnes)
- Oversized articulated delivery vehicles (for turbine component transport)
- Site Jeeps (off-road 4x4 all purpose vehicles)
- Private vehicles of those employed on site for the construction phase

It should be noted however that final selection of construction plant and vehicles may vary depending on suitability, availability, contractor's choice, etc.

Plant operators will be responsible for the upkeep and maintenance of construction plant and vehicles, ensuring good working order prior to use. Should emergency maintenance need to be carried out on site, this will be carried out at a designated area away from sensitive receptors and will ensure that a spill kit is nearby.

The hours of construction activity will be agreed with Kildare County Council and will be limited to avoid unsociable hours as per Section 8.5 (d) of the code of practice for BS 5228: Part 1: 1997. Construction operations shall generally be restricted to between 07:00 hours and 19:00 hours Monday to Saturday. It should be noted that it may be necessary to commence turbine base concrete pours earlier due to time constraints incurred by the concrete curing process.

Work on Sundays or public holidays will only be conducted in exceptional circumstances, to be agreed with Kildare County Council, or in an emergency. Additional emergency works may also be required outside of normal working hours as quoted above.

Construction commencement dates are yet to be confirmed at this stage; these will be made known to the Planning Authority by way of formal Commencement Notice.

Consultation and Notification

An Garda Síochána

Following the appointment of the successful contractor for this project, this Transport Management Plan shall be finalised following the appointment of the contractor for the main construction works. The contractor will liaise directly with An Garda Síochána in relation to the plan and any concerns/requirements they have will be incorporated in to the plan. This may include details in relation to the escorting of oversized loads.

The necessary permits (including approved route permits) will be applied for and obtained from An Garda Síochána.

County Council

The contractor will liaise directly with the County Council in relation to the plan and any concerns/requirements they have will be incorporated in to the plan. The contractor will also liaise with other local authorities, as necessary, along the final turbine delivery route.

The necessary permits (including standard permits) will be applied for and obtained from the relevant local authorities.

Local Residents

The following measures will be used to communicate the necessary information to the households along the local road to be used as a haul road:

(a) Information signs will be erected in advance of the construction/transportation works.

(b) A flyer drop will be carried out to advise households along the local road leading to the site in relation to the programme of construction works and especially in relation to oversized load movements.

(c) Contact details for a Liaison Officer will be provided so that any concerns can be easily channelled to the Developer.

Complaints will be entered into the site complaints log and the relevant site environmental officer will arrange to meet with those affected. The situation will be acted upon immediately and reviewed by the Project Manager.

Key Personnel and Responsibility

Once prepared and agreed with Kildare County Council and An Garda Síochána the contractor will implement the project specific Traffic Management Plan (TMP).

Please note that some items in this plan can only be finalised with appropriate input from the contractor who will carry out and schedule the works. Furthermore, it is appropriate that the Project Supervisor Construction Stage (PSCS), when appointed, should have an active role in the preparation/review of the Traffic Management Plan.

The following members of the contractors' staff will have responsibility for adherence to the TMP as follows:

Traffic Management Coordinator

The Traffic Management Coordinator will be responsible for maintaining regular contact with An Garda Síochána, Kildare County Council, the statutory bodies and the client concerning traffic control, interference with services and co-ordination of crossings at roads, rivers and railways.

The Transport Management Coordinator will contact the relevant bodies in relation to method statements prior to the work taking place. The Transport Management Coordinator will be responsible for instructing the Construction Manager, Foreman and all other personnel on the information in the agreed method statement prior to the work commencing and ensuring that the method statement is adhered to.

The Transport Management Coordinator will be responsible for ensuring that the Traffic Management Plan will be implemented in full.

Safety Officer

The Safety Officer will be responsible for implementing all safety requirements detailed in the Project Safety Plan. Ensure that all operatives receive site safety induction prior to commencing work on site. They will ensure that all plant, particularly lifting equipment, on site has the relevant certification and are checked regularly by a competent person. The Safety Officer will carry out safety audits and checks on a regular basis and amend procedures where necessary.

Construction Manager

The Construction Manager will be responsible for overall supervision of the operations to ensure they are constructed in a safe and efficient manner. They will ensure that sufficient resources are available to meet the programme and that the necessary information is provided to the appropriate staff.

Foreman

The Foreman is responsible for ensuring that the crew carry out the work in accordance with the method statement and contract specifications and drawings using good working practices in a safe manner. They will supervise construction personnel ensuring their competence. He will check all plant and equipment on a regular basis ensuring it is maintained and in good working order.

Wind Turbine Generator Deliveries

A detailed turbine delivery route assessment has been carried out for the project which can be found in Appendix 1 of this CEMP.

The components of 11 no. Wind Turbine Generators (WTG's) will be transported by road to the proposed development for on-site assembly, using the access route outlined in the above Turbine Delivery Route Assessment Report.

Wind turbine component deliveries, cranes and all large plant associated with turbine installations will use the turbine delivery route shown in Figure 2-1.

Restricted Public Road Use by Construction Traffic

The local authority may impose restrictions on the use of some local roads. These will be agreed in liaison with Kildare County Council prior to construction and will be outlined in this section, as well as specific signage requirements for construction works.

Materials will be delivered to site where possible via the indicative haul routes shown in Figure 4-8.

Road Closures, Diversions and Safety Measures for Road Crossings

There will be a small section of cable installed over Circa 1.38km of the public road L50242 required in order to connect the northern and southern turbines. It is important to note that the road works and the associated impact will move as the works progress and therefore the impact along this one stretch of road will be temporary.

In order to maintain this local access it is proposed to trench the cabling within the grass verge along the section of the route where local access needs to be maintained. This prevents the requirement for full road closures for the entire length of the cable route and effectively maintains local access where it is required. All traffic management measures will be developed and agreed in advance with KCC.

The L50242 cul de sac is at present too narrow for vehicles to pass each other except for where passing bays exist. There are existing passing bays on the route, which provide good visibility along the route and thus will continue to operate effectively in combination with the use of a banksmen at the site entrances on the L50242 and passing bays in order to hold vehicles until the route ahead is clear, allowing for HGVs to pass. The L50242 will operate effectively through the use of these existing passing bays combined with the use of banksmen, the good forward visibility currently present for vehicles and the relatively low frequency of vehicles on the route (owing to the fact that there are only two dwellings along the stretch of road in question).

Road Cleaning

Public roads shall be kept free of mud, dust, spillages and debris from the construction site, construction plant or haulage vehicles. Any necessary measures shall be put in place at the site entry/exit points.

Carriageway/ Road Reinstatement

It is anticipated that the proposed haul routes will be capable of accommodating the construction traffic associated with the project. After the main contractor is appointed and the haul routes are agreed with Kildare County Council. In the event that there are concerns around the structural capacity of a road on a proposed haul route, a structural survey shall be carried out to determine suitability of the existing roads to carry the loading. Where the structural survey indicates that a proposed haul route is not in a suitable condition, details of any upgrading works required shall be submitted to Kildare County Council for approval. The developer shall upgrade the road or junction in advance of haulage operations.

A pre-condition survey of haul routes, consisting of a video survey and photographs shall be carried out and a copy submitted to Kildare County Council. Any damage caused to the road shall be repaired to its previous condition, to the satisfaction of Kildare County Council. Any defects that appear during the haulage period shall be rectified by the project owner.

Additional Information and Mitigation Measures

Turbine Delivery Route

The TDR has been considered and chosen following route analysis by North Kildare Wind Farm Ltd. The TDR selection report is provided in Appendix 1 and is referred to hereunder as the "TDR Report".

The report identifies all alterations needed at bends and junctions required for turbine component delivery to the Proposed Development site.

The selection of the TDR has been undertaken to eliminate as far as possible and minimise any disruption to the road network to facilitate the delivery of wind turbine generators from the M4 motorway to the site.

It is proposed to deliver turbines to the site from the M4 motorway, then the R402 to the junction of the L402/L5025 and follow the L5025 to the main site entrance.

The appointed contractor will undertake adequate traffic management when performing these works to minimise impacts on local road users. Boundaries will be reinstated, and hedge planting undertaken as required following delivery of the turbine components.

- Programme of Deliveries – As agreed with Kildare County Council, a programme of deliveries will be submitted to Kildare County Council in advance of deliveries of turbine components to site. The programme will include details of the dates and times of each turbine component delivery along with the weight of each load, the route to be taken and details on support vehicles.
- Reinstatement – Any areas affected by the works to facilitate turbine delivery will be fully reinstated to their original condition.
- Consultation with the local authorities should be included in the contractor's traffic management plan to manage turbine component deliveries where necessary.
- Detailed Structural Surveys of Crossings - Prior to commencement of works on site, a structural survey of crossings along the TDR between the M4 and the site entrance be carried out by a suitably qualified engineer.

Cable Works

- Road Opening Licence - The road works associated with the cabling will be undertaken in line with the requirements of A road opening licence as agreed with Kildare County Council.
- Maintain local access during diversions and road closures – reasonable access to local dwellings, farms and businesses will be maintained at all times during any road closures associated with the cable works. The details of this will be agreed with the roads authority in advance of the works in consultation with the local residents in so far as is practicable. The network of local roads in the area will be used for traffic diversions for local traffic in order to expedite the works and limit the duration of the impact owing to the cabling works.
- Road Cleanliness - Appropriate steps will be taken to prevent soil/dirt generated during the trenching works from being transported on the public road. Road sweeping vehicles will be used to ensure that the public road network remains free of soil/dirt from the site.
- Temporary Trench Reinstatement - Trenches on public roads, once backfilled, will be temporarily reinstated without delay to the satisfaction of the roads authority.

- Surface Overlay after Trench Reinstatement – Following temporary reinstatement of trenches on public roads, and subject to agreement with the roads authority, sections of public roads along which the cable route travels will receive a surface overlay.
- Haul Route Interface - Aggregate imported to the Proposed Development from indicative quarry locations would be managed where possible to not coincide with the grid connection works.

Haul Routes

The indicative haul route, as presented on Figure 4-8, shows the routes that will be taken by most construction traffic to the wind farm from indicative quarry locations.

The proposed site entrance design is shown on planning application drawing P22-242-0300-0015 in Appendix 2.

The site entrance location on the L5025 shall provide 160m visibility to the north and 155m to the south when developed. It is considered that the sightline of 155m to the south will provide adequate visibility to oncoming traffic for traffic exiting the site, and vice versa. Advance signage will be provided on the L5025 in both directions to alert road users to the presence of HGVs and the proximity of the construction site.

Minor roadside hedgerow trimming will be required immediately to the east and west of the proposed entrance in order to maintain the above-mentioned sightlines. The proposed design has been developed with an "X" distance of 3m which is the allowable relaxed standard for new accesses on regional and local roads.

The internal road layout of the Proposed Development has been designed to ensure connectivity between various parts of the Proposed Development without the need to use existing local roads. The design of this internal road network and the connectivity it provides will significantly reduce the need to use local roads during the construction of the proposed development.

Operational Stage Impacts and Mitigation

There will be no significant operational stage traffic impacts associated with the proposed development.

Decommissioning Stage

On decommissioning, the adoption of and adherence to a decommissioning plan which will include traffic management proposals will ensure that the residual impacts on traffic and transport at the decommissioning stage will not be significant.

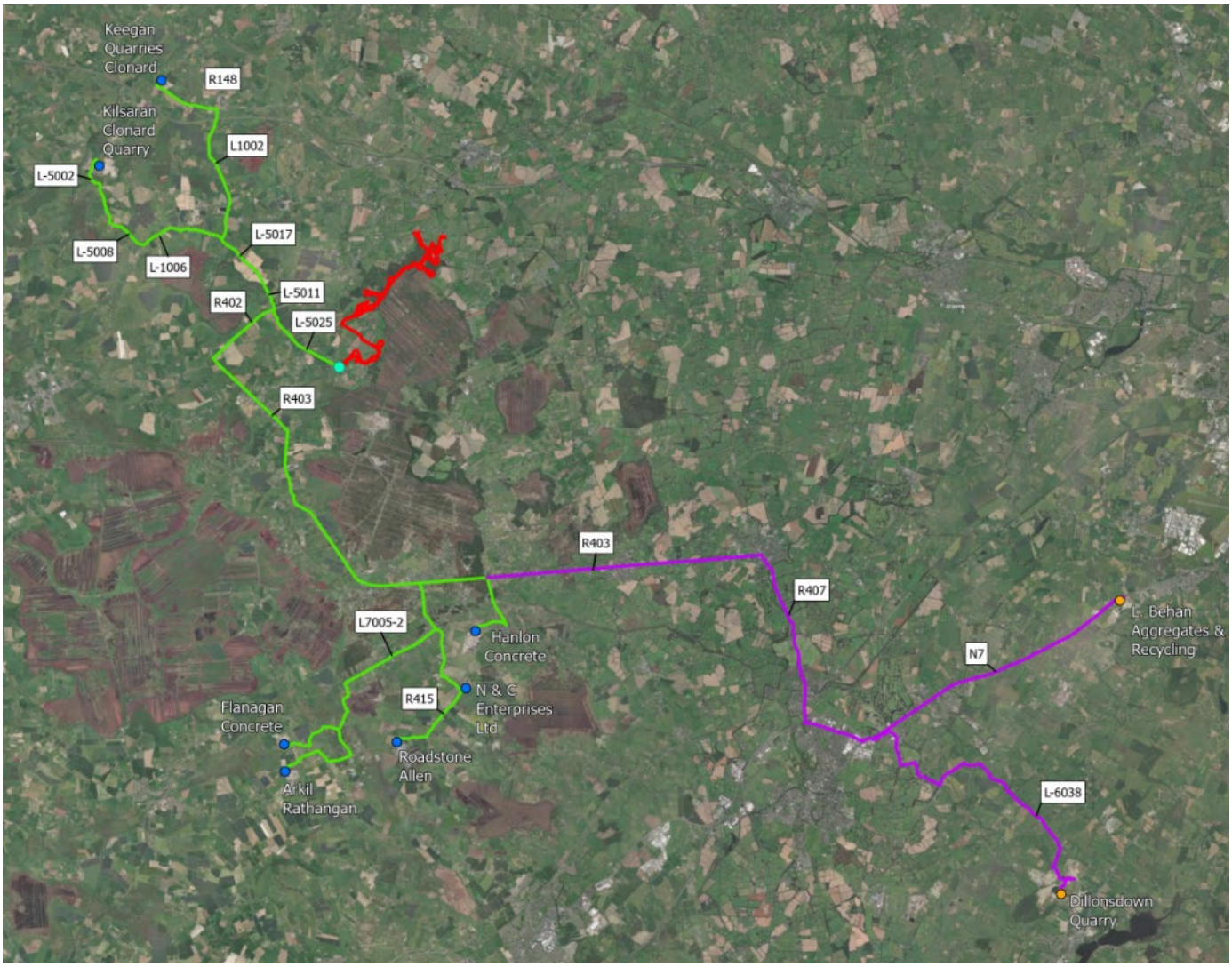


Figure 4-9: Quarry Locations and Indicative Haul Routes

4.3.10 Decommissioning Plan

The decommissioning phase works will be completed to approved standards, which include specified materials, standards, specifications and codes of practice (at the time decommissioning takes place).

An experienced main contractor will be appointed to undertake the of the decommissioning of the wind farm development. The main contractor will comply with the Construction and Environmental Management Plan (CEMP) prepared for the construction phase and the Operation and Environmental Management Plan (OEMP) implemented during operation and any revisions made to those documents throughout the phases in which they were adopted. The contractor will produce a detailed and site-specific Decommissioning Plan prior to commencement of decommissioning.

The key site targets are as follows;

- Ensure decommissioning works and activities are completed in accordance with mitigation and best practice approach presented in the accompanying Environmental Impact Assessment Report (EIAR) and associated planning documentation;
- Ensure decommissioning works and activities have minimal impact/disturbance to local landowners and the local community;

- Ensure decommissioning works and activities have minimal impact on the natural environment;
- Adopt a sustainable approach to decommissioning;
- Provide adequate environmental training and awareness for all project personnel.

The key site objectives are as follows;

- Using recycled materials, if possible, e.g. soil and overburden material for backfilling and reinstatement;
- Ensure sustainable sources for materials supply where possible;
- Avoidance of any pollution incident or near miss as a result of working around or close to existing watercourses and having emergency measures in place;
- Avoidance of vandalism;
- Keeping all watercourses free from obstruction and debris;
- Correct implementation of the sustainable drainage system (SuDS) drainage design principles;
- Keep impact of decommissioning works to a minimum on the local environment, watercourses, and wildlife;
- Correct fuel storage and refuelling procedures to be followed;
- Good waste management and house-keeping to be implemented;
- Air and noise pollution prevention to be implemented;
- Monitoring of the works and any adverse effects that it may have on the environment. Decommissioning methods will be altered where it is found there is the potential to have an adverse effect on the environment;

An overview of the anticipated decommissioning methodologies is provided below.

Wind Turbines

Prior to any works being undertaken on wind turbines, they will be disconnected from the grid by the site operator in conjunction with ESB Networks and EirGrid. The dismantling and removal of wind turbines of this scale is a specialist operation which will be undertaken by the turbine supplier that completed the installation where possible. Turbine dismantling will be undertaken in reverse order to methodology employed during their construction. A number of large-scale cranes will be brought back to site utilising the existing hard stand areas. The dismantling of turbines will be bound by the same safety considerations as was the case during construction in terms of weather conditions where works will not be undertaken during adverse weather conditions and in particular not during high winds.

The turbines will most likely be removed from site in a similar manner to how they were transported to the site originally in extended articulated trucks. The destination of the turbines post decommissioning is unclear at this time as a re-use option may be sourced if early decommissioning occurs.

The transport of disassembled turbines from the site will be undertaken in accordance with a Decommissioning Transport Management Plan which will be issued to and agreed with the competent authority at that time as part of a permit application for the delivery of abnormal loads using the local roads under the Road Traffic (Special Permits for Particular Vehicles) Regulations 2007. The Transport Management Plan will provide for all necessary safety measures, including a convoy and Garda escort as required, off-peak turning/reversing movements and any necessary safety controls.

The temporary accommodation works along the TDR will not be required for the decommissioning phase as turbine components can be dismantled on site, with turbine blades expected to be broken down, and removed using standard HGVs.

Turbine Foundations

On the dismantling of turbines, it is not intended to remove the concrete foundation from the ground. The foundation pedestals will be covered over and allowed to re-vegetate naturally. Leaving the turbine foundations in situ is considered a more environmentally sensible option as to remove the reinforced concrete associated with each turbine would result in environmental nuisances such as noise and vibration and dust.

Therefore, the turbine foundations will be backfilled and covered with soil material which will comprise the usable soil or overburden material on the site after construction. The soil will be spread and graded over the foundation using a tracked excavator and revegetation allowed to occur naturally.

It is proposed that all the internal site access tracks and turbine hard standings will be left in place. These will continue to be used for agriculture. Turbine foundation pedestals and hardstandings will be covered over with topsoil previously stripped and used for landscaping purposes during the construction stage and left to revegetate naturally.

Underground Cabling

The 33kV electrical and fibre optic cabling will be removed from the cable ducting. The cabling will be pulled from the cable duct using a mechanical winch which will extract the cable and re-roll it on to a cable drum. This will be undertaken at each of the joint bays/pull pits along the cable. The road will be excavated using a mechanical excavator at each cable pulling pit location and will be fully re-instated once the cables are removed. A decommissioning phase Traffic Management Plan will be prepared for these works. The cable ducting will be left in-situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation.

Grid connection infrastructure including the on-site substation and ancillary electrical equipment will form part of the national grid and will be left in situ.

It is expected that the decommissioning phase will take no longer than 6 months to complete.

4.4 Environmental Management Team - Structure and Responsibility

A preliminary organisation chart is included in Figure 4-9. Revisions to the project organisation chart shall be controlled independently of this plan following the appointment of the Contractor for the main construction works.

The Contractor's Project Manager will be responsible for the delivery of all elements of the Environmental Management Plan.

The Contractor's Project Manager will retain all responsibility for issuing, changing and monitoring the Environmental Management Plan throughout.

4.5 Training, Awareness and Competence

All site personnel will receive environmental awareness information as part of their initial site briefing. The detail of the information should be tailored to the scope of their work on site.

The contractor for the main construction works may decide to conduct the environmental awareness training at the same time as Health and Safety Training (often referred to as Site Inductions).

This will ensure that personnel are familiar with the environmental aspects and impacts associated with their activities, the procedures in place to control these impacts and the consequences of departure from these procedures.

The CEMP will be posted on the main site notice board during the project. The environmental performance at the site is on the agenda of the monthly project management meetings for the project.

Elements of the CEMP will be discussed at these meetings including objectives and targets, the effectiveness of environmental procedures etc. Two-way communication will be encouraged by inviting all personnel to offer their comments on environmental performance at the site.

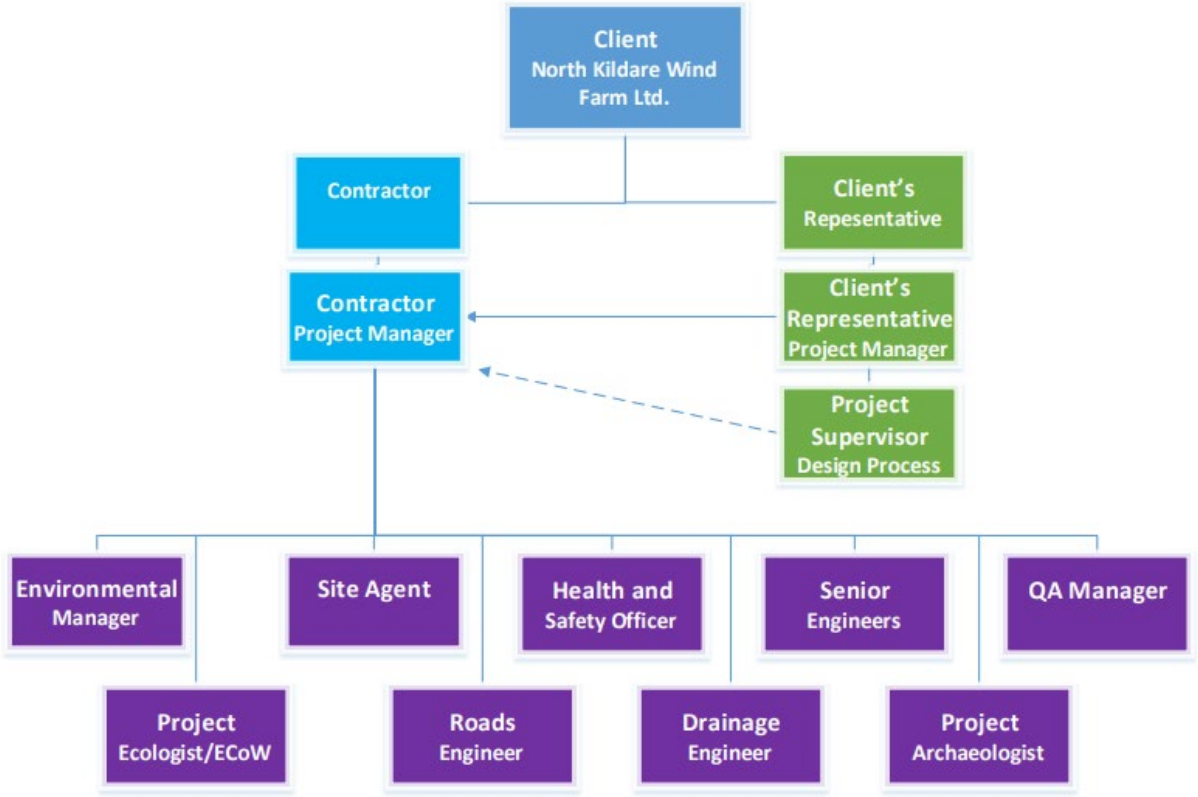


Figure 4-10: Project Management Team Organogram

4.6 Environmental Policy

The contractor is responsible for preparing and maintaining an Environmental Policy for the site. The policy should be appropriate to the project, commit to continuous improvement and compliance with legal requirements and provide a framework for objectives and targets. This will be communicated to all site personnel and will be available on site notice boards.

4.7 Register of Environmental Aspects

The contractor is responsible for preparing and maintaining a *Register of Environmental Aspects* pertaining to the site. This register will identify the environmental aspects associated with activities onsite and determine which aspects have or can have a significant impact on the environment.

4.8 Register of Legislation

The contractor is responsible for preparing and maintaining a register of key environmental legislation pertaining to the site. This register will reference all current environmental legislation and will be inspected, reviewed and updated regularly to ensure compliance.

4.9 Objectives and Targets

Objectives and targets are required to be set to ensure that the project can be constructed and operated in full accordance with the EIAR, planning conditions and legislative requirements, with minimal impact on the environment.

Environmental objectives are the broad goals that the contractor must set in order to improve environmental performance. Environmental targets are set performance measurements (key performance indicators or KPI's) that must be met in order to realise a given objective.

The contractor will set objectives based on each significant environmental impact. Key objectives are likely to include the following:

- To ensure that the rivers and streams are not negatively impacted by construction works.
- To ensure that humans are not negatively impacted by dust generated by construction works.
- To ensure that humans are not negatively impacted by noise or vibration generated by construction works.
- To ensure that impacts to habitats and wildlife are minimised during works.
- To ensure that a waste management plan for this site will be fully implemented.
- To ensure that the visual impact during the construction work is minimised.
- To ensure is constructed in compliance with the EIAR and planning conditions

Performance in relation to each of these objectives will be reviewed on a regular basis by means of inspections, audits, monitoring programmes, etc.

4.10 Non-Conformance, Corrective and Preventative Action

Non-Conformance Notices will be issued where there is a situation where limits associated with activities on the project are exceeded, or there is an internal/external complaint associated with environmental performance.

Non-Conformance is the situation where essential components of the EMS are absent or dysfunctional, or where there is insufficient control of the activities and processes to the extent that the functionality of the EMS in terms of the policy, objectives and management programmes, is compromised. A Non-Conformance register should be controlled by the contractor.

The EMS and all its components must conform to the EMP, objectives and targets and the requirements of the ISO 14001 management standard.

In the event of non-conformance with any of the above, the following must be undertaken:

- Cause of the non-compliance;
- Develop a plan for correction of the non-compliance;
- Determine preventive measures and ensure they are effective;
- Verify the effectiveness of the correction of the non-compliance;
- Ensure that any procedures affected by the corrective action taken are revised accordingly.

Responsibility must be designated for the investigation, correction, mitigation and prevention of non-conformance.

4.11 EMS Documentation

The Contractor is required to keep the following documentation in relation to the environmental management of the project (as a minimum):

- Construction Environmental Management Plan for the Proposed Development
- Register of Environmental Impacts
- Register of Planning Conditions
- Monitoring Records
- Minutes of Meetings
- Training Records
- Audit and Review Records

All of these documents and records are to be available for inspection in the site office. The documentation shall be up to date and shall be reviewed on a regular basis with revisions controlled in accordance with the site quality plan.

4.12 Control of Documents

The Contractor will establish, implement and maintain a procedure to control CEMP documents and records so they are clearly identifiable, organised, current, easily located and revised when necessary.

5. SAFETY & HEALTH MANAGEMENT PLAN

5.1 Introduction

This Safety and Health Management Plan (SHMP) defines the work practices, procedures and management responsibilities relating to the management of health and safety during the design, construction and operation of the Proposed Development and shall be read in conjunction with the Preliminary Safety & Health Plan prepared for the project by the Project Supervisor for the Design Process. The Safety and Health Management Plan shall be finalised in accordance with this plan following the appointment of the contractor for the main construction works.

This SHMP describes how the contractor for the main construction works will implement a site safety management system (SMS) on this project to meet the specified contractual, regulatory and statutory requirements, environmental impact statement mitigation measures and planning conditions. It is the contractor's responsibility to implement an effective safety management system to ensure that the developer's safety requirements for the construction of this project are met.

All site personnel will be required to be familiar with the requirements of the safety management plan as related to their role on site. The plan describes the project organisation and sets out the health and safety procedures that will be adopted on site.

- The Safety and Health Plan is a controlled document and will be reviewed and revised as necessary.
- A copy of the Safety and Health Plan will be located on/near the site H&S notice board.
- All employees, suppliers and contractors whose work activities cause/could cause impacts on the environment will be made aware of the SHMP and its contents.

5.2 Project Obligations

The construction of the Proposed Development will impose numerous safety management obligations on the developer, designer and contractor. As well as statutory obligations, there are a number of specific obligations set out in the EIAR and in the planning conditions for the proposed development These obligations are set out below. The contractor for the main construction works and all of its sub-contractors are to ensure that they are fully aware of and in compliance with these safety obligations.

5.2.1 EIA Obligations

EIAR obligations are described in Section 4.2.1.

5.2.2 Planning Permission Obligations

Planning permission obligations will be fully outlined in the Contractor's CEMP.

5.2.3 Statutory Obligations

The Safety, Health and Welfare at Work Act 2005 and the Safety, Health and Welfare at Work (Construction) Regulations 2013 place a responsibility on the Developer as the "Client", the Designer, the Project Supervisors and the Contractor.

The Client must:

- Appoint a competent and adequately resourced Project Supervisor for the Design Phase (PSDP)
- Appoint a competent and adequately resourced Supervisor for the Construction Stage (PSCS)
- Be satisfied that each designer and contractor appointed has adequate training, knowledge, experience and resources for the work to be performed
- Co-operate with the project supervisor and supply necessary information
- Keep and make available the safety file for the completed structure
- Provide a copy of the safety and health plan prepared by the PSDP to every person tendering for the project
- Notify the Authority of the appointment of the PSDP.

Designers must:

- Identify any hazards that their design may present during construction and subsequent maintenance
- Eliminate the hazards or reduce the risk
- Communicate necessary control measures, design assumptions or remaining risks to the PSDP so they can be dealt with in the safety and health plan
- Co-operate with other designers and the PSDP or PSCS
- Take account of any existing safety and health plan or safety file
- Comply with directions issued by the PSDP or PSCS.

The PSDP must:

- Identify hazards arising from the design or from the technical, organisational, planning or time related aspects of the project
- Where possible, eliminate the hazards or reduce the risks
- Communicate necessary control measure, design assumptions or remaining risks to the PSCS so they can be dealt with in the safety and health plan
- Ensure that the work of designers is coordinated to ensure safety
- Organise co-operation between designers
- Prepare a written safety and health plan for any project and deliver it to the client prior to tender
- Prepare a safety file for the completed structure and give it to the client.

The PSCS must:

- Co-ordinate the identification of hazards, the elimination of the hazards or the reduction of risks during construction
- Develop the Safety and Health Plan initially prepared by the PSDP before construction commences
- Co-ordinate the implementation of the construction regulations by contractors
- Organise cooperation between contractors and the provision of information

- Co-ordinate the reporting of accidents to the Authority
- Notify the Authority before construction commences
- Provide information to the site safety representative
- Co-ordinate the checking of sage working procedures
- Co-ordinate measures to restrict entry on to the site
- Co-ordinate the provision and maintenance of welfare facilities
- Co-ordinate arrangements to ensure that craft, general construction workers and security workers have a Safety Awareness card, e.g. Safe Pass and a Construction Skills card where required
- Co-ordinate the appointment of a site safety representative where there are more than 20 persons on site
- Appoint a safety adviser where there are more than 100 on site
- Provide all necessary safety file information to the PSDP
- Monitor the compliance of contractors and others and take corrective action where necessary;
- Notify the Authority and the client of non-compliance with any written directions issued.

The Contractor must:

- Co-operate with the PSCS
- Promptly provide the PSCS with information required for the safety file
- Comply with directions of the project supervisors
- Report accidents to the Authority and to the PSCS where an employee cannot perform their normal work for more than 3 days
- Comply with site rules and the safety and health plan and ensure that your employees comply
- Identify hazards, eliminate the hazards or reduce risks during construction
- Facilitate the site safety representative
- Ensure that relevant workers have a safety awareness card and a construction skills card where required
- Provide workers with site specific induction
- Appoint a safety officer where there are more than 20 on site or 30 employed
- Consult workers with site specific induction
- Monitor compliance and take corrective action.

Consequently, at all stages of the project there are statutory requirements for the management of safety, health and welfare of all involved in or affected by the development. As previously outlined this CEMP and specifically the Safety and Health Management Plan addresses key construction management issues associated with the proposed wind farm. This plan will be developed further at the construction stage, on the appointment of the Contractor for the main construction works.

5.2.4 The Management of Health and Safety during the Design Process

Egan Safety Solutions (ESS) have been appointed Project Supervisor for the Design Process for the development stage. ESS are competent to fulfil this role in accordance with the Safety, Health and Welfare at Work (Construction) Regulations, 2013.

It is ESS's policy to comply fully with all health and safety legislation, in particular the Safety, Health and Welfare at Work Act, 2005, Safety, Health and Welfare at Work (General Application) Regulations 2007, and the Safety, Health and Welfare at Work (Construction) Regulations 2013.

ESS has developed in-house procedures for execution of the PSDP Role which are detailed in inhouse document ESS-HS-PROC-001 "Project Supervisor Design Process (PSDP) Procedure"

The purpose of this procedure is to define the requirements for the management of health & safety during design projects, to ensure that the PSDP role is fully discharged. ESS fulfils its obligations by carrying out the following main activities;

- Ensuring that Designers design in accordance with the General Principles of Prevention.
- Ensuring Co-ordination between Designers
- Taking account of information in existing safety files and conveying this information to the design team
- Maintaining a Hazard Diary for the duration of the project which indicates hazards which have been eliminated (design out in accordance with the General Principles of Prevention) and issues which require communication to other parties (e.g. Other Designers, PSCS)
- Ensuring that all hazards which may pose a "particular risk" as defined by the relevant legislation are clearly identified and measures necessary to control these are clearly documented as part of the design risk assessments.
- Reviewing design risk assessments from designers and requesting amendments where required.
- Preparing a Preliminary Safety and Health Plan
- Ensuring that the PSCS receives all relevant information to allow preparation of the Construction Stage Safety and Health Plan
- Co-operating with the PSCS throughout the construction period.
- Compiling the Safety File.

ESS promotes a collaborative approach to health and safety on site where the Client, PSDP, Designers, Contractors and PSCS co-operate with each other and share information. Joint site safety audits and/or walk-downs are carried out as part of this collaboration and safety is monitored and addressed on site on an ongoing basis. The regular safety meetings are held to document this ongoing co-operation, get an over-view of works currently in hand onsite and about to commence and share information.

The Preliminary Safety and Health Plan

In accordance with the requirements of the Safety, Health & Welfare at Work (Construction) Regulations 2013 a Preliminary Safety & Health Plan will be required as part of the design process. This plan will be further developed by the PSCS on appointment and maintained as a live document during construction and commissioning of the development.

The safety and health plan is required to include the following information:

- a general description of the project;
- details of other work activities taking place on site;
- works involving particular risks;
- the timescale for the project and the basis on which the time frame was established;
- conclusions drawn by designers and the PSDP having taken into account the General Principles of Prevention and any relevant Safety and Health Plan or Safety File;
- the location of electricity water and sewage connections so as to facilitate early establishment of welfare facilities.

In accordance with the PSDP's procedures the Preliminary Safety & Health Plan for the proposed development should include the following sections and subsections to ensure the PSCS is aware of the health and safety issues at tender stage and enable them to price accordingly:

Preamble:

1 General Project Information:
- 1.1 Title
- 1.2 Description of Project
- 1.3 Employer
- 1.4 Designers / Other Consultants
- 1.5 Project Supervisor Design Process
- 1.6 Drawings, Specifications and Other Documents
- 1.7 Intended Contract Commencement Date
- 1.8 Intended Contract Completion Date
- 1.9 Basis for Contract Duration
- 1.10 Restrictions on Working Hours
- 1.11 Notification of Project
- 1.12 Termination of the PSCS Appointment

2 The Existing Environment:
- 2.1 Site Location
- 2.2 Relevant Adjoining Land Uses
- 2.3 Site Restrictions
- 2.4 Restrictions on Access
- 2.5 Hazardous Area Classification
- 2.6 Existing Services
- 2.7 Ground Conditions
- 2.8 Existing Hazards
- 2.9 Liaison with Statutory Bodies

3 Other Work Activities:
- 3.1 Other Contracts Which May Affect Work
- 3.2 Occupation of Site
- 3.3 Building Activities
- 3.4 Other Work Activities

3.5 Emergency Procedures in Place on Site

4 Particular and Residual Risks:
- 4.1 Works Which Puts Persons at Work at risk
- 4.2 Work Which Puts Persons at Risk from Chemical or Biological Substances
- 4.3 Work with Ionising Radiation
- 4.4 Work near High Voltage Power Lines
- 4.5 Work Exposing Persons at Work to the Risk of Drowning
- 4.6 Work on Wells, Underground Earthworks and Tunnels
- 4.7 Work Carried Out by Divers at Work Having a System of Air Supply
- 4.8 Work Carried Out in a Caisson with a Compressed Air Atmosphere
- 4.9 Work Involving the Use of Explosives
- 4.10 Work Involving the Assembly or Dismantling of Heavy Prefabricated Components
- 4.11 Work Involving Hazardous Material
- 4.12 Residual Risks

5 Additional Information:
- 5.1 Existing Documents
- 5.2 Site Possession
- 5.3 Site Rules
- 5.4 Site Specific Safety Objectives
- 5.5 Phasing of Works
- 5.6 Permits / Authorisation Required
- 5.7 Maintenance
- 5.8 Continuing Liaison
- 5.9 Specific Recommendations

6 Information Required for Safety File:
- 6.1 Information Required for Safety File from PSCS

5.2.5 The Management of Health and Safety during the Construction Phase

The selection criteria for the Contractor for the works will be based on the ability to construct the works in a manner that will not endanger the safety, health and welfare of any parties and competence to fulfil the role of PSCS.

The contract will be awarded on the basis of assessment of the candidates against relevant health and safety criteria including experience of similar projects, knowledge of the construction processes involved and training of their management and staff who will be involved in carrying out the works.

5.2.6 The Construction Stage Safety and Health Plan

In accordance with the requirements of the Safety, Health & Welfare at Work (Construction) Regulations 2013 the preliminary Safety & Health Plan prepared by the PSDP will be further developed by the PSCS before the commencement of the construction work and updated on a regular basis during the construction phase of the project.

The document will include the following sections and subsections to ensure the management of health and safety during the construction phase of the project:

1. Description of Project:

- project description and programme details
- details of client, PSDP and PSCS, designers
- main contractor and other consultants
- extent and location of existing records and plans
- arrangements for communicating with Contractors, PSDP and others as appropriate

2. Communication and Management of the Work:
   - management structure and responsibilities
   - safety and health goals for the project and arrangements for monitoring and review of safety and health performance
   - arrangements for:
     - regular liaison between parties on site
     - consultation with the workforce
     - the exchange of design information between the Client, Designers, Project Supervisor for the Design Process, Project Supervisor Construction Stage and Contractors on site
     - handling design changes during the project
     - the selection and control of contractors
     - the exchange of safety and health information between contractors
     - security, site induction, and on-site training
     - welfare facilities and first aid
     - the production and approval of risk assessments and method statements
     - the reporting and investigation of accidents and other incidents (including near misses)
   - site rules
   - fire and emergency procedures

3. Arrangements for Controlling Significant Site Risks:
   - safety risks
     - services, including temporary electrical installations
     - preventing falls
     - work with or near fragile materials
     - control of lifting operations
     - dealing with services (water, electricity and gas)
     - the maintenance of plant and equipment
     - poor ground conditions
     - traffic routes and segregation of vehicles and pedestrians
     - storage of hazardous materials
     - dealing with existing unstable structures
     - accommodating adjacent land use
     - other significant safety risks
   - health risks:
     - removal of asbestos

- dealing with contaminated land
- manual handling
- use of hazardous substances
- reducing noise and vibration
- other significant health risks

The construction stage safety and health plan will be maintained on site by the PSCS and will be communicated to all relevant parties on an ongoing basis through inductions, site safety meetings and tool box talks etc. as required.

6. EMERGENCY RESPONSE PLAN

6.1 Introduction

This chapter of the CEMP presents an Emergency Response Plan for the proposed development. The Emergency Response Plan shall be finalised in accordance with this plan following the appointment of the contractor for the main construction works and following detailed design development.

This Emergency Response Plan contains predetermined guidelines and procedures to ensure the safety, health and welfare of everybody involved in the project and to protect the environment during the construction phase of Proposed Development. This outlines the immediate response to an emergency or disaster situation and will be developed by the main construction works contractor and PSCS as part of their construction stage Safety and Health Plan.

An emergency is any disruptive or harmful event that endangers people, environment, property or assets. Emergencies can be small, as in a fire contained by employees using firefighting equipment or large, as in a disaster resulting from a storm.

In the context of the Proposed Development, examples of Emergency Response Plan emergency events are:

- medical emergency
- explosion
- overheated equipment
- chemical and fuel spill
- fire
- loss of power
- vehicle incidents

Example sources of emergency or disaster events are:

- unstable/inappropriate stockpiles on site
- faulty or incorrect use of equipment
- falls from height
- smoking
- storm/adverse weather
- power failure
- fuel spill
- road failure
- serious vehicle collisions or overturning

6.2 Emergency Response Plan

An emergency response plan deals with the immediate physical effects of a disaster and outlines the initial response.

6.2.1 Emergency Response Liaison

The contractor/PSCS will designate an individual to serve as the Emergency Response Liaison for this project. The emergency response liaison will coordinate the emergency response for the duration of any emergency at or nearby the project site.

Kildare County Council, An Garda Síochána and the HSE Ambulance Co-ordinator will be provided with the construction programme and the onsite contact information from the Emergency Response Liaison prior to construction.

The Emergency Response Liaison will be immediately reachable at all times during project construction. The Liaison will coordinate with the above agencies to establish emergency procedures for access to and within the site in the event of an emergency.

6.2.2 Reporting Emergencies

In the event of fire, storm, flood, serious injury or other emergency, contact:

ALL ON SITE EMERGENCIES DIAL 999

6.2.3 Designated Responder

A map depicting tower locations with the emergency meeting point will be furnished to Kildare County Council Fire Department and HSE ambulance co-ordinators.

Upon arrival on the scene, the senior EMS Officer will set up the incident command structure. The Emergency Response Liaison and all contractor's personnel will cooperate with directions of the incident commander and assist as directed.

The nearest emergency services, ambulance and Accident & Emergency (A&E) facilities are:

Service:	Contact Details:	
Accident & Emergency (A&E)	Naas General Hospital	(045) 849 500
Ambulance Service	Dial 112 or 999	
Fire Services	Dial 112 or 999	
Garda Station	Enfield Garda Station	(046) 954 1002
District HQ:	Trim Garda Station	+353 46 9481547
Divisional HQ:	Navan Garda Station	+353 46 9036300

Each member of the contractor's site team who are First-Aid and Cardiopulmonary Resuscitation (CPR) trained personnel will be identifiable with a hard hat sticker indicating their training.

6.2.4 Emergency Alarm

The emergency alarm will be raised on site as soon as an emergency situation is detected, the alarm will be identified (contractor to check those that apply):

	Air Horn		Radio		Voice		Hand Signals		Siren

6.2.5 Emergency Reporting

In the event of an emergency the nearest supervisor with radio equipment/mobile phone will be notified. The degree of emergency will be reported to the Emergency Response Liaison who will contact the Emergency Services and request the appropriate emergency service.

6.2.6 Medical Protocol

In the event of a major medical emergency, the emergency centre (999) will be notified and an ambulance and emergency medical team will respond to the scene. All major medical cases require professional (ambulance) transportation. In the event of a minor medical case, the affected employee can be transported via company vehicle in the escort of a foreman or site engineer (with first aid training).

6.2.7 Emergency Response

Upon notification, the Emergency Response Liaison will respond to the emergency scene and manage emergency operations:

1. Assess hazards and make the area safe – If you cannot enter the area without risking your safety, don't do it, call the Emergency Services immediately and wait for them. If you think you can safety enter the area, look around the emergency scene for anything that can be dangerous or hazardous to you, the casualty, or anyone else at the scene. Bystanders can help with making the area safe. First aid kits will be available on site. Operators that have been first aid/CPR/AED trained will be listed on site and easily identifiable by a hard hat sticker.

2. Take charge of the situation – if you are the first-aid provider on the scene act fast. If someone is already in charge, briefly introduce yourself and see if that person needs any help. If there is any chance the casualty could have a head or spinal injury, tell them not to move.

3. Get Consent – always identify yourself as a first-aid provider and offer to help. Always ask for consent before touching a conscious adult casualty and always ask for consent from a parent or guardian before touching an unconscious or conscious child or infant. With an unconscious adult casualty consent is implied as it is generally accepted that most people want to live. Remember to protect yourself first by wearing gloves and eye protection.

4. Assess Responsiveness – is the casualty conscious or unconscious? Note their response while you are asking them for their consent. If they respond, continue with the primary survey, and if they don't respond, be aware that an unconscious casualty is or has the potential of being a breathing emergency.

5. Call out for help – this will attract bystanders. Help is always useful in an emergency situation. Someone can be called over to phone for medical help. Others can bring blankets if needed, get water, etc. a bystander can help with any of the following:

- Make the area safe.
- Find all the casualties.
- Find the first aid kit, or any useful medical supplies.
- Control the crowd.
- Call for medical help.
- Help give first aid, under your direction.
- Gather and protect the casualty's belongings.
- Take notes, gather information, be a witness.
- Reassure the casualty's relatives.
- Lead the ambulance attendants to the scene of the emergency.
- Notify Emergency Services as soon as you can. Either send a bystander or call yourself.

In the event of a major medical emergency the Emergency Response Liaison, as the person-in-charge of the emergency scene, will dispatch someone to the site access point nearest the emergency scene to direct and lead arriving outside responders to the emergency scene. The designated meeting point will be agreed prior to the commencement of construction. Emergency personnel will be met at this meeting point communicated by management during the 999 call. The emergency personnel escort will use the hazard lights on their vehicle, so they are easily identified.

6.2.8 Escape and Evacuation Procedure

Dependent upon the degree of the emergency and if safe to do so, employees will evacuate to the designated assembly area where the designated wardens shall account for all employees and determine if anyone still remains within the emergency scene.

Should a wild land fire or peat slippage occur, and the designated assembly area is compromised other locations will be designated as secondary assembly areas.

6.2.9 Tower Rescue Procedure

In the event personnel are trapped or injured in an elevated tower position the following protocol will be initiated:

1. The Emergency protocol will be initiated
2. Emergency Response Liaison will be notified
3. Tower Rescue Team will be activated and respond to the scene
4. Outside medical and Rescue Teams will be notified and respond to the scene.

Tower Rescue Procedure:

1. Upon learning of an emergency, the on-scene foreman shall assess the emergency and ascertain its degree, location and the extent of any injuries.
2. Upon confirming that an emergency exists the on-scene foreman notifies the Emergency Response Liaison and the project Office.

3. Upon notification of the emergency the Emergency Response Liaison shall notify senior project supervision and the local emergency centre (999) of the emergency.
4. The Emergency Response Liaison shall inform the dispatcher of the location, tower number, the degree of the emergency and the extent of injuries.

6.2.10 Prevention of Illness/Injury Due to Weather/Elements

1. All employees will have access to shelter and heat in the event of inclement weather.
2. Employees will have access to at least a litre of water at all times.
3. High wind warnings and weather forecast will be discussed every morning with the crews. Weather conditions and forecast will be monitored regularly by management.
4. No Employee will work alone. A buddy system will be used so employees can contact a supervisor in case of an emergency.

6.2.11 Environmental Emergency Procedure

An emergency preparedness and response procedure is required to prevent environmental pollution incidents. Emergency Silt Control and Spillage Response Procedures are included in Section 4.3.3 of this CEMP.

Suitable spill kits and absorbent material for dealing with oil spills will be maintained on site. In the event of pollution or potential risk of pollution the Local Authority should be informed immediately.

In the case of water pollution in addition to the Local Authority, Inland Fisheries Ireland should also be informed immediately.

6.2.12 Emergency Response Plan – Haul Routes

Emergency Response Procedure relating to transportation of plant, equipment and materials to site to be developed by the main contractor during the construction phase of the Proposed Development.

6.2.13 Emergency Events – Wind Turbine Damage/Failures

Each wind turbine, incorporating the tower, blades, gearbox and ancillary equipment in the tower and nacelle is a machine under the European Machinery Directive [2006/42/EC]. The duties of designers and manufacturers of machinery are set out in the Machinery Directive, which has been transposed into national law by the 2008 European Communities (Machinery) Regulations [S.I.No.407/2008] (as amended). All wind turbines will be CE marked, which is in effect, a mark of assurance that the wind turbine complies with the essential health and safety requirements (EHSRs) of EU supply law. In all cases, the manufacturer or the manufacturer's authorised representative will compile information in a technical file confirming how the machine complies with these requirements. The commissioning of turbines and ancillaries will only be carried out by competent, trained and qualified personnel. The system of work for commissioning must be planned, organised, maintained and revised to ensure safety of personnel.

Potential emergency events associated with wind turbines include:

- Blade loss;
- Fire;
- Wind turbine toppling (due to foundation or tower failure);
- Wind turbine rotational failure in extreme wind conditions (due to control system or rotor break failure).

The primary mitigation against an emergency catastrophic event that may endanger the health and safety of the public is implemented at design stage through adequate siting of wind turbines which provide sufficient set back distances from occupied buildings and other infrastructure to avoid the risk of impact in the event of wind turbine collapse.

Peat slippage contingency measures have been included in Section 6.2.14 below in the unlikely event of landslide scenario.

6.2.14 Land Slippage Contingency Measures

6.2.14.1 Excessive Movement

Where there is excessive movement or continuing peat movement recorded at a monitoring location or identified at any location within the site but no apparent signs of distress to the peat (e.g. cracking, surface rippling) then the following shall be carried out.

1. All activities (if any) shall cease within the affected area.
2. Increased monitoring at the location shall be carried out. The area will be monitored, as appropriate, until such time as movements have ceased.
3. Re-commencement of activities shall only start following a cessation of movement and a review by an experienced geotechnical engineer.

6.2.14.2 Onset of Peat Slide

In the unlikely event where there is the onset or actual detachment of peat (e.g. cracking, surface rippling) then the following will be carried out.

4. On alert of a peat slide incident, all activities (if any) in the area will cease and all available resources will be diverted to assist in the required mitigation procedures.
5. Action will be taken to prevent a peat slide reaching any watercourse. This will take the form of the construction of check barrages on land. Due to the terrain and the inability to predict locations it may not be possible to implement any on-land prevention measures, in this case a watercourse check barrage will be implemented.
6. All relevant authorities will be notified if a peat slide event occurs on site.

7. For localised peat slides that do not represent a risk to a watercourse and have essentially come to rest the area will be stabilised initially by rock infill, if required. The failed area and surrounding area will then be assessed by an experienced geotechnical engineer and stabilisation procedures implemented. The area will be monitored, as appropriate, until such time as movements have ceased.

FEHILY TIMONEY

DESIGNING AND DELIVERING
A SUSTAINABLE FUTURE

APPENDIX 1

Turbine Delivery Report (TDR Report)

Pell Frischmann

Drehid Wind Farm

Route Survey Report

December 2024

10109576

Report Ref.	**241218 Drehid Rsr**
File Path	**https://pellf.sharepoint.com/sites/EdinburghOfficeTeam/Shared Documents/General/Projects/10109576 Statkraft Drehid Rev/01 - WIP/Reports/241218 Drehid RSR.docx**

Rev	Suit	Description	Date	Originator	Checker	Approver
01		Draft	02/10/2024	G Buchan	T Lockett	G Buchan
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Ref. reference. Rev revision. Suit suitability.

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1 Introduction

1.1 Purpose of the Report

Pell Frischmann (PF) has been commissioned by North Kildare Wind Farm Limited to undertake an route access review of the potential delivery route for wind turbine Abnormal Indivisible Loads (AIL) associated with the construction and development of Drehid Wind Farm, located southeast of Kilshanroe, Co. Kildare.

The Route Survey Report (RSR) has been prepared to help inform the developer on the likely issues associated with the development of the site with regards to off-site transport and access for AIL traffic. The report identifies the key issues associated with AIL deliveries and notes that remedial works, either in the form of physical works or as traffic management interventions will be required to accommodate the predicted loads.

The detailed assessment and subsequent designs of any remedial works are beyond the agreed scope of works between PF and North Kildare Wind Farm Limited at this point in time.

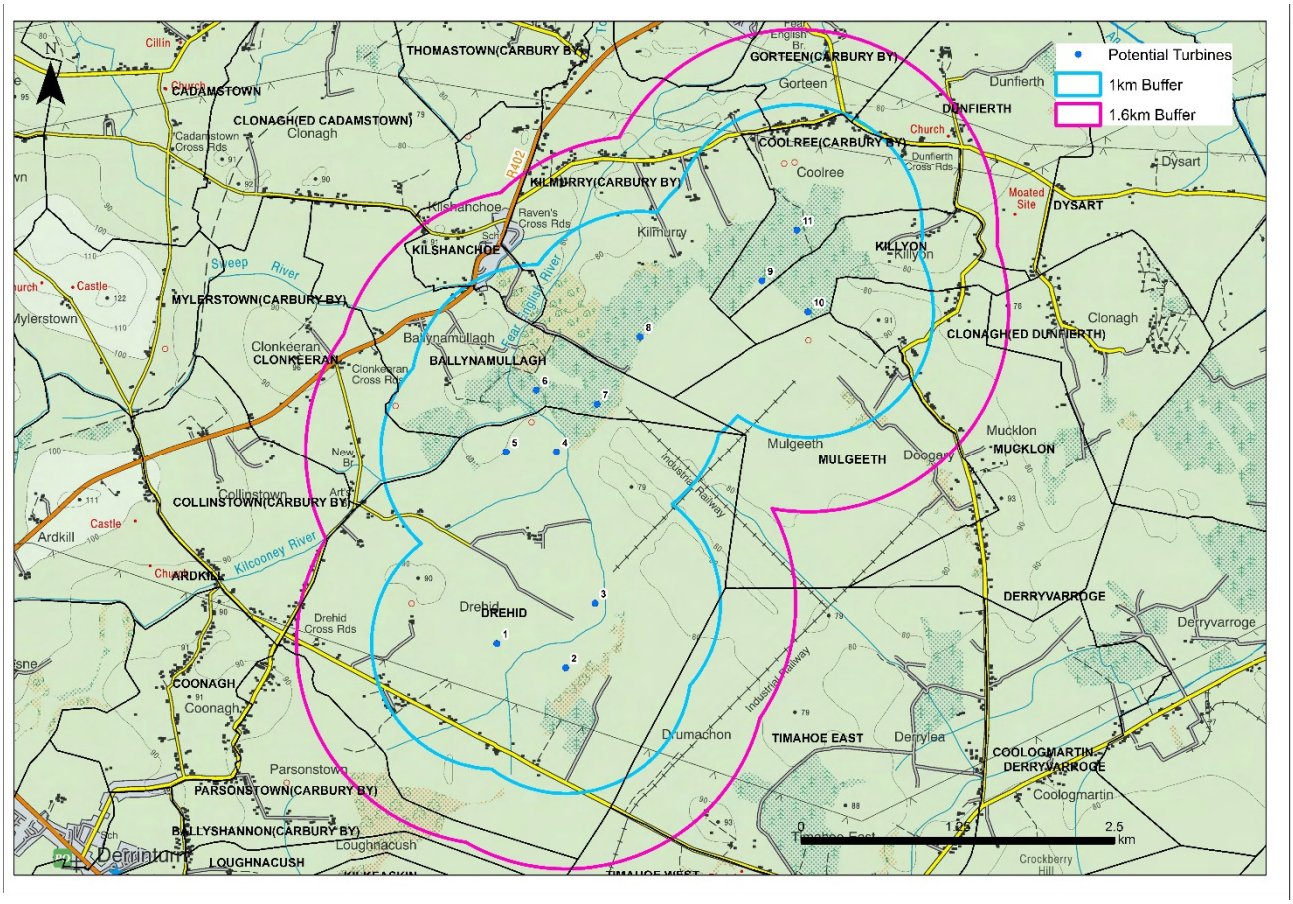
It is the responsibility of the wind turbine supplier to ensure that the entirety of the proposed access route is suitable and meets with their satisfaction. The turbine supplier will be responsible for ensuring that the finalised proposals meet with the appropriate levels of health and safety consideration for all road users has been made in accordance with the relevant legislation at the time of delivery.

2 Site Background

2.1 Sites Location

The development site is located to the southeast of Kilshanroe, Co. Kildare. Figure 1 illustrates the general site location.

Figure 1: Site Location Plan



2.2 Candidate Turbine

North Kildare Wind Farm Limited have indicated that they wish to consider the use of a Nordex N133 on a TS 100 tower. This assessment has considered the N133 blade (total length of 65.5m) and a worst-case tower section (26.9m in length x 4.3m in diameter) to consider access for all components.

2.3 Proposed Delivery Equipment

To provide a robust assessment scenario based upon the known issues along the access route, it has been assumed that all blades would be carried on a Super Wing Carrier trailer to reduce the need for mitigation in constrained sections of the route.

Towers would be carried in a 4+7 clamp adaptor style trailer, whereas loads such as the hub, nacelle housing and top towers would be carried on a six-axle step frame trailer.

Figure 2: Super Wing Carrier Trailer

Figure 3: Tower Trailer

Where access constraints are extreme, it is proposed that the blade would be transferred from the Super Wing trailer to a blade lifting trailer. This trailer can lift blades up to a maximum angle of 60 degrees to clear potential constraints and shortening the length plan view. An example trailer is illustrated in Figure 4.

Figure 4: Example Blade Lifting Trailer

To undertake the transfer between trailers, a blade transfer area will need to be constructed. The area of land required will need to be circa 175m x 60m and will need to include two crane pads. Storage for up to six blades should also be available, with all infrastructure designed in accordance with turbine supplier standards.

The proposed location for the transfer station is the southern development area of the proposed wind farm and as such, no additional third party land areas are required.

3 Access Route Review

3.1 Proposed Access Route

As requested by North Kildare Wind Farm Limited, access has been considered from the M4 motorway. Access from the port to the M4 will be undertaken once the turbine haulier has been engaged by the developer, post planning determination.

Access to the site will be taken from the south for all loads. Access from the south to the northern turbine locations is not possible using internal access tracks, so all northern turbine components will need to access the southern junction where blades will be transferred to a blade lifting trailer (required to overcome physical constraints) at a blade transfer area. Tower and all other loads will undertake a U turn in the southern area, and will then backtrack until the R402 Raven Junction, where they will turn right for the northern access junction.

The proposed access route is as follows:

- Loads will depart the M4 at Junction 9 and will join the R402, southbound;
- Loads will pass through Johnstown Bridge and Kilshancoe;
- All loads will turn off the R402 onto the L5025, turning left at The Sweep Crossroads junction;
- Loads will continue on the L5025 heading southeast to the site access junction. At the site access junction, loads will turn left into a purpose designed junction;
- Blade loads for the northern turbines will be transferred onto a blade lifting trailer. All other northern turbine loads will undertake a U-turn and will rejoin the L5025, proceed northwest;
- Northern turbine loads will turn right onto the R402 and will proceed northbound;
- At the Raven Junction, loads will turn right onto Kilshanroe Road and will continue eastbound to the northern access junction.

The proposed access route from the M4 to the development site access junctions is shown in Figure 5 for the southern access. Figure 6 illustrates the route from the blade transfer area to the northern access junction.

Figure 5: Proposed Access Route from M4 to Southern Access Junction

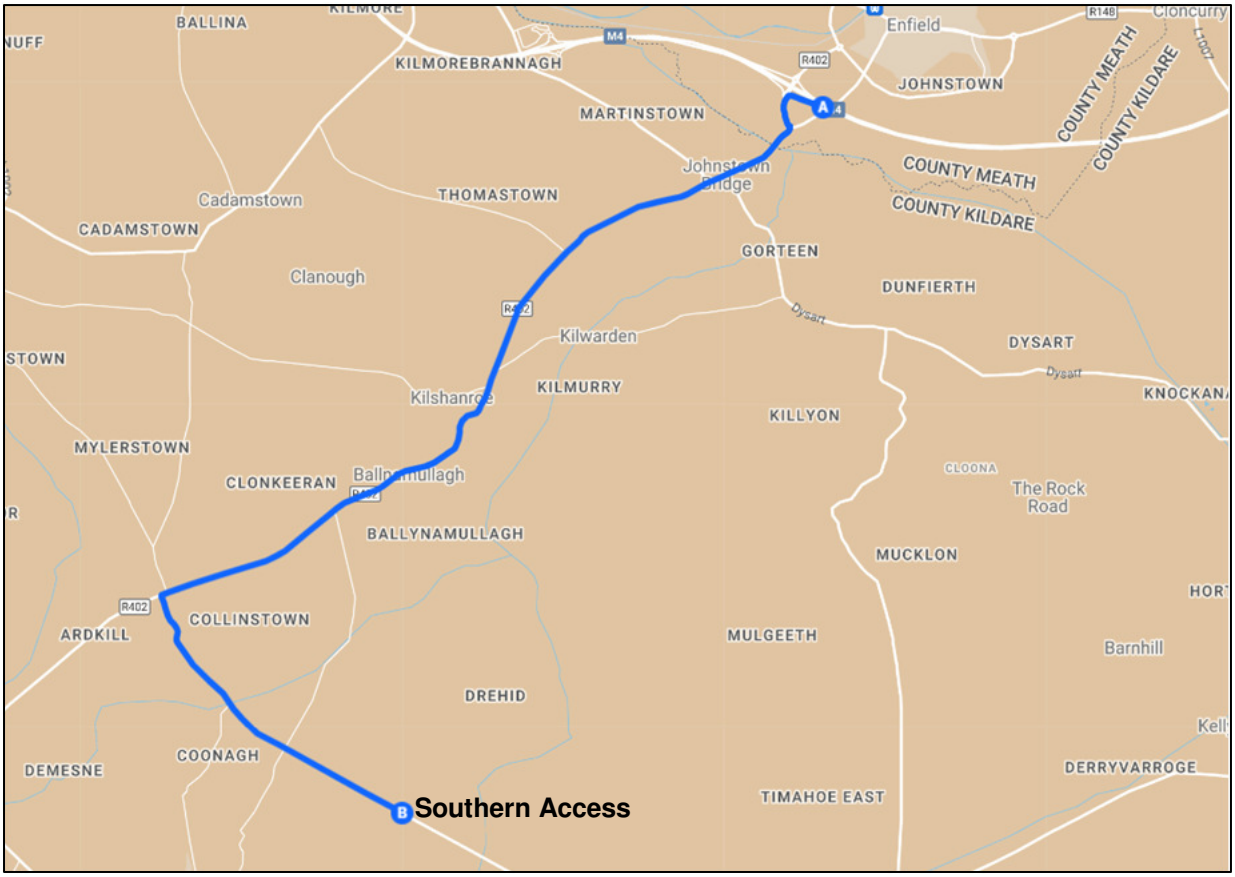
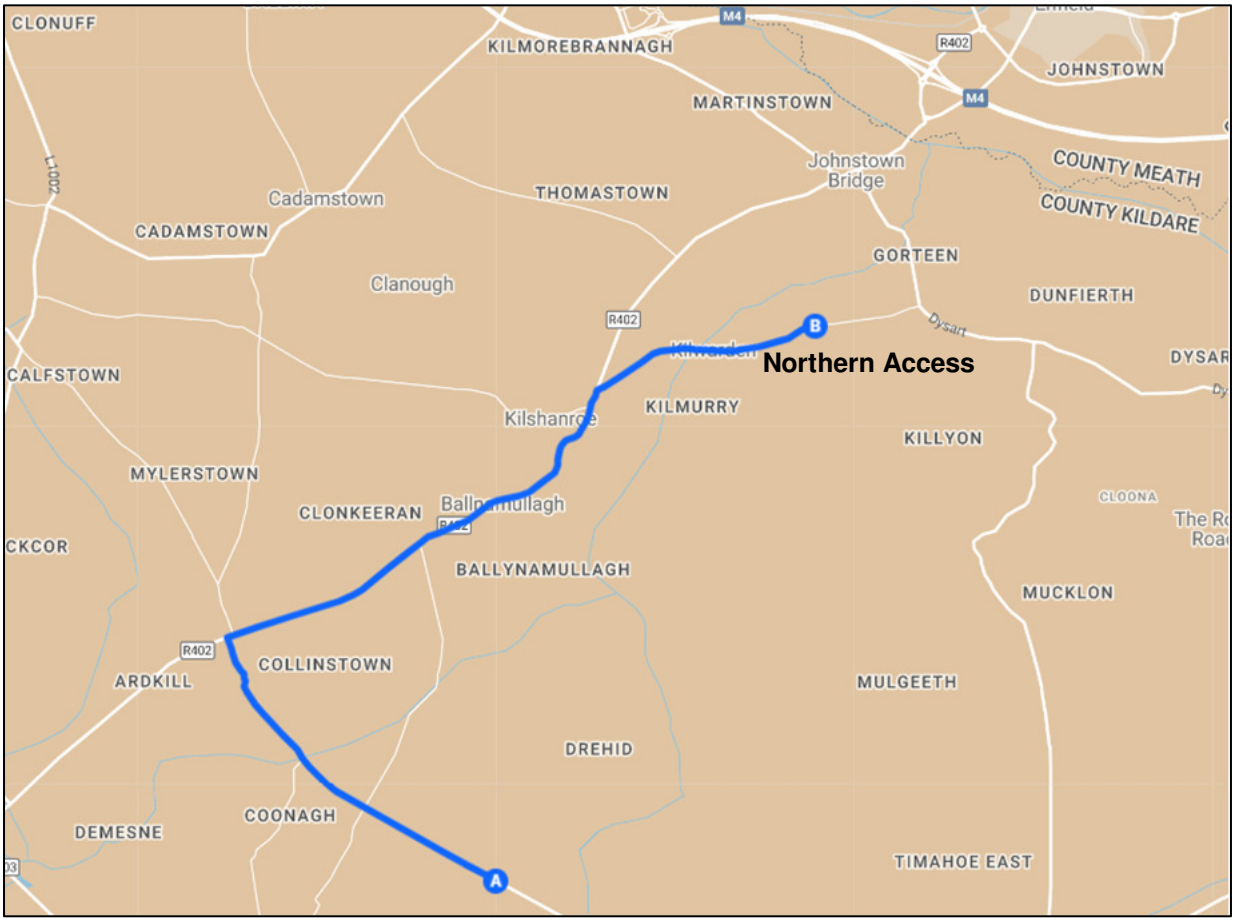


Figure 6: Proposed Access Route from Blade Transfer Area to Northern Access



3.2 Route Constraints

The constraints noted during the access route review are provided in the tables below. These cover all constraints from the M4 through to the proposed site entrance. No consideration of the transport issues within the port or development site have been undertaken and this includes the design of the site access junction.

Plans illustrating the location of the constraints are provided in Appendix A.

Table 3-1: Constraint Points and Details

POI	Key Constraint	Details
1	**M4 Junction 9 Slip Road** 	Loads will depart the M4 at Junction 9 and will take the first exit at the roundabout with the R402 (southbound). A swept path assessment has been undertaken and indicates that loads will oversail the entry verge where two road signs should be removed. Loads will require an over-run surface on the central island of the roundabout where one chevron sign should be removed. On exiting the junction, loads will over-run the splitter island where three road signs should be removed. Verge vegetation trimming is required on the exist.
2	**R402 / Johnstown Road Roundabout** 	Loads will continue southbound on the R402. At the roundabout with Johnstown Road, loads will take the second exit and will continue southbound on the R402. A swept path assessment has been undertaken and indicates that loads will over-run the entry splitter island, central island and exit splitter island of the roundabout. Load bearing surfaces are required. Two road signs on the entry splitter island, two chevron signs on the central island and two signs on the exit splitter island should be removed. Following the roundabout, loads will continue southbound, heading through Johnstown Bridge and Kilshanroe. Loads will need to exercise care passing through both villages and oncoming traffic should be held back to allow loads access to both lanes in sinuous sections. Care should be exercised when passing over traffic calming measures noted on the road.
3	**R402 / L5025 Access Junction** 	**Southern Access Route** Loads will turn left onto the L5025 and will continue eastbound to reach the southern access junction. A swept path assessment has been undertaken and indicates that loads will oversail the inside of the junction where two road signs and a barrier should be removed. It is recommended that the load suspension settings are increased to account for any changes in vertical clearance on the L5025. **Northern Access Route** Loads that are destined for the northern access will have turned at the facilities accessed from the southern junction. When travelling back on the L5025, loads will turn right at this junction. The swept path assessment also covers this movement. All overhead utilities on the L5025 should be lowered or relocated to enable the raised blade for the northern turbines to pass along the road.

POI	Key Constraint	Details
4	**L5025 Bend 1** 	**Southern Access Route** Loads will proceed ahead on the L5025. A swept path assessment has been undertaken at this location and indicates that loads will oversail both verges. Tree canopy trimming to accommodate the raised blade will be required. **Northern Access Route** Loads that are destined for the northern access will have turned at the facilities accessed from the southern junction. When travelling back on the L5025, loads continue ahead. The swept path assessment also covers this movement. All overhead utilities on the L5025 should be lowered or relocated to enable the raised blade for the northern turbines to pass along the road.
5	**L5025 Bend 2**  	**Southern Access Route** Loads will proceed ahead on the L5025, passing through the two bends. A swept path assessment has been undertaken at this location and indicates that loads will oversail both sides of the road. Hedge trimming works will be required in the western verge along with an area of load bearing surfacing. Tree canopy trimming is required. A minor area of load bearing surface is required in the eastern verge along with the removal of a utility pole stay wire. **Northern Access Route** Loads that are destined for the northern access will have turned at the facilities accessed from the southern junction. When travelling back on the L5025, loads continue ahead. The swept path assessment also covers this movement. All overhead utilities on the L5025 should be lowered or relocated to enable the raised blade for the northern turbines to pass along the road.
6	**L5025, north of the River Kilooney Bridge** 	**Southern Access Route** Loads will proceed ahead on the L5025. A swept path assessment has been undertaken at this location and indicates that loads will oversail both verges. Tree canopy trimming to accommodate the raised blade will be required. **Northern Access Route** Loads that are destined for the northern access will have turned at the facilities accessed from the southern junction. When travelling back on the L5025, loads continue ahead. The swept path assessment also covers this movement. All overhead utilities on the L5025 should be lowered or relocated to enable the raised blade for the northern turbines to pass along the road.

POI	Key Constraint	Details
7	**L5025, south of the River Kilooney Bridge** 	**Southern Access Route** Loads will proceed ahead on the L5025. A swept path assessment has been undertaken at this location and indicates that that loads will oversail both verges. Tree canopy trimming to accommodate the raised blade will be required. **Northern Access Route** Loads that are destined for the northern access will have turned at the facilities accessed from the southern junction. When travelling back on the L5025, loads continue ahead. The swept path assessment also covers this movement. All overhead utilities on the L5025 should be lowered or relocated to enable the raised blade for the northern turbines to pass along the road.
8	**Southern Site Access Junction** 	**Southern Access Route** Loads will turn left into a new site access junction. A swept path assessment has been undertaken at this location and indicates that loads will require the removal of a section of fence, access gate and hedge to enable the construction of the access junction. **Northern Access Route** Loads that are destined for the northern access will have turned at the facilities accessed from the southern junction. When travelling back on the L5025, loads will turn right out of the site. The swept path assessment also covers this movement. All overhead utilities on the L5025 and inside the access site should be lowered or relocated to enable the raised blade for the northern turbines to pass along the road.
9	**R402 Raven Junction** 	**Northern Access Route** Loads for the northern access junction will turn right at the junction. A swept path assessment has been undertaken at this location and indicates that loads will oversail the inside of the junction where verge vegetation trimming is required. It is recommended that the load suspension settings are increased to account for any changes in vertical clearance on the Kilshanroe Road.
10	**Kilshanroe Road Bend 1** 	**Northern Access Route** Loads for the northern access junction will proceed ahead on Kilshanroe Road. A swept path assessment has been undertaken at this location and indicates that loads will oversail both verges. Tree canopy trimming to accommodate the raised blade will be required. All overhead utilities on Kilshanroe Road should be lowered or relocated to enable the raised blade for the northern turbines to pass along the road.

POI	Key Constraint	Details
11	**Kilshanroe Road Bend 2** 	**Northern Access Route** Loads for the northern access junction will proceed ahead on Kilshanroe Road. A swept path assessment has been undertaken at this location and indicates that loads will oversail both verges. Tree canopy trimming to accommodate the raised blade will be required. All overhead utilities on Kilshanroe Road should be lowered or relocated to enable the raised blade for the northern turbines to pass along the road.
12	**Kilshanroe Road Bend 3** 	**Northern Access Route** Loads for the northern access junction will proceed ahead on Kilshanroe Road. A swept path assessment has been undertaken at this location and indicates that loads will oversail both verges. Tree canopy trimming to accommodate the raised blade will be required. A section of verge hedge should be trimmed on the northern verge. All overhead utilities on Kilshanroe Road should be lowered or relocated to enable the raised blade for the northern turbines to pass along the road.
13	**Kilshanroe Road Bend 4** 	**Northern Access Route** Loads for the northern access junction will proceed ahead on Kilshanroe Road. A swept path assessment has been undertaken at this location and indicates that loads will oversail both verges. Tree canopy trimming to accommodate the raised blade will be required. Two lengths of hedge should be trimmed on the northern verge. All overhead utilities on Kilshanroe Road should be lowered or relocated to enable the raised blade for the northern turbines to pass along the road.
14	**Kilshanroe Road Bend 5** 	**Northern Access Route** Loads for the northern access junction will proceed ahead on Kilshanroe Road. A swept path assessment has been undertaken at this location and indicates that loads will oversail both verges. Tree canopy trimming to accommodate the raised blade will be required. A minor area of load bearing surface is required in the northern verge. All overhead utilities on Kilshanroe Road should be lowered or relocated to enable the raised blade for the northern turbines to pass along the road.

POI	Key Constraint	Details
15	**Northern Site Access** 	**Northern Access Route** Loads will turn right into a new site access junction. A swept path assessment has been undertaken at this location and indicates that trees should be removed to enable the construction of the site access junction. A swept path assessment has been undertaken at this location and indicates that loads will oversail both verges. Tree canopy trimming to accommodate the raised blade will be required. All overhead utilities on Kilshanroe Road should be lowered or relocated to enable the raised blade for the northern turbines to pass along the road. Engagement on with the power line operator is recommended.

3.3 Swept Path Assessment Results and Summary

The detailed swept path drawings for the locations assessed are provided in Appendix B for review. The drawings in Appendix B illustrate tracking undertaken for the worst-case loads at each location.

The colours illustrated on the swept paths are:

- Grey / Black – OS / Topographical Base Mapping;
- Green – Vehicle body outline (body swept path);
- Red – Tracked pathway of the wheels (wheel swept path); and
- Purple – The over-sail tracked path of the load where it encroaches outwith the trailer (load swept path).

Where mitigation works are required, the extents of over-run and over-sail areas are illustrated on the swept path drawings.

3.4 Overhead Constraints

Overhead utilities will foul the raised blade when this is carried in the upright position. Where the blade is raised, these will need to be relocated, lowered or removed. It is assumed in this assessment that the blade tip is raised from the southern access junction, through to the northern access junction. As such, all overhead utilities would need to be removed.

A detailed overhead utility review is required prior to loads being transported and engagement with utility providers will be required.

Overhead utilities on the R402 should also be removed. It may be possible, depending upon the views of the Garda and haulier to lower the blade on straight sections of the R402 and early engagement with both is recommended.

3.5 Summary Issues

It is strongly suggested that following a review of the RSR, North Kildare Wind Farm Limited should undertake the following prior to the delivery of the first abnormal loads, to ensure load and road user safety:

- A review of clear heights with utility providers and the transport agencies along the route to ensure that there is sufficient space to allow for loads plus sufficient flashover protection (to electrical installations);
- That any verge vegetation and tree canopies which may foul loads is trimmed prior to loads moving;
- That a review of potential roadworks and or closures is undertaken once the delivery schedule is established in draft form;

- That a test run is completed to confirm the route and review any vertical clearance issues; and
- That a condition survey is undertaken to ascertain the extents of road defects prior to loads commencing to protect the developer from spurious damage claims.

4 Summary

4.1 Summary of Access Review

PF has been commissioned by North Kildare Wind Farm Limited to prepare a Route Survey Report to examine the issues associated with the transport of AIL turbine components to Drehid Wind Farm.

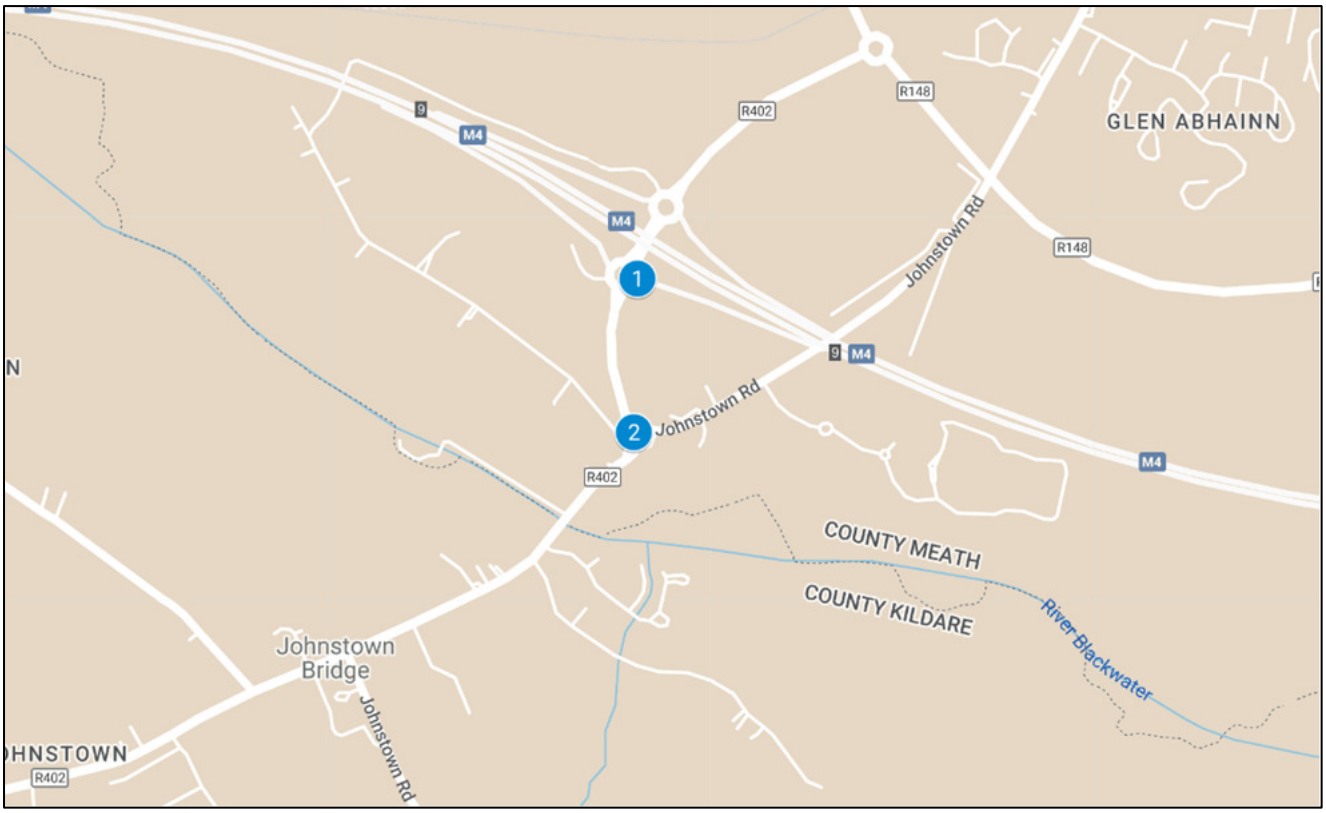
This report identifies the key points and issues associated with the proposed routes and outlines the issues that will need to be considered for successful delivery of components.

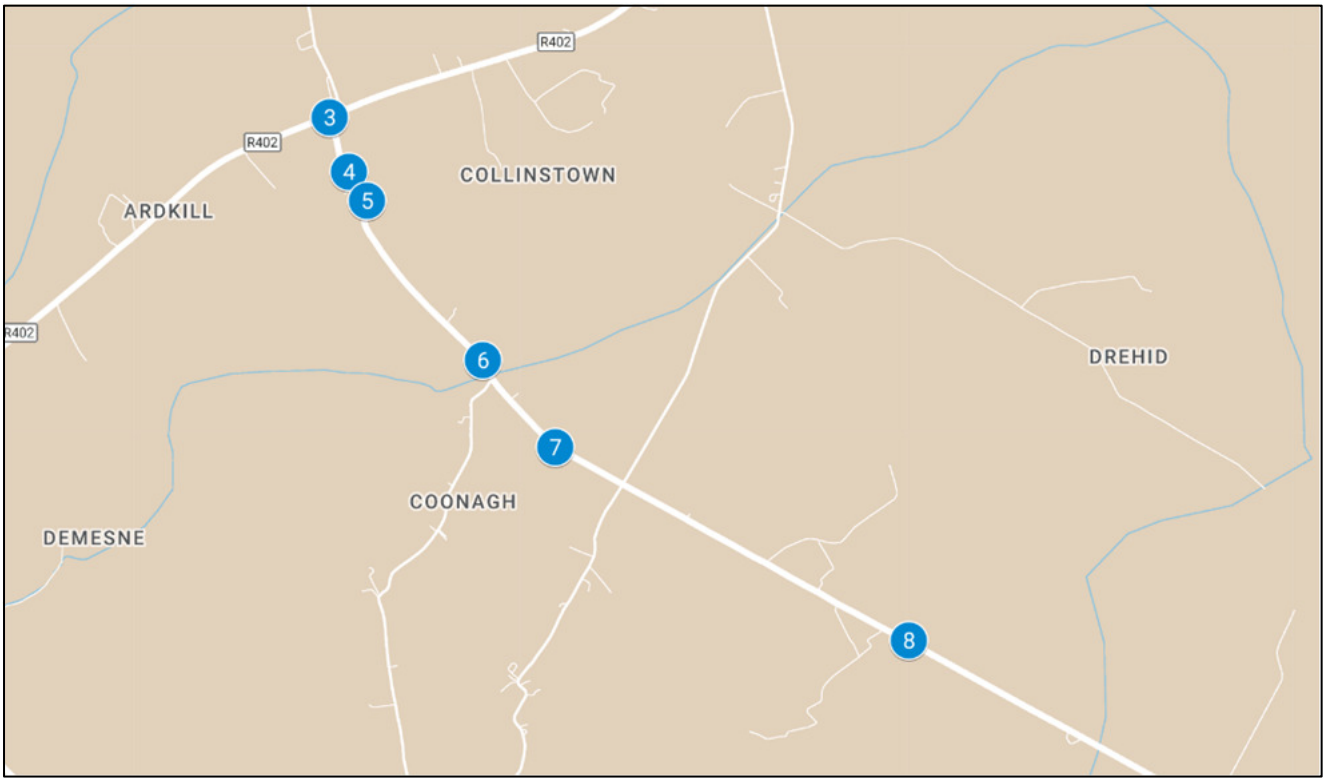
This report has been based upon a worst case of Nordex N133 turbine sections and has been undertaken on the basis of a Superwing Carrier blade trailer, transferring to a blade lifting trailer for access to the northern development area.

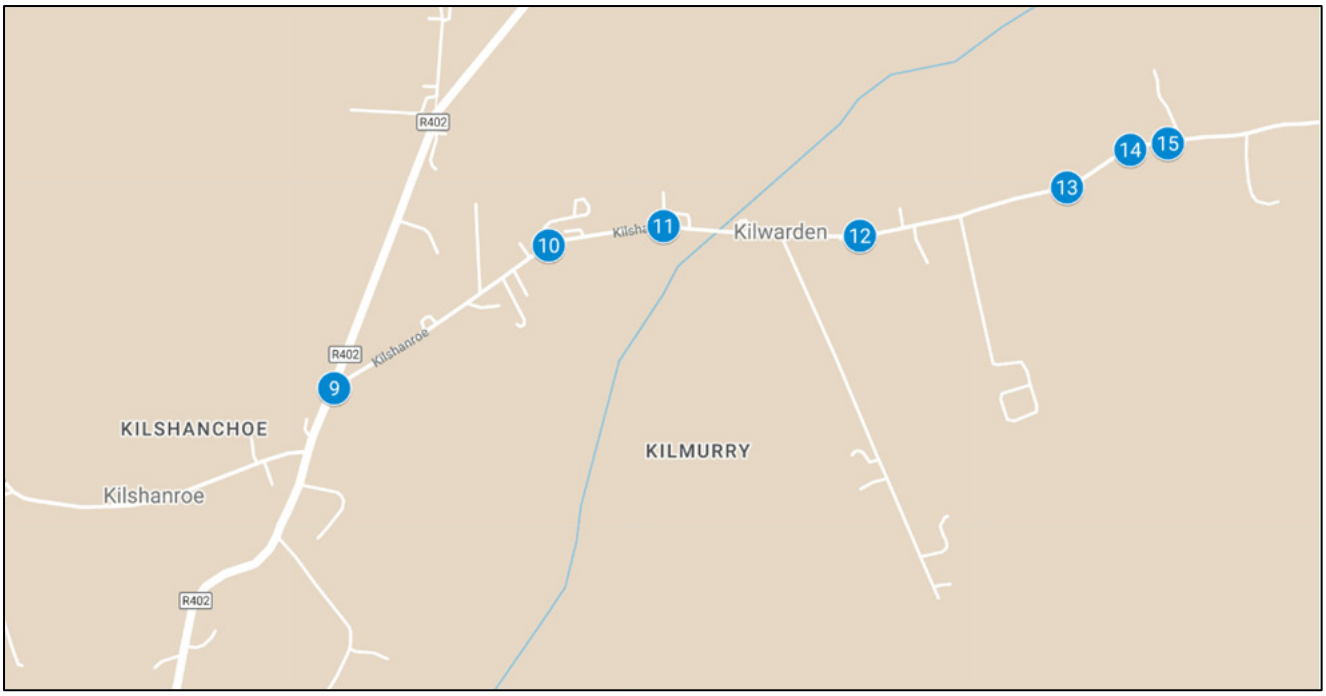
The report is presented for consideration to North Kildare Wind Farm Limited. Various road modifications and interventions are required to successfully access the site.

Appendix A Points of Interest

An electronic version of the POI plan can be found here:
https://www.google.com/maps/d/edit?mid=1Vm6M6mS4QLn5zg9k91_iL_p2v2ojopw&usp=sharing






R402
R402
R402
Kilshanroe
Kilshanroe
KILSHANCHOE
KILMURRY
Kilwarden
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Appendix B Swept Path Assessment Drawings

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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: M4 Junction 9 Slip Road

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		1

Scale: 1:500 @ A3

File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

Drawing No.: SK01

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00

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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: M4 Junction 9 Slip Road

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		1

Scale: 1:1000 @ A3

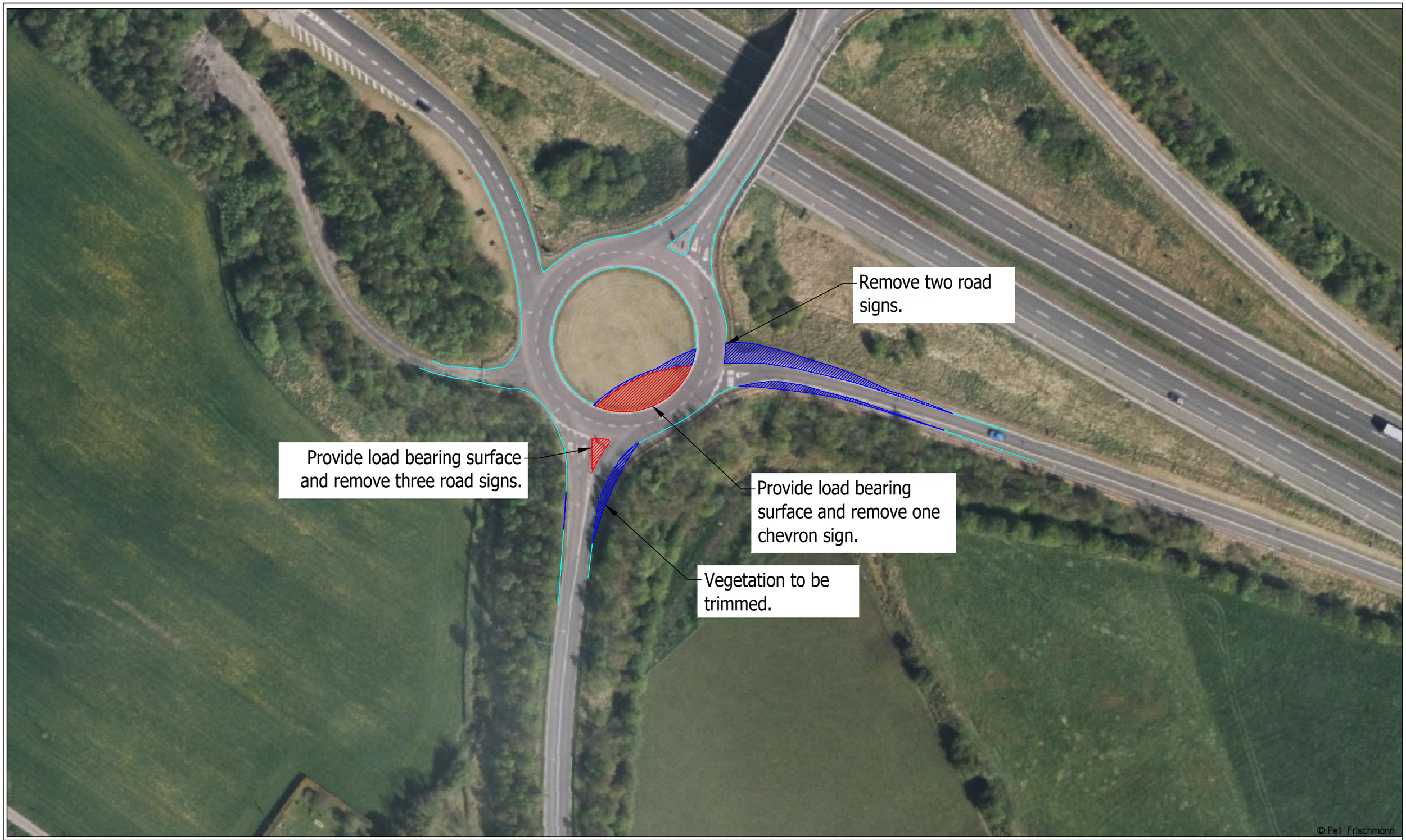
File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

Drawing No.: SK01A

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00



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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: M4 Junction 9 Slip Road

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		1

Scale: 1:1000 @ A3

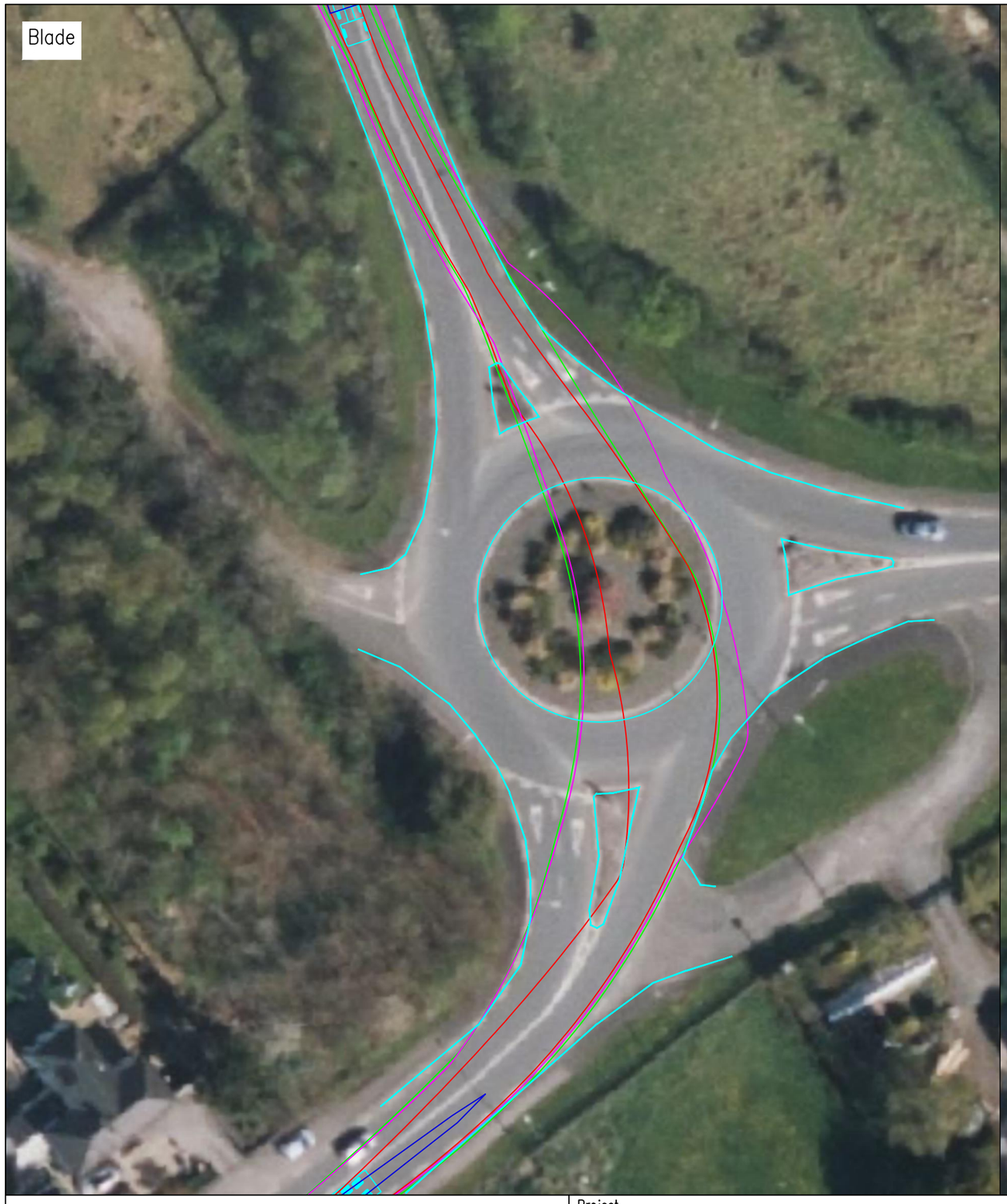
File No.: 241218 Drehid RSR Tracking.dwg

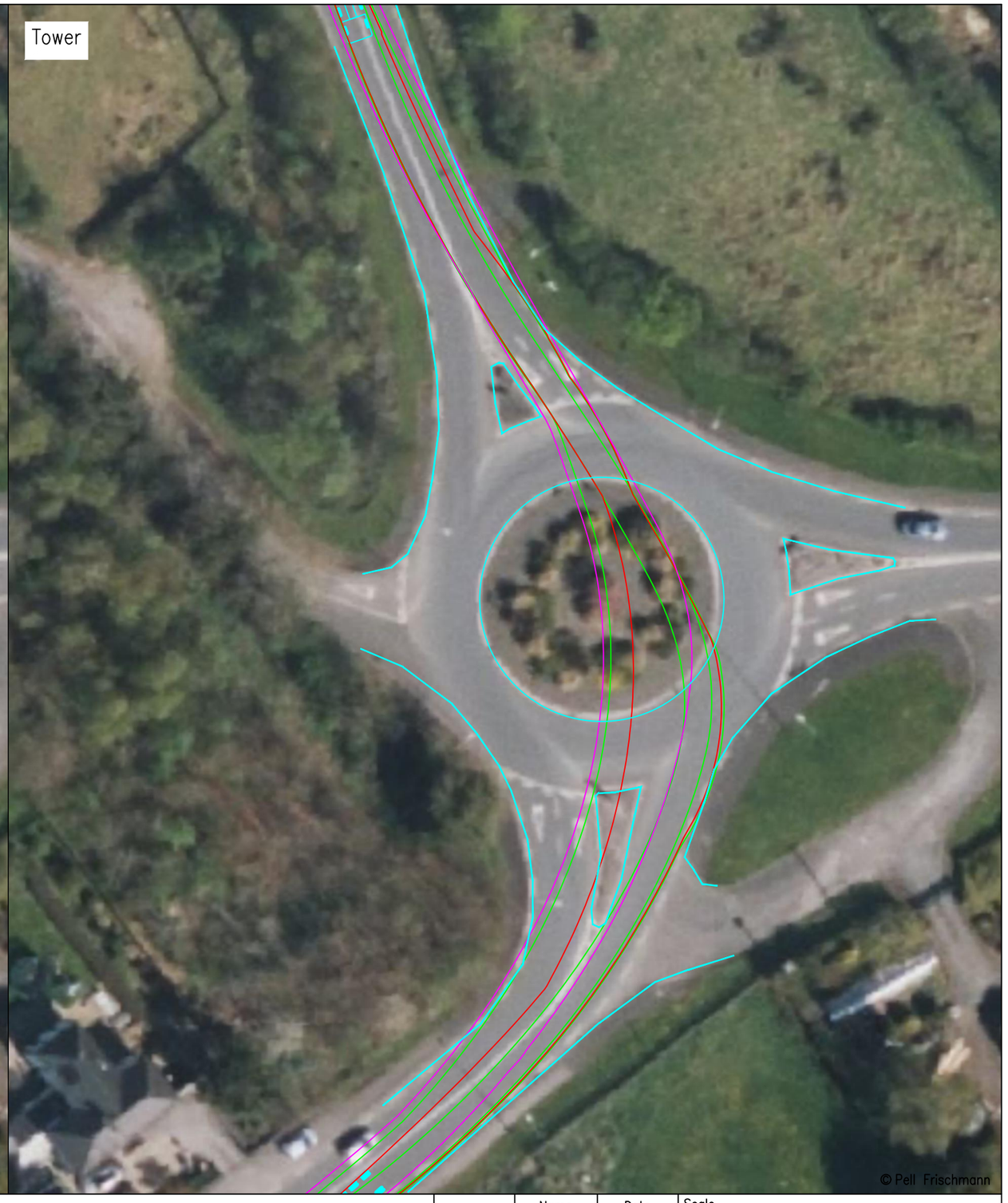
Drawing Status: Draft

Drawing No.: SK01B

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00





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www.pellfrischmann.com

Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: R402 / Johnstown Road Roundabout

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		2

Scale: 1:500 @ A3

File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

Drawing No.: SK02

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00

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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: R402 / Johnstown Road Roundabout

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		2

Scale: 1:1000 @ A3

File No.: 241218 Drehid RSR Tracking.dwg

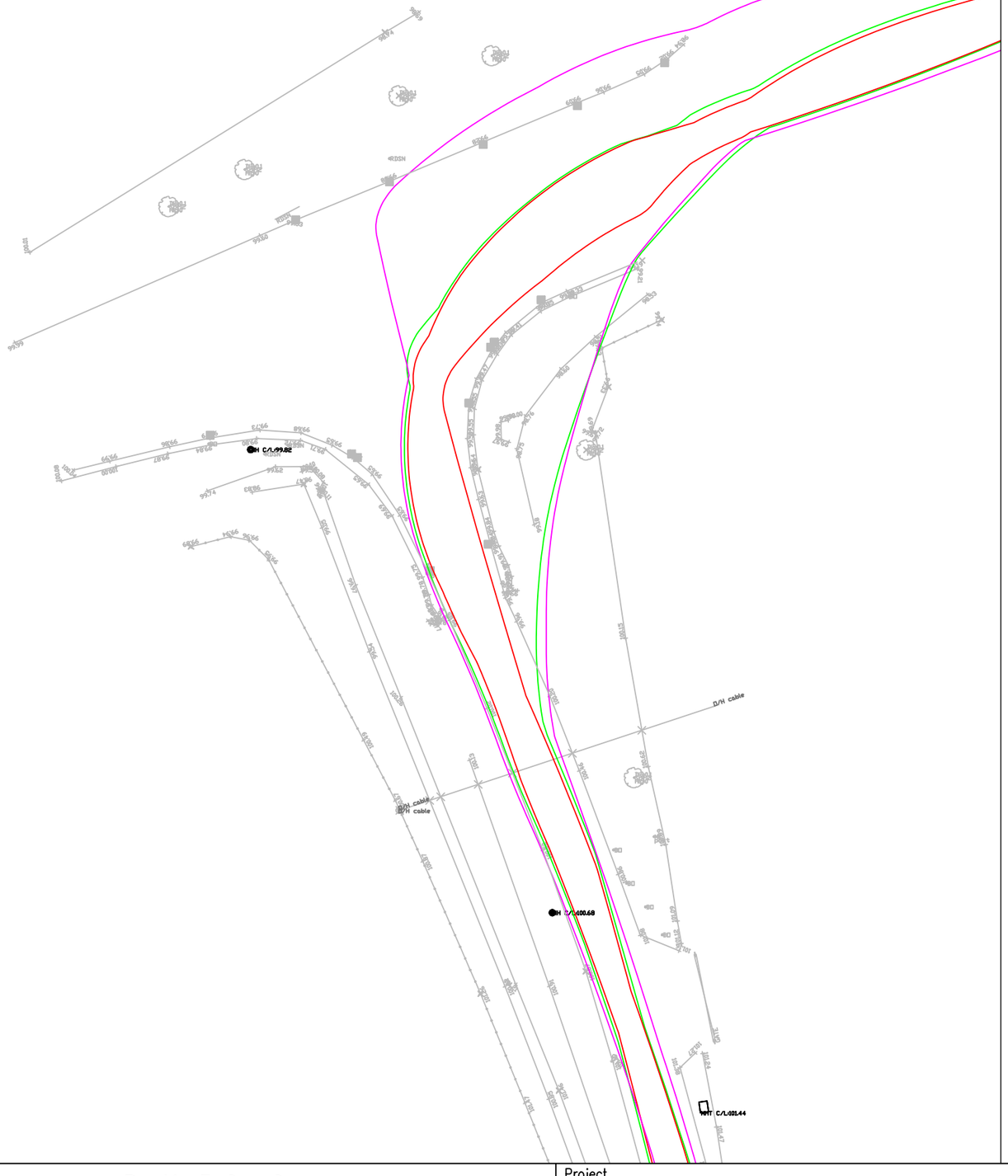
Drawing Status: Draft

Drawing No.: SK02A

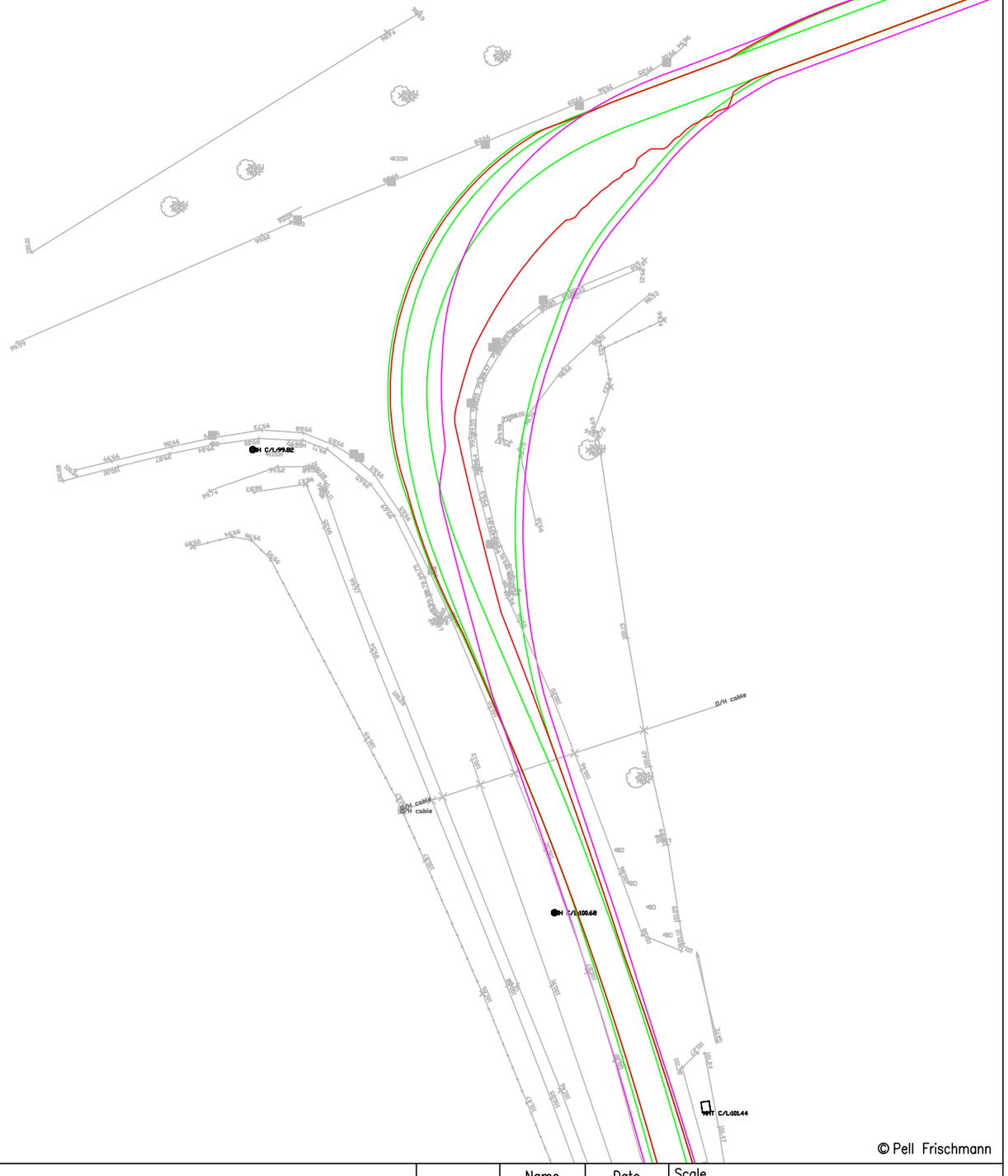
Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00

Blade



Tower



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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: R402 / L5025 Junction

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		3

Scale: 1:500 @ A3

File No.: 241218 Drehid RSR Tracking.dwg

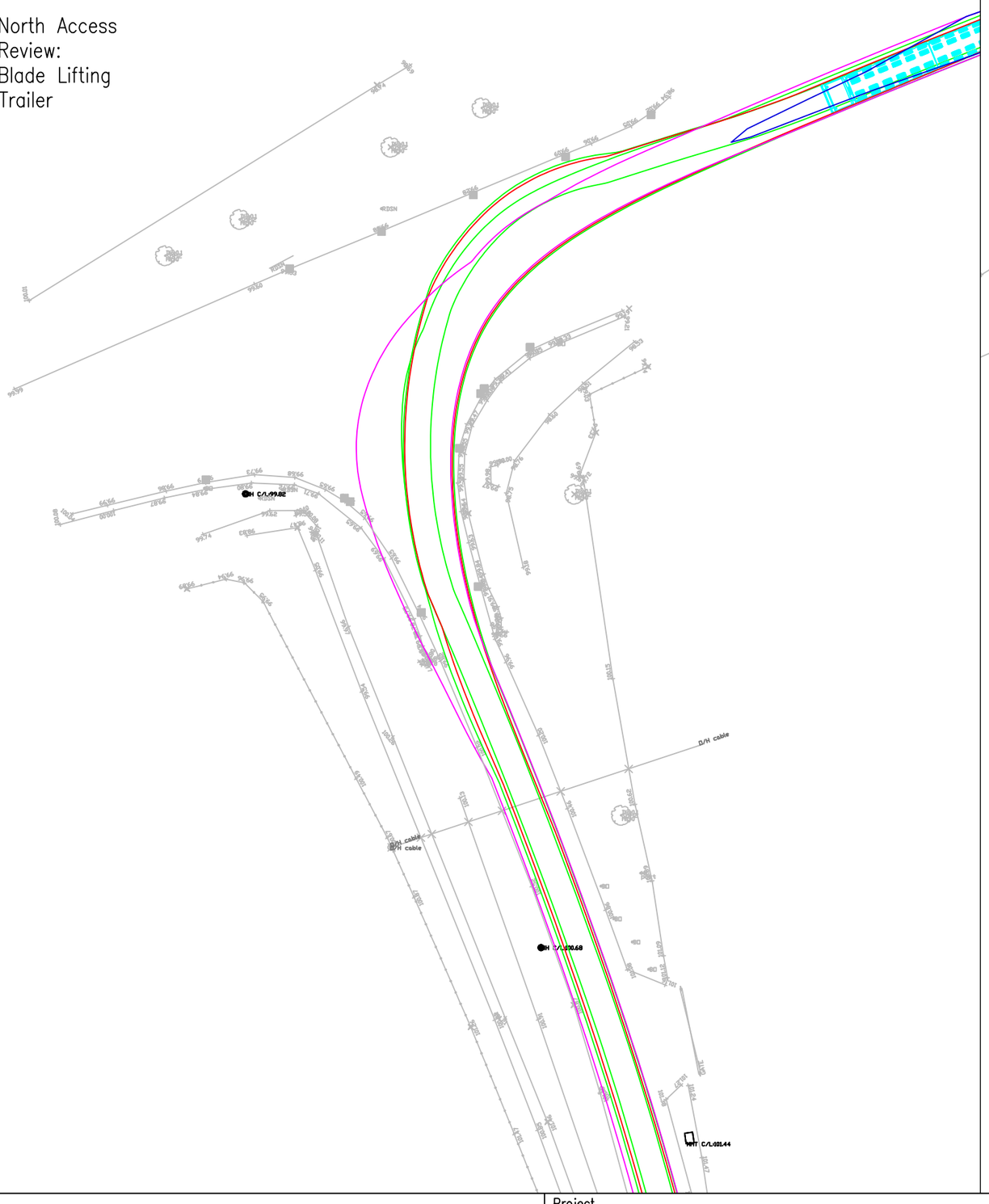
Drawing Status: Draft

Drawing No.: SK03

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00

North Access
Review:
Blade Lifting
Trailer



North Access
Review:
Tower

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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: R402 / L5025 Junction

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		3

Scale: 1:500 @ A3

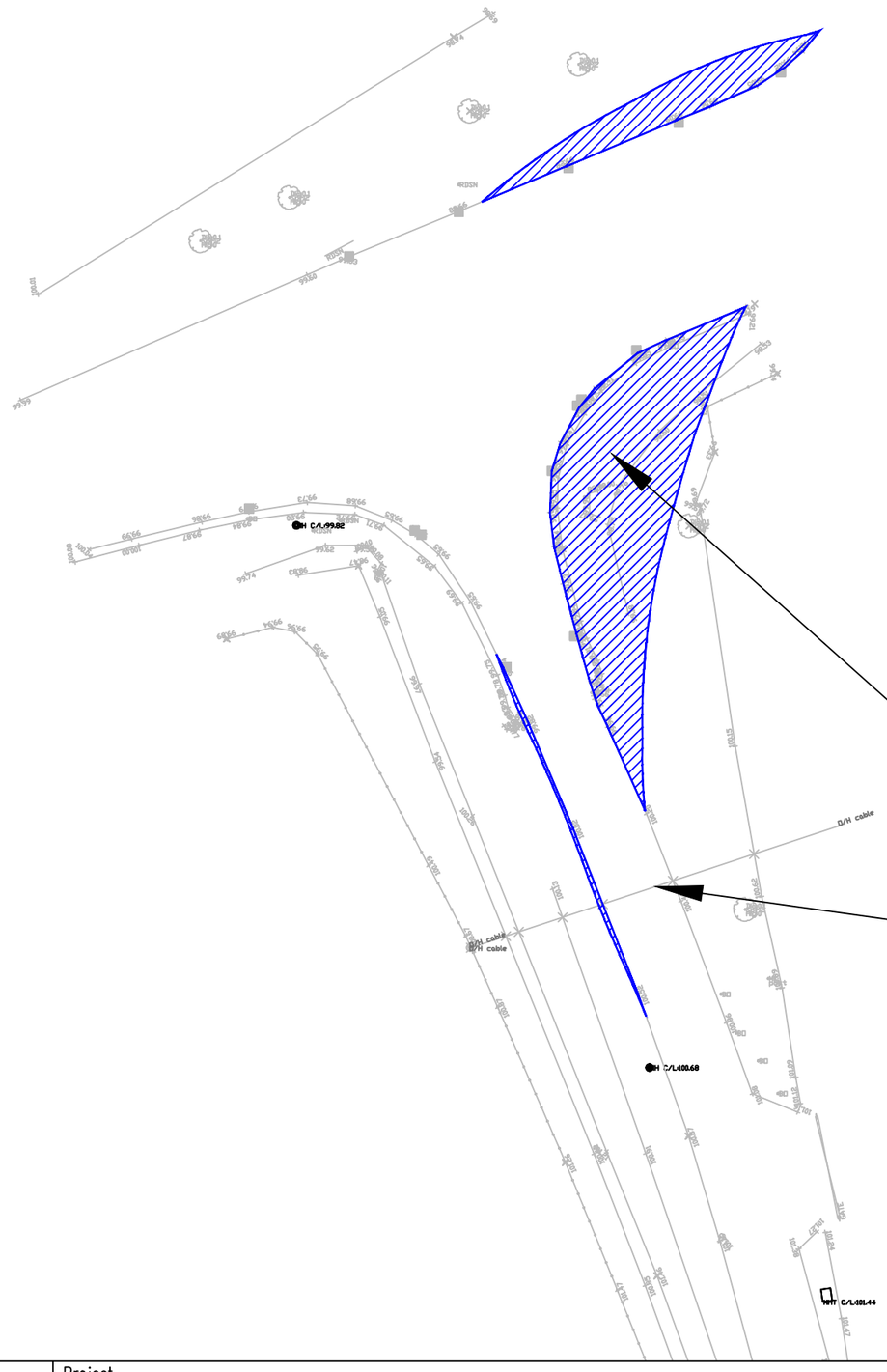
File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

Drawing No.: SK03A

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00



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Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: R402 / L5025 Junction

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		3

Scale: 1:500 @ A3

File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

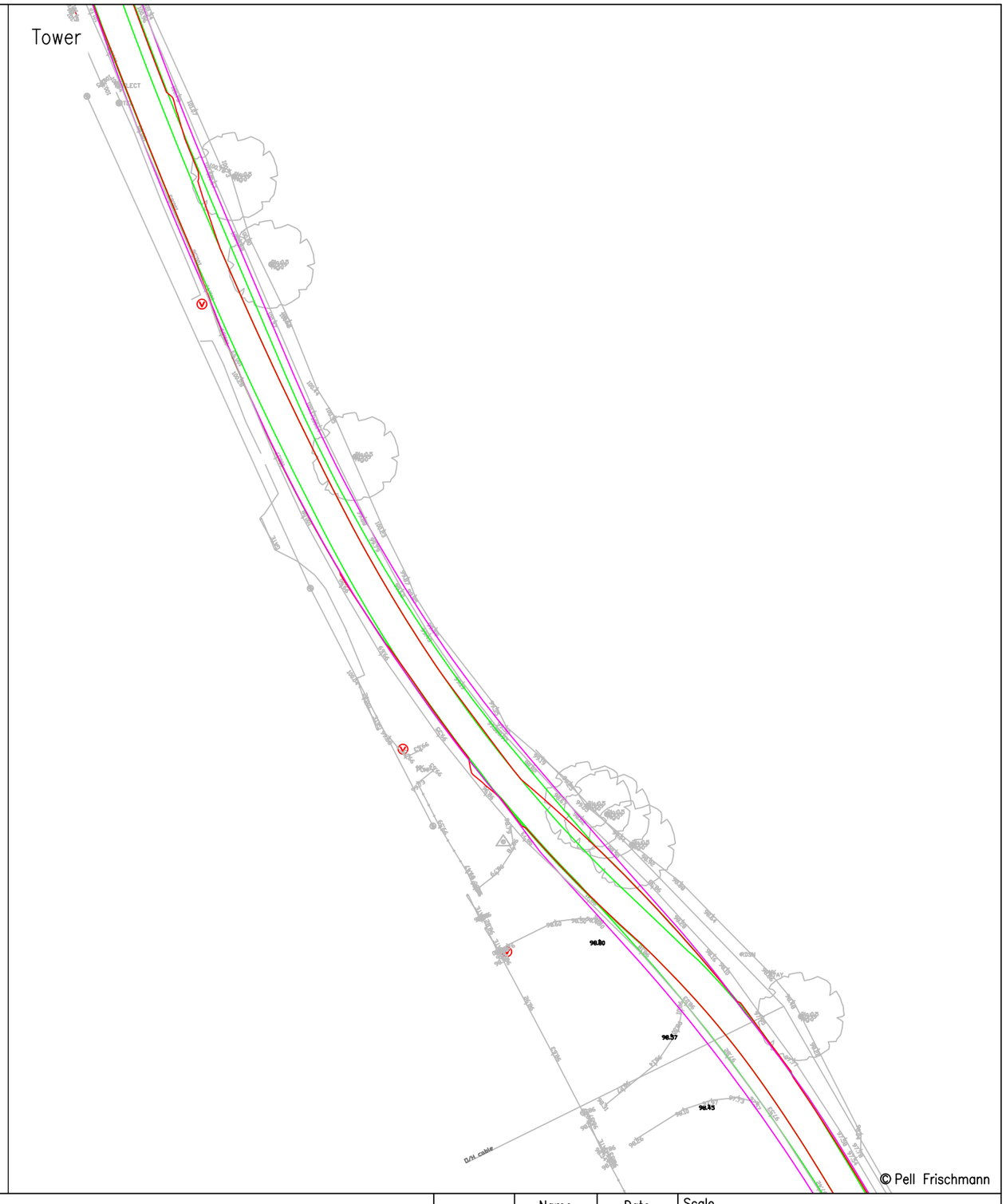
Drawing No.: SK03B

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00

Blade

Tower



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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: L5025 Bend 1

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		4

Scale: 1:500 @ A3

File No.: 241218 Drehid RSR Tracking.dwg

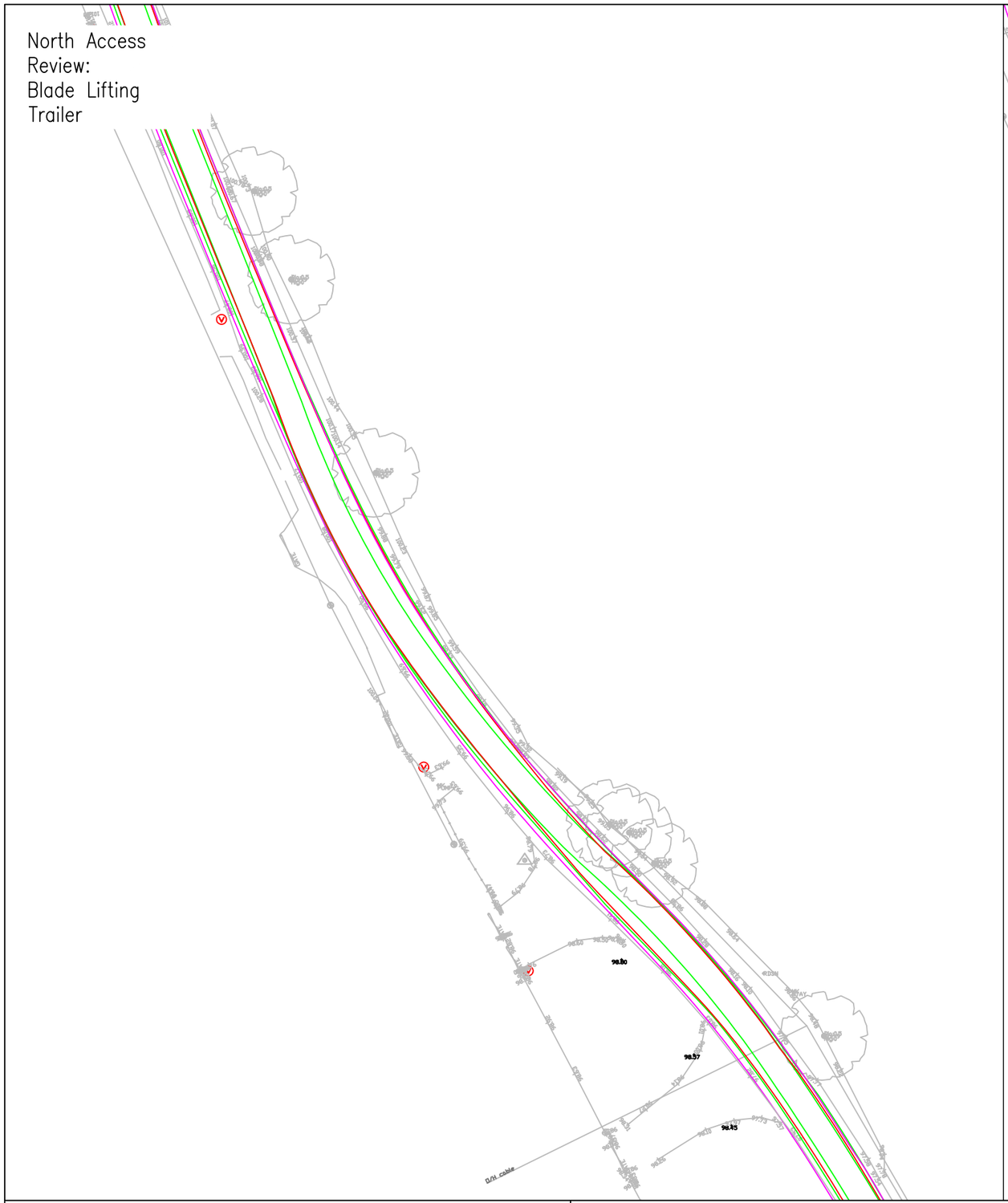
Drawing Status: Draft

Drawing No.: SK04

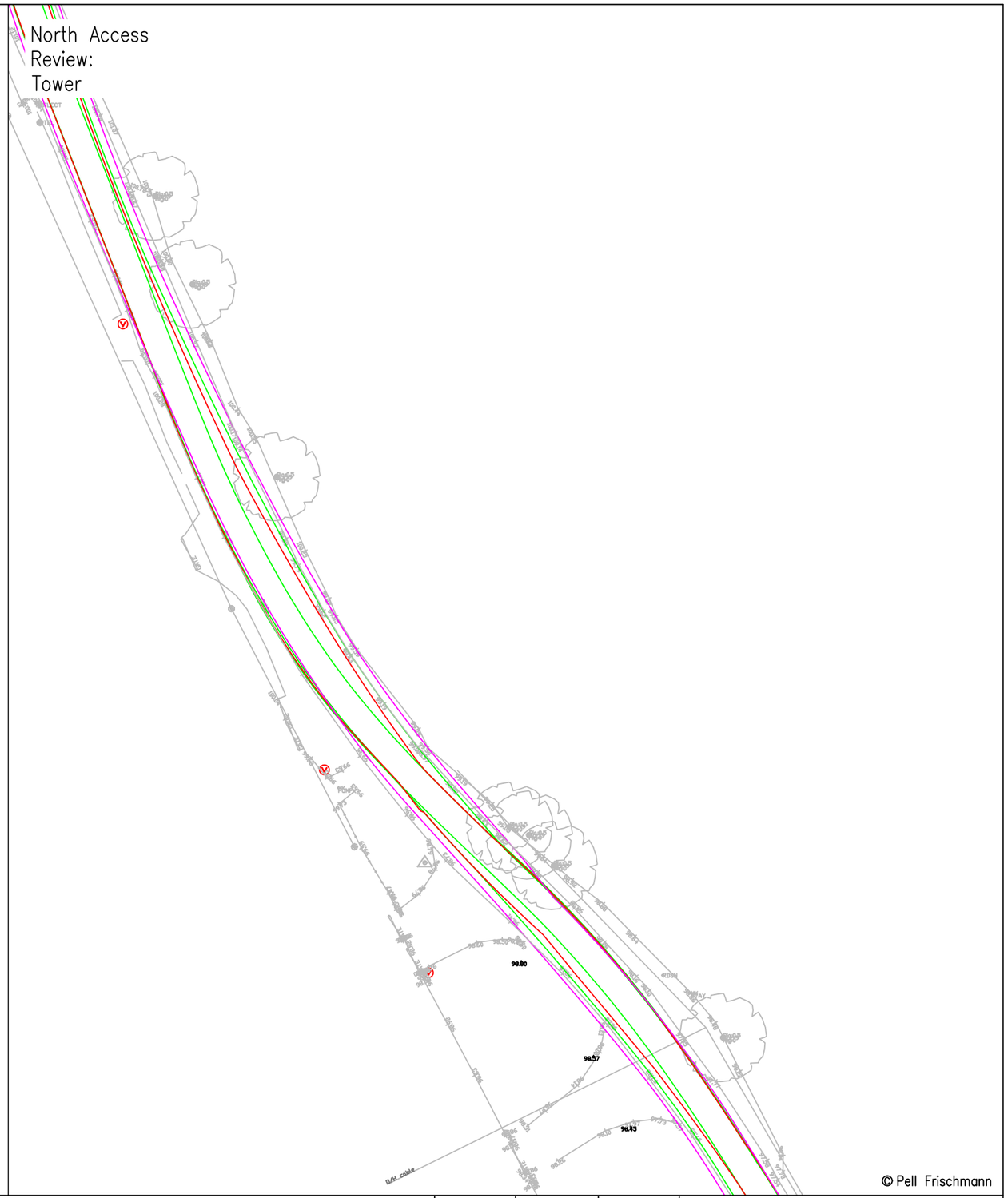
Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00

North Access
Review:
Blade Lifting
Trailer



North Access
Review:
Tower



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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: L5025 Bend 1

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		4

Scale: 1:500 @ A3

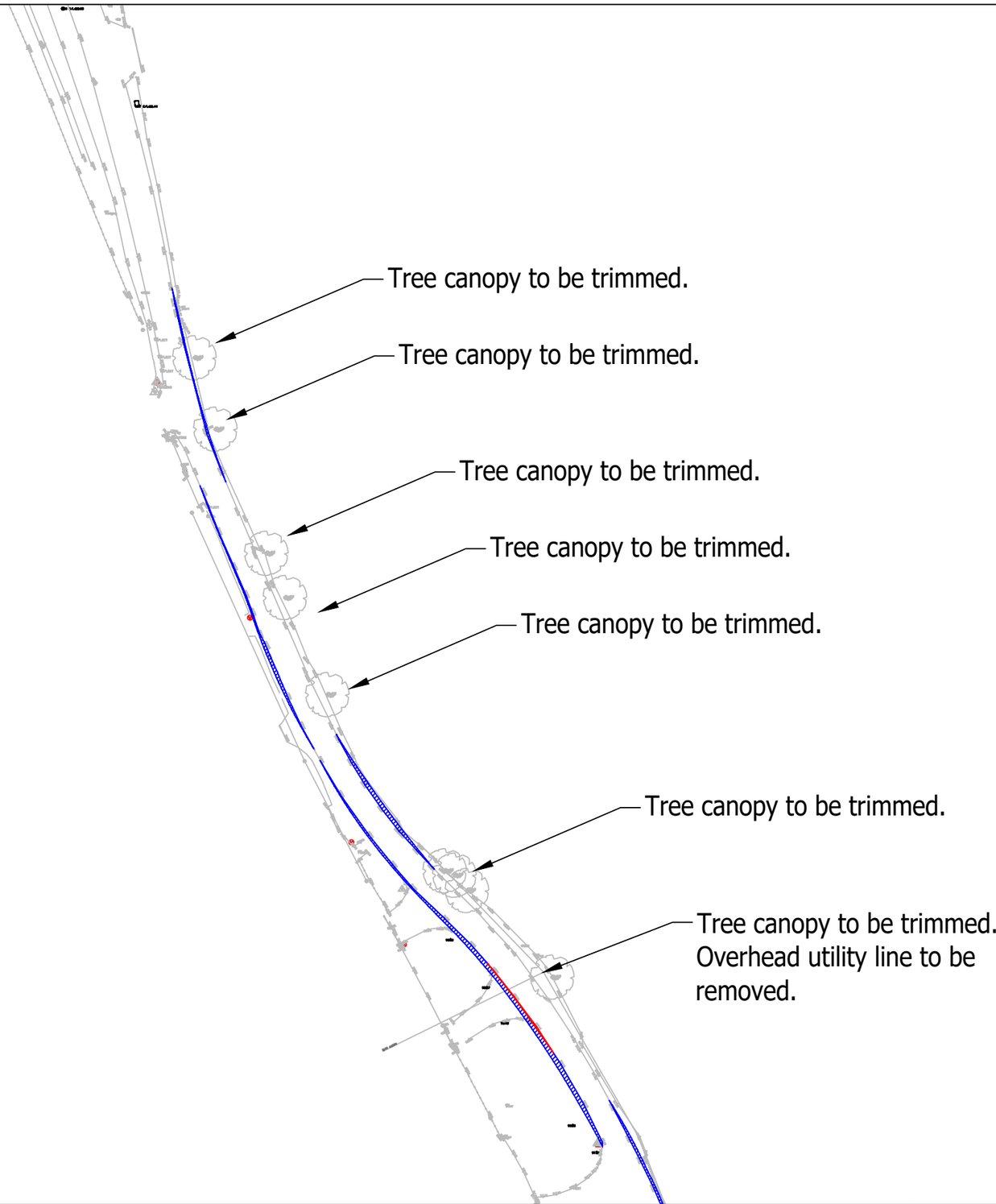
File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

Drawing No.: SK04A

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00



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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: L5025 Bend 1

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		4

Scale: 1:1000 @ A3

File No.: 241218 Drehid RSR Tracking.dwg

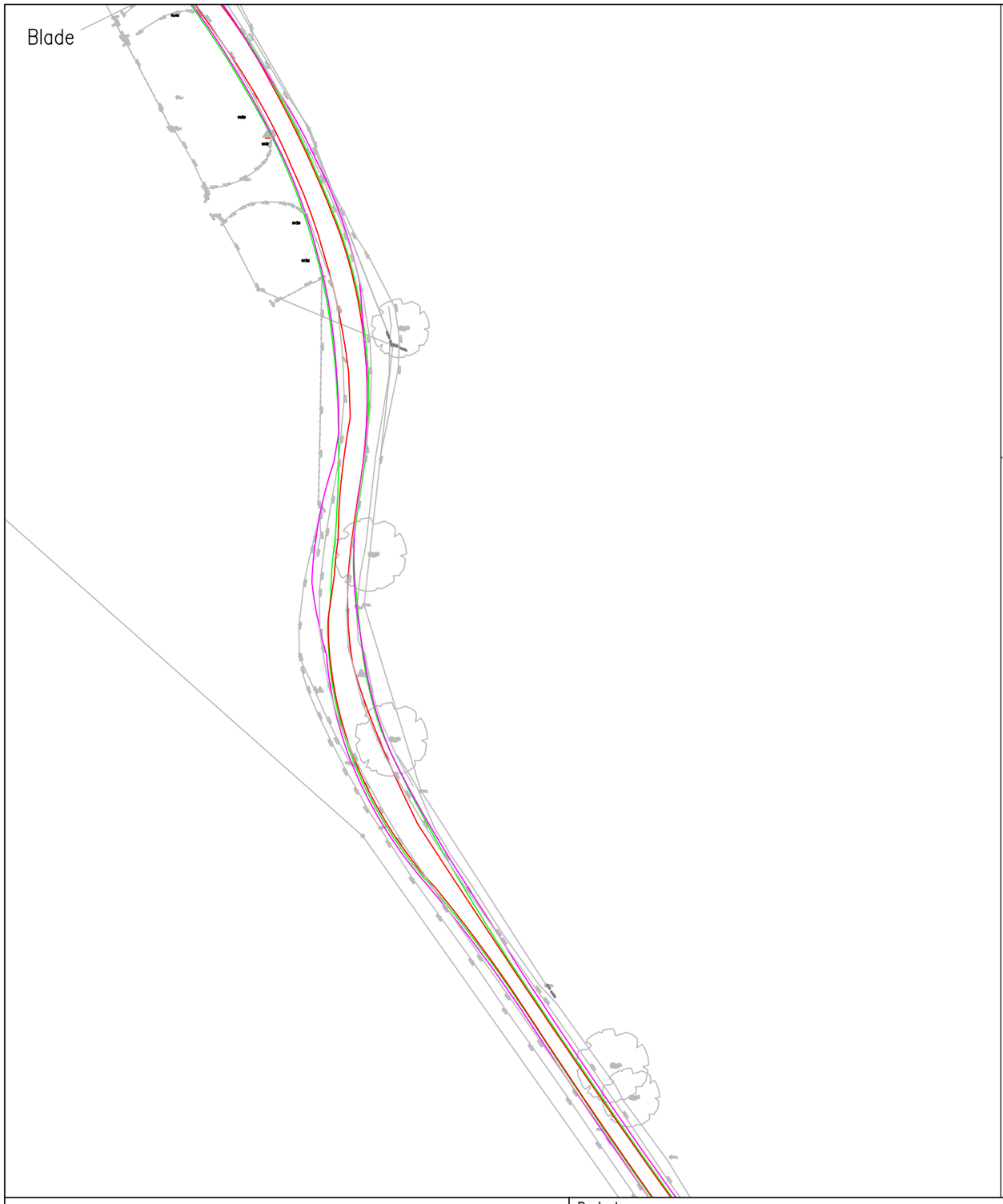
Drawing Status: Draft

Drawing No.: SK04B

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00

Blade



Tower

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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: L5025 Bend 2

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		5

Scale: 1:1000 @ A3

File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

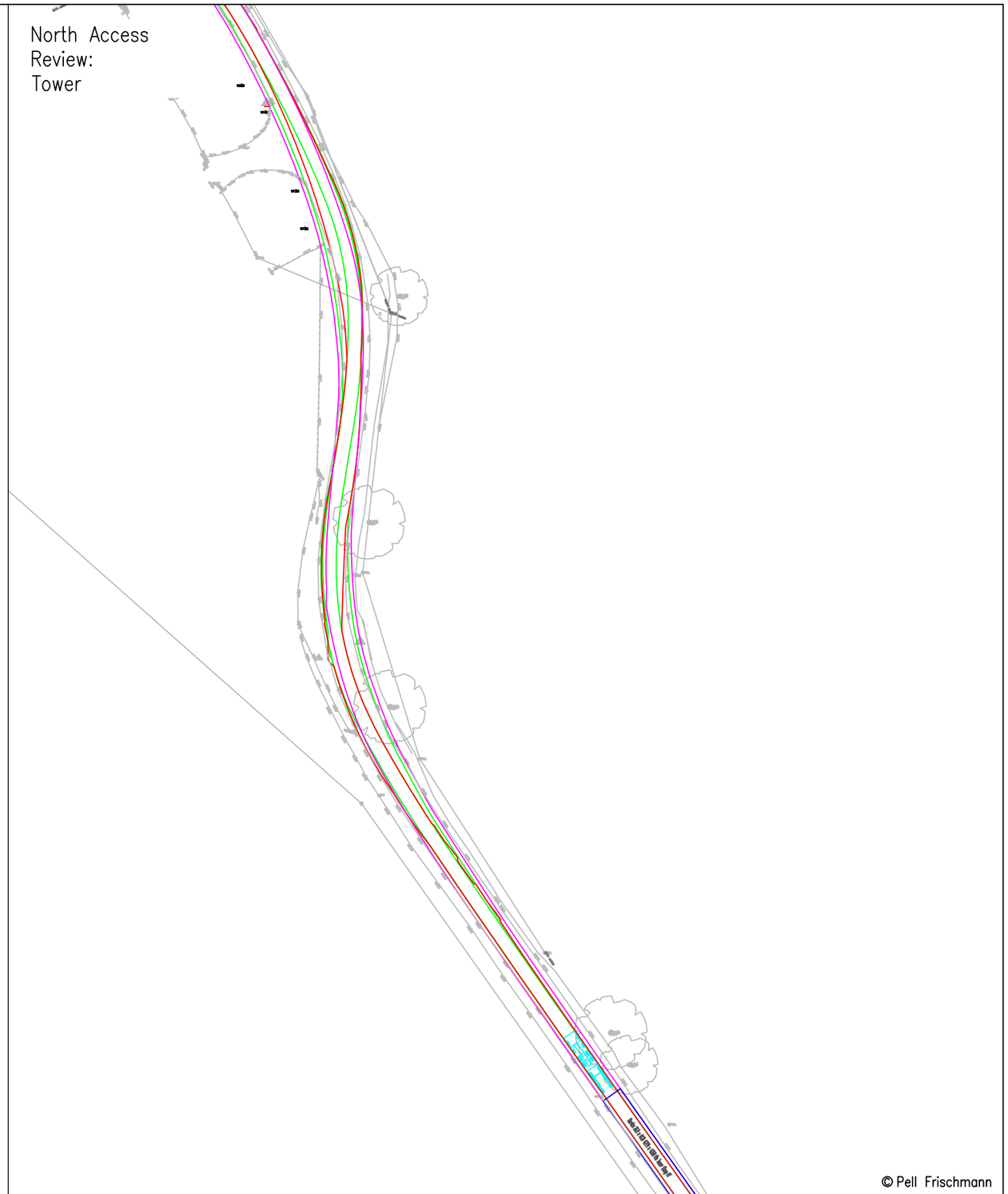
Drawing No.: SK05

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 01

North Access
Review:
Blade Lifting
Trailer

North Access
Review:
Tower



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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: L5025 Bend 2

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		5

Scale: 1:1000 @ A3

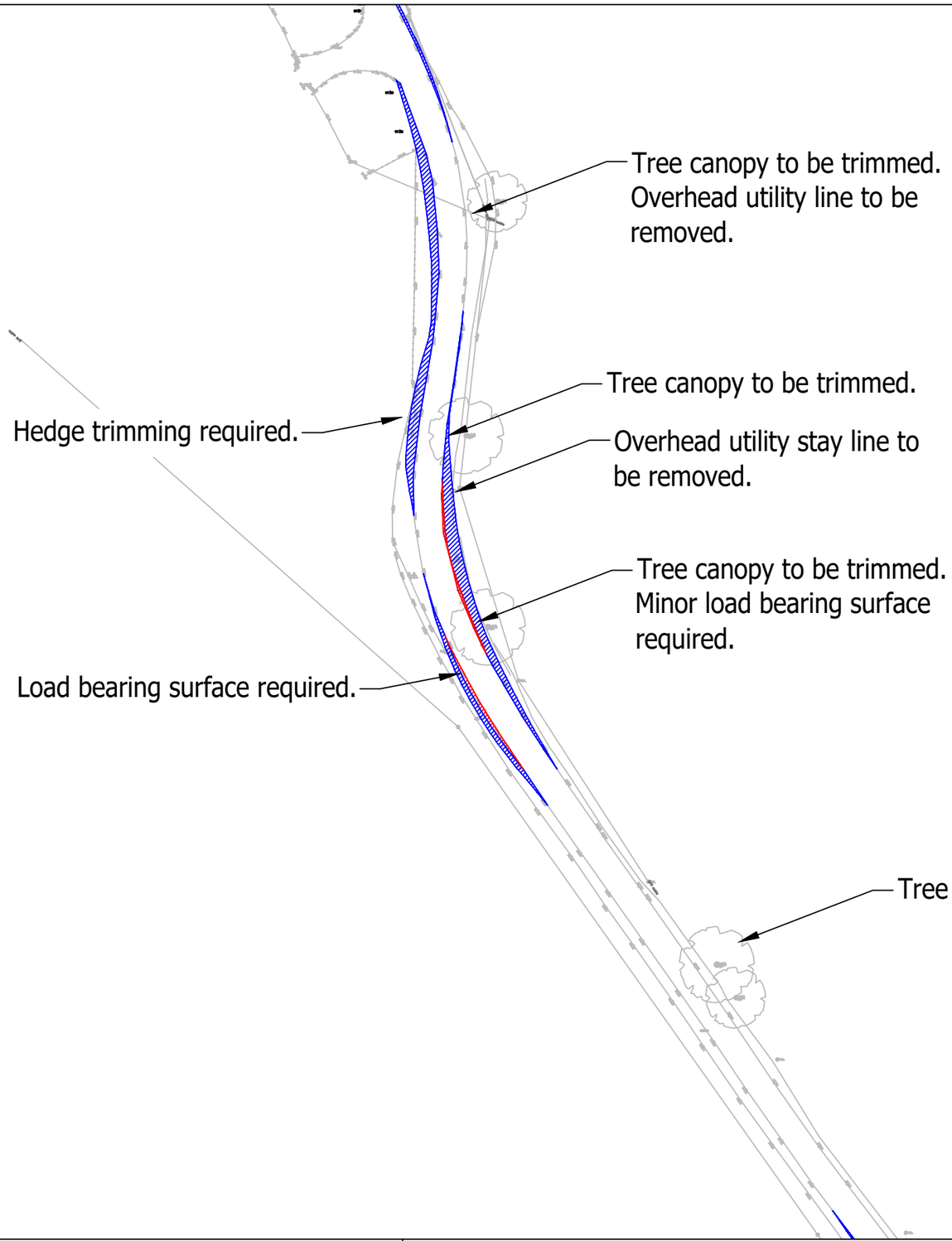
File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

Drawing No.: SK05A

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00



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Client: NORTH KILDARE WIND FARM LTD.

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Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: L5025 Bend 2

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		5

Scale: 1:1000 @ A3

File No.: 241218 Drehid RSR Tracking.dwg

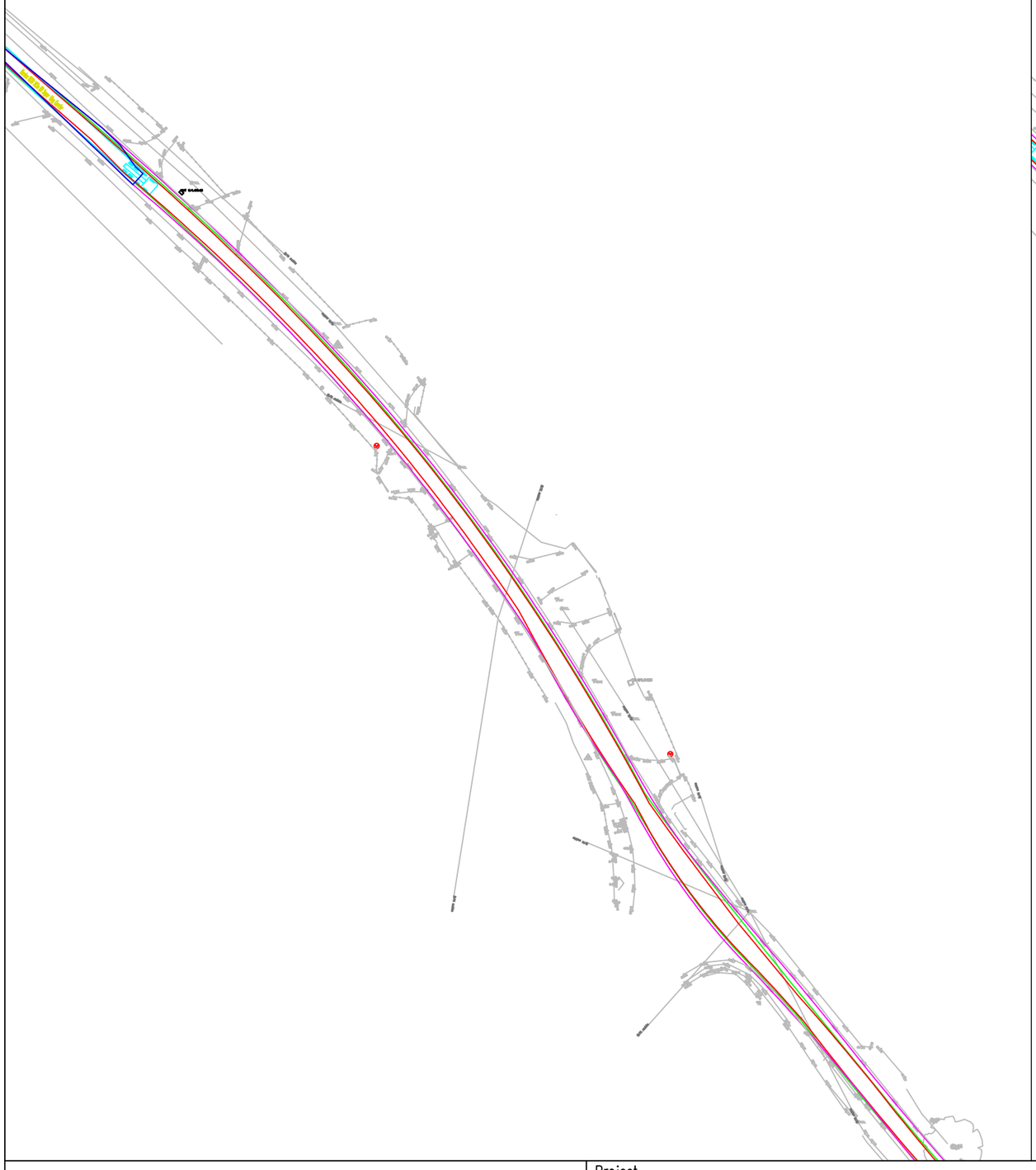
Drawing Status: Draft

Drawing No.: SK05B

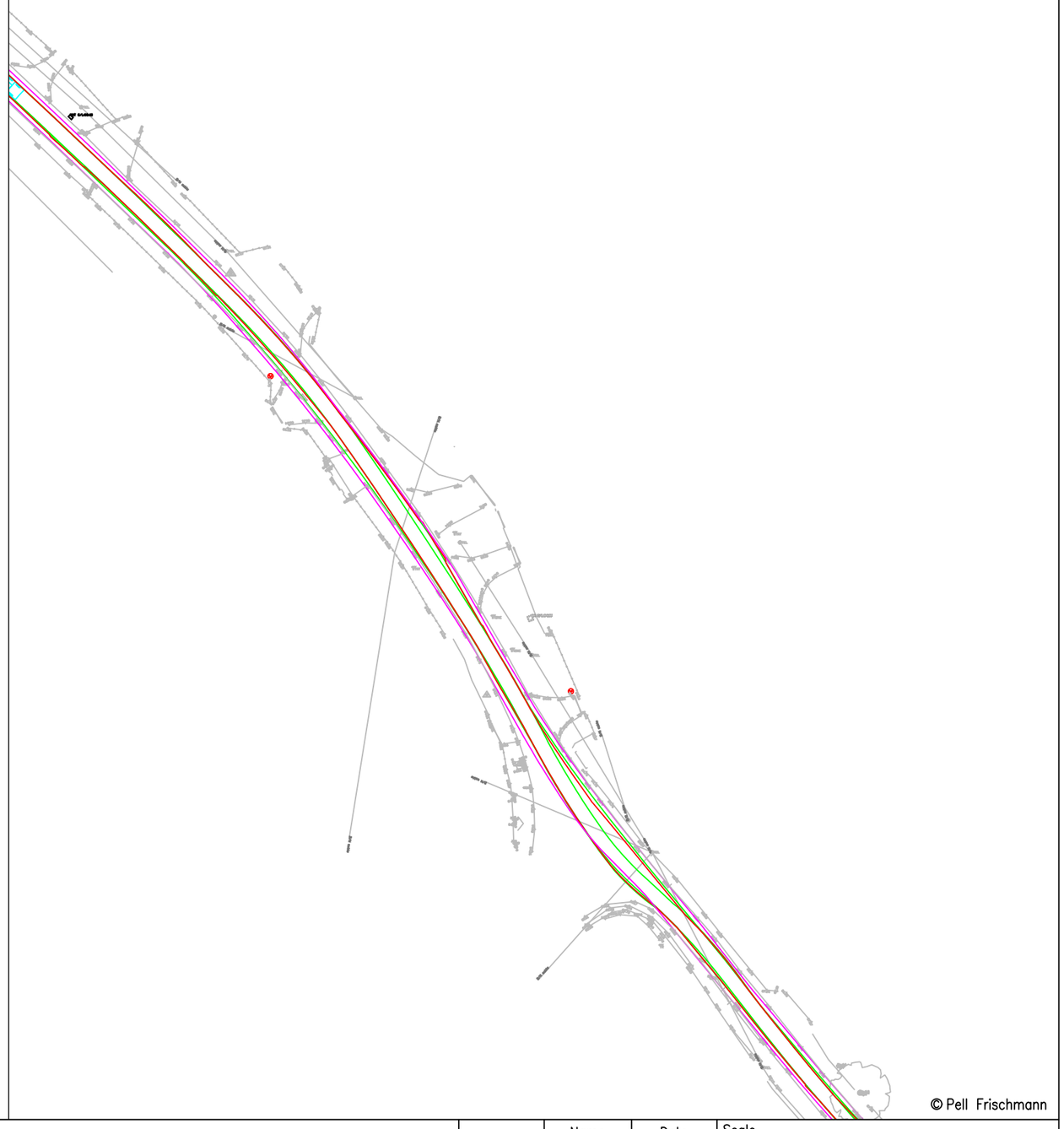
Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 01

Blade



Tower



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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: L5025 North of River Kilooney Bridge

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		6

Scale: 1:1000 @ A3

File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

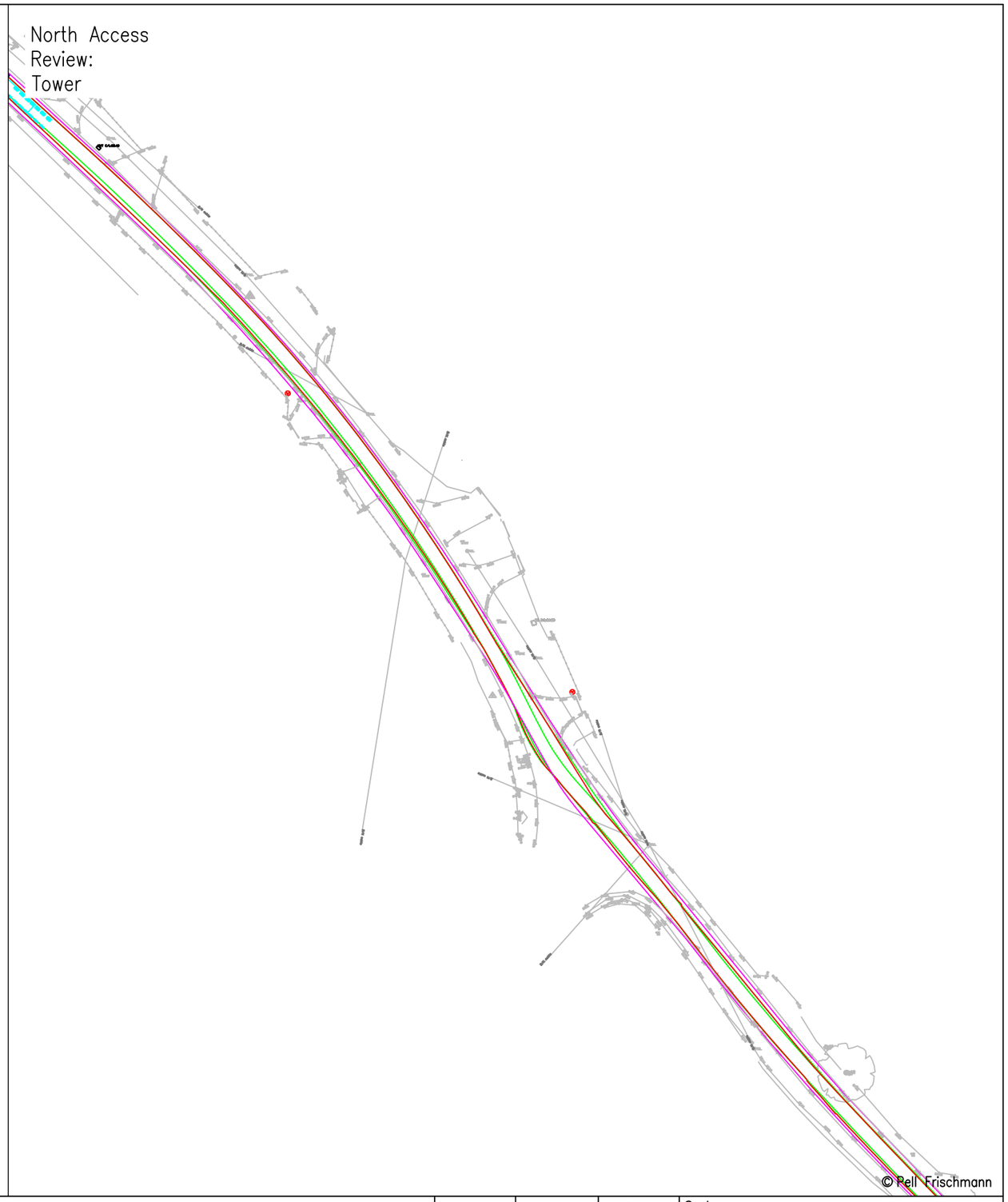
Drawing No.: SK06

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00

North Access
Review:
Blade Lifting
Trailer

North Access
Review:
Tower



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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: L5025 North of River Kilooney Bridge

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		6

Scale: 1:1000 @ A3

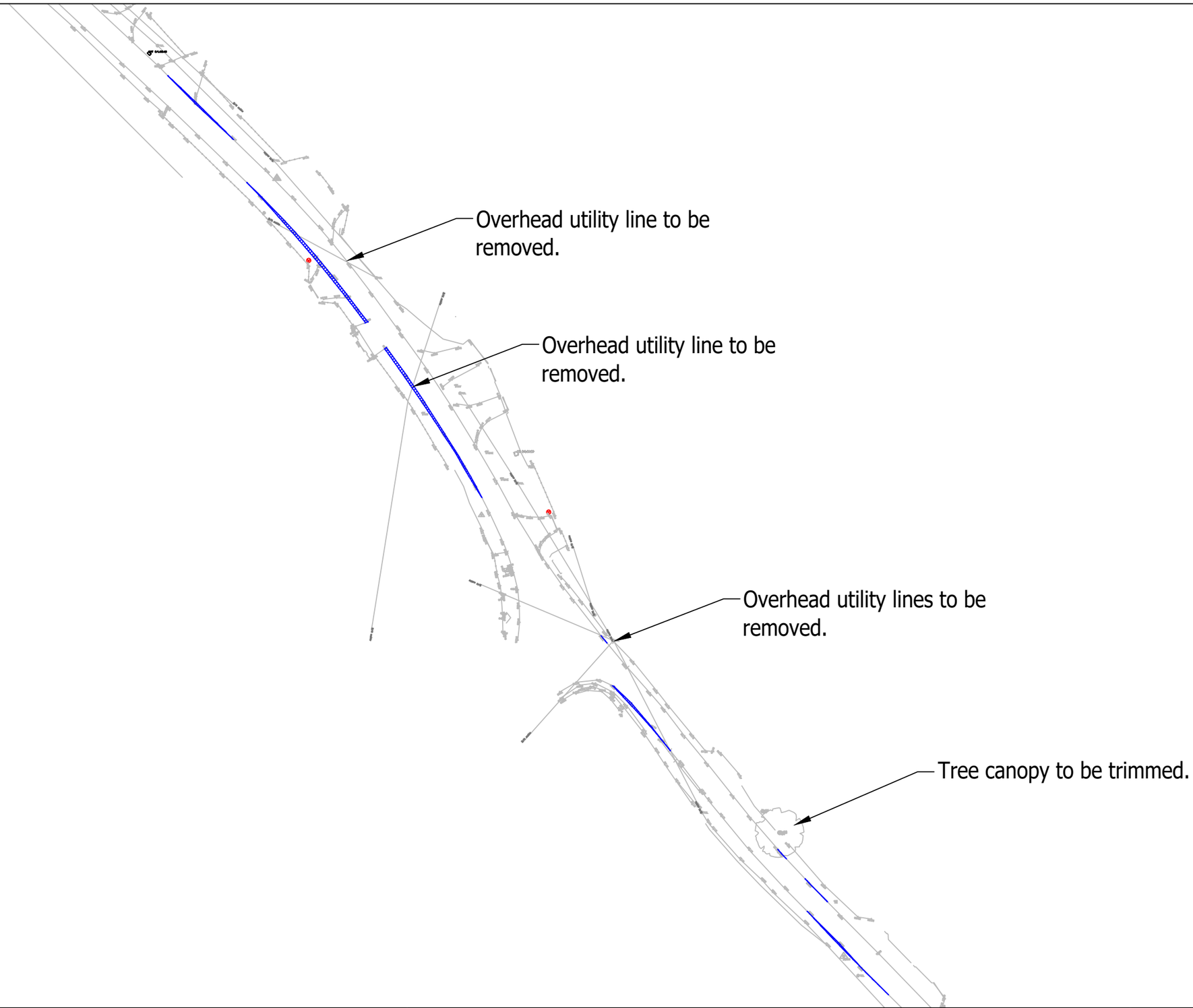
File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

Drawing No.: SK06A

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00



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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: L5025 North of River Kilooney Bridge

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		6

Scale: 1:1000 @ A3

File No.: 241218 Drehid RSR Tracking.dwg

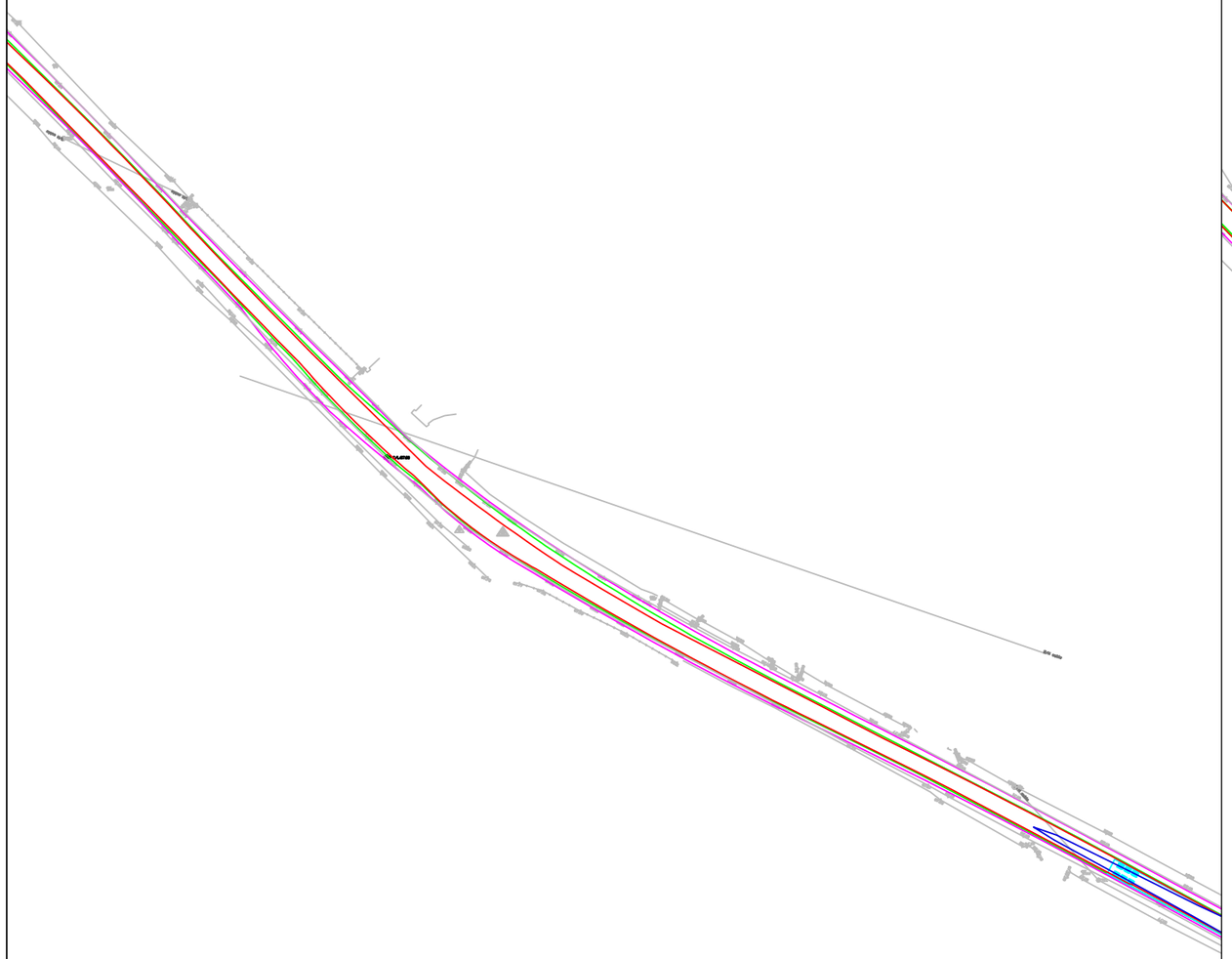
Drawing Status: Draft

Drawing No.: SK06B

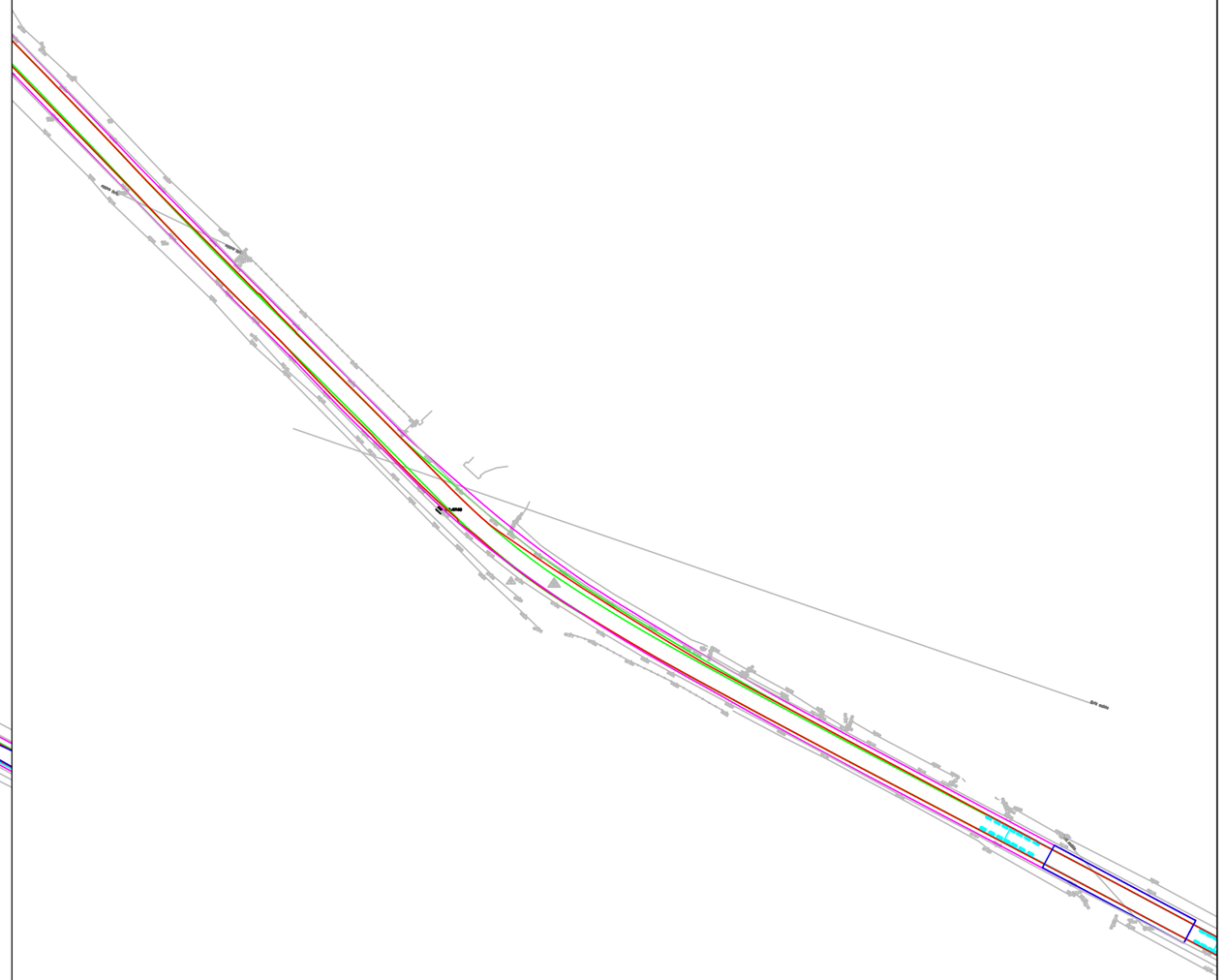
Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00

Blade



Tower



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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: L5025 South of River Kilooney Bridge

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		7

Scale: 1:1000 @ A3

File No.: 241218 Drehid RSR Tracking.dwg

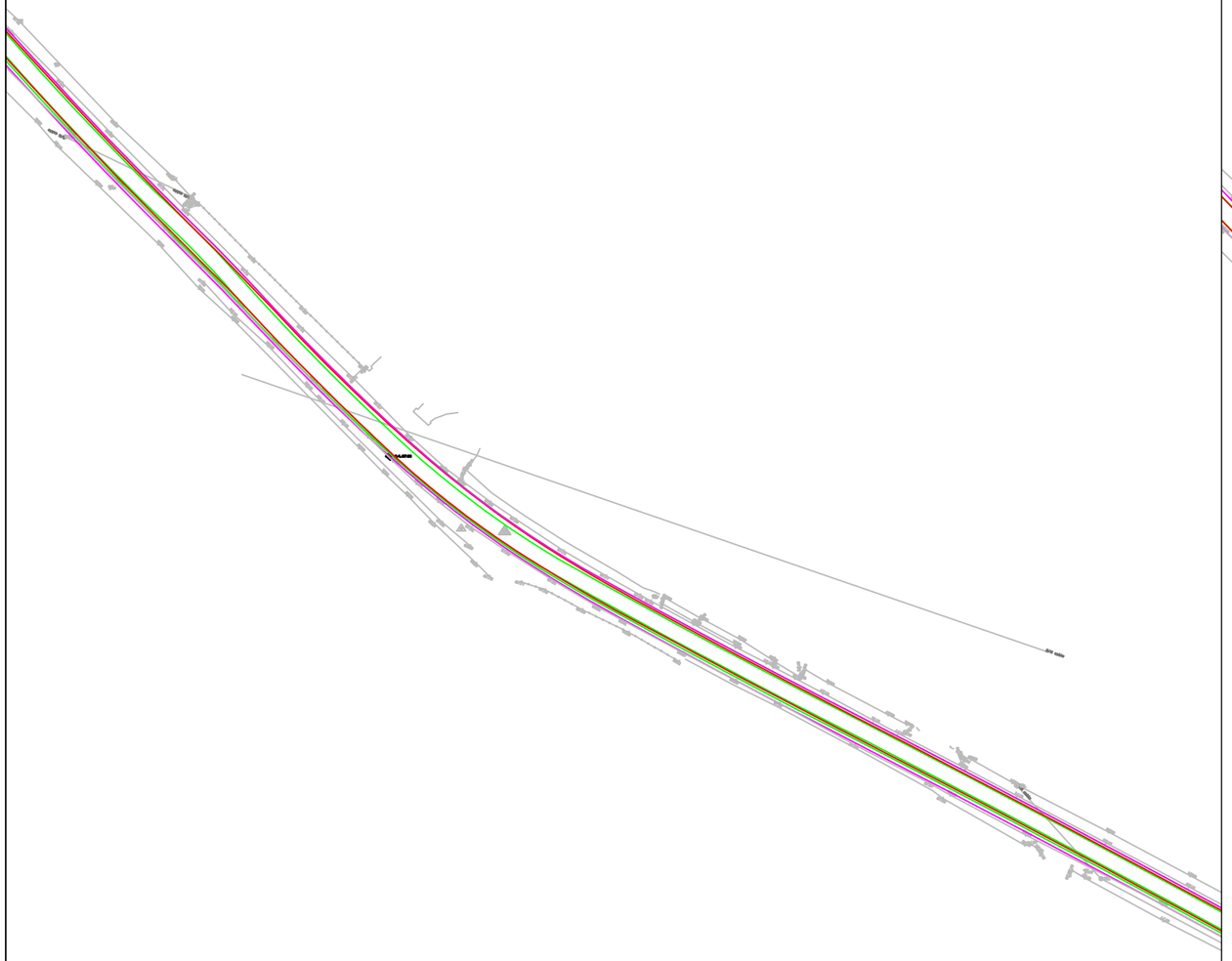
Drawing Status: Draft

Drawing No.: SK07

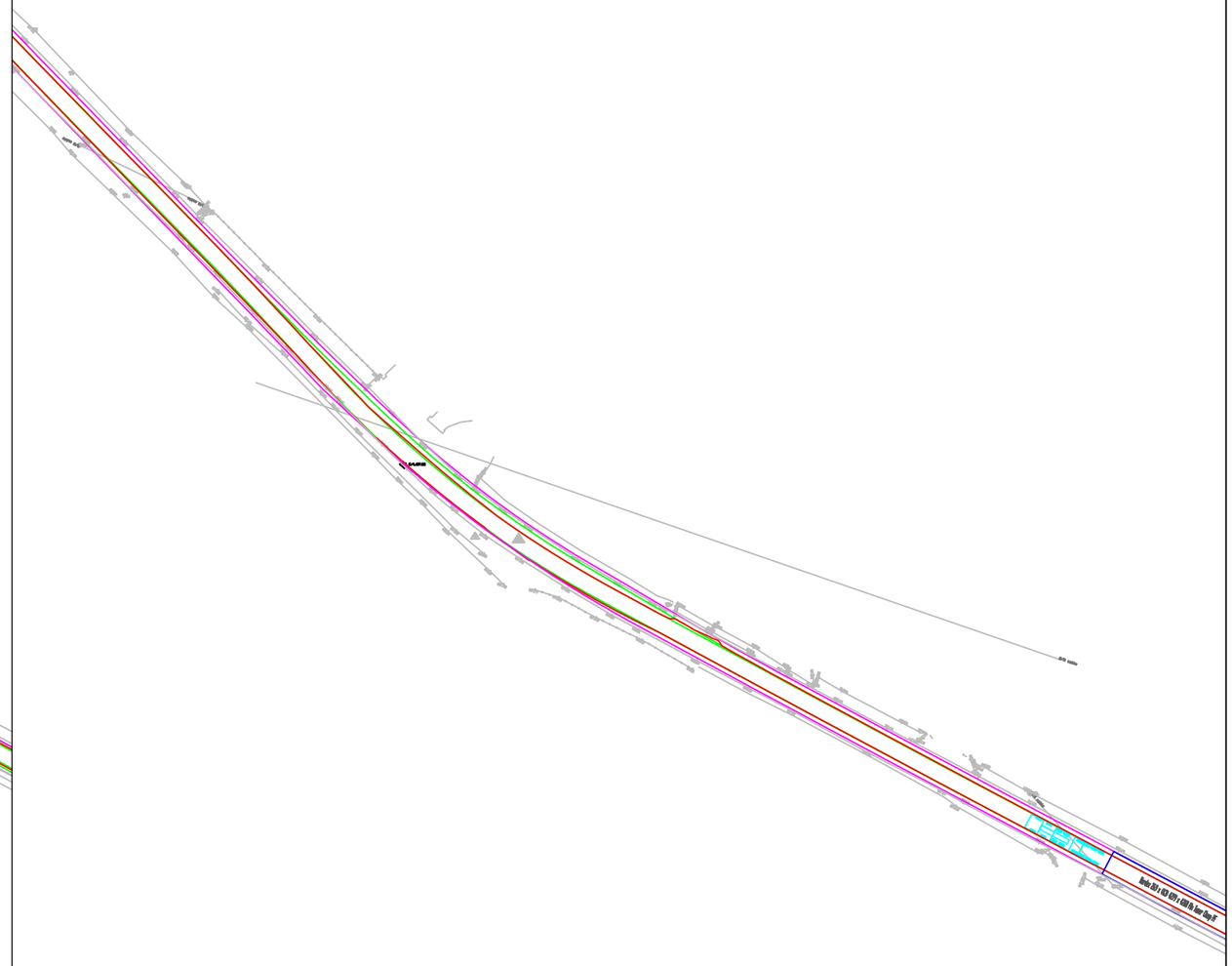
Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00

North Access
Review:
Blade Lifting
Trailer



North Access
Review:
Tower



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Email: pfedinburgh@pellfrischmann.com
www.pellfrischmann.com

Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: L5025 South of River Kilooney Bridge

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		7

Scale: 1:1000 @ A3

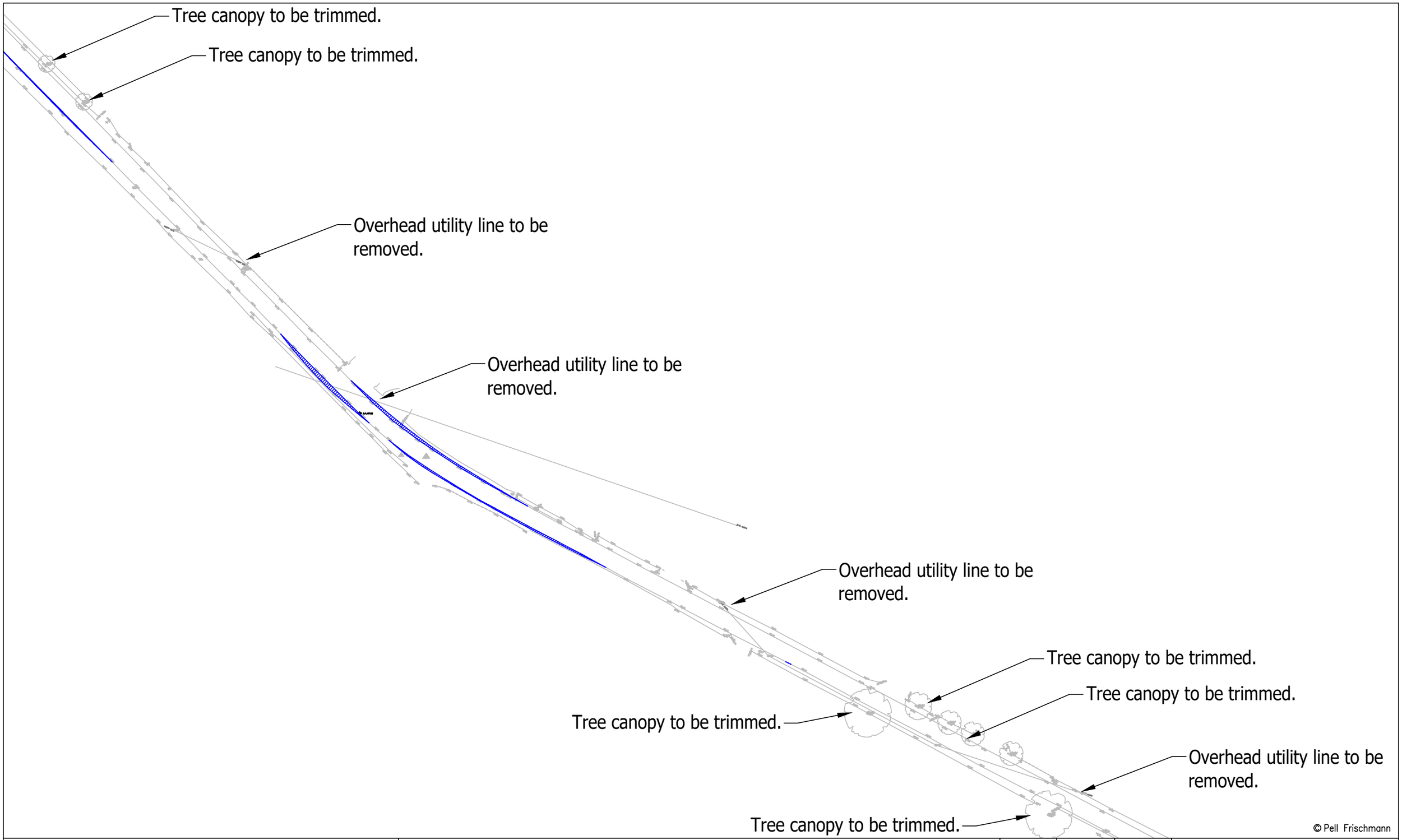
File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

Drawing No.: SK07A

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00



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www.pellfrischmann.com

Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: L5025 South of River Kilooney Bridge

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		7

Scale: 1:1000 @ A3

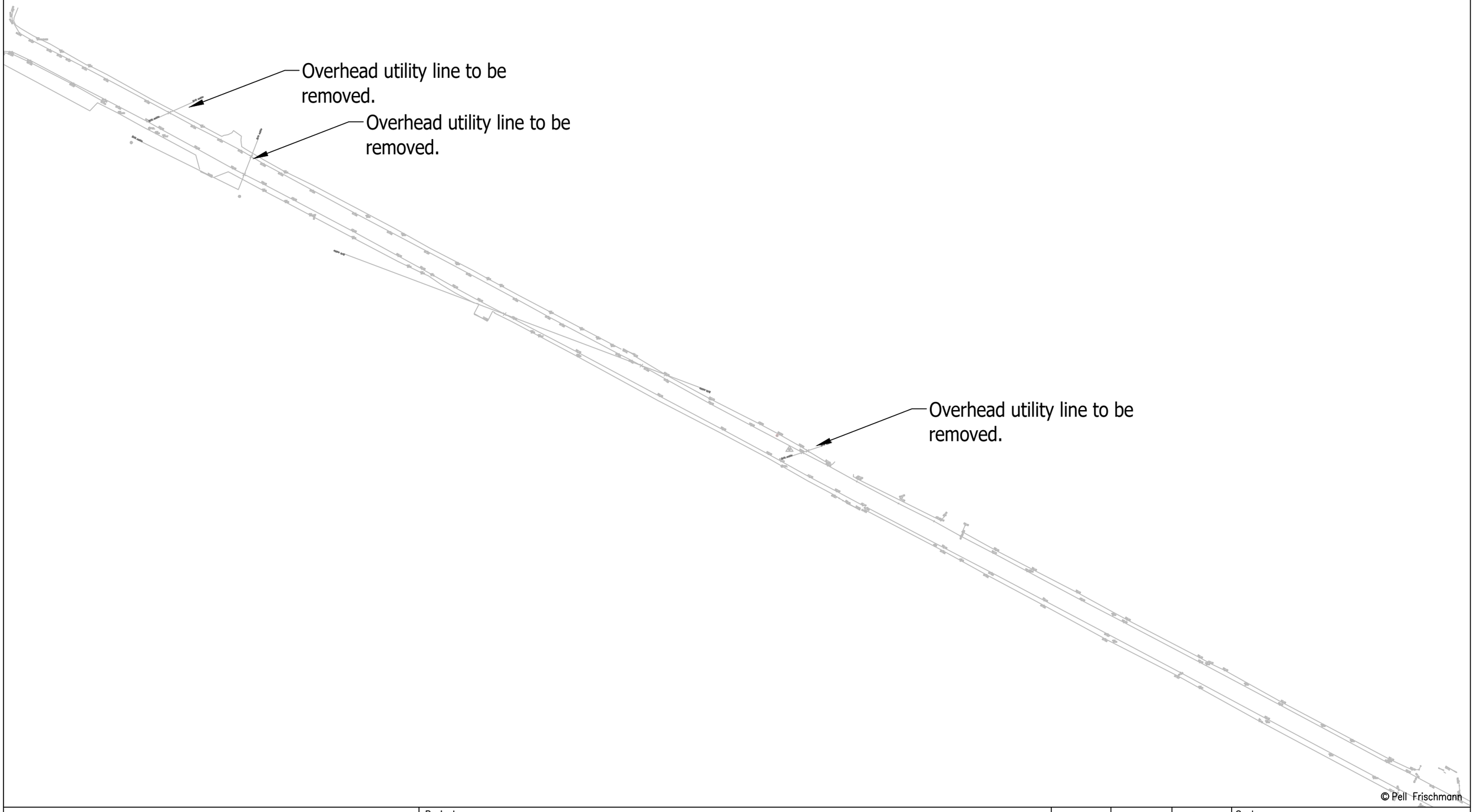
File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

Drawing No.: SK07B

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00



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www.pellfrischmann.com

Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: L5025 East of River Kilooney Bridge

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		7

Scale: 1:1000 @ A3

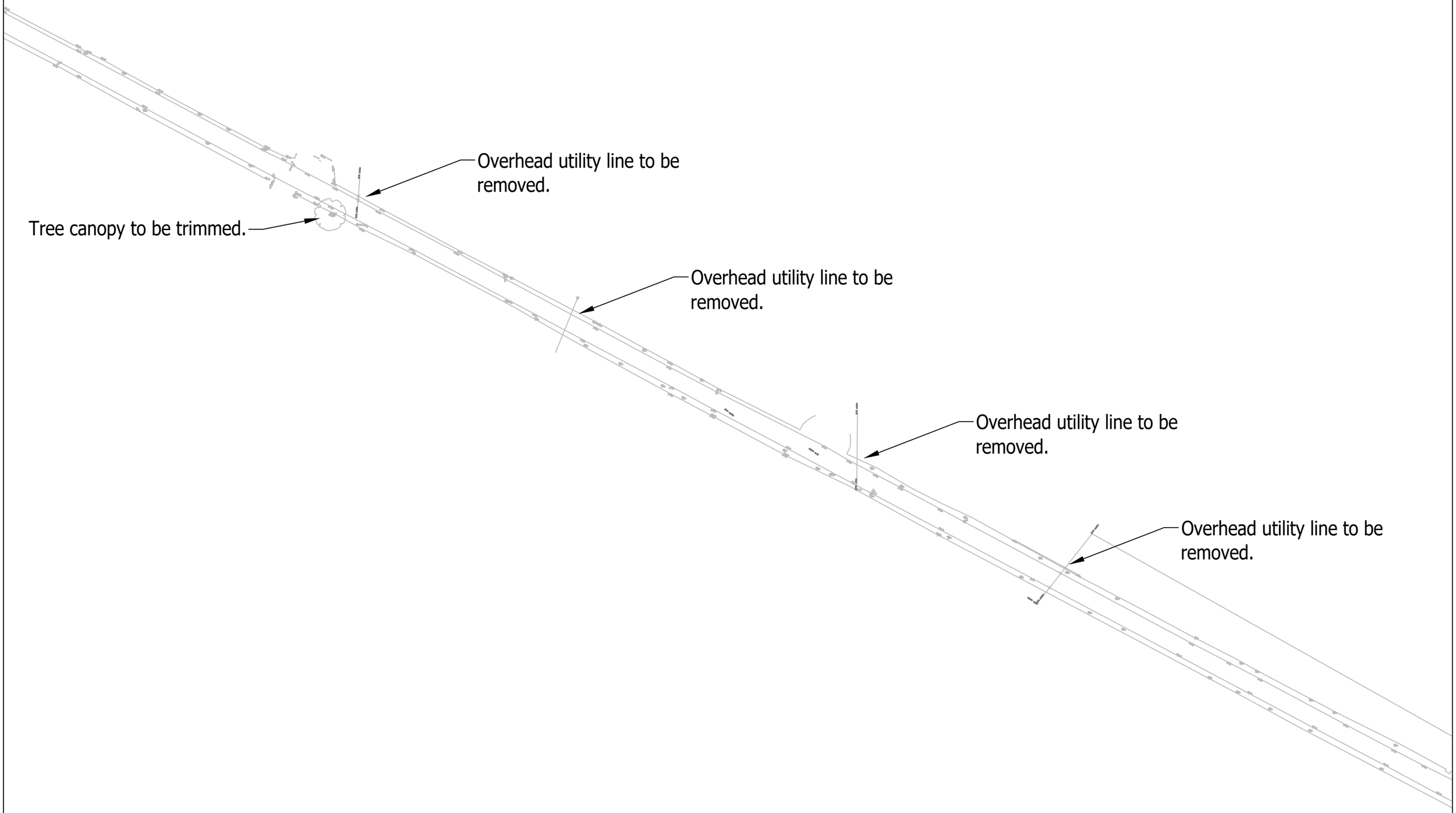
File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

Drawing No.: SK07C

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00



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www.pellfrischmann.com

Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: L5025 East of River Kilooney Bridge

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		7

Scale: 1:1000 @ A3

File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

Drawing No.: SK07D

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00

Blade

Tower

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Email: pfedinburgh@pellfrischmann.com
www.pellfrischmann.com

Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: Southern Site Access Junction

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		8

Scale: 1:1000 @ A3

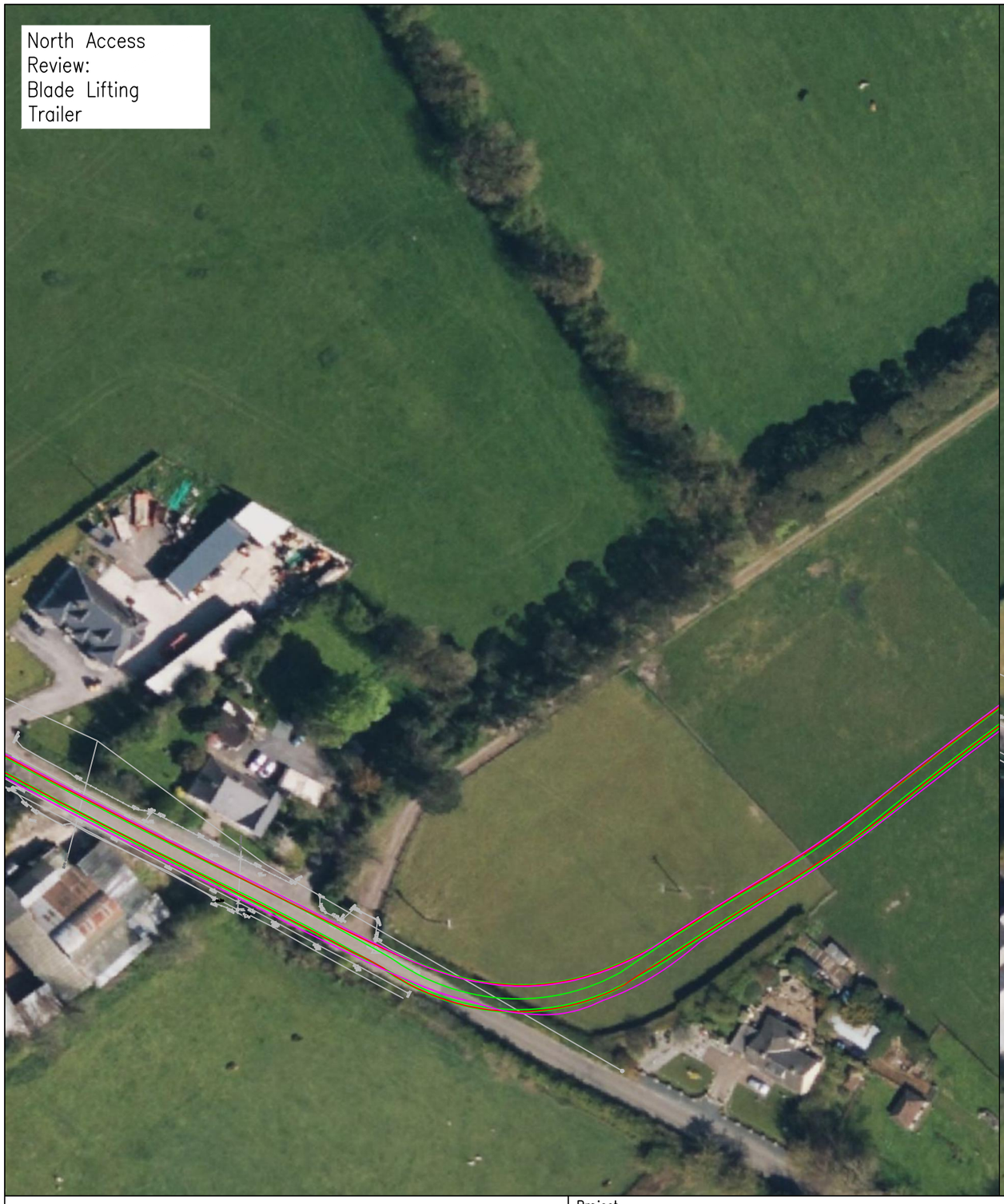
File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

Drawing No.: SK08

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00



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www.pellfrischmann.com

Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: Southern Site Access Junction

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		8

Scale: 1:1000 @ A3

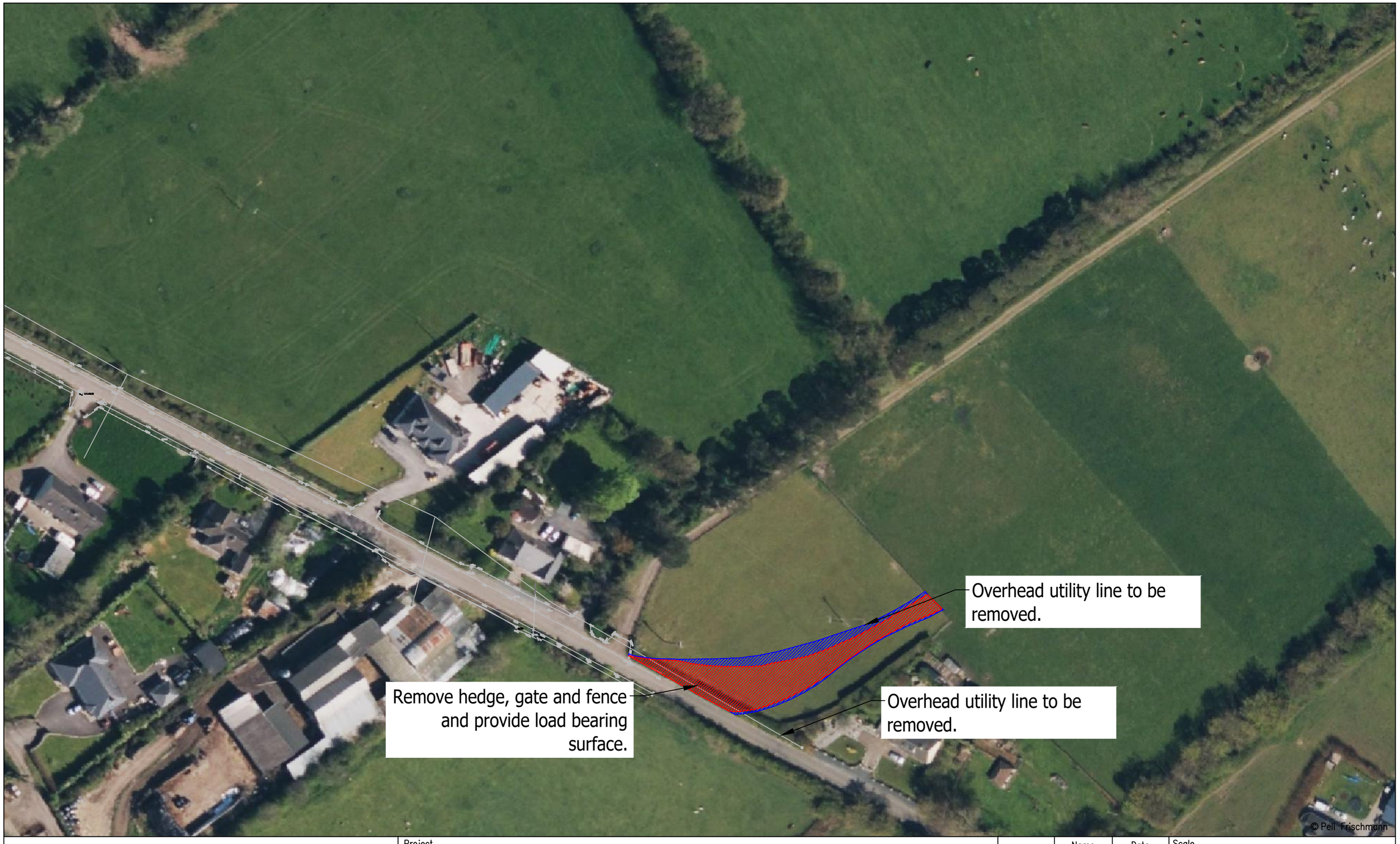
File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

Drawing No.: SK08A

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00



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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: Southern Site Access Junction

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		8

Scale: 1:1000 @ A3

File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

Drawing No.: SK08B

Notes:
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Revision: 00

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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: R402 Raven Junction

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		9

Scale: 1:500 @ A3

File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

Drawing No.: SK09

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00

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Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: R402 Raven Junction

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		9

Scale: 1:1000 @ A3

File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

Drawing No.: SK09A

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00

Blade

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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: Kilshanroe Road Bends 1 & 2

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		10&11

Scale: 1:1000 @ A3

File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

Drawing No.: SK10

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00

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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: Kilshanroe Road Bend 1&2

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		10&11

Scale: 1:1000 @ A3

File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

Drawing No.: SK10A

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Revision: 00

Blade

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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: Kilshanroe Road Bend 3

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		12

Scale: 1:1000 @ A3

File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

Drawing No.: SK11

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00

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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: Kilshanroe Road Bend 3

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		12

Scale: 1:1000 @ A3

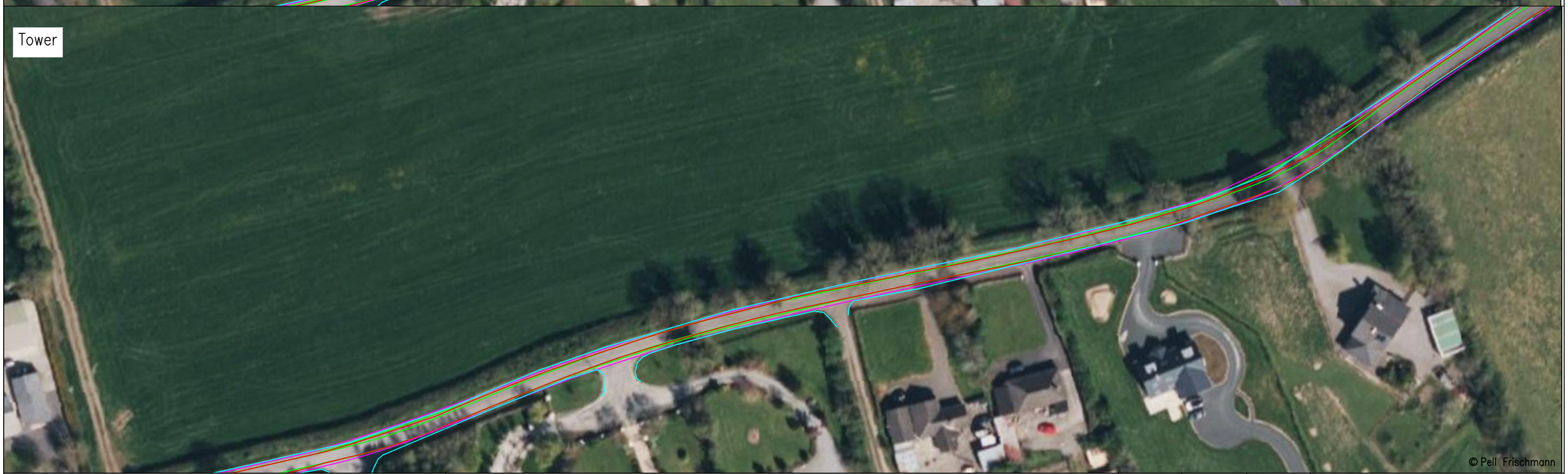
File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

Drawing No.: SK11A

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00



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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: Kilshanroe Road Bend 4

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		13

Scale: 1:1000 @ A3

File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

Drawing No.: SK12

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 00

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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: Kilshanroe Road Bend 4

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		13

Scale: 1:1000 @ A3

File No.: 241218 Drehid RSR Tracking.dwg

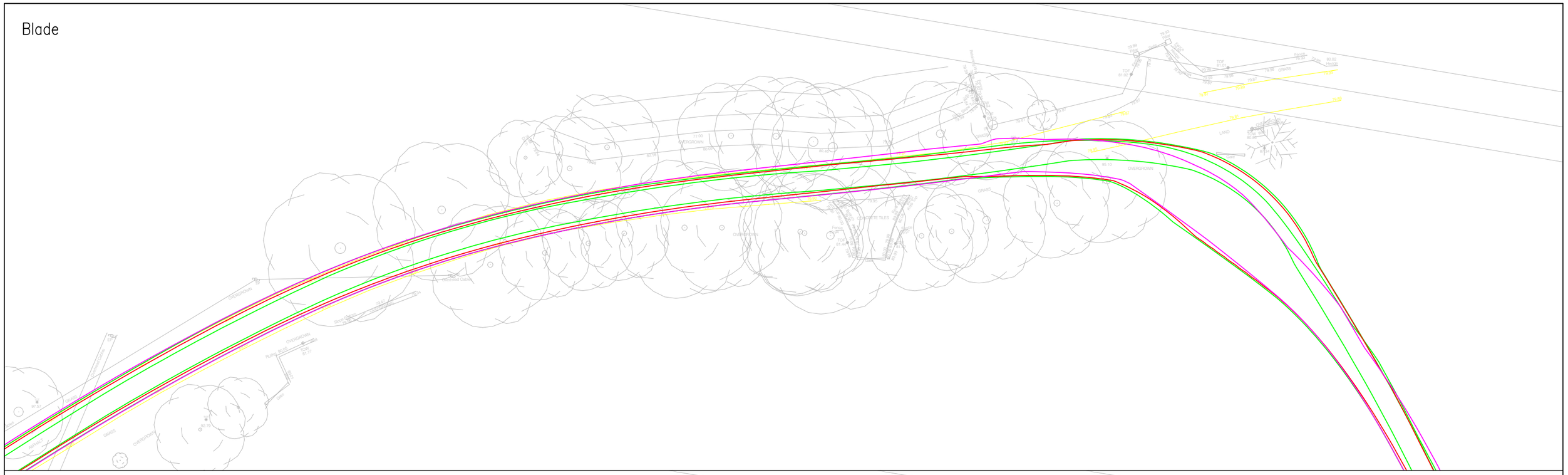
Drawing Status: Draft

Drawing No.: SK12A

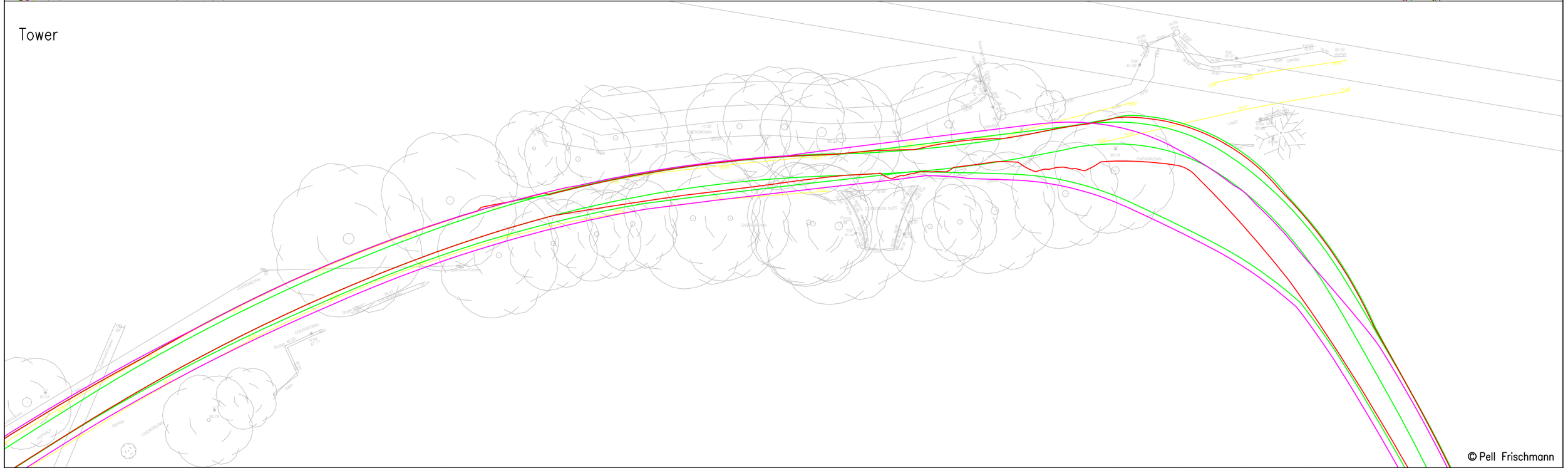
Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 01

Blade



Tower



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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: Kilshanroe Road Bend 5 and North Site Access

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		14&15

Scale: 1:500 @ A3

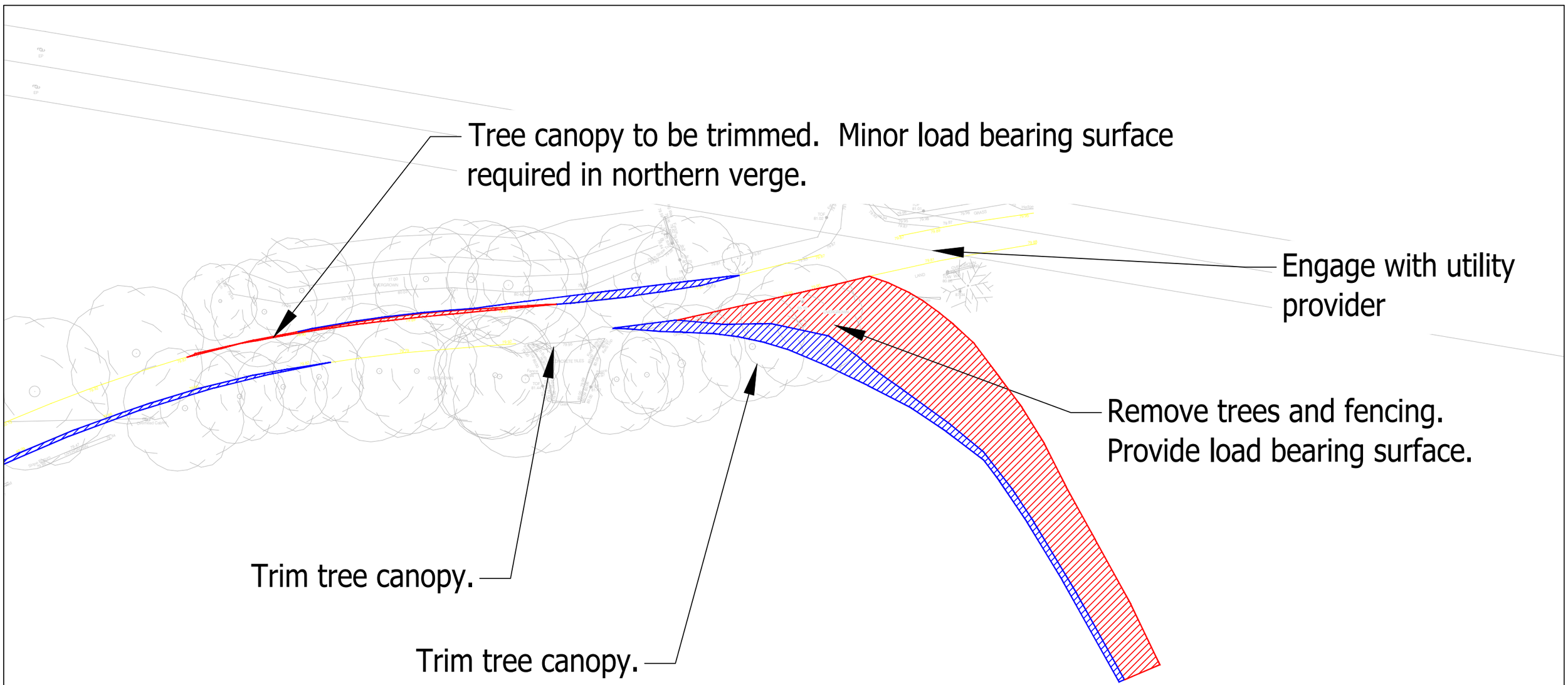
File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

Drawing No.: SK13

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

Revision: 01



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Client: NORTH KILDARE WIND FARM LTD.

Key: Wheel SPA | Body SPA | Load SPA | Indicative | Overrun | Oversail

Project: DREHID WIND FARM

Drawing Title: NORDEX N133 BLADE & N133 TS100 TOWER

SPA Location: Kilshanroe Road Bend 5 and North Site Access

	Name	Date
Drawn	GB	18/12/2024
Designed	GB	18/12/2024
Checked	TL	18/12/2024
Point of Interest		14&15

Scale: 1:500 @ A3

File No.: 241218 Drehid RSR Tracking.dwg

Drawing Status: Draft

Drawing No.: SK13A

Notes:
1. All mitigation is subject to confirmation through a test run.
2. This is not a construction drawing and is intended for illustration purposes only.

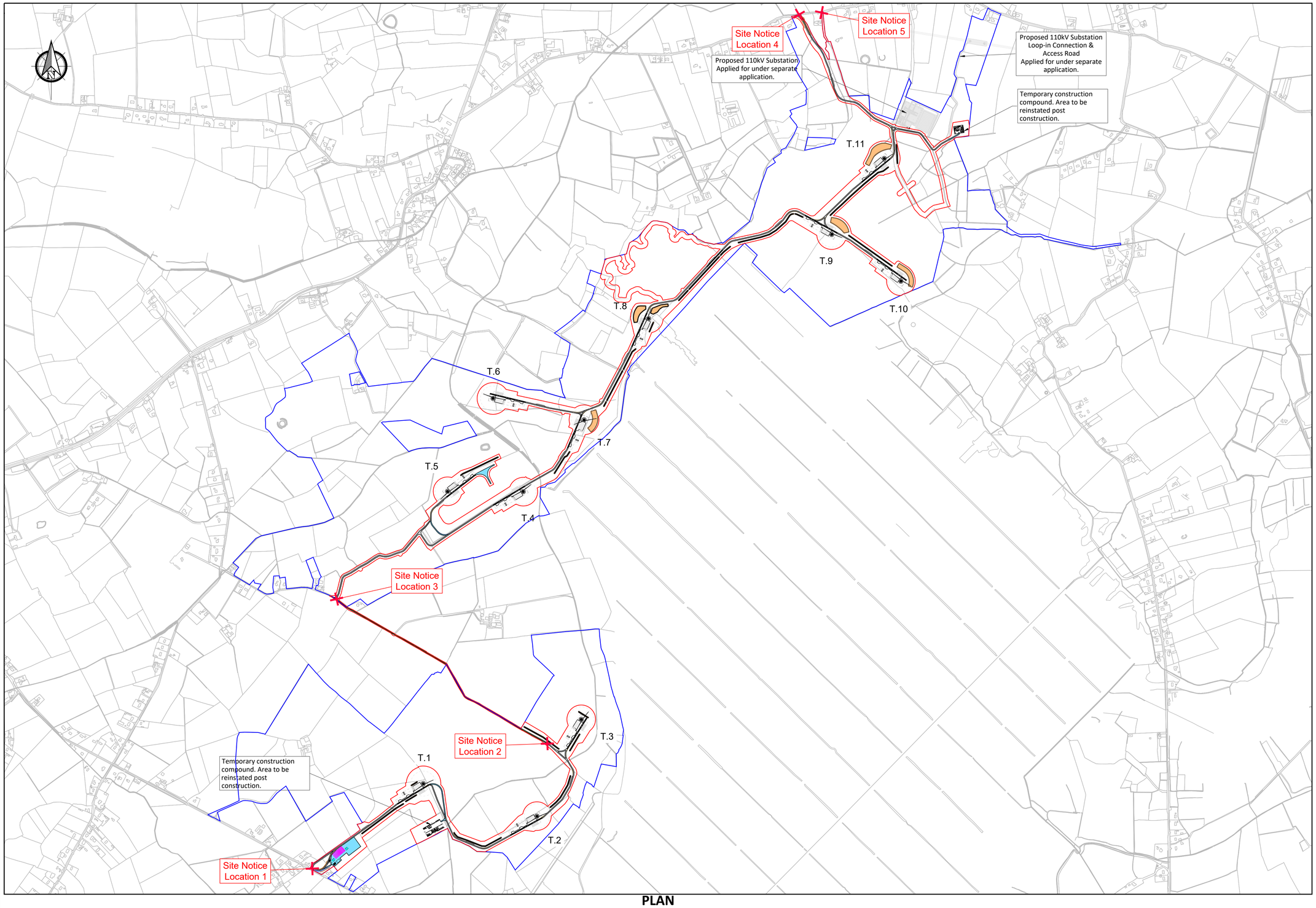
Revision: 01

FEHILY TIMONEY

DESIGNING AND DELIVERING
A SUSTAINABLE FUTURE

APPENDIX 2

Referenced Planning Application Drawings



Legend

- Planning Site Boundary
- Land Holding Boundary
- Proposed Turbine
  - Laydown Areas
  - Hardstand
  - Turbine Swing Footprint
- Proposed Internal Access Track — Temporary Widening Areas
- Temporary Construction Phase Surfaces — Temporary Widening Areas
- Existing Public Road to be used for Construction and Operation Phase

Notes.

1. This drawing is for planning purposes only.
2. Dimensions in meters unless otherwise noted.
3. Levels shown relative to ordinance datum (Malin Head).
4. Co-ordinates are to Irish Transverse Mercator (ITM).

0m 100m 200m 300m 400m 500m 600m 700m 800m 900m 1000m

Scale 1:10000

PLAN

Scale 1:10000

FEHILY TIMONEY
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www.fehilytimoney.ie

Rev.	Description	App By	Date
A	ISSUE FOR PLANNING	JH	11.03.25

PROJECT	DREHID WIND FARM & SUBSTATION
CLIENT	NORTH KILDARE WIND FARM Ltd.
SHEET	1:10000 SITE LOCATION
Date	11.03.25
Project number	P22-242
Scale (@ A1-)	1:10000
Drawn by	CS
Checked by	BC
Drawing Number	P22-242-0100-0001
Rev	A

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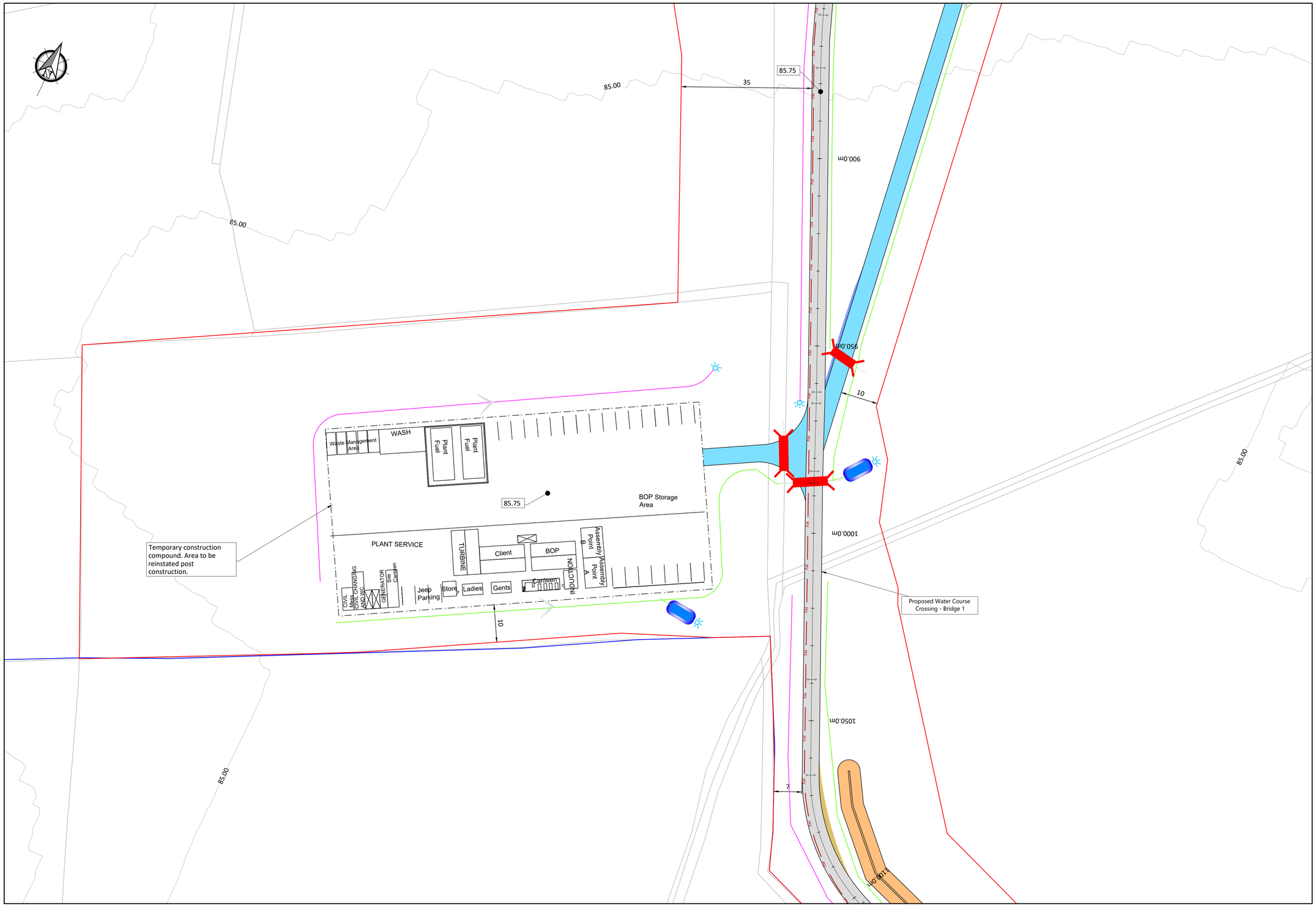
21 May 2025

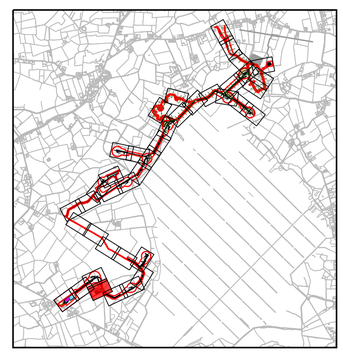


Legend

- Planning Site Boundary
- Land Holding Boundary
- Proposed Turbine
  - Laydown Areas
  - Hardstand
  - Turbine Swing Footprint
- Proposed Internal Access Track — Temporary Widening Areas
- Temporary Construction Phase Surfaces — Temporary Widening Areas
- Existing Public Road to be used for Construction and Operation Phase
- Proposed Internal Collector Cable (HV)
- Existing Ground Contour
- Interceptor Drain With Diffuse Outflow
- Roadside Swale
- Stilling Pond and Diffuse
- Proposed Culvert
- Existing Culvert
- Temporary Bridge Crossing
- Proposed Berms
- Proposed Amenity Trail
- Temporary Noise Barriers

Notes.

1. This drawing is for planning purposes only.
2. Dimensions in meters unless otherwise noted.
3. Levels shown relative to ordinance datum (Malin Head).
4. Co-ordinates are to Irish Transverse Mercator (ITM).



KEY PLAN

0m 5m 10m 15m 20m 25m 30m 35m 40m 45m 50m

Scale 1:500

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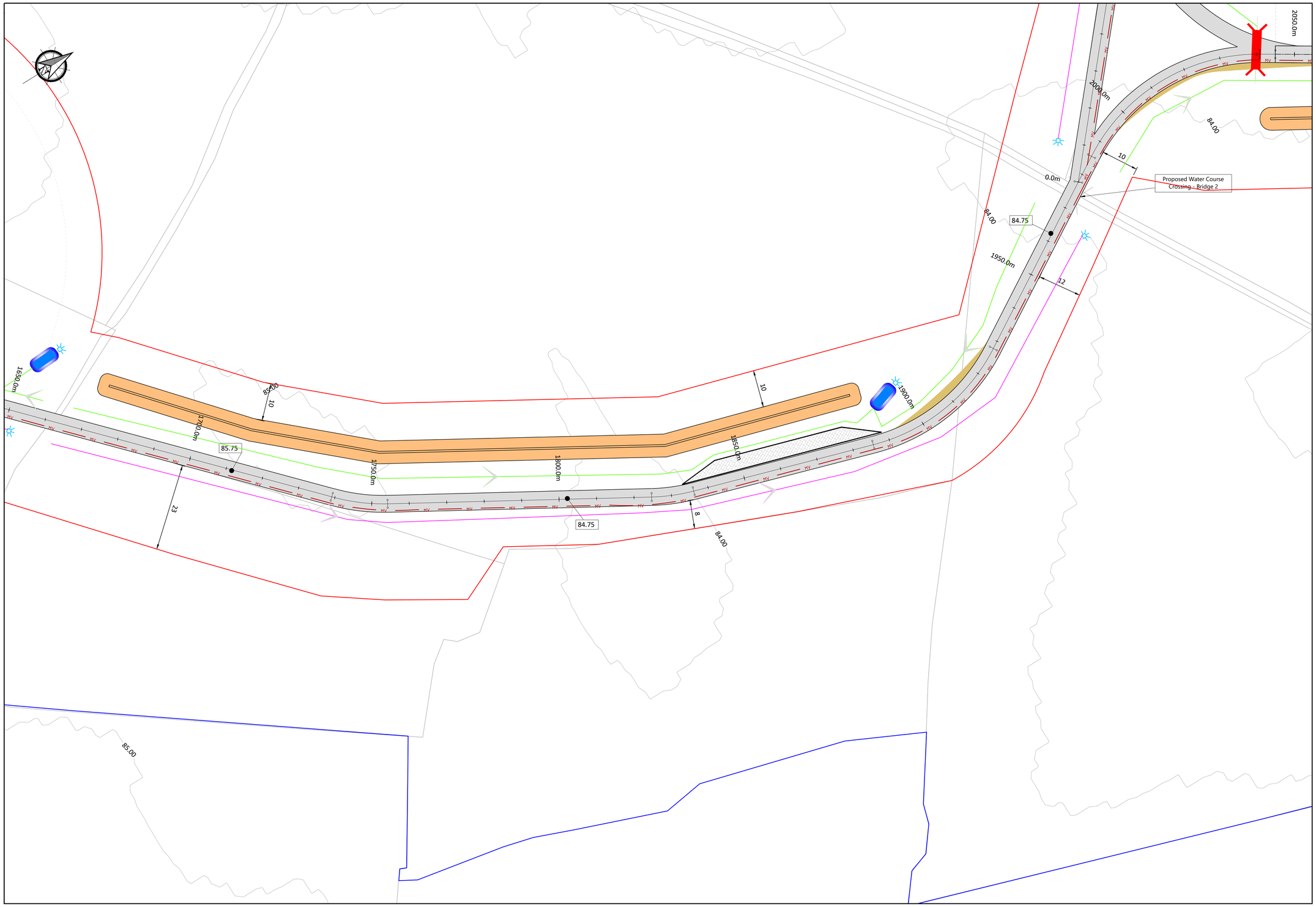
Rev.	Description	App By	Date
A	ISSUE FOR PLANNING	JH	11.03.25

PROJECT	DREHID WIND FARM & SUBSTATION
CLIENT	NORTH KILDARE WIND FARM Ltd.
SHEET	1:500 SITE LAYOUT PLAN SHEET 4 OF 40
Date	11.03.25
Project number	P22-242
Scale (@ A1-)	1:500
Drawn by	CS
Checked by	BC
Drawing Number	P22-242-0101-0004
Rev	A

O:\ACAD\2022\P22-242\P22-242-0101-0004

21 May 2025



Legend

- Planning Site Boundary
- Land Holding Boundary
- Proposed Turbine
  - Laydown Areas
  - Hardstand
  - Turbine Swing Footprint
- Proposed Internal Access Track — Temporary Widening Areas
- Temporary Construction Phase Surfaces — Temporary Widening Areas
- Existing Public Road to be used for Construction and Operation Phase
- Proposed Internal Collector Cable
- Existing Ground Contour
- Interceptor Drain With Diffuse Outflow
- Roadside Swale
- Stilling Pond and Diffuse
- Proposed Culvert
- Existing Culvert
- Temporary Bridge Crossing
- Proposed Berms
- Proposed Amenity Trail
- Temporary Noise Barriers

Notes.

1. This drawing is for planning purposes only.
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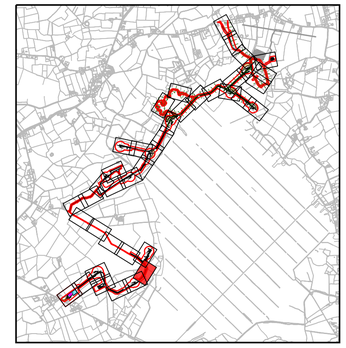
3. Levels shown relative to ordinance datum (Malin Head).
4. Co-ordinates are to Irish Transverse Mercator (ITM).



KEY PLAN

0m 5m 10m 15m 20m 25m 30m 35m 40m 45m 50m

Scale 1:500

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Rev.	Description	App By	Date
A	ISSUE FOR PLANNING	JH	11.03.25

PROJECT	DREHID WIND FARM & SUBSTATION
CLIENT	NORTH KILDARE WIND FARM Ltd.
SHEET	1:500 SITE LAYOUT PLAN SHEET 7 OF 40

Date 11.03.25	Project number P22-242	Scale (@ A1-) 1:500	
Drawn by CS	Drawing Number P22-242-0101-0007		Rev A
Checked by BC			

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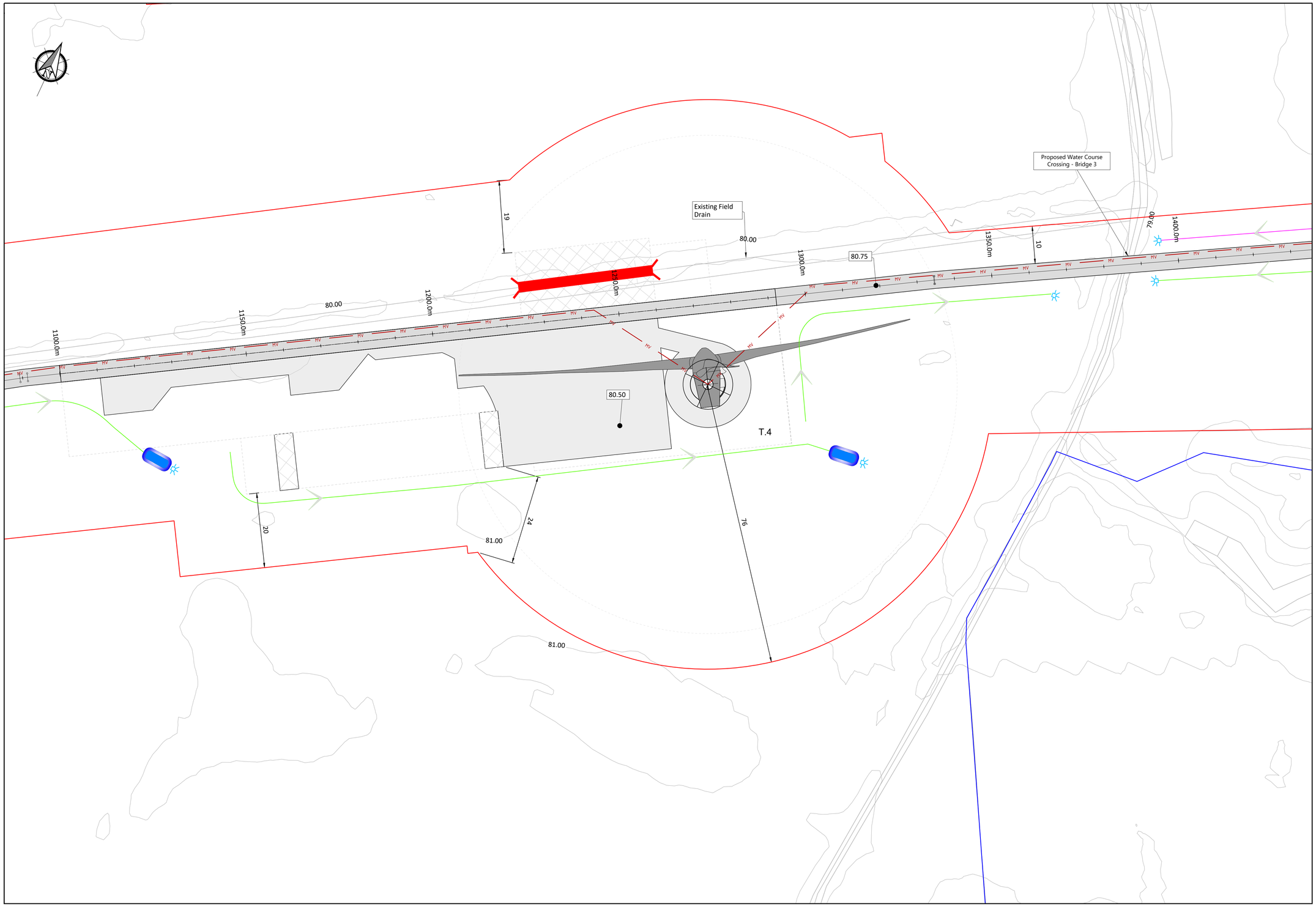
21 May 2025

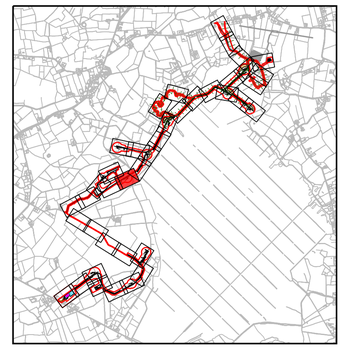


Legend

- Planning Site Boundary
- Land Holding Boundary
- Proposed Turbine
  - Laydown Areas
  - Hardstand
  - Turbine Swing Footprint
- Proposed Internal Access Track
  - Temporary Widening Areas
- Temporary Construction Phase Surfaces
  - Temporary Widening Areas
- Existing Public Road to be used for Construction and Operation Phase
- Proposed Internal Collector Cable
- Existing Ground Contour
- Interceptor Drain With Diffuse Outflow
- Roadside Swale
- Stilling Pond and Diffuse
- Proposed Culvert
- Existing Culvert
- Temporary Bridge Crossing
- Proposed Berms
- Proposed Amenity Trail
- Temporary Noise Barriers

Notes.

1. This drawing is for planning purposes only.
2. Dimensions in meters unless otherwise noted.
3. Levels shown relative to ordinance datum (Malin Head).
4. Co-ordinates are to Irish Transverse Mercator (ITM).



KEY PLAN

0m 5m 10m 15m 20m 25m 30m 35m 40m 45m 50m

Scale 1:500

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Rev.	Description	App By	Date
A	ISSUE FOR PLANNING	JH	11.03.25

PROJECT	DREHID WIND FARM & SUBSTATION
CLIENT	NORTH KILDARE WIND FARM Ltd.
SHEET	1:500 SITE LAYOUT PLAN SHEET 18 OF 40
Date	11.03.25
Project number	P22-242
Scale (@ A1-)	1:500
Drawn by	CS
Checked by	BC
Drawing Number	P22-242-0101-0018
Rev	A

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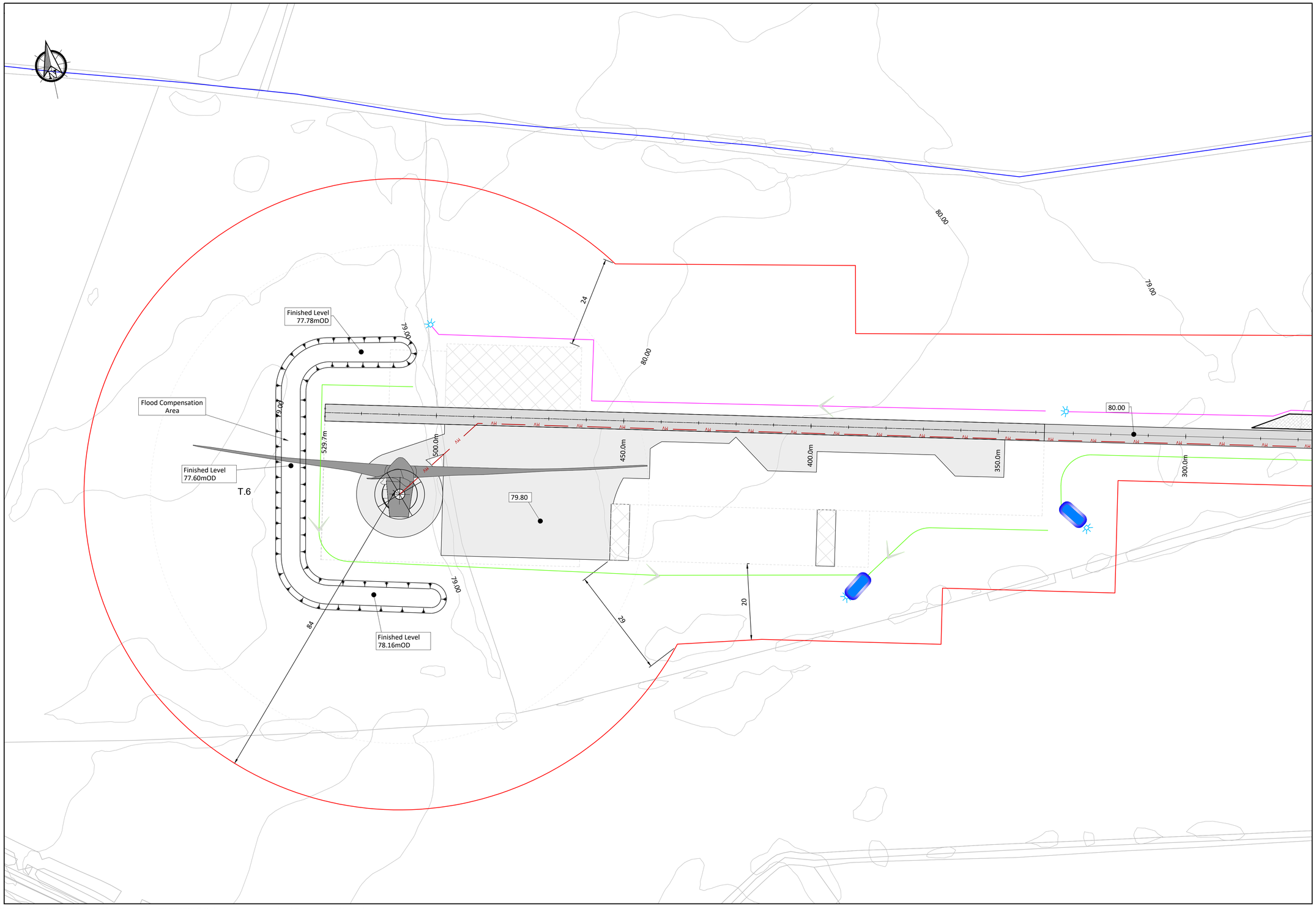
21 May 2025

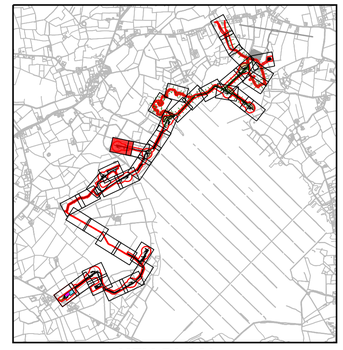


Legend

- Planning Site Boundary
- Land Holding Boundary
- Proposed Turbine
  - Laydown Areas
  - Hardstand
  - Turbine Swing Footprint
- Proposed Internal Access Track — Temporary Widening Areas
- Temporary Construction Phase Surfaces — Temporary Widening Areas
- Existing Public Road to be used for Construction and Operation Phase
- Proposed Internal Collector Cable
- Existing Ground Contour
- Interceptor Drain With Diffuse Outflow
- Roadside Swale
- Stilling Pond and Diffuse
- Proposed Culvert
- Existing Culvert
- Temporary Bridge Crossing
- Proposed Berms
- Proposed Amenity Trail
- Temporary Noise Barriers

Notes.

1. This drawing is for planning purposes only.
2. Dimensions in meters unless otherwise noted.
3. Levels shown relative to ordinance datum (Malin Head).
4. Co-ordinates are to Irish Transverse Mercator (ITM).



KEY PLAN

0m 5m 10m 15m 20m 25m 30m 35m 40m 45m 50m

Scale 1:500

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Rev.	Description	App By	Date
A	ISSUE FOR PLANNING	JH	11.03.25

PROJECT	DREHID WIND FARM & SUBSTATION
CLIENT	NORTH KILDARE WIND FARM Ltd.
SHEET	1:500 SITE LAYOUT PLAN SHEET 33 OF 40

Date 11.03.25	Project number P22-242	Scale (@ A1-) 1:500	
Drawn by CS	Drawing Number P22-242-0101-0033		Rev A
Checked by BC			

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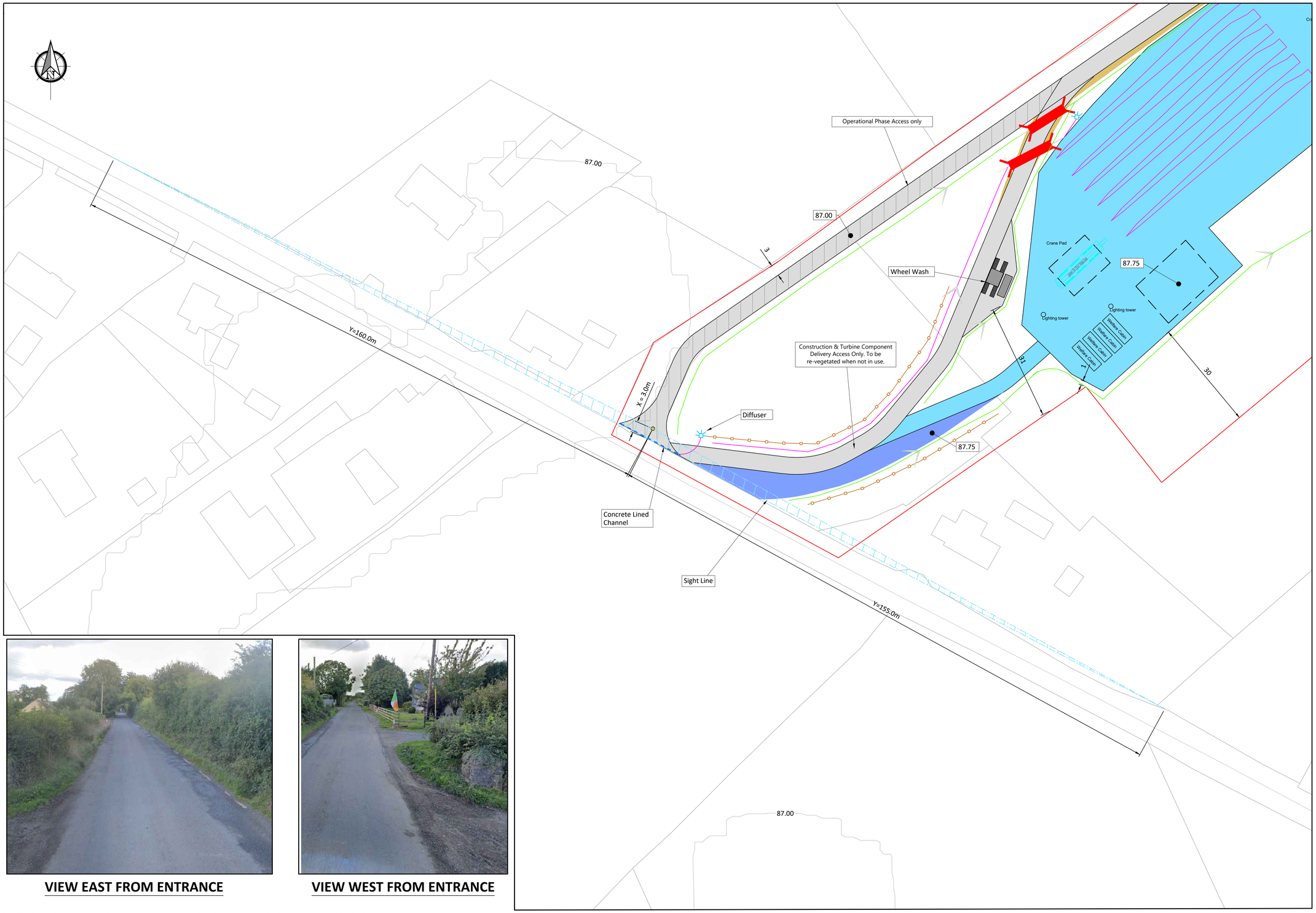
21 May 2025



Legend

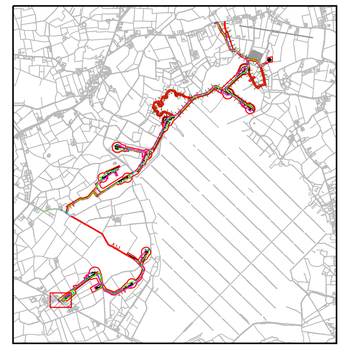
- Planning Site Boundary
- Land Holding Boundary
- Proposed Internal Access Track (Temporary Widening Areas)
- Temporary Construction Phase Surfaces (Temporary Widening Areas)
- Existing Public Road to be used for Construction and Operation Phase
- Proposed Internal Collector Cable (HV)
- Existing Ground Contour
- Interceptor Drain With Diffuse Outflow
- Roadside Swale
- Stilling Pond and Diffuse
- Proposed Culvert
- Existing Culvert
- Temporary Bridge Crossing
- Proposed Berms
- Proposed Amenity Trail
- Temporary Noise Barriers

Notes.

1. All dimensions in metres.
2. Entrance surfaces to be graded -2.5% with fall towards the development to ensure surface water does not discharge to public road.
3. Proposed entrance geometry and sight lines are designed in accordance with TII publications DN-GEO-03060 and DN-GEO-03031.
4. This entrance will be used by construction HGVs, LGVs and turbine component delivery vehicles.

VIEW EAST FROM ENTRANCE

VIEW WEST FROM ENTRANCE



KEY PLAN

0m 5m 10m 15m 20m 25m 30m 35m 40m 45m 50m

Scale 1:500

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Rev.	Description	App By	Date
A	ISSUE FOR PLANNING	JH	11.03.25

PROJECT	DREHID WIND FARM & SUBSTATION
CLIENT	NORTH KILDARE WIND FARM Ltd.
SHEET	SITE ACCESS MAIN ENTRANCE
Date	11.03.25
Project number	P22-242
Scale (@ A1-)	1:500
Drawn by	CS
Checked by	BC
Drawing Number	P22-242-0300-0015
Rev	A

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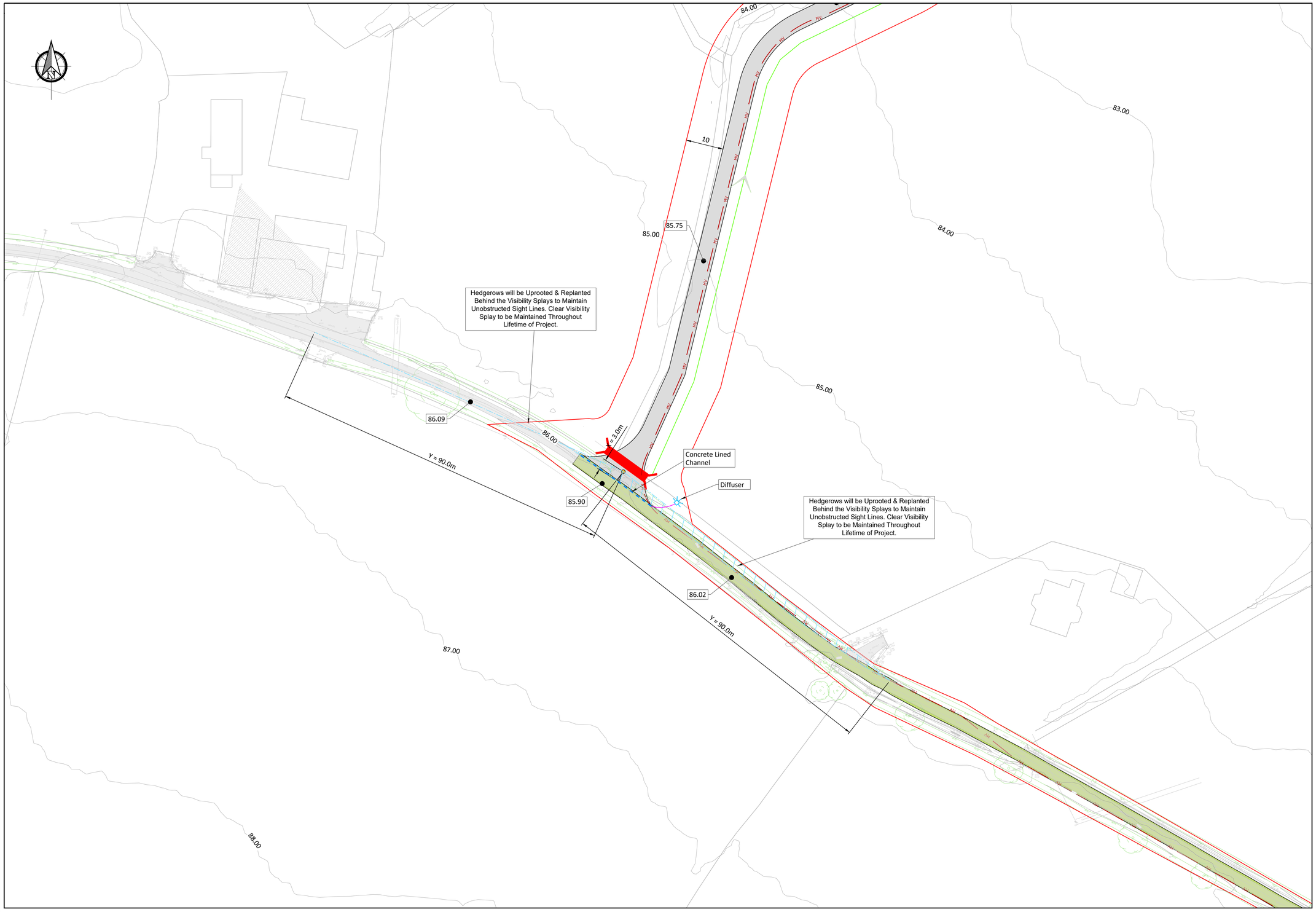
21 May 2025

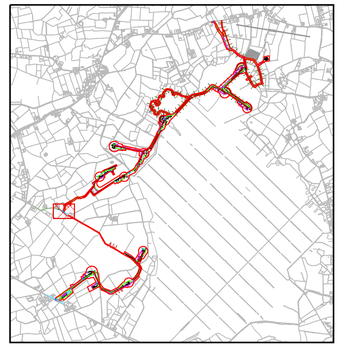


Legend

- Planning Site Boundary
- Land Holding Boundary
- Proposed Internal Access Track — Temporary Widening Areas
- Temporary Construction Phase Surfaces — Temporary Widening Areas
- Existing Public Road to be used for Construction and Operation Phase
- Proposed Internal Collector Cable
- Existing Ground Contour
- Interceptor Drain With Diffuse Outflow
- Roadside Swale
- Stilling Pond and Diffuse
- Proposed Culvert
- Existing Culvert
- Temporary Bridge Crossing

Notes.

1. All dimensions in metres.
2. Entrance surfaces to be graded -2.5% with fall towards the development to ensure surface water does not discharge to public road.
3. Proposed entrance geometry and sight lines are designed in accordance with TII publications DN-GEO-03060 and DN-GEO-03031.
4. This entrance will be used by construction HGVs & LGVs only and will not be used by turbine component delivery vehicles.



KEY PLAN

0m 5m 10m 15m 20m 25m 30m 35m 40m 45m 50m

Scale 1:500

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Rev.	Description	App By	Date
A	ISSUE FOR PLANNING	JH	11.03.25

PROJECT: **DREHID WIND FARM & SUBSTATION**

CLIENT: **NORTH KILDARE WIND FARM Ltd.**

SHEET: **SITE ACCESS ENTRANCE 2**

Date: 11.03.25
Project number: P22-242
Scale (@ A1-): 1:500
Drawn by: CS
Checked by: BC
Drawing Number: **P22-242-0300-0016**
Rev: **A**

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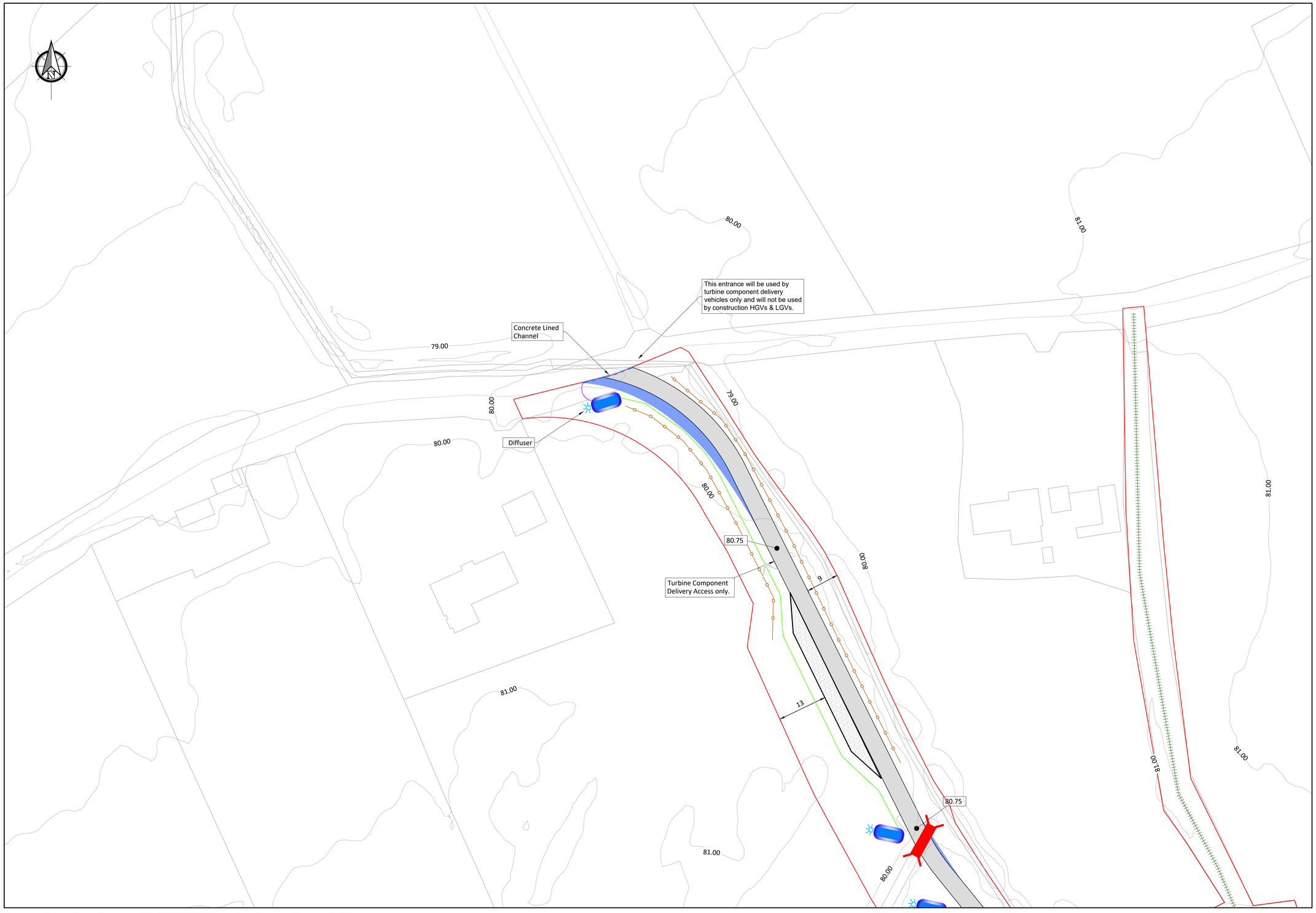
21 May 2025

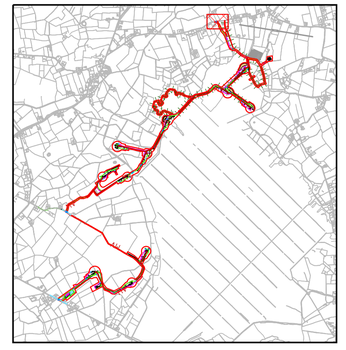


Legend

- Planning Site Boundary
- Land Holding Boundary
- Proposed Internal Access Track (Temporary Widening Areas)
- Temporary Construction Phase Surfaces (Temporary Widening Areas)
- Existing Public Road to be used for Construction and Operation Phase
- Proposed Internal Collector Cable (MV)
- Existing Ground Contour
- Interceptor Drain With Diffuse Outflow
- Roadside Swale
- Stilling Pond and Diffuse
- Proposed Culvert
- Existing Culvert
- Temporary Bridge Crossing
- Proposed Berms

Notes.

1. All dimensions in metres.
2. Entrance surfaces to be graded -2.5% with fall towards the development to ensure surface water does not discharge to public road.
3. Proposed entrance geometry is designed according to turbine delivery vehicle swept path analysis with consideration for vehicle overrun and load oversail extents.
4. This entrance will be used by turbine component delivery vehicles only and will not be used by construction HGVs & LGVs.
5. Advanced warning signage will be erected at appropriate distances on approach to the entrance in accordance with the latest Irish Traffic Signs Manual at construction stage.



KEY PLAN

0m 5m 10m 15m 20m 25m 30m 35m 40m 45m 50m

Scale 1:500

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Rev.	Description	App By	Date
A	ISSUE FOR PLANNING	JH	11.03.25

PROJECT	DREHID WIND FARM & SUBSTATION
CLIENT	NORTH KILDARE WIND FARM Ltd.
SHEET	SITE ENTRANCE TO ACCOMMODATE TDR

Date 11.03.25	Project number P22-242	Scale (@ A1-) 1:500	
Drawn by CS	Drawing Number P22-242-0300-0017		Rev A
Checked by BC			

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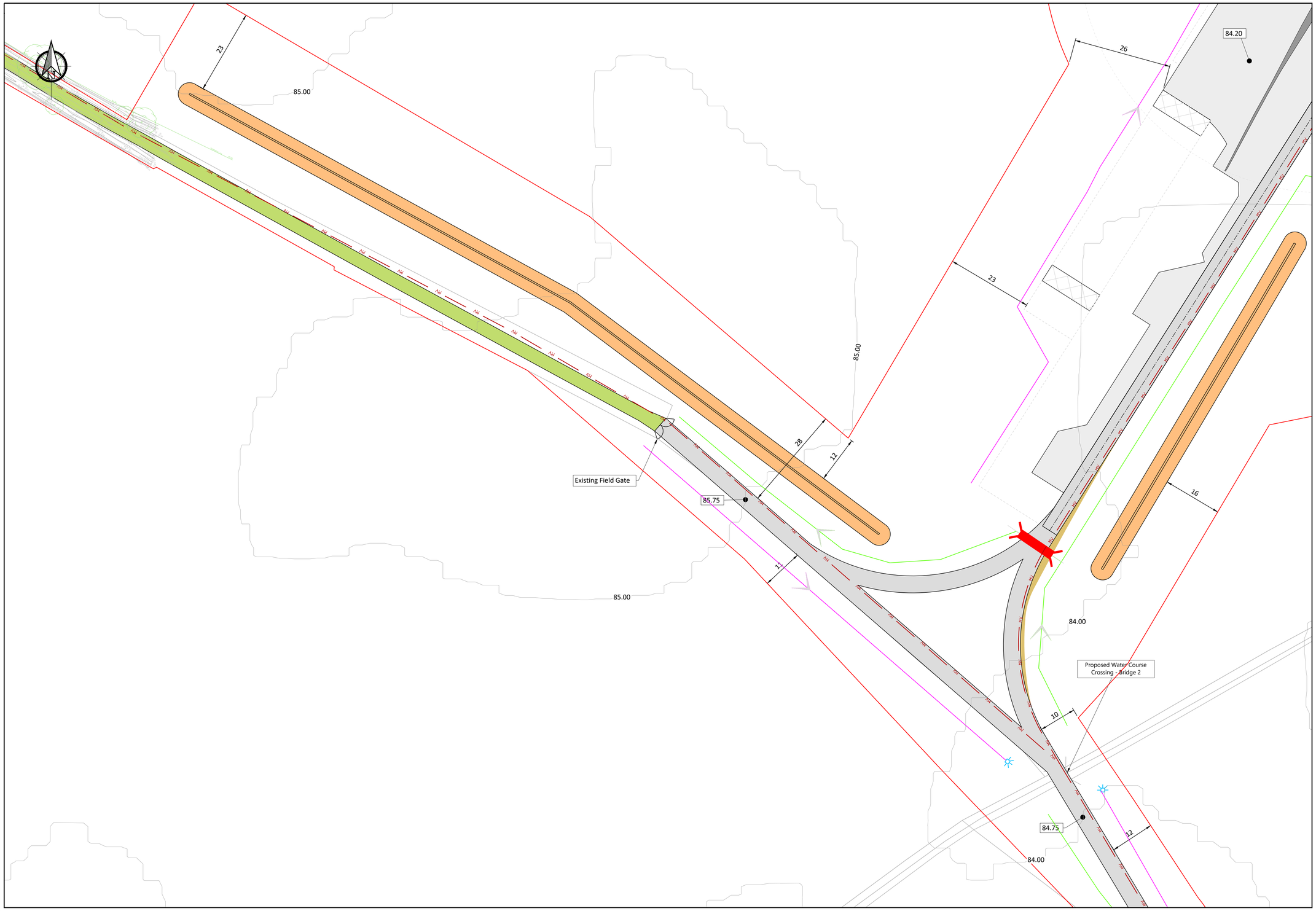
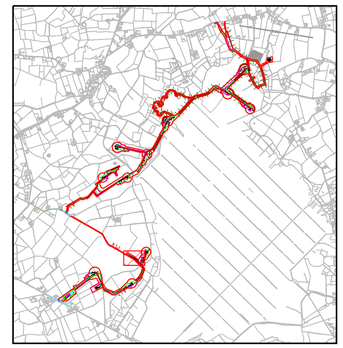
21 May 2025



Legend

- Planning Site Boundary
- Land Holding Boundary
- Proposed Internal Access Track (Temporary Widening Areas)
- Temporary Construction Phase Surfaces (Temporary Widening Areas)
- Existing Public Road to be used for Construction and Operation Phase
- Proposed Internal Collector Cable
- Existing Ground Contour
- Interceptor Drain With Diffuse Outflow
- Roadside Swale
- Stilling Pond and Diffuse
- Proposed Culvert
- Existing Culvert
- Temporary Bridge Crossing
- Proposed Berms



KEY PLAN

0m 5m 10m 15m 20m 25m 30m 35m 40m 45m 50m

Scale 1:500

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Rev.	Description	App By	Date
A	ISSUE FOR PLANNING	JH	11.03.25

PROJECT	DREHID WIND FARM & SUBSTATION
CLIENT	NORTH KILDARE WIND FARM Ltd.
SHEET	SITE ACCESS ENTRANCE 3
Date	11.03.25
Project number	P22-242
Scale (@ A1-)	1:500
Drawn by	CS
Checked by	BC
Drawing Number	P22-242-0300-0018
Rev	A

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21 May 2025

EGL = 85.00m

Waste Management Area

WASH

Plant Fuel

Plant Fuel

3.5

100

85.75

BOP Storage Area

50

PLANT SERVICE

TURBINE

Client

BOP

Assembly Point B

Assembly Point A

3.5

CIVIL Mess

CIVIL CHANGING AND WC

GENERATOR

Site Canteen

Jeep Parking

Store

Ladies

Gents

Canteen

INDUCTION

10

EGL = 85.00m

Legend

Planning Site Boundary

Land Holding Boundary

Proposed Turbine

Laydown Areas

Hardstand

Turbine Swing Footprint

Proposed Internal Access Track

Temporary Widening Areas

Temporary Construction Phase Surfaces

Temporary Widening Areas

Existing Public Road to be used for Construction and Operation Phase

Proposed Internal Collector Cable

Existing Ground Contour

Interceptor Drain With Diffuse Outflow

Roadside Swale

Stilling Pond and Diffuse

Proposed Culvert

Existing Culvert

Temporary Bridge Crossing

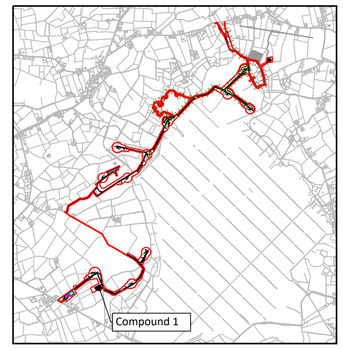
Proposed Berms

Proposed Amenity Trail

Temporary Noise Barriers

Notes.

1. This drawing is for planning purposes only.
2. Dimensions in meters unless otherwise noted.
3. Levels shown relative to ordinance datum (Malin Head).
4. Co-ordinates are to Irish Transverse Mercator (ITM).



KEY PLAN

0m 2m 4m 6m 8m 10m 12m 14m 16m 18m 20m

Scale 1:200

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Rev.	Description	App By	Date
A	ISSUE FOR PLANNING	JH	11.03.25

PROJECT

DREHID WIND FARM & SUBSTATION

CLIENT

NORTH KILDARE WIND FARM Ltd.

SHEET

TEMPORARY CONSTRUCTION COMPOUND 1 LAYOUT

Date 11.03.25	Project number P22-242	Scale (@ A1-) 1:200	
Drawn by CS	Drawing Number P22-242-0300-0019		Rev A
Checked by BC			

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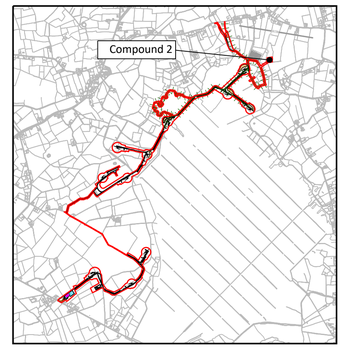
21 May 2025

Legend

- Planning Site Boundary
- Land Holding Boundary
- Proposed Turbine
  - Laydown Areas
  - Hardstand
  - Turbine Swing Footprint
- Proposed Internal Access Track — Temporary Widening Areas
- Temporary Construction Phase Surfaces — Temporary Widening Areas
- Existing Public Road to be used for Construction and Operation Phase
- Proposed Internal Collector Cable
- Existing Ground Contour
- Interceptor Drain With Diffuse Outflow
- Roadside Swale
- Stilling Pond and Diffuse
- Proposed Culvert
- Existing Culvert
- Temporary Bridge Crossing
- Proposed Berms
- Proposed Amenity Trail
- Temporary Noise Barriers

Notes.

1. This drawing is for planning purposes only.
2. Dimensions in meters unless otherwise noted.
3. Levels shown relative to ordinance datum (Malin Head).
4. Co-ordinates are to Irish Transverse Mercator (ITM).



KEY PLAN

0m 2m 4m 6m 8m 10m 12m 14m 16m 18m 20m

Scale 1:200

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Rev.	Description	App By	Date
A	ISSUE FOR PLANNING	IH	11.03.25

PROJECT	DREHID WIND FARM & SUBSTATION
CLIENT	NORTH KILDARE WIND FARM Ltd.
SHEET	TEMPORARY CONSTRUCTION COMPOUND 2 LAYOUT
Date	11.03.25
Project number	P22-242
Scale (@ A1-)	1:200
Drawn by	CS
Checked by	BC
Drawing Number	P22-242-0300-0020
Rev	A

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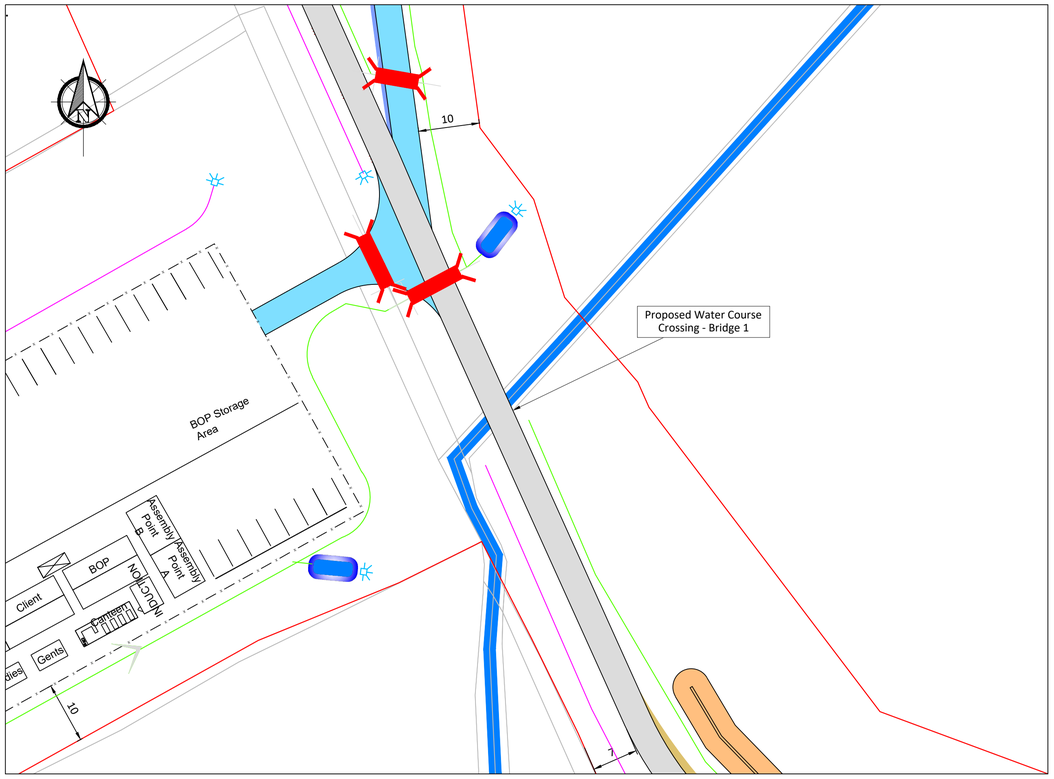
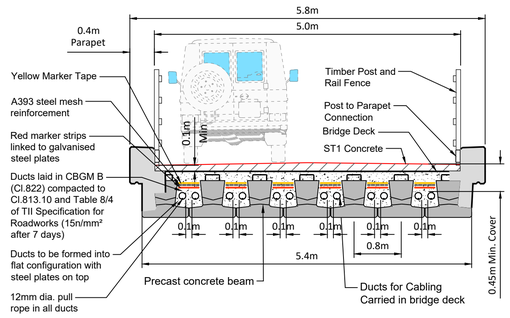
21 May 2025



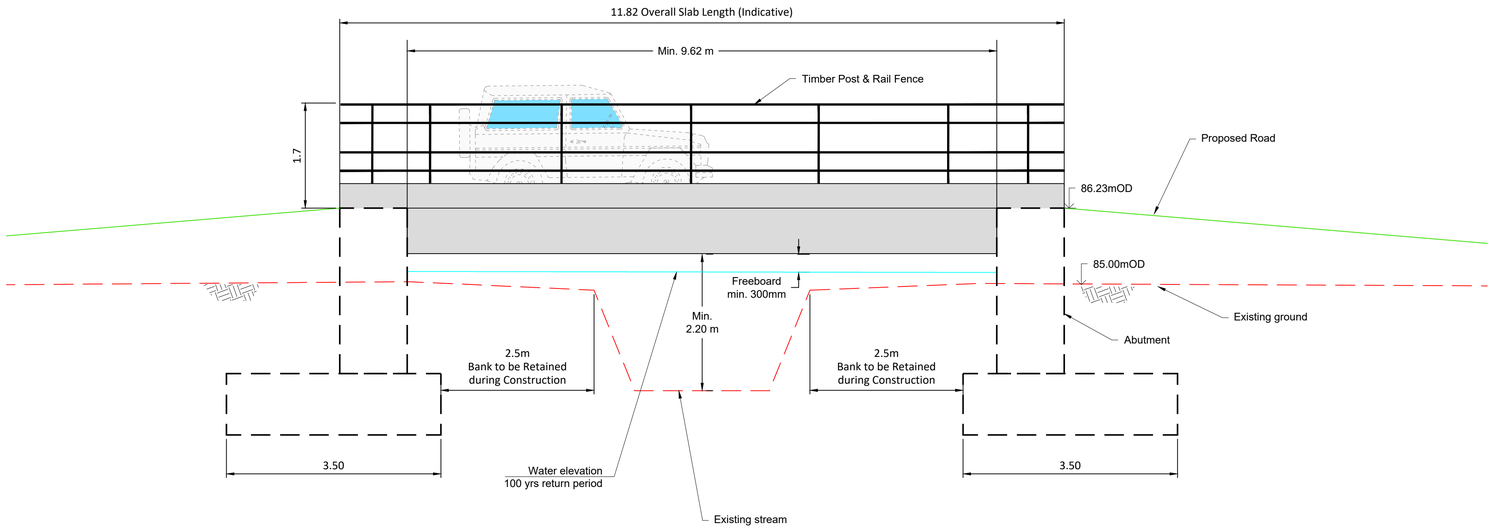
PROPOSED WATER COURSE CROSSING - BRIDGE 1

Scale 1:500



BRIDGE 1 SECTION

Scale 1:50



BRIDGE 1 ELEVATION

Scale 1:50

Legend

- Planning Site Boundary
- Land Holding Boundary
- Proposed Turbine
  - Laydown Areas
  - Hardstand
  - Turbine Swing Footprint
- Proposed Internal Access Track — Temporary Widening Areas
- Temporary Construction Phase Surfaces — Temporary Widening Areas
- Existing Public Road to be used for Construction and Operation Phase
- Proposed Internal Collector Cable
- Existing Ground Contour
- Interceptor Drain With Diffuse Outflow
- Roadside Swale
- Stilling Pond and Diffuse
- Proposed Culvert
- Existing Culvert
- Temporary Bridge Crossing
- Proposed Berms
- Proposed Amenity Trail
- Temporary Noise Barriers

Notes.

0m 5m 10m 15m 20m 25m 30m 35m 40m 45m 50m

Scale 1:500

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Rev.	Description	App By	Date
A	ISSUE FOR PLANNING	JH	11.03.25

PROJECT: DREHID WIND FARM & SUBSTATION

CLIENT: NORTH KILDARE WIND FARM Ltd.

SHEET: PROPOSED WATER COURSE CROSSING - BRIDGE 1 PLAN & DETAILS

Date: 11.03.25

Project number: P22-242

Scale (@ A1-): 1:500

Drawn by: CS

Checked by: BC

Drawing Number: P22-242-0300-0021

Rev: A

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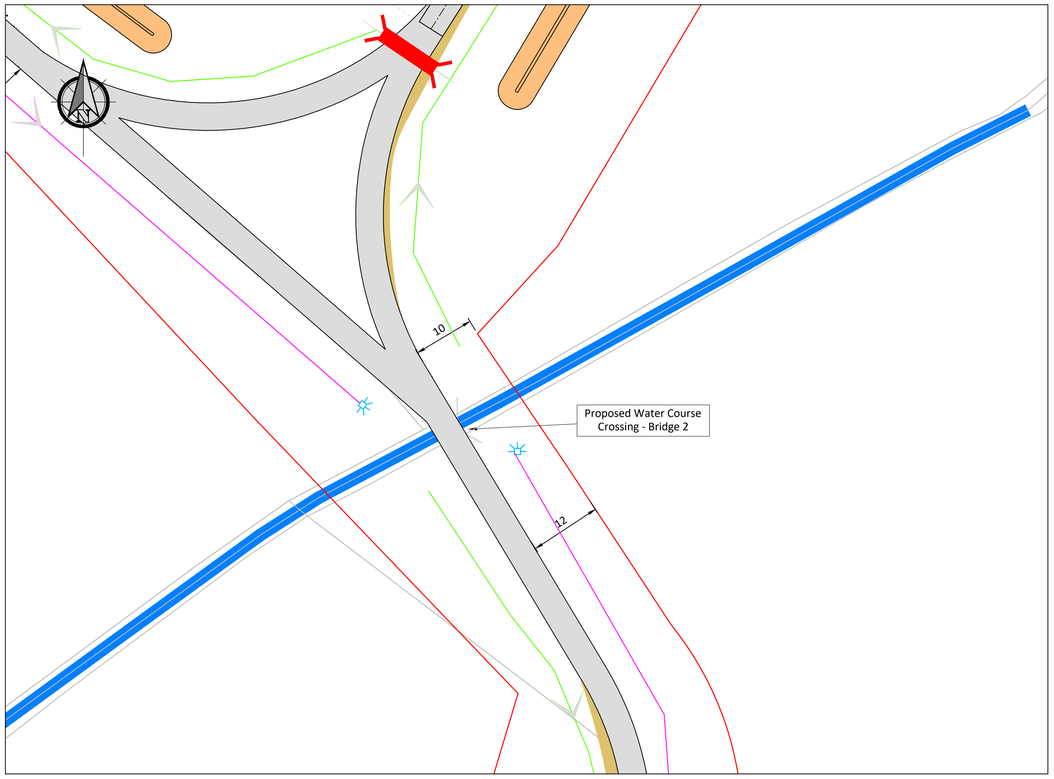
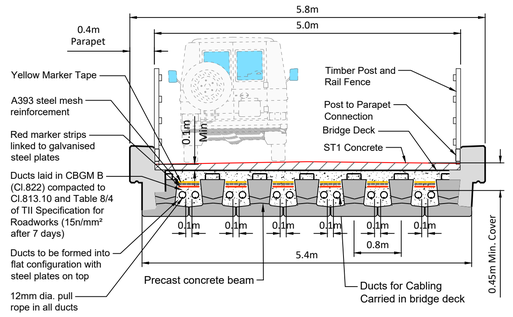
21 May 2025



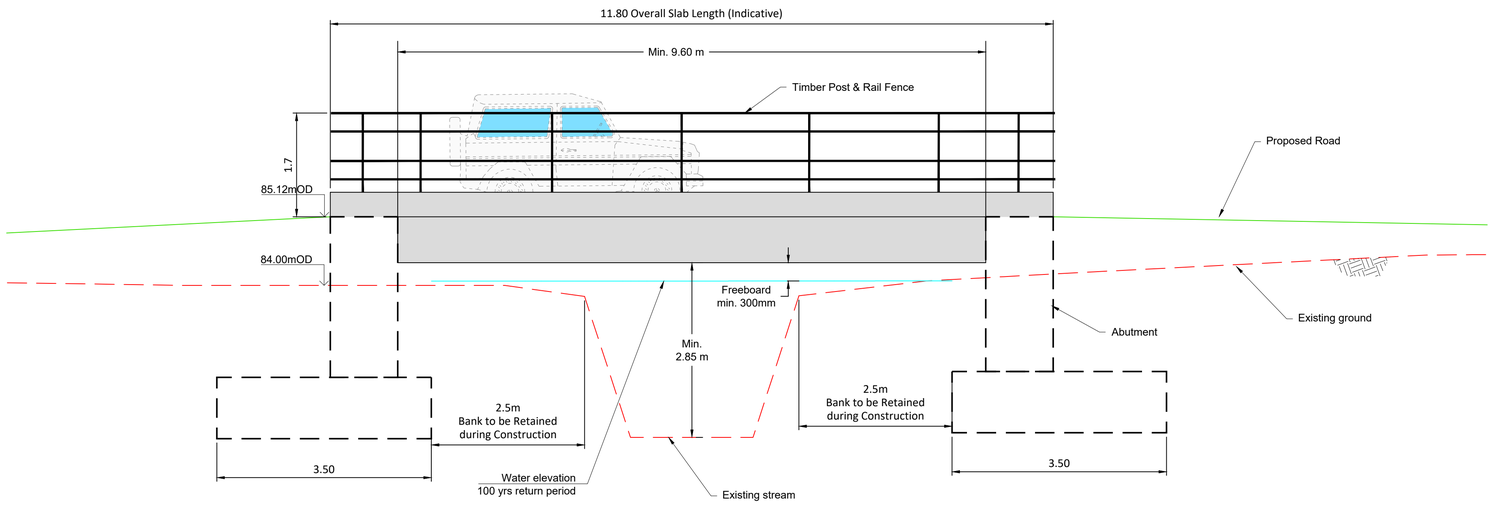
PROPOSED WATER COURSE CROSSING - BRIDGE 2

Scale 1:500



BRIDGE 2 SECTION

Scale 1:50



BRIDGE 2 ELEVATION

Scale 1:50

Legend

- Planning Site Boundary
- Land Holding Boundary
- Proposed Turbine
- Laydown Areas
- Hardstand
- Turbine Swing Footprint
- Proposed Internal Access Track (Temporary Widening Areas)
- Temporary Construction Phase Surfaces (Temporary Widening Areas)
- Existing Public Road to be used for Construction and Operation Phase
- Proposed Internal Collector Cable
- Existing Ground Contour
- Interceptor Drain With Diffuse Outflow
- Roadside Swale
- Stilling Pond and Diffuse
- Proposed Culvert
- Existing Culvert
- Temporary Bridge Crossing
- Proposed Berms
- Proposed Amenity Trail
- Temporary Noise Barriers

Notes.

0m 5m 10m 15m 20m 25m 30m 35m 40m 45m 50m

Scale 1:500

FEHILY TIMONEY

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Rev.	Description	App By	Date
A	ISSUE FOR PLANNING	JH	11.03.25

PROJECT: DREHID WIND FARM & SUBSTATION

CLIENT: NORTH KILDARE WIND FARM Ltd.

SHEET: PROPOSED WATER COURSE CROSSING - BRIDGE 2 PLAN & DETAILS

Date: 11.03.25

Project number: P22-242

Scale (@ A1-): 1:500

Drawn by: CS

Checked by: BC

Drawing Number: P22-242-0300-0022

Rev: A

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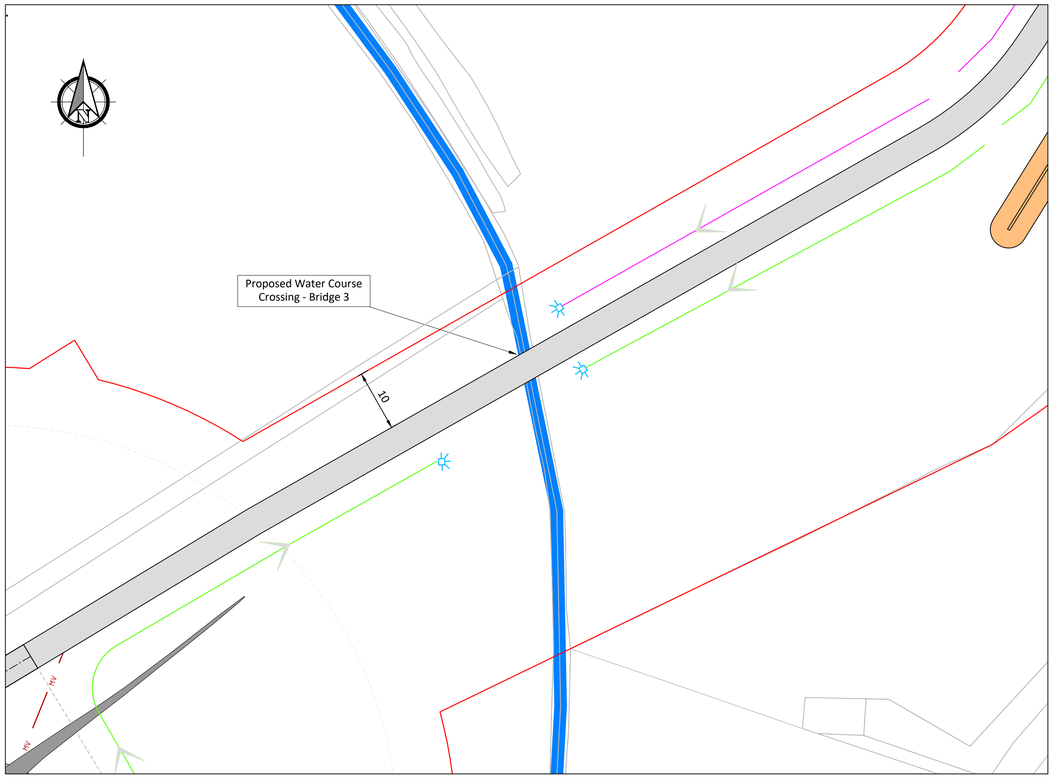
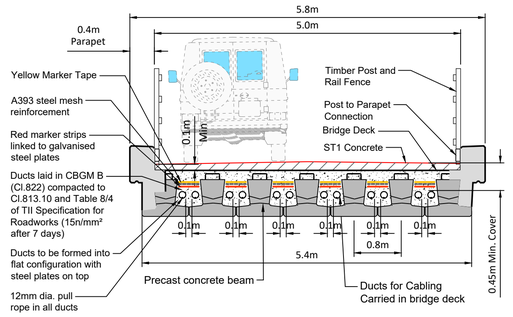
21 May 2025



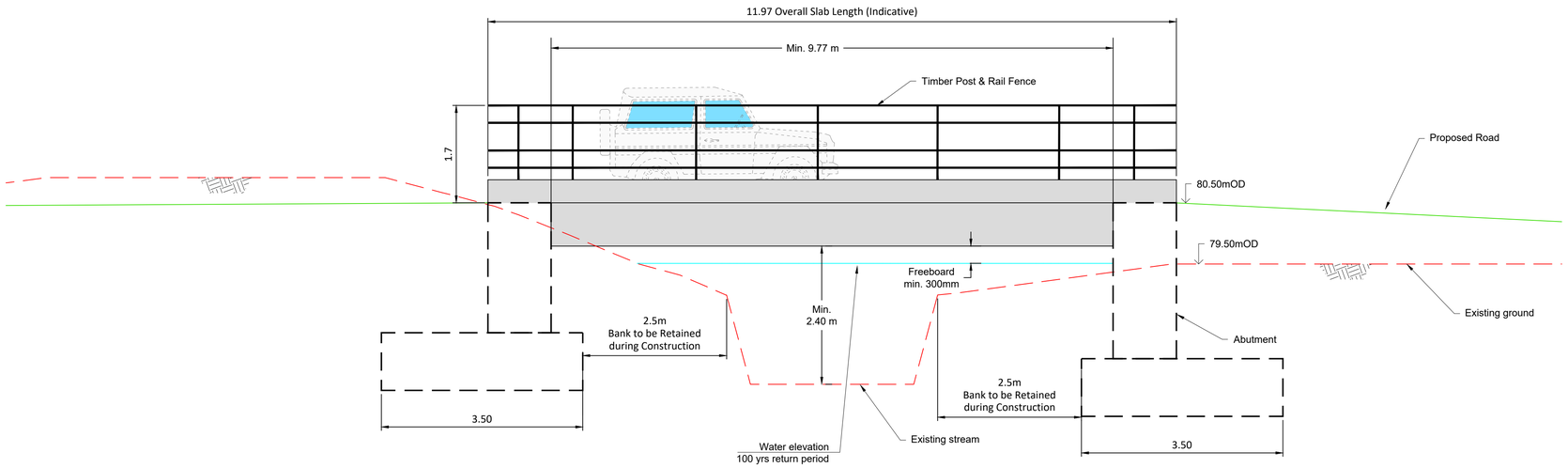
PROPOSED WATER COURSE CROSSING - BRIDGE 3

Scale 1:500



BRIDGE 3 SECTION

Scale 1:50



BRIDGE 3 ELEVATION

Scale 1:50

Legend

- Planning Site Boundary
- Land Holding Boundary
- Proposed Turbine
- Laydown Areas
- Hardstand
- Turbine Swing Footprint
- Proposed Internal Access Track
- Temporary Widening Areas
- Temporary Construction Phase Surfaces
- Temporary Widening Areas
- Existing Public Road to be used for Construction and Operation Phase
- Proposed Internal Collector Cable
- Existing Ground Contour
- Interceptor Drain With Diffuse Outflow
- Roadside Swale
- Stilling Pond and Diffuse
- Proposed Culvert
- Existing Culvert
- Temporary Bridge Crossing
- Proposed Berms
- Proposed Amenity Trail
- Temporary Noise Barriers

Notes.

0m 5m 10m 15m 20m 25m 30m 35m 40m 45m 50m

Scale 1:500

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Rev.	Description	App By	Date
A	ISSUE FOR PLANNING	JH	11.03.25

PROJECT: DREHID WIND FARM & SUBSTATION

CLIENT: NORTH KILDARE WIND FARM Ltd.

SHEET: PROPOSED WATER COURSE CROSSING - BRIDGE 3 PLAN & DETAILS

Date: 11.03.25

Project number: P22-242

Scale (@ A1-): 1:500

Drawn by: CS

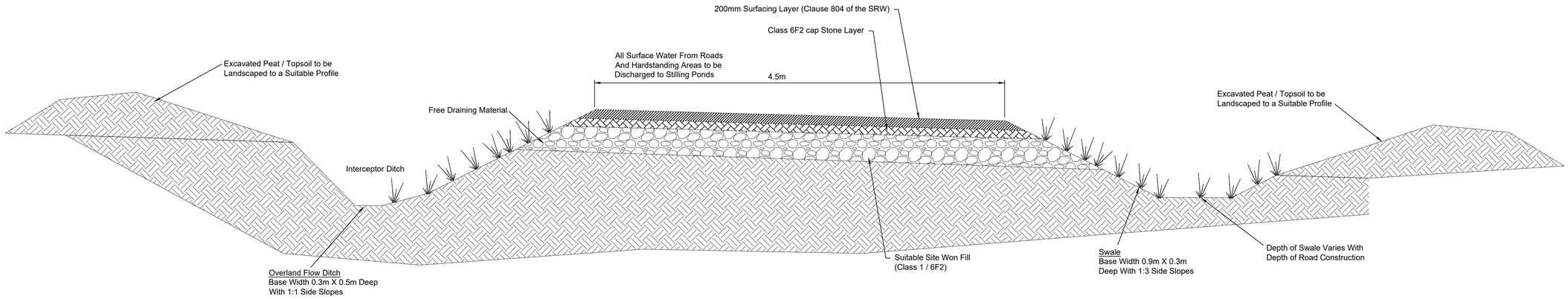
Checked by: BC

Drawing Number: P22-242-0300-0023

Rev: A

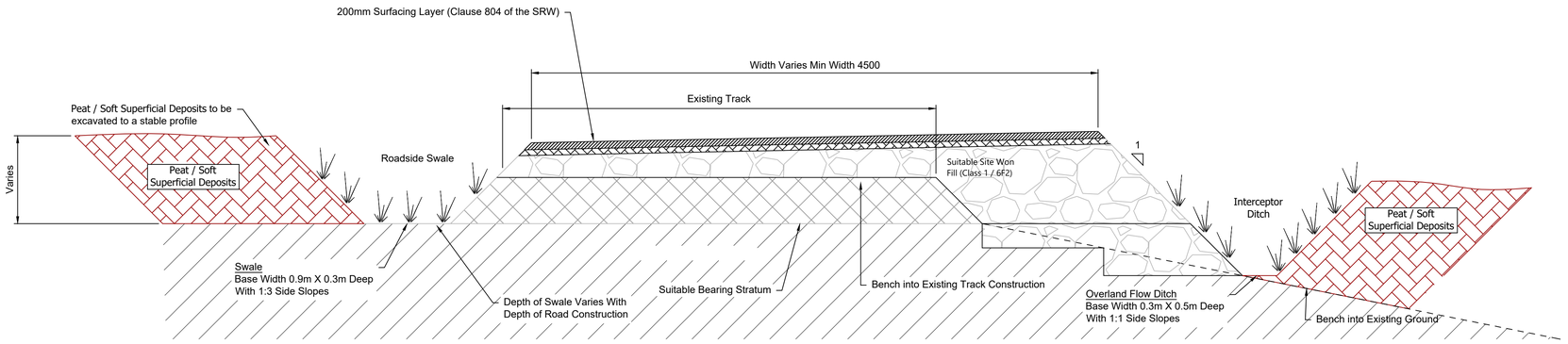
O:\ACAD\2022\P22-242\P22-242-0300-0023

21 May 2025



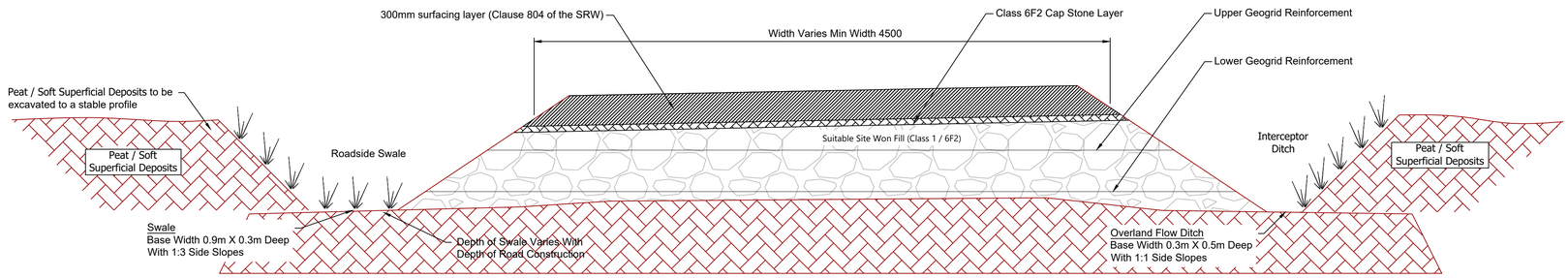
NEW ROAD DETAIL

Scale 1:25



UPGRADED ROAD DETAIL

Scale 1:25



FLOATING ROAD DETAIL

Scale 1:25

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Rev.	Description	App By	Date
A	ISSUE FOR PLANNING	JH	11.03.25

PROJECT	DREHID WIND FARM & SUBSTATION
CLIENT	NORTH KILDARE WIND FARM Ltd.
SHEET	ACCESS TRACK DETAILS

Date 11.03.25	Project number P22-242	Scale (@ A1-) 1:25	
Drawn by CS	Drawing Number P22-242-0300-0026		Rev A
Checked by BC			

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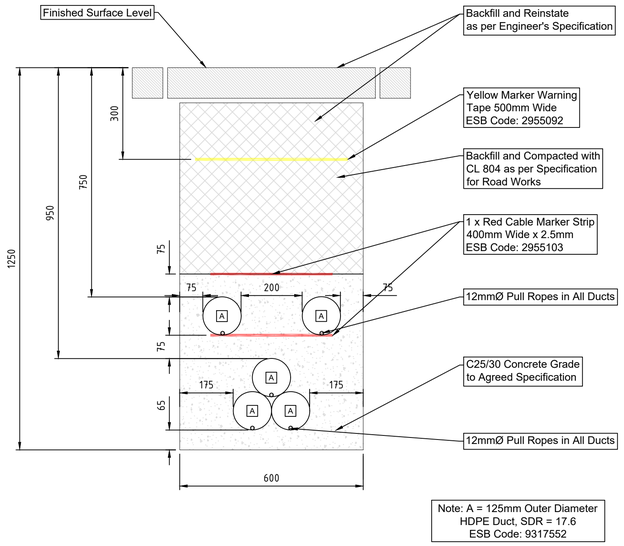
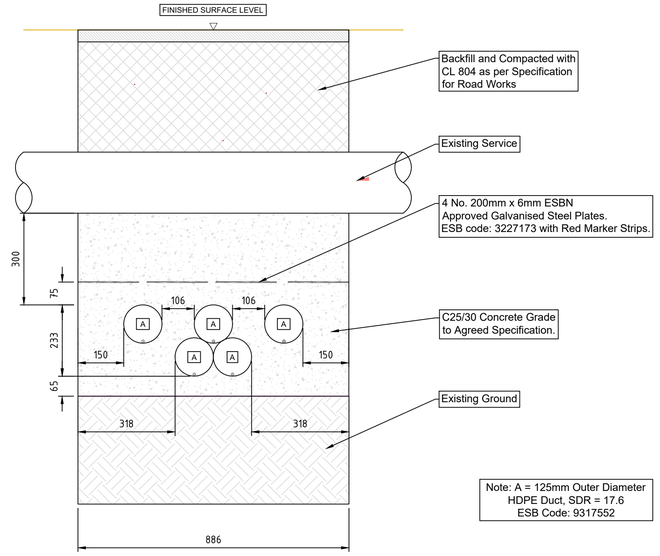
21 May 2025



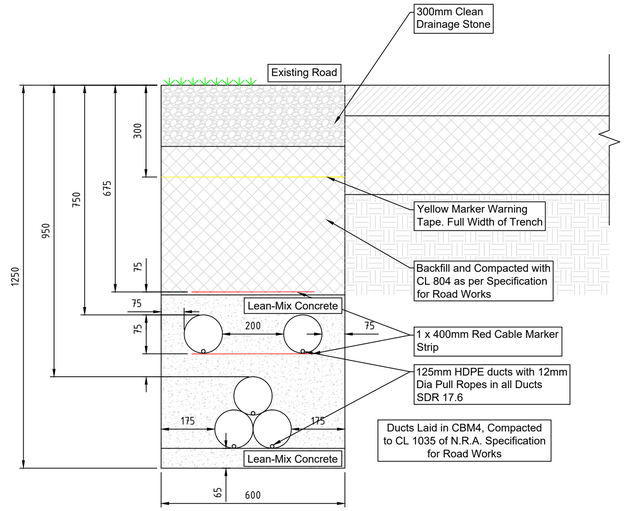
DETAIL A - STANDARD TRENCH ARRANGEMENT IN PUBLIC ROAD

Scale 1:10



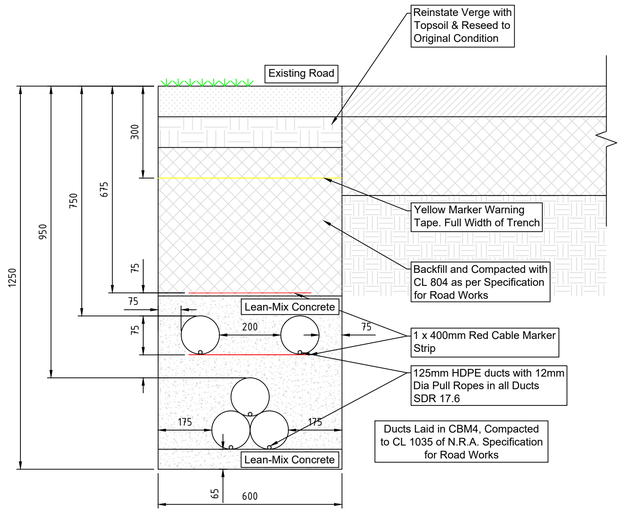
DETAIL B - STANDARD TRENCH CROSSING UNDER EXISTING SERVICES

Scale 1:10



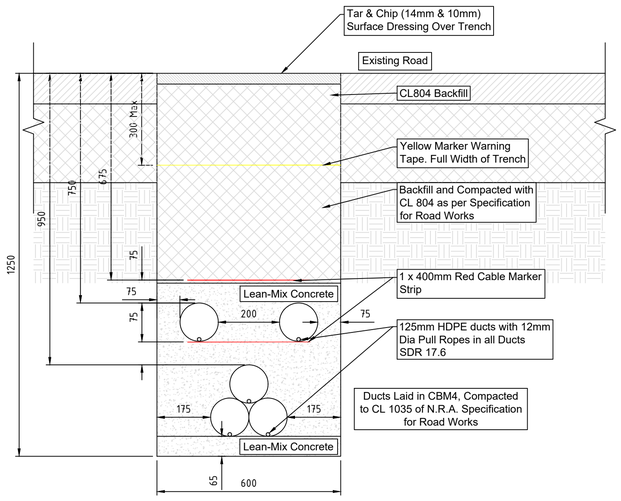
DETAIL C - STANDARD TRENCH ARRANGEMENT IN PUBLIC ROAD VERGE WHERE SHALLOW SURFACE DRAIN PRESENT

Scale 1:10



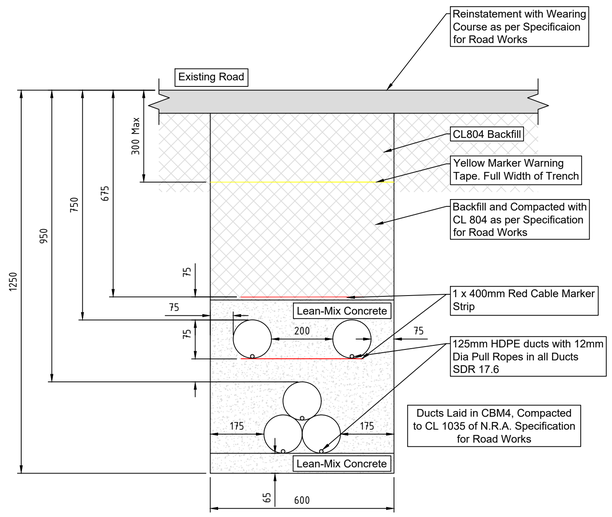
DETAIL D - STANDARD TRENCH ARRANGEMENT IN PUBLIC ROAD VERGE

Scale 1:10



DETAIL E - TYPICAL CROSS SECTION OF TEMPORARY ROAD REINSTATEMENT

Scale 1:10



DETAIL F - TYPICAL CROSS SECTION OF PERMANENT ROAD REINSTATEMENT

Scale 1:10

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Rev.	Description	App By	Date
A	ISSUE FOR PLANNING	JH	11.03.25

PROJECT	DREHID WIND FARM & SUBSTATION
CLIENT	NORTH KILDARE WIND FARM Ltd.
SHEET	TRENCH DETAILS FOR INTERNAL COLLECTOR CABLES

Date 11.03.25	Project number P22-242	Scale (@ A1-) As Shown
Drawn by CS	Drawing Number P22-242-0300-0028	Rev A
Checked by BC		

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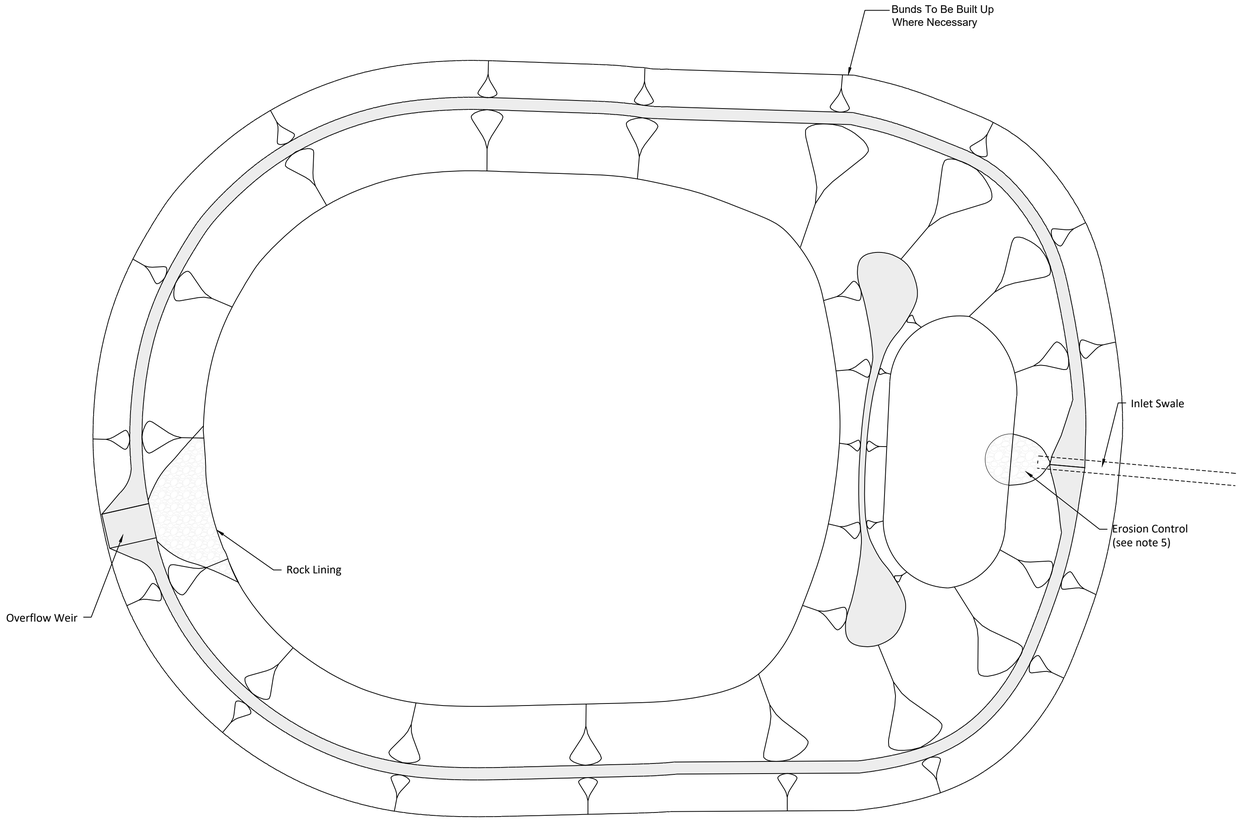
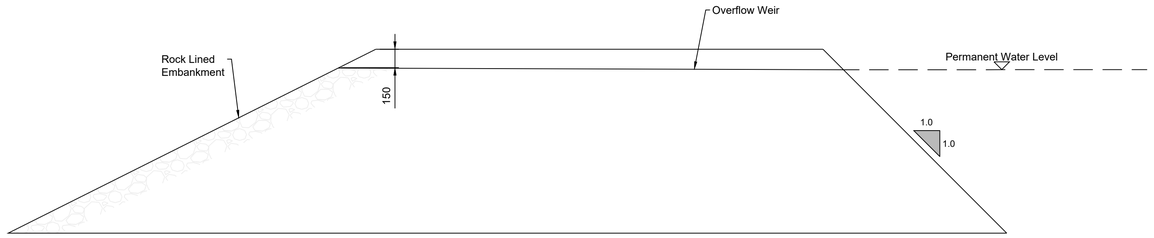
21 May 2025



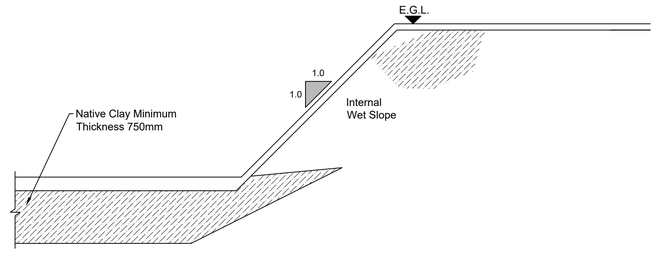
STILLING POND LAYOUT

Scale 1:250



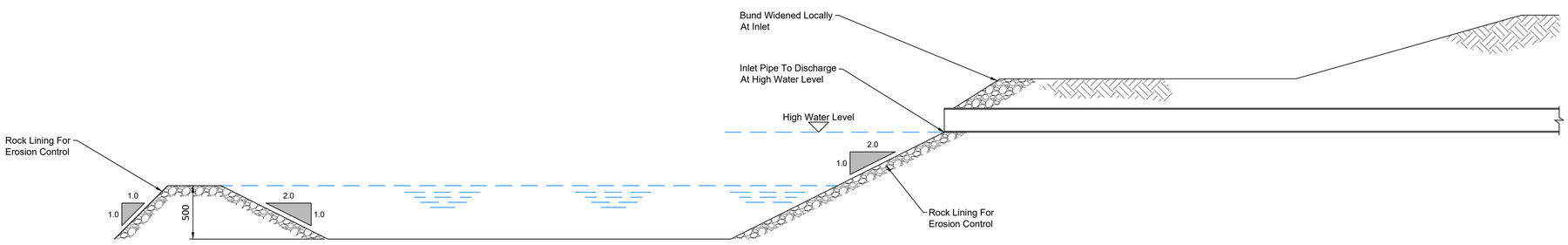
SECTION AT OUTLET

Scale 1:25



BUND CONSTRUCTION
(Where Pond is Below Ground Level)

Scale 1:25



SECTION THROUGH FOREBAY

Scale 1:25

NOTES

1. This drawing should only be read in relation to subject of the title. Other information shown on drawing is to be considered indicative only.
2. All dimensions are in millimetres unless otherwise stated.
3. The pond base and sides below the permanent water level should be made impermeable by:
Cohesive material using native clay or a synthetic liner 1 mm LLDPE.
4. Bunds in ponds to be constructed from native clay.
5. Erosion control to be rock lining. Extent to be agreed on site.
6. Rock lining to be a 125mm thickness of Class 1B material.
7. Refer to stilling pond schedules for pond sizes.
8. Swale inlet at 0.15 m below top of pond.
9. All ponds to be fenced off.

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Rev.	Description	App By	Date
A	ISSUE FOR PLANNING	JH	19.05.25

PROJECT: DREHID WIND FARM & SUBSTATION

CLIENT: NORTH KILDARE WIND FARM Ltd.

SHEET: STILLING POND DETAILS

Date: 19.05.25

Project number: P22-242

Scale (@ A1-): As Shown

Drawn by: CS

Checked by: BC

Drawing Number: P22-242-0300-0030

Rev: A

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21 May 2025

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APPENDIX 3.3

ESB Specification

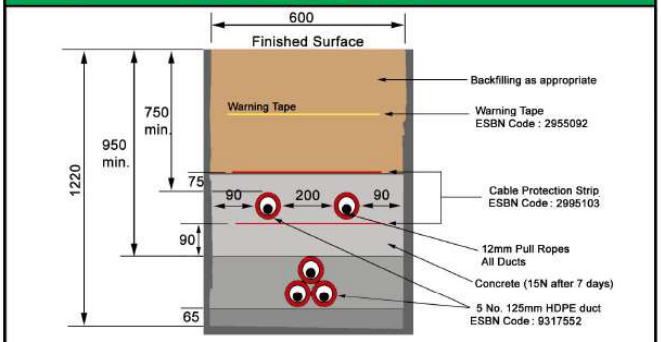
Standard Specification for ESB 110kV Networks Ducting/Cabling (Minimum Standards)

Note 1 : ESB Networks reserves the right not to accept ducting which does not conform to these standards and dimensions
Note 2 : Refer to ESB Networks for Specific job Specification. These instructions do not apply to LV/MV/38kV/220kV cable
Note 3 : All materials (ducts, marker tapes/strips, duct surrounds, mandrels and brushes) must be ESB approved materials

ESB Networks
Rev 0: Date 09-10
Approved:

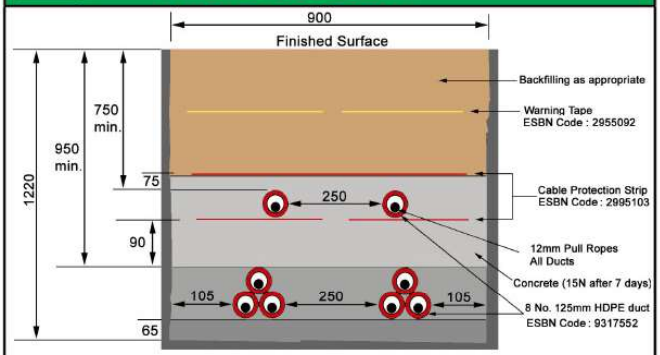
Document No:DTIS-230908-BUV

1A 110kV Single Circuit Standard Trench Cross-Section

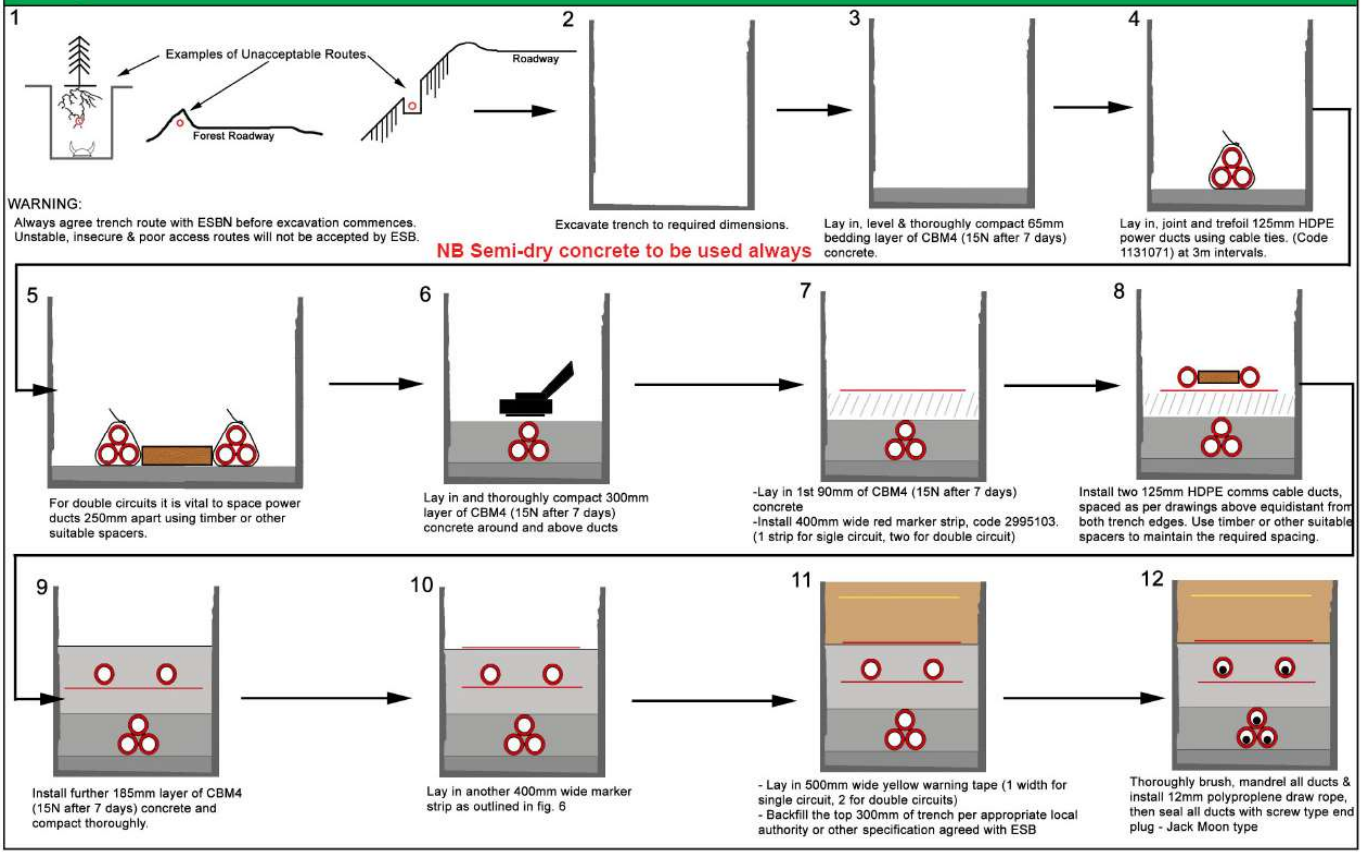


Note : Only 1ESBN comms duct maybe required if ESBN specify
Note : Maximum duct depth ≤ 1.5m to top of trefoil group

1B 110kV Double Circuit Standard Trench Cross-Section



1C Trench Installation Sequence



WARNING:
Always agree trench route with ESBN before excavation commences.
Unstable, insecure & poor access routes will not be accepted by ESB.

Excavate trench to required dimensions.

NB Semi-dry concrete to be used always

Lay in, level & thoroughly compact 65mm bedding layer of CBM4 (15N after 7 days) concrete.

Lay in, joint and trefoil 125mm HDPE power ducts using cable ties. (Code 1131071) at 3m intervals.

For double circuits it is vital to space power ducts 250mm apart using timber or other suitable spacers.

Lay in and thoroughly compact 300mm layer of CBM4 (15N after 7 days) concrete around and above ducts

-Lay in 1st 90mm of CBM4 (15N after 7 days) concrete
-Install 400mm wide red marker strip, code 2995103.
(1 strip for sigle circuit, two for double circuit)

Install two 125mm HDPE comms cable ducts, spaced as per drawings above equidistant from both trench edges. Use timber or other suitable spacers to maintain the required spacing.

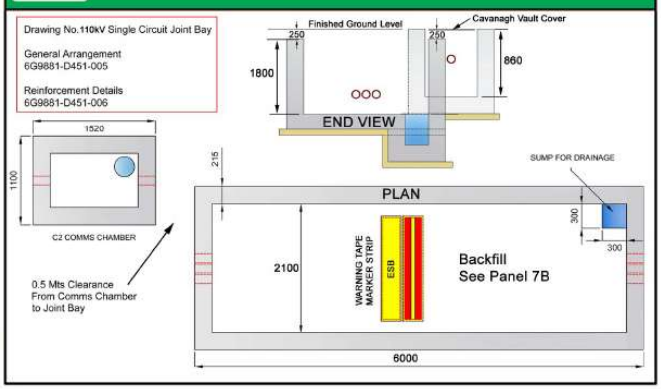
Install further 185mm layer of CBM4 (15N after 7 days) concrete and compact thoroughly.

Lay in another 400mm wide marker strip as outlined in fig. 6

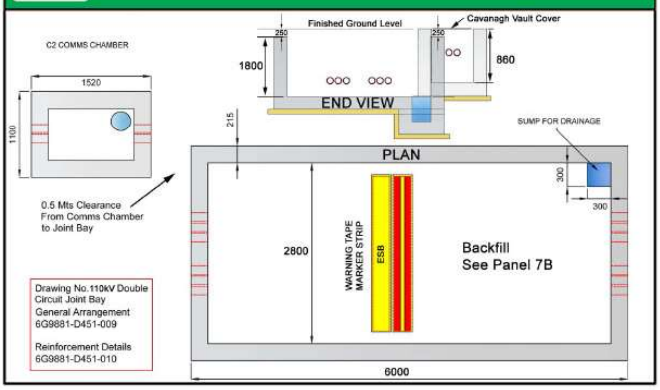
- Lay in 500mm wide yellow warning tape (1 width for single circuit, 2 for double circuits)
- Backfill the top 300mm of trench per appropriate local authority or other specification agreed with ESB

Thoroughly brush, mandrel all ducts & install 12mm polyproplene draw rope, then seal all ducts with screw type end plug - Jack Moon type

2A 110kV Single Circuit Joint Bay



2B 110kV Double Circuit Joint Bay

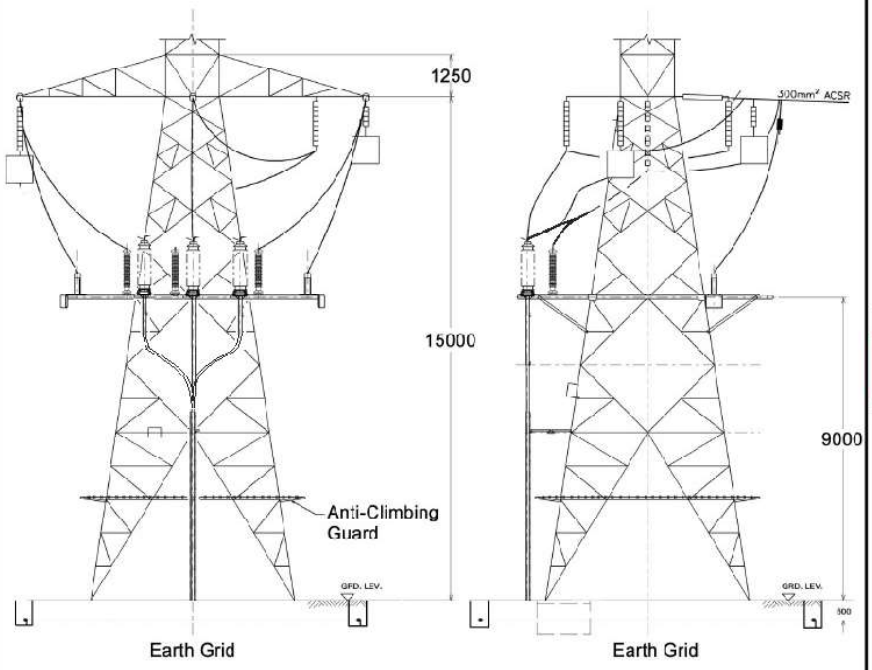


Standard Specification for ESB 110kV Networks Ducting/Cabling (Minimum Standards)

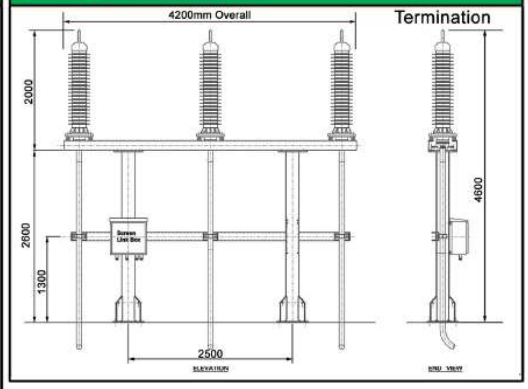
Note 1 : ESB Networks reserves the right not to accept ducting which does not conform to these standards and dimensions
Note 2 : Refer to ESB Networks for Specific job Specification. These instructions do not apply to LV/MV/38kV/220kV cable
Note 3 : All materials (ducts, marker tapes/strips, duct surrounds, mandrels and brushes) must be ESB approved materials

ESB Networks
Rev 0: Date 09-10
Approved:

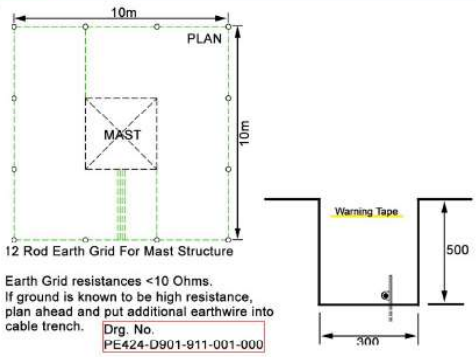
3A 110kV Cable End Mast Termination



3B Typical 110kV Termiantion Arrangement for Substations



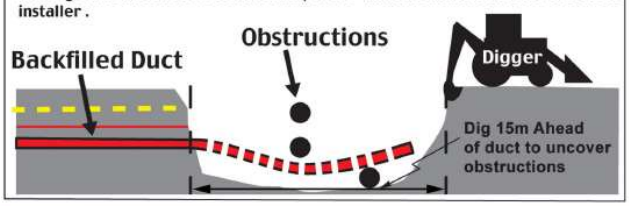
3C Earth Grids



Earth Grid resistances <10 Ohms.
If ground is known to be high resistance, plan ahead and put additional earthwire into cable trench.
Drg. No. PE424-D901-911-001-000

4A Obligation of Duct Installer to Minimise the Number and Severity of Duct Bends

The duct installer must minimise the number and severity of preformed bends in ground with obstructions and other utility service crossings by opening ground 15m ahead of backfilled duct, wherever practical to do so. This safety obligation, which may require use of steel plating, allows the duct installer to pick the least bendy duct route through utility crossings and obstructions . Otherwise, numerous sharp unrecorded duct route deviations will be present making cable installation considerably more difficult and less safe for the cable installer .

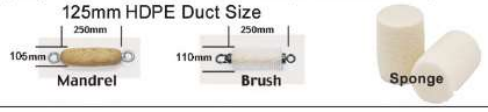


4B Standard for Brushing, Mandrelling, Roping and End-Capping of 110kV Ducts

All Ducts must be:
- Thoroughly brushed and mandrelled to prove ducts against debris /excessive deflection
- Roped using 12mm polypropelene rope with certified safe breaking load of 1.5 tons -- all rope joints to be properly spliced and PVC taped over. Approved Supplier Silver Strand Bunclana Donegal, ph (074) 9382503 - 500m drum lengths available to minimise splicing/coil handling
- Sealed using endcaps against grit and water getting into them
  NB: Replace mandrels once mandrel wear indicators or grooves are worn down
  Replace brushes once brush diameter falls 5mm below dimensions in table below
- Approved endcaps, both disposable and reusable types, are available from suppliers of approved ESBN ducting
- Approved ESBN Mandrel and brush suppliers :

Brandon Agencies, Rathnew, Co Wicklow: Phone 0404 20500 (Brushes & Mandrels)
IS Varian, Greenhills industrial Estate, Walkinstown, Dublin 12 Phone: 01-4501150 (Brushes Only)
Clydesdale UK Phone 0044 1234 855 855 (Brushes & Mandrels)
Tynagh Network Systems, Loughrea, Co Galway. Phone: 091 842206 (Brushes & Mandrels)

125mm HDPE Duct Size

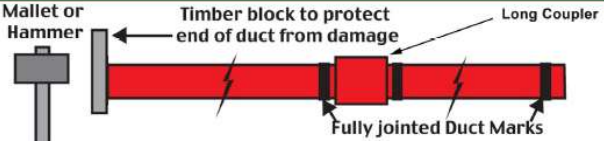


4C Approved ESBN ducting for 110kV cables

- Use only solid wall high impact resistance ESBN approved HDPE red ducting to IS 370 colour standard and ESBN specification 16113 (7.1mm minimum wall thickness) Discoloured or unidentified ducting not acceptable. All duct material must be approved by ESB Networks.
- Lightweight flexible corrugated twinwall ducting is not acceptable to ESBN irrespective of manufacturer

- Current approved HDPE Duct and duct bend manufacturers are:
  Lynplast (bend fittings only), Uponor-Radius Systems, Wavin, Quality Plastics, Emtelle

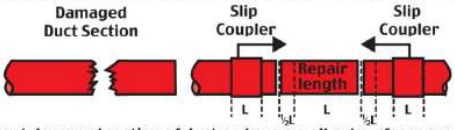
4D Specification for Duct Jointing for 110kV Cables



All ducts to be securely jointed by tapping against timber board on each duct until the black depth insertion mark is reached
Always smear duct lubricant on coupler rubber ring

4E Repair of Existing Ducts

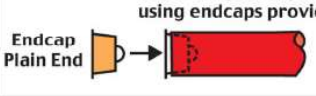
Use only approved slip couplers from approved manufacturers in section 4C



- Cut out damaged section of duct and ensure all cut surfaces are square and free from sharp edges
- Slide, position and centre the repair couplers on the centering marks

4F Sealing of Ducts

All ducts to be permanently sealed at both ends of duct run
Ducts to be temporarily sealed during installation using endcaps provided with each bale



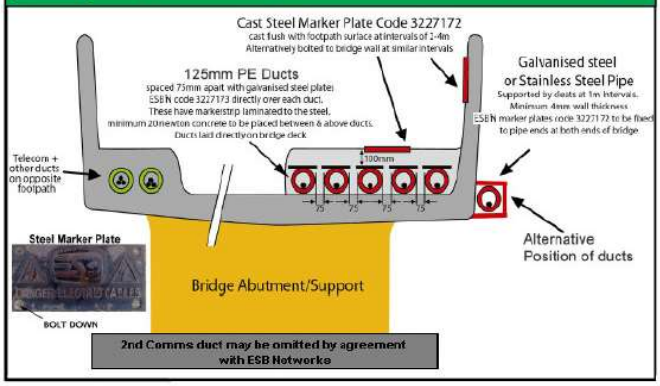
ESBN Code 125mm: 9317583

Standard Specification for ESB 110kV Networks Ducting/Cabling (Minimum Standards)

Note 1 : ESB Networks reserves the right not to accept ducting which does not conform to these standards and dimensions
Note 2 : Refer to ESB Networks for Specific job Specification. These instructions do not apply to LV/MV/38kV/220kV cable
Note 3 : All materials (ducts, marker tapes/strips, duct surrounds, mandrels and brushes) must be ESB approved materials

ESB Networks
Rev 0: Date 09-10
Approved:

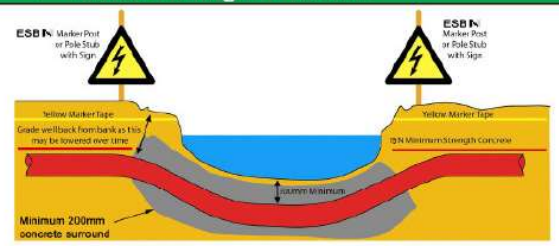
5A Bridge Crossings: Restricted Footpath Designs



5B Bridge Crossings: Restricted Footpath Designs

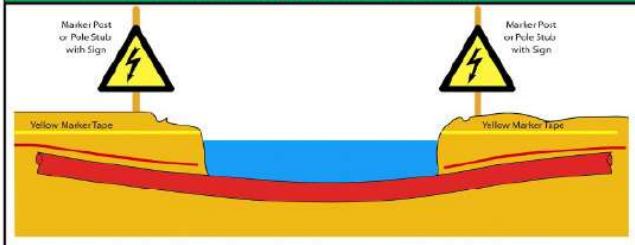
1. The design must be agreed with the bridge authority. Position in footpath is preferred.
2. Minimum cover over ducts on footpath 100mm.
3. **Where duct cover is >600mm, marker strip 75mm above ducts and marker tape (300mm below surface) + steel surface markers suffice**
4. Red ducting is not suitable for cable run external to bridges.
5. Where possible galvanised steel/stainless steel piping should be used, all joints must be free of weld burrs on inside. Alternatively heavy duty 10mm wall thickness black HDPE material with cast steel marker plates attached must be used to permanently warn of presence of electric cable.

6A River/Stream Crossings: Standard Where Burial/Drilling IS Possible



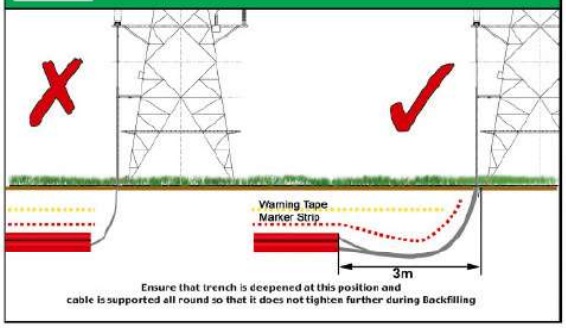
1. Depth of burial below bottom of river or stream to be agreed with relevant authority (if applicable)
2. If normal red ducting is installed by trenching, it must be encased in CBM4 (15N after 7 days) concrete to prevent uplift and to provide mechanical protection. Seal any joints to prevent concrete entering duct.
3. If drilled crossing is practical, use heavy red wall coiled HDPE duct (**sections 2.2 & 2.9 in MV/LV manual**)
4. Install an ESBN marker post on both sides of the crossing - ESBN code 8327355 or use stub pole minimum 2.0m above ground level & warning sign 8238139.
5. Where circumstances require it a large steel pipe can be installed into which a number of standard ESBN duct sizes are pulled in (**see section 2.9.4 of MV/LV manual for guidance**)
6. If crossing a tidal section of a river or stream a foreshore licence will be required

6B River/Stream Crossings: Standard Where Burial/Drilling IS NOT Possible



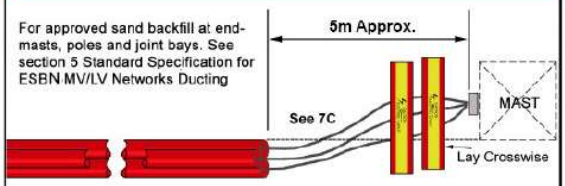
1. Installation on base of river or stream to be agreed with relevant authority (if applicable)
2. Heavy wall steel pipe to be used free of weld beads/swarf. Minimum 8mm steel wall thickness to be used. Encase in CBM4 (15N after 7 days) concrete for corrosion protection, minimum 100mm surround
3. Install an ESBN marker post on both sides of the crossing. ESBN code 8327355 or use stub pole minimum 2.0m above ground level & warning sign 8238139.
4. Ensure a smooth connection using rubber coupler between crossing pipe size and ESBN standard duct as the steel pipe size will usually differ from the standard ESBN ducting. Alternatively run ESBN ducting right through the steel pipe
5. If crossing a tidal section of a river or stream a foreshore licence will be required

7A Cable End Mast Position



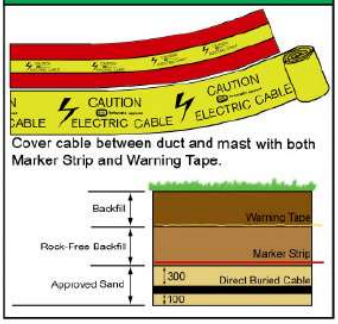
Ensure that trench is deepened at this position and cable is supported all round so that it does not tighten further during Backfilling

7B Cable End Mast Position



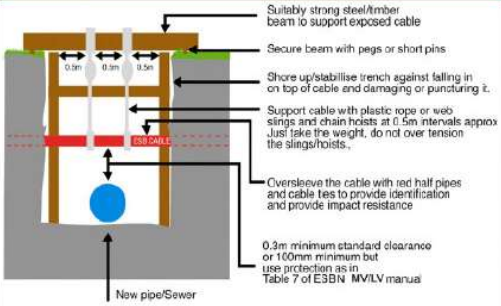
Offset trefoil to line up with edge of mast for ease of cable pulling.
Never install ducting right up to mast with long radius bend attached.
Both marker strip and warning tape to be used between duct and mast (laying the marker strip crosswise as shown above).

7C Cable End Mast - Marker Strip/Tape

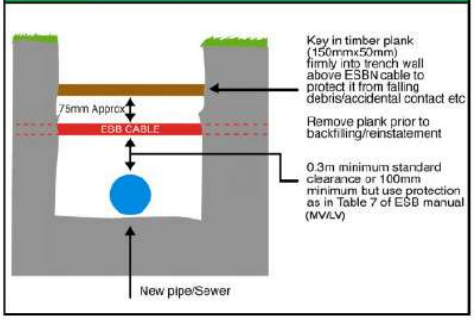


Cover cable between duct and mast with both Marker Strip and Warning Tape.

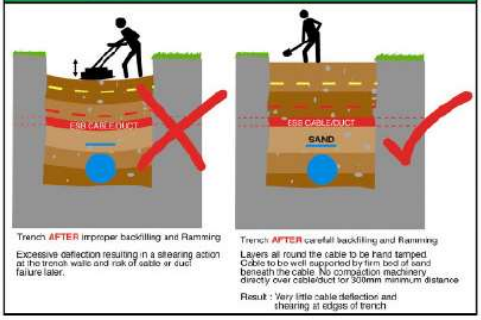
8A Supporting ESBN Cables/Ducts During Trenching Works



8B Supporting ESBN Cables/Ducts During Trenching Works



9 Avoidance of Cable Damage Due to Improper Backfilling at Cable Crossings



Trench **AFTER** improper backfilling and Ramming

Excessive deflection resulting in a shearing action at the trench walls and risk of cable or duct failure later.

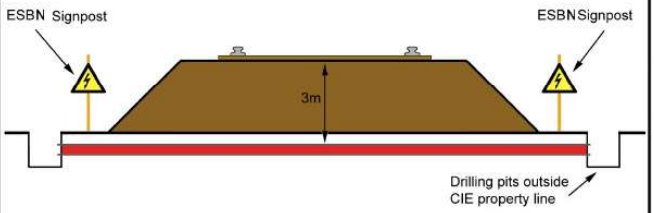
Trench **AFTER** carefull backfilling and Ramming

Layers all round the cable to be hand tamped. Cable to be well supported by firm bed of sand beneath the cable. No compaction machinery directly over cable/duct for 300mm minimum distance.

Result : Very little cable deflection and shearing at edges of trench

Standard Specification for ESB 110kV Networks Ducting/Cabling

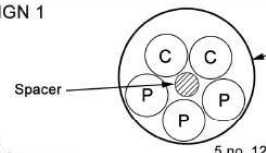
10A 110kV Railway Crossing Details



Formal licence for crossing and approval required from Iarnrod Eireann
Accurately record crossing location & erect marker posts.

10B TypicalDirectional Drill/Thrust Bore Duct Bore Details

DESIGN 1



Minimum internal bore size = 370mm for 5 ducts

=330mm for 4 ducts where approved by ESBN

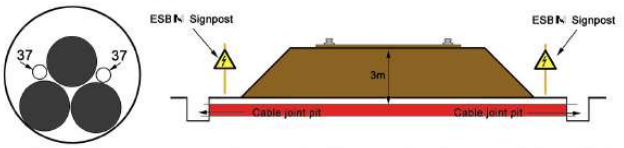
Index
Duct C = comms
Duct P = power

5 no. 125mm diameter HDPE ducts

Alternatively use 2 x 37mm HDPE ducts for comms cables with C2 chamber on each side of the crossing to permit pulling along entire route. (See 10C)
All interstitial space to be bentonited thoroughly to maintain cable rating.
Accurately record crossing location & erect marker posts.

10C Typical Directional Drill/Thrust Bore Duct Bore Details

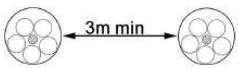
ALTERNATIVE DESIGN



Install 1 no. 300mm ID SDR 17.6 duct with 3 no. short length cables pulled into this pipe along with 2 x 37mm comms ducts.
Full cable joint bays are required on either side of crossing along with C2 chambers for this design .
This method is used where it is not not practical to install large diameter pipe -eg. risk of ground upheaval or presence of obstructions.
All interstitial space to be thoroughly bentonited to maintain cable rating.
Accurately record crossing location & erect marker posts.

10D Typical Double Circuit Bore Crossing

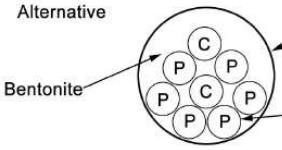
Standard Design



-Both Bentonited

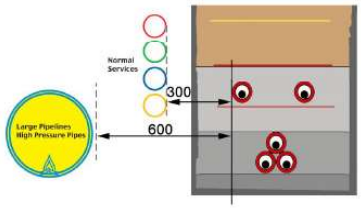
Separate drilling for each circuit crossing

Alternative



All crossings to be accurately recorded and signposts erected given impracticality of marker tape.

11 Minimum Standard Clearances to Other Services

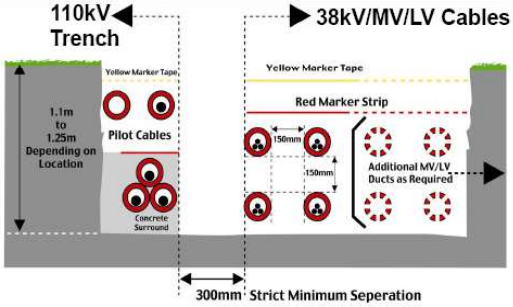


Clearances less than the above at pinch points and crossings requires placement of additional mechanical protection (concrete slab/brick) and agreement of ESBN

ESBN ducts must never be laid over other services on parallel runs, except with the written prior agreement of the other utilities and ESBN

Other services must never be laid directly over ESBN ducts on parallel runs

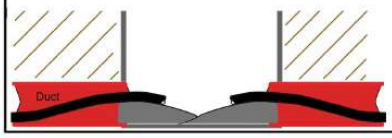
12 Combined 110kV & 38kV Cable Runs



NB. Where it is necessary to employ this formation, the seperation distance of 300mm should be strictly controlled and monitored to minimise derating (see MV/LV manual page 180)
Detailed calculations and design to be agreed between ESBN / ESBI

13 Sealing and Protection of 110kV Cables Once they Exit Ducts

Ducts to be thoroughly sealed using ESBN tyco approved water sealant and 4hr fire rating approved for firestop.
NB - All joint bay entries to be thoroughly sealed to prevent sand washout and subsidence.

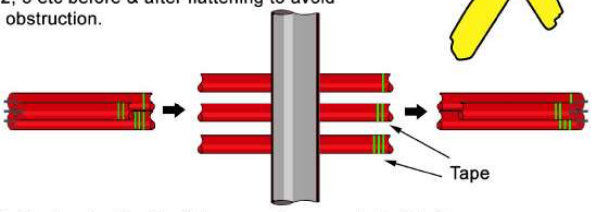


Sandbags or other durable support for cable as it exits ducts to prevent damage to cable sheath

14 Duct Crossovers Are Not Allowed

Be especially careful when going from flat to trefoil formation in vicinity of services

Eliminate this possibility by marking ducts 1, 2, 3 etc before & after flattening to avoid an obstruction.



NB. If using double circuit, tape mark power ducts 1 to 6

15 Crossing Dumps/Contaminated Ground

Thoroughly seal all joints with adhesive water-tight duct jointing compound and pressure test for airtightness.
Gasketed couplers alone are inadequate.

Fusion welded couplers are also acceptable but require red over-taping.

NB. Avoid whenever possible due to: Subsidence, methane gas & severe thermal derating risks.
Seek advice from ug networks section to ensure rating of cable is adequate (derating of 50% can occur)
NB. Waste oils and chemicals can also seriously damage cables

Seal all duct joints with duct adhesive compound or use continuous duct lengths & seal all duct ends in joint bays. Alternatively weld pipes.