

TRANSPORTATION

Project

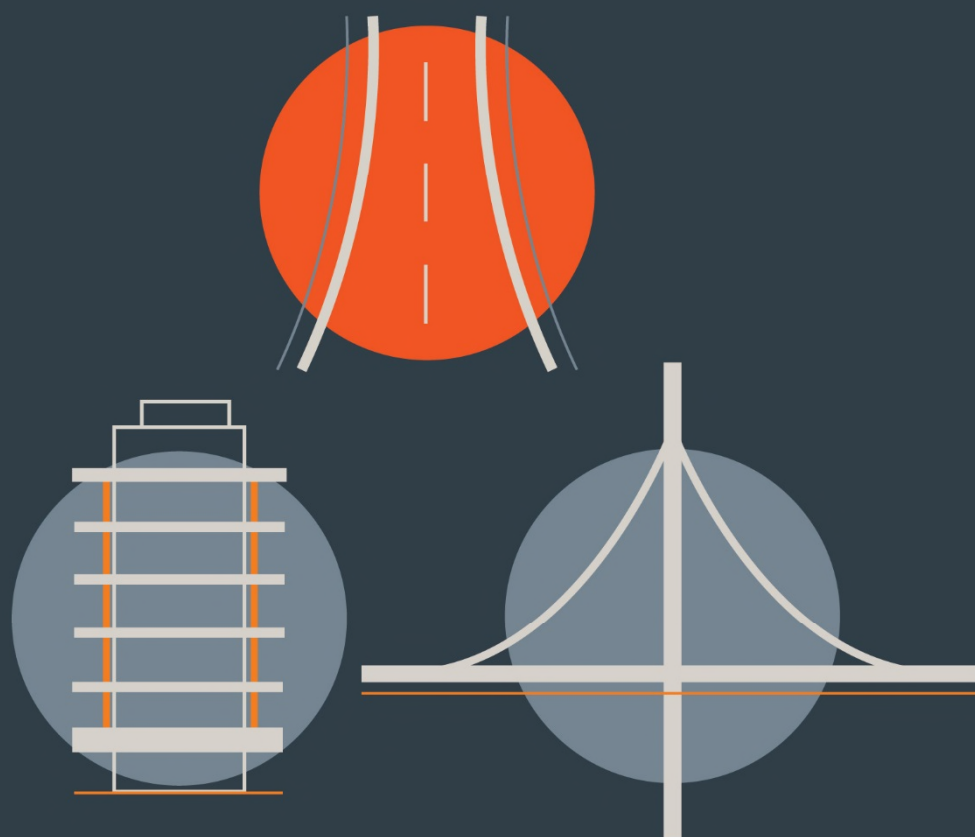
**Boyne Greenway
(Drogheda to Mornington)**

Report Title

Outline Construction Methodology

Client

Meath County Council



DBFL CONSULTING ENGINEERS

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1.0 INTRODUCTION

1.1 Overview

DBFL Consulting Engineers were originally appointed by Meath County Council (MCC) to design a pedestrian and cycle route from the end of the constructed Phase I of the Boyne Greenway/Cycleway from the Meath/Louth boundary along the Ramparts to the west of Drogheda, out to Mornington and terminating at the Tower Road / Crook Road junction in advance of the beach (dunes area).

As part of the investigation into the feasibility of delivering this section of the proposed Boyne Greenway, between Drogheda and Mornington, DBFL have prepared this report to outline the proposed construction methodologies for same. The aim of the report is to provide an overview of the proposed construction methodologies as well as presenting early options aimed at lessening the ecological impact of the proposed cycle and pedestrian infrastructure on the existing Boyne Estuary Special Protection Area and the Boyne Coast and Estuary Special Area of Conservation, both during construction and long term during the operational stage. The effectiveness of the intrinsic design measures will be monitored during construction and post construction for 3 years. Monitoring during construction will be undertaken by a suitably qualified Ecological Clerk of Works, (ECoW) with a 'Stop Works' authority. This Ecologist will have previous experience and extensive knowledge of working on construction programmes within SAC and SPA areas with significant bird populations.

1.2 Greenway Route Drogheda to Mornington

The section of the Boyne Greenway route that this report will focus attention on is the section east of Drogheda from the railway viaduct (Belfast Dublin line) out to Mornington (see **Figure 1**). We would also note that this section of the route will serve as a direct route for pedestrian and cyclists between Mornington/East Meath and the population employment centre in Drogheda. It will also provide local access points at key locations along the route.

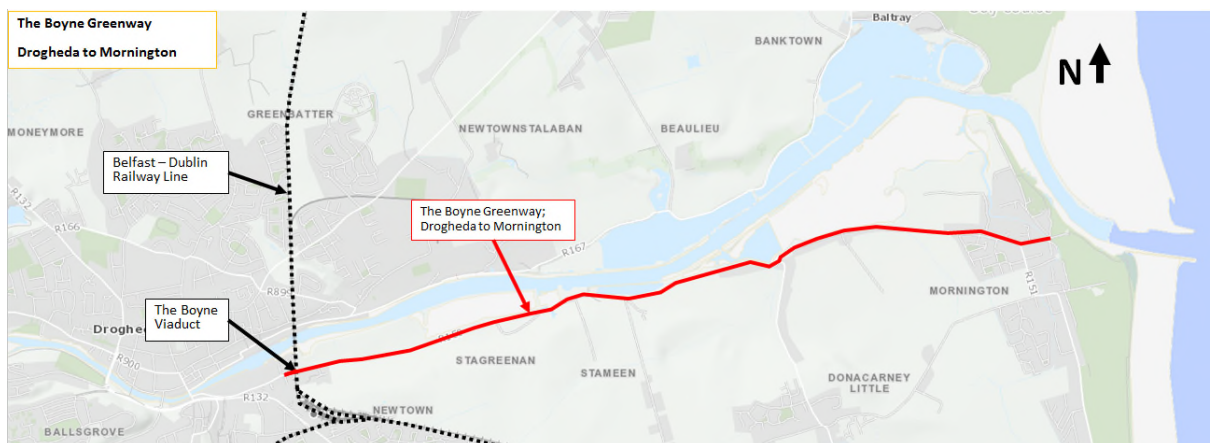


Figure 1 Proposed Greenway Route Drogheda East to Mornington

The identified route for the Boyne Greenway, between Drogheda and Mornington, generally follows the existing R150/R151 Regional Road, moving away from the road due to levels, lack of space, or to ensure that open views to the Boyne Estuary are retained where possible and maximising the benefits of the greenway. As highlighted earlier, a significant portion of the route falls within the boundary of the Boyne Estuary Special Protection Area and Special Area of Conservation.

The provisional route for this section of the Boyne Greenway is approximately 5.9 km in length with approximately 4.1 km of the route directly alongside the Regional Road, and 1.8km away from the route of the road to ensure both a safe continuation of the route and the retention of the views across the Boyne Estuary.

Although it would be preferable to have the greenway completely away from the road, this approach balances the reduced impact on the SPA/SAC with access and functionality yet still providing the outstanding views available.

1.3 Physical Constraints and Opportunities

There are a number of constraints and opportunities, both natural (i.e. existing natural environment) and physical (the built environment), which constrain route options for the proposed scheme within the defined study area. These include:

- River Boyne.
- Boyne Estuary SPA and the Boyne Coast and Estuary SAC.
- Existing and committed future development along the route.
- Existing monuments and protected structures along the route such as Mornington Bridge.
- Mature Trees and other natural features along the Marsh Road (R150) and Mornington Road (R151).
- Road alignment along the Marsh Road (R150) and Mornington Road (R151).
- The need to maintain traffic flow for access to local amenities.
- Land ownership.
- Environmental impacts and engineering constraints such as steep topography, frequent watercourse crossings, and potential flooding.

2.0 Proposed Works

2.1 Overview

As outlined above the proposed section of the Boyne Greenway, running from Drogheda East out to Mornington, is to be made up of two different construction forms depending on location:

1. Construction directly alongside, or within very close proximity of, the regional road within an area of existing roadside verge.
2. Construction significantly away from the roadside and/or within the intertidal zone/SPA/SAC.

Each of the proposed construction forms is discussed below providing an overview of the proposals and measures intrinsic to project design which will avoid impact on the ecological aspects of the scheme.

2.2 Greenway Construction Alongside Road

There is approximately 4.1km of the proposed greenway to be constructed alongside the road or very close to the road edge. Given the location, access and low maintenance requirements, robust construction forms are preferred. Therefore, bituminous construction in accordance with the recommendations of the TII Design Manual for Roads and Bridges (TII DMRB) is considered the most appropriate. With this proposed form of construction, verge vegetation would be cleared with limited additional excavation. The pavement will be formed by placing imported granular subbase material on a geotextile separator and finished with approximately 100mm of bituminous surfacing in accordance with the TII DMRB. The width of the greenway will be limited to 4 metres and restrained on each side with a kerb. A typical section is provided as part of the submitted drawing package. Some similar greenway examples are provided below for illustration.



Figure 2 Examples of Bituminous Surfaced Greenways Alongside Road (Holland and Ireland)

As part of the proposed outline construction methodology, a number of measures will be employed to ensure minimal impact on the ecology during construction of the greenway:

- a. Works will be restricted to a period outside of October to March at all sensitive sites where disturbance is an issue i.e within the SAC/SPA or immediately adjacent. The timing restriction will not apply to public road sections well away from the SAC/SPA.
- b. Construction works will be limited to daylight hours to avoid effects on bats, birds and otters. The use of construction lighting will be limited to absolute minimums. Where it is necessary, all lighting will be cowled away from sensitive habitats, with no light spillage, in line with best practice for bats. Only existing municipal compound areas will be utilised, and security lighting will be sensor based at these locations.
- c. The timing of the works and the measures intrinsic to the design, outlined above, will be sufficient to avoid significant effects. Nevertheless, if on the advice of the onsite ecologist further protection is required, then a suitable camouflage barrier netting will be utilised. Camouflage netting, supported between demountable posts, will be utilised on all roadside works outside the period March to September, to minimise noise transfer, as a matter of course.
- d. Regular monitoring of the works will be provided by a suitably qualified ECoW with authority to 'Stop the Works'. The representative will have knowledge of working on construction programmes within SAC and SPA areas where significant bird populations exist.

In operation, the roadside greenway should have a negligible impact on the fauna and flora in the long term as it is generally alongside the road which would have a similar impact to that of the greenway. Nonetheless, further direction will be taken from the ecological consultant and NPWS. The following measures are proposed to limit the impact of the greenway in operation:

1. No engineered barriers are proposed. This will minimise any visual impact both from the road or estuary side. Nonetheless, natural mid-level barrier planting will be provided particularly where similar items have been removed to allow for the greenway. Native species of hedging, locally sourced, will be utilised for biodiversity enhancement. This would offer protection to birds and act as general biodiversity enhancement.
2. Operational lighting, where necessary for security and safety, will be LED based (to avoid emission of UV light) and will be cowled away from estuarine habitats with no light spillage in line with best practice for bats and birds. Low energy LED luminaires incorporating a solar power source and motion detectors will be used throughout. Furthermore, to minimise the requirement for lighting all access features, such as bollards and gates, shall have reflectorised strips in line with best practice guidance. No lighting will be provided where birds forage within 50 metres of the cycle path to avoid any disturbance.

2.3 Greenway Construction Intertidal Zones/SPA/SAC

There is approximately 2.4km of proposed greenway within the SPA/SAC areas with approximately 610 metres of this within the intertidal zone. In these areas it is proposed that the greenway be elevated onto a boardwalk structure to minimise impact as agreed provisionally with the ecological consultant. The boardwalk will be constructed at a minimum level defined within the flood risk assessment report (3.54m Above Ordnance Datum). This is approximately 1.5 metre above the present day highest astronomical tide level and will mitigate the risk of flood throughout the design life of the boardwalk section of greenway. The width of the boardwalk will be limited to 4metres (maximum). Following a review of the options, and in consultation with the ecological consultant, it has been agreed that the elevated boardwalk be formed using propriety recycled plastic elements. Further detail bellow.

Proprietary Recycled Plastic Elements

A section of Phase 1 of the Boyne Greenway has already been constructed using this form (see figure below). It involves installing recycled plastic components much like forming a similar timber structure. Long column type elements typically 100mm by 100mm square are installed into the underlying ground at regular intervals acting as mini piles. They are installed to a depth to suit the underlying geology and provide the required level of load capacity. The running surface is then created by bolting transverse and longitudinal beams together. Running boards are then fixed to the beams to provide the surface. As the boardwalk is elevated a barrier will be necessary. This is fixed to the elevated structure and uses similar recycled plastic components.



Figure 3 Boyne Greenway Upstream Recycle Plastic Elements Construction

As the intertidal, SPA and SAC areas are typically away from the road, and are most ecologically sensitive, the following measures will be employed to ensure minimal impact during construction of the greenway:

- a. The works will be scheduled to avoid the winter months between October and March when most of the species likely to be affected will be present. Therefore, all works will be undertaken between March and September.

- b. The timing of the works and the measures intrinsic to the design, outlined above, will be sufficient to avoid significant effects. Nevertheless, if on the advice of the onsite ecologist further protection is required, then a suitable camouflage barrier netting, supported between demountable posts, will be utilised.
- c. Construction works will be limited to daylight hours to avoid effects on bats, birds and otters. The use of construction lighting will be limited to absolute minimums. Where it is necessary, all lighting will be cowled away from sensitive habitats, with no light spillage, in line with best practice for bats. Existing municipal compound areas will be utilised with sensor-based security lighting only.
- d. The mini piling will be installed using reduced noise equipment in accordance with best practice.
- e. Regular monitoring of the works will be provided by a suitably qualified ECoW with authority to 'Stop the Works'. The representative will have knowledge of working on construction programmes within SAC and SPA areas where significant bird populations exist.

In operation the boardwalk section of greenway should have a negligible impact on the fauna and flora in the long term as it will generally merge into the surroundings. To limit impact, the following measures are proposed initially:

1. To counteract impact from dogs particularly, and avoid noise transfer to birds and other species which may occur, the boardwalk barrier will be screened to half height (~600mm) with full height (~1200 mm) an option in particularly sensitive locations. The screening will be provided by fixing boardwalk running boards to the fence posts.
2. No lighting is anticipated in the first instance as the boardwalk section will likely only be used during daylight hours. Should operational lighting be necessary for security and safety, it will be LED based (to avoid emission of UV light) and will be cowled away from estuarine habitats with no light spillage in line with best practice for bats and birds. Low energy LED luminaires incorporating a solar power source and motion detectors will be used only. Furthermore, to minimise the requirement for lighting all access features, such as bollards and gates, shall have reflectorised strips in line with best practice guidance. No lighting will be provided where birds forage within 50 metres of the greenway to avoid any disturbance.

2.4 Greenway Construction Bridge Sections

Bridge sections will be required at two locations along the route of the greenway to provide 20 metre clear spans. The first is between chainage 3705 and 3725 and spans the outlet from the Stameen/Colpe Stream. The second is between chainage 4720 and 4740 and spans the outlet from an unnamed watercourse.

The proposed bridge at chainage 3705 to 3725, spanning the outlet of the Stameen/Colpe Stream, will be a prefabricated steel arch bridge placed on precast concrete cross beams on precast concrete piles. This construction approach was agreed through discussions with the architectural heritage department of Meath County Council to limit impact on the existing stone arch bridge structure and not detract from the bridge visually.



Figure 4 Typical Prefabricated Steel Arch Bridges

The proposed bridge at chainage 4720 to 4740, spanning the outfall of the unnamed watercourse, will be a simpler option formed by providing a prestressed precast concrete beam resting on a precast concrete ground beam on precast concrete piles. The deck will be partially precast with in-situ finished surface.



Figure 5 Typical Precast Concrete Bridges

3.0 Summary

This outline Construction Methodology has provided initial proposals for the delivery of the Boyne Greenway from Drogheda to Mornington Town. The report has presented the proposed construction forms and strategies for delivery and operation of the greenway in the context of impact in the Boyne SPA and SAC. The report is seen as a live document for discussion with the ecological consultant and NPWS. All proposals have been discussed and agreed to date. A summary of the route, in terms of position in relation to road, flood level, intertidal zone, interaction with SPA/SAC and construction form is provided in Appendix A for clarity. This should be read in conjunction with the submitted drawing package which illustrates the route.

Impact on the environment has been considered, in the context of existing infrastructure in the area, and has outlined measures to avoid any risks associated with the proposed construction works.

3.1 Monitoring Commitment

The effectiveness of the intrinsic design measures will be monitored during construction and post construction for 3 years. Monitoring of all ecological matters during construction will be undertaken by a suitably qualified Ecological Clerk of Works, (ECoW) with a 'Stop Works' authority. This ecologist will have previous experience and extensive knowledge of working on construction programmes within SAC and SPA areas with significant bird populations.

The importance of the annex species listed for the SPA requires that on-going monitoring of the greenway corridor is required during construction and for a number of years post construction to prove that birds are not displaced such that the integrity of the Natura Sites is affected negatively.

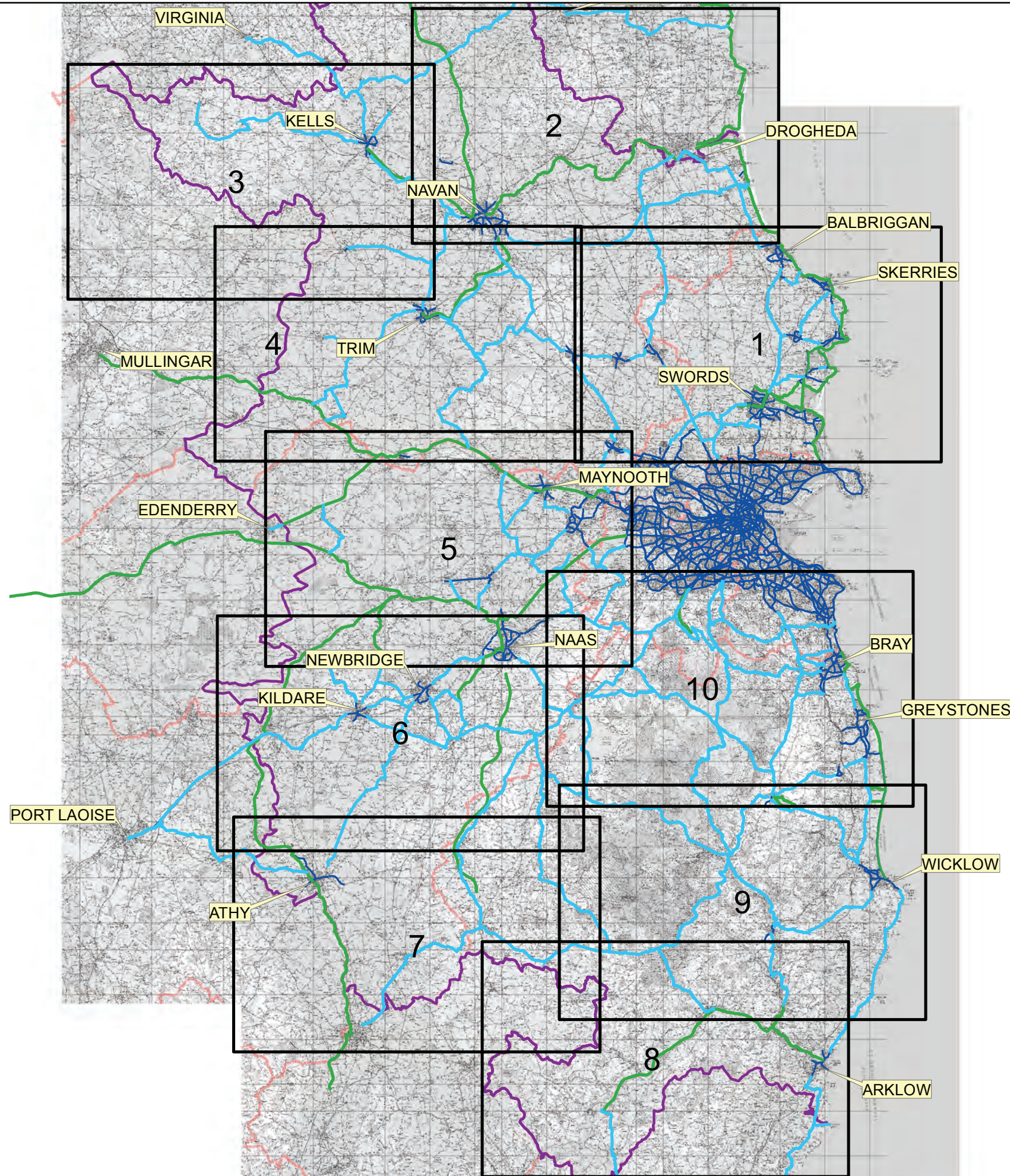
The monitoring shall test the effectiveness of the proposed design measures for the new greenway using actual bird survey counts and behaviour analysis. A report of each inspection shall be prepared and reviewed at the start and finish of each season, for a period of three years following construction completion. The ecologist/ornithologist shall, where necessary, recommend adaptive measures to be implemented by the greenway management team and provide advice during the implementation of measures and further monitor the effectiveness of any adaptive measures once deployed. The performance of the particular measures of importance shall be observed, such as the durability of the fencing erected, the effectiveness of any screening and feeding habits of birds adjacent to the screens.

Appendix A
Planning Drawings & Route Description Summary

START CHAINAGE	INTERTIDAL ZONE	FLOOD ZONE A	SAC	SPA	ROUTE POSITION	CONSTRUCTION TYPE
0	NO	YES	NO	NO	ALONGSIDE ROAD	BITUMINOUS
90	NO	NO	NO	NO	ALONGSIDE ROAD	BITUMINOUS
340	NO	YES	NO	NO	ALONGSIDE ROAD	BITUMINOUS
1470	NO	NO	NO	NO	ALONGSIDE ROAD	BITUMINOUS
2000	YES	YES	YES	YES	ALONGSIDE ROAD	BOARDWALK
2100	NO	YES	NO	NO	ALONGSIDE ROAD	BOARDWALK
2160	NO	NO	NO	NO	ALONGSIDE ROAD	BITUMINOUS
2260	NO	NO	YES	YES	ALONGSIDE ROAD	BITUMINOUS
2360	NO	NO	YES	YES	AWAY FROM ROAD	BOARDWALK
2380	YES	NO	YES	YES	AWAY FROM ROAD	BOARDWALK
2550	NO	NO	YES	YES	AWAY FROM ROAD	BOARDWALK
2900	NO	NO	NO	YES	AWAY FROM ROAD	BITUMINOUS
3030	NO	NO	YES	YES	AWAY FROM ROAD	BITUMINOUS
3110	NO	NO	YES	YES	AWAY FROM ROAD	BOARDWALK
3280	NO	NO	NO	NO	AWAY FROM ROAD	BOARDWALK
3320	NO	NO	YES	YES	AWAY FROM ROAD	BOARDWALK
3700	NO	NO	YES	YES	ALONGSIDE ROAD	BRIDGE
3720	YES	NO	YES	YES	ALONGSIDE ROAD	BRIDGE
3730	YES	NO	YES	YES	ALONGSIDE ROAD	BOARDWALK
3750	NO	YES	YES	YES	ALONGSIDE ROAD	BOARDWALK
3830	YES	YES	YES	YES	ALONGSIDE ROAD	BOARDWALK
3880	NO	YES	YES	YES	ALONGSIDE ROAD	BOARDWALK
4090	YES	YES	YES	YES	ALONGSIDE ROAD	BOARDWALK
4330	NO	YES	YES	YES	ALONGSIDE ROAD	BOARDWALK
4350	NO	NO	YES	YES	ALONGSIDE ROAD	BOARDWALK
4430	NO	NO	NO	NO	AWAY FROM ROAD	BITUMINOUS
4620	NO	NO	YES	YES	AWAY FROM ROAD	BITUMINOUS
4640	NO	YES	YES	YES	AWAY FROM ROAD	BITUMINOUS
4720	NO	YES	YES	YES	AWAY FROM ROAD	BRIDGE
4730	YES	YES	YES	YES	AWAY FROM ROAD	BRIDGE
4740	NO	YES	YES	YES	AWAY FROM ROAD	BRIDGE
4750	NO	YES	NO	NO	ALONGSIDE ROAD	BITUMINOUS
4860	NO	NO	NO	NO	ALONGSIDE ROAD	BITUMINOUS
5500	NO	YES	NO	NO	ALONGSIDE ROAD	BITUMINOUS
5660	NO	YES	NO	NO	ALONGSIDE ROAD	EXISTING
5860	YES	YES	YES	NO	ALONGSIDE ROAD	EXISTING
5870	NO	YES	YES	NO	ALONGSIDE ROAD	EXISTING

1. The start chainage refers to the point at which the existing environment, location or construction type changes.
2. The intertidal zone refers to a level of the existing ground that is below 2.1 metres above ordnance datum (highest astronomical tide) where the proposed greenway route passes through.
3. The flood zone refers to a level of 3.54 metres above ordnance datum (above Flood Zone A) for coastal flooding (representing the acceptable risk level for the greenway) where the proposed greenway route passes through.
4. The SAC and SPA are the Special Area of Conservation and Special Protection Area respectively where the proposed greenway route passes through.
5. The route position refers to the location of the proposed greenway in relation to the existing road. It is either alongside or away from the road.
6. The construction type is as defined in the main section of this report

Appendix B
National Cycle Network – East Meath



Legend

- Inter-Urban Routes
- Greenway
- - - Possible Greenway
- Urban/Town Network
- Study Area
- - - - County Council Boundaries

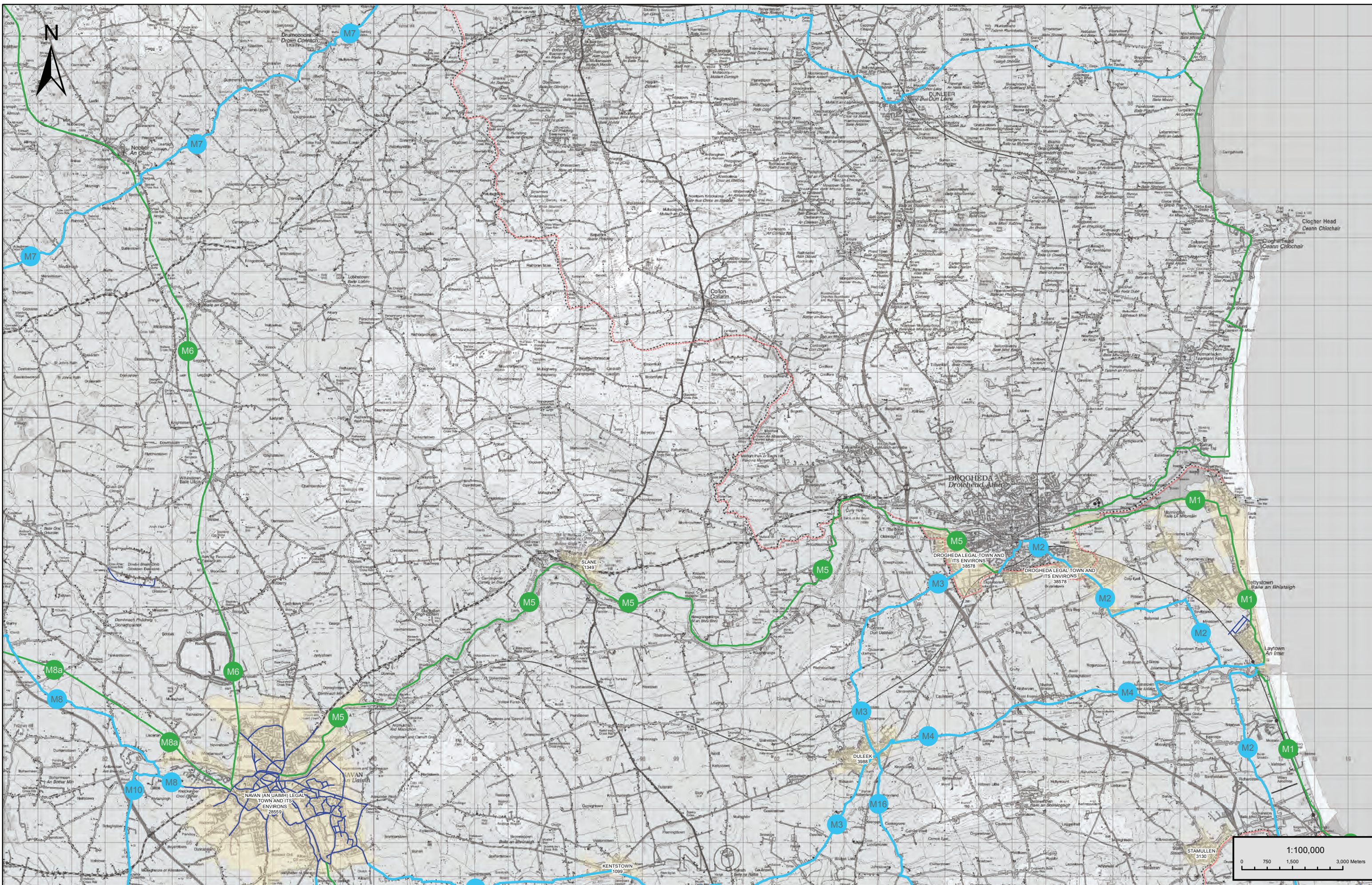
Project: **CYCLE NETWORK PLAN FOR THE GREATER DUBLIN AREA**

Title: **INTER-URBAN CYCLE ROUTES SHEET PLAN**



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**CYCLE NETWORK PLAN FOR
 THE GREATER DUBLIN AREA**

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