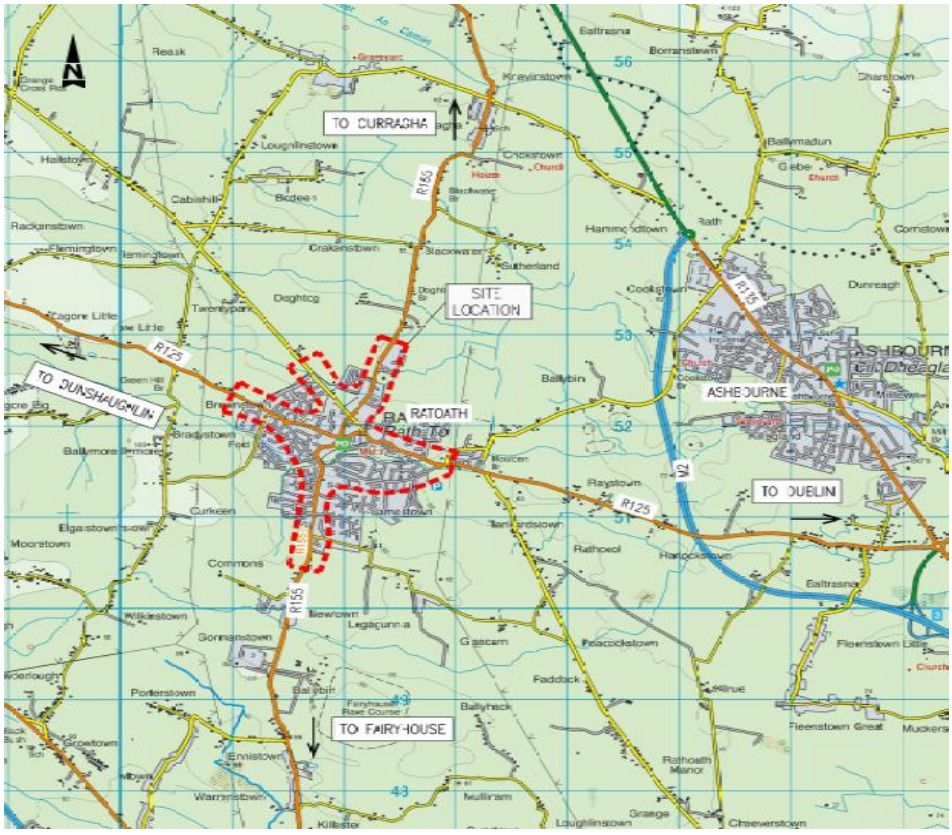
comhairle chontae na mí
meath county council

Outline Construction Environmental Management Plan

Ratoath Pedestrian and Cycling Improvement Plan

April 2020



Meath County Council

Buvinda House

Dublin Rd,

Navan

Co. Meath

C15 Y291

Table of Contents

Chapter

1. Introduction

Scheme Over View / Background

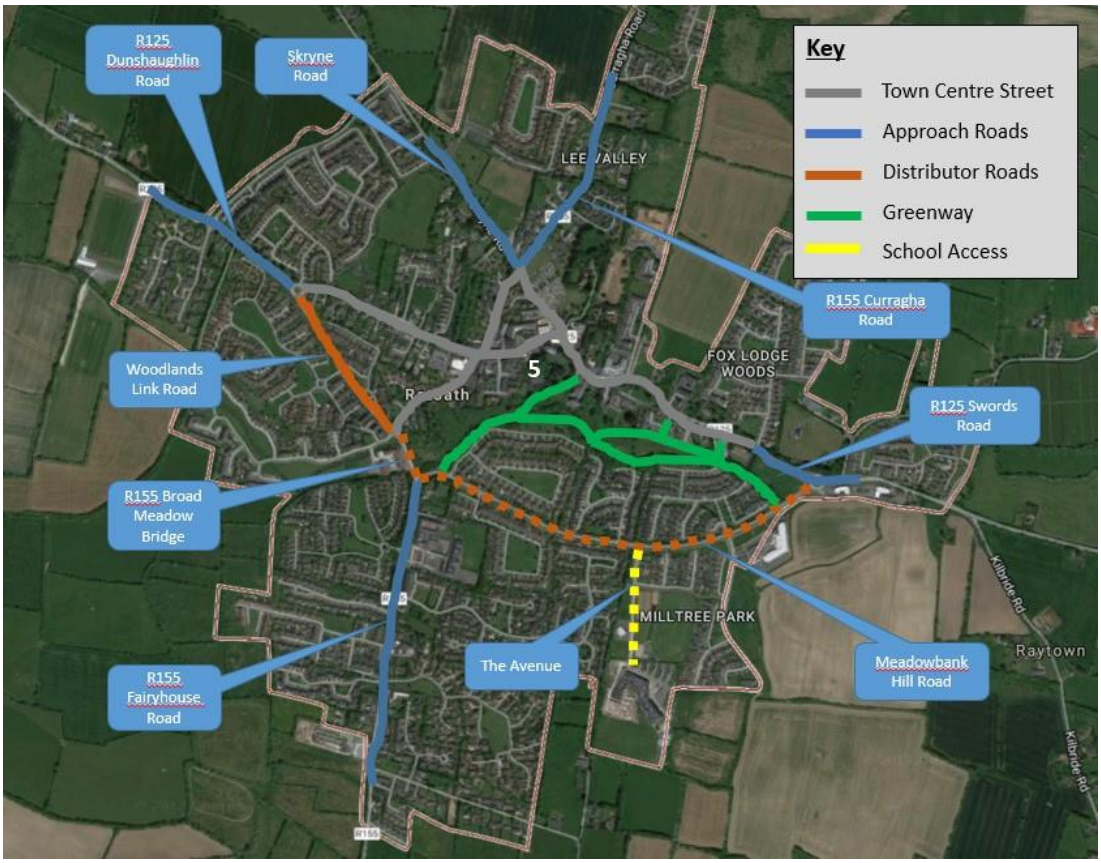
1.1. Meath County Council (MCC) in partnership with the National Transport Authority (NTA) proposes to deliver a high quality Pedestrian and Cycle Scheme within Ratoath.

1.2. The proposed scheme consists of improvements and upgrades to the follow key routes:

- Town Centre Streets
- Approach Roads
- Distributor Roads
- Greenway
- School Access Roads

1.3. These routes are illustrated in Figure 1.1 below.

Figure 1-1: Ratoath Pedestrian and Cycle Network

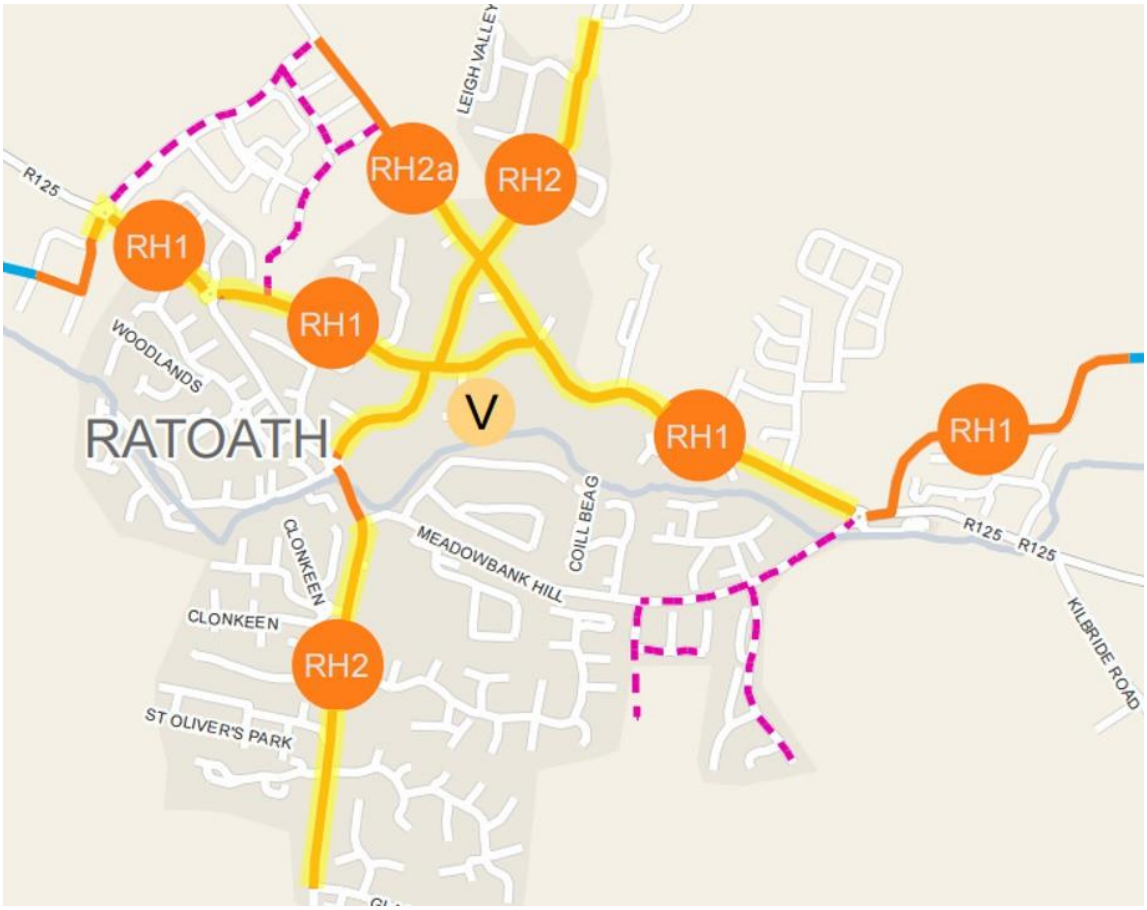


1.4. Of the above routes, it should be noted that the Broadmeadow Bridge, Meadowbank Hill and The Avenue cycle routes which are indicated with a dashed line are subject to separate planning processes and are not subject to this Part 8 Planning Report. The remainder of the routes as indicated with a solid line therefore form the proposed Ratoath Pedestrian and Cycle Scheme which are subject of this Planning Report and associated Part 8 planning application.

1.5. It should also be noted that the proposed Ratoath Pedestrian and Cycle Scheme incorporates the Ratoath Cycle Network as developed by the NTA within the Cycle Network Plan (CNP) for the Greater Dublin Area (GDA). The CNP implements policies as set out within the National Cycle Policy Framework (NCPF).

1.6. The Ratoath Pedestrian and Cycle Scheme encompasses Route RH1, RH2 and RH2a as illustrated in Figure 1.2 below.

Figure 1-2: Ratoath Cycle Network (Extract from CNP)



1.7. The CNP recognises Ratoath Town as an important population centre within the GDA with potential to become an exemplar cycling town that will facilitate a significant increase in cycling for all trip purposes.

Scheme Benefits

1.8. The Ratoath Pedestrian and Cycle Scheme will result in a high quality pedestrian and cyclist network within the town of Ratoath that will create safe and comfortable routes between a number of large residential areas and key attractors such as the he GAA Club, BMX Club, Soccer Club, Primary Schools, Secondary School and the town centre itself. There are a number of benefits which will be realised by all road users, including pedestrians, cyclists, public transport users and motorists through the implementation of the proposed scheme. These benefits include;

- Provision of a connected, safe, high quality pedestrian and cycle network;
- Provision of key facilities to encourage an uptake in cycling particularly within the school going age group.

- Improved bus facilities within the town centre including upgrades to shelters and the provision of bicycle parking;
- Improved operational safety for all road users at the R155 / R125 junction at Supervalu;
- Implementation of traffic management measures to encourage reduced vehicular speeds thereby improving road safety for all road users;
- Provision of pedestrian crossing points at key desire points and facilitating safe crossing locations particularly across side road junction;

1.9. The scheme is aligned with National Policy and is in keeping with the objectives of the Meath County Development Plan and Ratoath local Area Plan

Works Extents

1.10. In summary the proposed works facilitate the implementation of improvements to pedestrian and cycle facilities and general traffic management within the town centre itself, along the Broadmeadow River and along the following major approach roads;

- Skryne Road
- Curragha Road
- Swords Road
- Fairyhouse Road
- Woodlands Link Road
- Dunshaughlin Road

1.11. This will comprise the retrofitting of the existing road and street layout, to incorporate realignment of kerbs, widening of the pedestrian footpaths, provision of new uncontrolled and controlled pedestrian crossings, retrofitting existing priority, roundabout and traffic signal junction layouts, upgrade of existing bus stops, relocation, upgrade and installation of public lighting, and implementation of speed management measures to create a self-regulating street environment conducive to pedestrian and cyclist safety and comfort.

1.12. Certain sections of the works will also include the provision of appropriate street furniture and landscaping, removal of unnecessary street signage and furniture, installation of cycle parking and the resurfacing of road and footway pavements with appropriate materials.

2. Purpose of the Scheme

Scheme Purpose

2.1. Ratoath is a situated on the intersection of the R125 and R155 regional roads in the south east of County Meath. The town has developed significantly over the last 20 years and acts as a commuter town with more than three quarters of the population travelling to work in Dublin. In this time the town's population has also grown significantly with a stated population of just over 1,000 inhabitants in 1996, compared to over 9,000 inhabitants per the 2011 census records.

2.2. The expansion of both residential and educational developments within Ratoath over this period has coincided with national policy to promote and encourage sustainable travel among all age groups with a particular emphasis on creating a walking and cycling cultural among younger generations for the undertaking of short local short trip purposes. As such the need has arisen to provide improved pedestrian and cycle provision to form better connections between residential areas, schools, amenities and the town centre.

2.3. The proposed scheme will therefore aim to secure the development of pedestrian and cycle routes that will provide a high quality of service, whilst also ensuring that there remains an optimal balance of provision between the various competing transport modes within the town and its environs.

Scheme Objectives

2.4. The objectives of the proposed Pedestrian and Cycle Scheme are;

- Provide appropriate pedestrian and cycle facilities within the town centre, along the Broadmeadow river and on all key approach roads
- To provide safe route link and crossing facilities for pedestrian and cyclists;
- To provide appropriate speed and traffic management within the town centre and on approach roads;
- To facilitate national/county policies/objectives in relation to sustainable transportation;
- To facilitate the development of the Greater Dublin Area Cycle Network Plan;
- To comply with the design standards and principles advocated within the Design Manual for Urban Roads and Streets and National Cycle Manual.

3. Approach to Design

3.1. In terms of alternative options, pedestrians are catered for by footpaths which are existing, upgraded or new to the specific route. As such this section of the report relates only to the potential options available for cycle facilities.

General

3.2. The cycling network in Ratoath consists of a series of links that must form a coherent and safe network that appropriately caters for all types of cyclists, in particular school children and other vulnerable users, whilst taking account of the constraints and opportunities that are evident from a engineering, environmental and land ownership perspective. In this context route options were developed both holistically, considering the entire network, and on a link by link basis.

3.3. The cycle network has been designed in accordance with the National Cycle Manual (NCM) and in particular and the Design Manual for Urban Roads and Streets (DMURS). It is also critical that the cycle route requirements are balanced with the needs of pedestrians and that the requirements for vehicular traffic movement and parking is appropriately considered.

3.4. There are two key considerations in the development of cycle route options. In the first instance traffic volume and speeds must be fully assessed as these are key characteristics of the road and street network. Traffic volumes and speeds have a direct impact on the second key consideration which is the provision of either an integrated or segregated cycling provision.

3.5. **Integrated cycling provision** requires cyclists interacting directly with vehicular traffic, either sharing the lane with traffic or in a cycle lane. In integrated provision it is critical for vulnerable cyclists that prevailing traffic speeds are low, preferably a maximum of 30kph but integrated provision can be considered up to 50kph. In this context roads and streets should operate as self-regulating environments wherein the layout of the street and the driver's visual and psychological interpretation of the street environment instinctively tell the driver the appropriate speed as opposed to a reliance on legislation and regulation such as posted speed limits.

3.6. **Segregated cycling provision** provides for physical separation of cyclists from motorised traffic and these can be provided in the form of cycle tracks, cycle paths or cycle ways. Depending on the volume of pedestrians and cyclists and available width, these segregated facilities can either be shared use with pedestrian and cycle or segregated from pedestrians. Shared provision is appropriate where the path width can adequately cater for the cyclist and pedestrian volumes and where movements are generally linear in nature i.e. people are generally not crossing and are not congregating on the path. In general these should be a minimum of 3.0m in width, with allowances for pinch points, and there should be no delineation marking between pedestrian and cyclist space.

3.7. Whilst segregated provision is most desirable for vulnerable or inexperienced cyclists, experienced cyclists will often choose to cycle in the traffic lane regardless of the whether there is a segregated cycle provision along a route. Indeed cyclists who may be travelling into Ratoath along longer distance rural cycle routes would be expected to remain on road and street within the town. Within Ratoath the provision for cyclists to cycle on street throughout the town has been appropriately considered in the context of the prevailing existing 50kph speed limit.

Scheme Options

3.8. In order to appropriately assess integrated or segregated route options along the designated cycle routes the network must be considered in its entirety in order that the network is designed as a coherent and legible network of cycle routes. At the same time each section of the cycle routes must be considered in terms of the appropriate and viable route options and preferred cycling provision.

3.9. Specific reference has been made to the traffic flow and speed data along the routes and in this context it was determined that the streets within the town centre should be design as a low speed self regulating environment to encourage speeds of 30kph or lower within which integrated shared street provision can be considered.

3.10. The introduction of a self regulating low speed environment is appropriate in terms of the traffic volumes and considered achievable in terms of the prevailing traffic speeds on each route, allowing for the introduction of appropriate traffic management measures where necessary and appropriate to ensure that the environment is self-regulating and that the 30kph will be the prevailing maximum traffic speed. The introduction of segregated cycling provision within the town centre would not be viable or appropriate, requiring road widening and associate land purchase in order to facilitate cycle tracks.

3.11. The introduction of a self regulating low speed environment within the town centre will have an anticipated effect of reducing traffic volumes through the town centre. It is expected that a proportion of through traffic travelling from west to east and vice versa between the Dunshaughlin Road and Swords Road would divert onto the route at Woodlands Link and Meadowbank Hill which has been constructed as a distributor route and therefore more appropriate for the carrying of through traffic around the town. It can be reasonably assumed therefore that the maximum traffic volumes within the self regulating low speed town centre environment would be substantially less than the 10,000 AADT thresholds for integrated cycling provision.

3.12. Outside of the town centre and within the 50kph speed limit area , generally integrated or segregated provision can be considered with due account taken of the prevailing characteristics of each route as set out in Chapter 4. However along the Woodlands Link it is evident that segregated provision would be the preferred option given the distributor road nature of this route and that this route would be a primary route serving the schools in the south of the town. Furthermore the potential to divert through traffic from the town centre along this route would be consistent with a segregated provision.

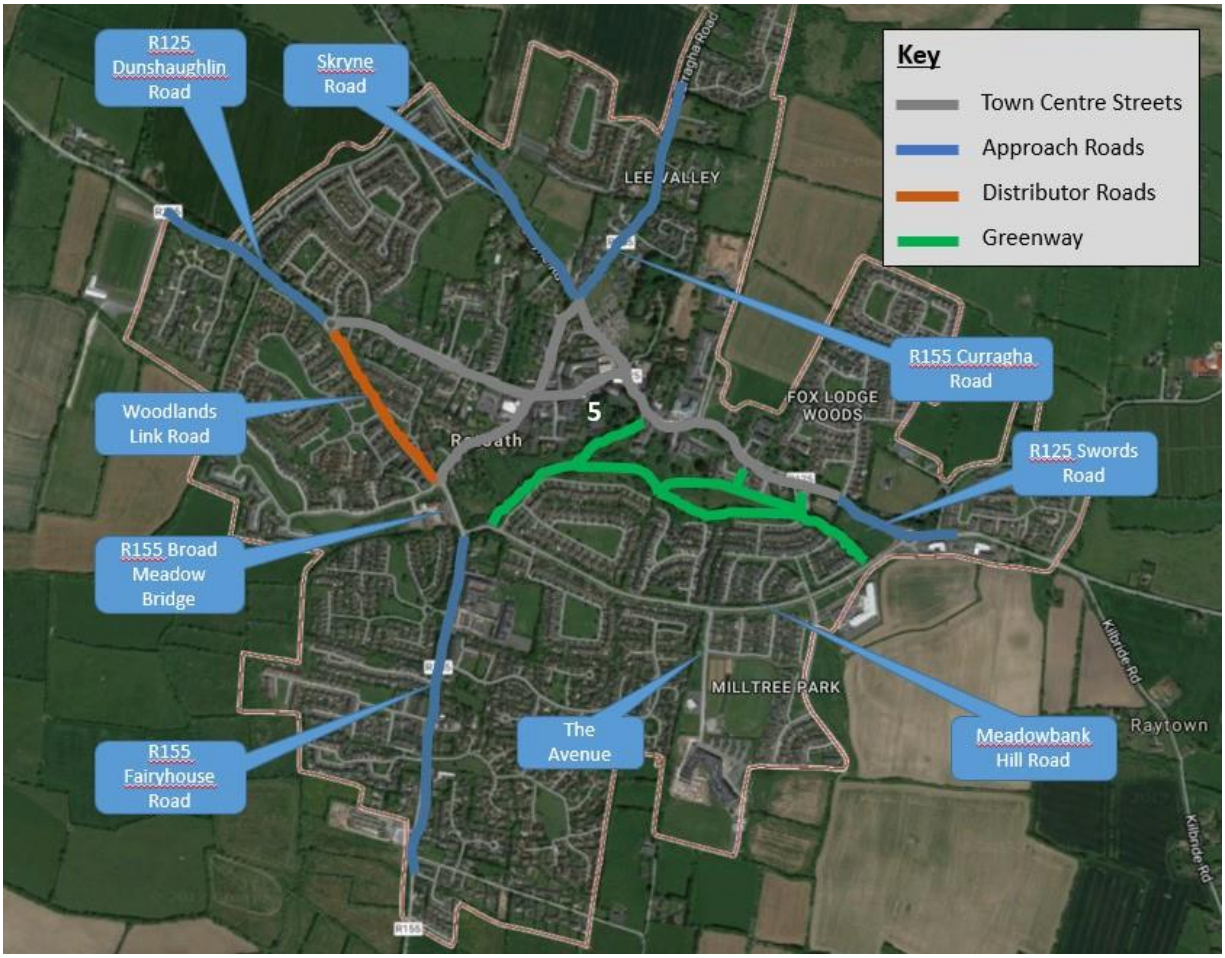
3.13. The preferred options which are proposed as part of this Part 8 Panning Report and associated Application.

4. Description of Proposed Scheme

Scheme Proposals

4.1. As presented in Chapter 4: Description of the Proposed Route, the proposed pedestrian and cycle scheme subject to this Part 8 Panning Report and Application is illustrated below.

Figure 6-1: Ratoath Pedestrian and Cycle Scheme



4.2. The description of the proposed pedestrian and cycle facilities for each section is as follows.

Approach Roads

4.3. **Skryne Road:** The proposed pedestrian and cycle facilities along this section of the scheme consist of an existing 2.0m wide footpath on the western side of the road which will be redesignated as a shared use pedestrian and cycle path. This path will connect with existing pedestrian and cycle facilities at the Silverstream Housing estate and also connect with the facilities proposed on the Currgaha Road and the town centre streets. Raised uncontrolled crossings are provided at side roads and a raised controlled crossing is provided to connect with the Pitch and Putt course and Ratoath Harps Soccer club.

4.4. **R155 Curragha Road:** The proposed pedestrian and cycle facilities along this section of the scheme consist of a new 2.0m footpath along the western side of the road from the Lee Valley housing estate to the traffic signal junction with the Skryne

4.5. Road. The road will therefore be narrowed to 6.0m and designated as a shared street with a number of traffic management measures implemented. These measures consist of raised junction tables at the entrances to Lee Valley and Glebe Park and recurrent shared street cycle symbols painted onto the carriageway. In addition a 50kmh driver feedback sign is to be introduced at the approach to the posted 50kmh speed zone.

4.6. Minor improvements in the form of kerb realignment, footpath upgrade and tactile paving will be introduced at the Curragha Road / Skryne Road traffic signal junction.

4.7. **R125 Swords Road:** The proposed pedestrian and cycle facilities along this section of the scheme consist of upgrade and redesignation of the existing footpath / cycle track from the access lane to the sewage works to the controlled crossing due east of the junction with the Foxlodge Woods housing estate. From this crossing to the roundabout, the existing footpaths and one way cycle tracks on both sides of the road will be reconstructed to suit proposed alignment. The existing unusually bus lane entry to the roundabout will be removed and associated bus stops on both sides of the road realigned and reconstructed as per the proposed plans. Crossings on the roundabout will be widened to a 4.0m whilst a raised zebra crossing will be introduced on the western arm.

4.8. The southern arm of the roundabout will tie in with pedestrian and cycle facilities proposed as part of the Meadowbank Hill upgrade subject of separate planning permission. From the roundabout to the Moulden Bridge housing estate a two way shared pedestrian and cycle path will be introduced and will gain access to the estate which via a permeability access point through the existing boundary wall. Pedestrians will cross the Bourne Road via a raised uncontrolled crossing. Existing footpaths and cycle tracks to the south and southwest of the roundabout will be resurfaced and designated as a shared pedestrian and cycle path. Raised tables will be implemented at the junctions of Foxlodge Woods and the access lane to the sewage works.

4.9. **R155 Fairyhouse Road:** The proposed pedestrian and cycle facilities along this section of the scheme consist of the reconstruction of the footpath on the eastern side of the road which will include widening of the path, thereby reducing the carriageway width to 6.0m. The path will extend from Gláscairn Lane directly opposite Ratoath BMX Club at the south of the town, northwards towards Ratoath National School and the traffic signal junction with Meadowbank Hill where it will tie with facilities as part of the proposed Meadowbank Hill upgrade subject to a separate planning permission. The proposed path between Gláscairn Lane and Fairyhouse Lodge housing estate is a minimum of 2.5m wide while the remainder of the path is a minimum of 3.0m. Raised uncontrolled crossings are provide at all side road accesses on both sides of the road. There will be requirement at Seagrave Hall and Seagrave Park

4.10. **R125 Dunshaughlin Road:** The proposed pedestrian and cycle facilities along this section of the scheme consist of a shared use pedestrian and cycle path from the entrance to Ratoath GAA Club to the south eastern roundabout intersecting with the woodlands link and providing access to Steeplechase Hill. Kerb lines are slightly modified and raised zebra crossings are provided on all arms of this roundabout whilst raised zebra crossings are provided on the southern and eastern arms only of the Brownstown / Steeplechase Wood roundabout. The proposed crossings will connect to existing pedestrian and cycle facilities on the northern side of this road. The existing bus stop will be retained. The eastern extent of this section will connect with proposals on the Woodlands Link and the Dunshaughlin Road town centre street.

Distributor Road

4.11. **Woodlands Link:** The proposed pedestrian and cycle facilities along this section of the scheme consist one way cycle tracks on both sides of the road adjacent to the existing footpaths. This will entail removal of the existing trees, replacement of the existing verge with bound pavement to form the cycle track and relocation of existing public lighting column to back edge of footpath. The carriageway and associated kerbs and drainage features are to be maintained as per existing. Side road junctions will be negotiated via raised uncontrolled crossings. The northern extent of this section will tie with proposed facilities on the R125 Dunshaughlin Road, whilst the southern extent will tie in with proposals at the Somerville Roundabout which are subject of a separate planning permission.

Town Centre \Streets

4.12. The proposed pedestrian and cycle facilities along the town centre streets of the scheme generally incorporate traffic management measures predominantly consisting of raised platforms at uncontrolled and controlled crossings, raised junction tables and revised signage and road markings. The streets which are covered under the town centre designation are as follows:

- R125 Dunshaughlin Road
- Main Street
- East of Main Street
- Curragha Road / Skryne Road junction to R125 / Skryne Road Junction
- Curragha Road / Skryne Road junction to R125 / R155 junction
- R125 / R155 junction to Somerville junction

4.13. The above measures are proposed to encourage a low speed environment and to deter general eastbound / westbound traffic from the town centre and to encourage such through traffic to utilise the southern distributor route provided by the Meadowbank Hiill and Woodlands Link. The proposed measures and resultant potential reduction in traffic speeds and volumes will assist in promoting a shared street mixed traffic cycling regime within the town centre.

Broadmeadow Greenway

4.14. The proposals for the riverside greenway are predominantly straightforward. It is proposed to upgrade the existing path to a consistent standard in terms of width, surfacing and appropriate public lighting.

4.15. It is also proposed to provide additional paths both north and south of the river which will provided access further east towards the Meadowbank Hill, increasing permeability and offering additional walking and cycling amenity within the town. These will largely follow the route of already etched out dirt tracks/ desire lines formed by people using these unofficial routes.

Figure : Greenway Options Through Existing Paths and New Identified Paths

5. Environmental Risks and Avoidance Measures

Appropriate Assessment - Screening Report

A review of designated conservation sites (pNHAs, NHAs, SACs and SPAs) in proximity to the development or ecologically linked to the development was conducted. The only designated conservation sites which are linked to the development site are Malahide Estuary pNHA (000205), SAC (000205) and SPA (004025).

5.1. *As detailed in the accompanying Stage 1 Screening for Appropriate Assessment (5139451DG11) there are no likely significant impacts arising from the proposed development on these sites.* A Screening Report was produced to fulfill the requirements of EU Habitats Directive (92/34/EEC). The screening document provides the information required in order to establish whether or not the proposed greenway is likely to have a significant impact on Natura 2000 sites in the context of their conservation objectives and specifically on the habitats and species for which the Natura 2000 sites have been designated

Rare / Protected Species

In relation to protected species records for the site, a data request was made to NPWS. There are records for hedgehog (*Erinaceus europaeus*), Irish hare (*Lepus timidus*), frog (*Rana temporaria*) and golden dock (*Rumex maritimus*) within the wider environment, but not necessarily along the corridor of the pathway. The records for hedgehog are from Ratoath; Irish hare records are from the 10km grid square within which the study areas is located; while frog records are from Garristown, Co. Dublin. The records of golden dock are from Curragha Bog near Garristown.

5.2. The Broadmeadow River, which runs through Ratoath, however is hydrologically linked with the Malahide Estuary SAC (000205) and Broadmeadow/Swords (Malahide Estuary) SPA (004025) and are located some 19.5km form the proposed development sites. Notwithstanding this, the Appropriate Assessment Screening Report, contained under separate cover, concludes that there are no material impacts arising from the proposed scheme on any Natura 2000 sites. It is therefore not necessary to progress to Stage 2 Appropriate Assessment.
See Appropriate Assessment Report full Report

5.3. **Ecology Constraints Assessment**

A desktop assessment was initially conducted to identify the presence of designated sites in proximity to the study area. The NPWS mapviewer (http://webgis.npws.ie/npwsviewer/; accessed 1st October, 2015) was reviewed to identify these sites. The NPWS website was also searched for records of rare or protected species from the 10km grid in which the site is located. Shapefiles of designated sites were downloaded for use in the creation of maps.

In addition to the NPWS website, the National Biodiversity Data Centre online mapping was also reviewed for records of protected flora and mammal species within the 2km grids in which the site is located. A data request was also issued to NPWS for protected species records in the vicinity.

Consultation with NPWS and IFI has been initiated; however, a response has not been received to date.

A site visit was conducted on the 7th October, 2015 to identify any ecological constraints associated with the site and the proposed development.

The assessment followed CIEEM guidance (*Guidelines for Preliminary Ecological Assessment*, CIEEM 2013).

Ecological evaluation of sites was based on the National Roads Authority's evaluation methodology (after NRA, 2009).

See Ecology Constraints Assessment for full Report

5.4. Waste Management Plan

The Contractor shall exercise due care in the handling and disposal of any potentially contaminating material. Appropriate site management control shall be demonstrated at all times to minimise the potential for pollution of the environment.

The Contractor shall submit a Waste Management Plan to the Employer's Representative for approval, a minimum period of 2 weeks in advance of any works commencing on the Site. This shall include details of the following items:

• All proposed methods of waste disposal (reuse, recycle, landfill, discharge to drain etc.). This shall include, but not be limited to the off-site disposal of all bitumen containing paving materials extracted from the Site and other Unacceptable Class U2 Materials.

• Details of the proposed licensed waste disposal contractors and licensed disposal sites, to be used by the Contractor.

• Given the extent of the proposed excavation works as part of the Earthworks phase, it is noted that Class U2 Unacceptable Material, as defined in Clause 601.3 of the Specification is unlikely to be encountered on Site. Should Class U2 material be encountered the following procedure shall be completed, the Contractor shall notify the Employer's Representative and shall submit a method statement for the classification, removal and disposal of the Class U2 material for the Employer's Representative's approval. Any Class U2 material shall be treated as hazardous, until proven otherwise. All testing of Class U2 materials to be completed in accordance with the requirements of Appendix 1/5 and the Specification.

The Contractor shall ensure that the disposal of all Class U2 materials complies with the current legislation and disposed of at appropriate licenced waste facilities.

The Contractor shall maintain detailed records and receipts for all movements of waste materials from the site, for inspection by the Employer's Representative.
The Contractor shall carry out the works in accordance with the Waste Management (Hazardous Waste) Regulations 1998 (S.I. No. 163 of 1998) and Waste Management (Hazardous Waste) (Amendment) Regulations 2000.

5.5. Impact of Proposed Scheme

Introduction

The following categories have been identified as factors which may impact on the environment and thus require further considerations:

- Traffic and Transport;
- Landscape and Visual Impact;
- Ecology;
- Cultural Heritage;
- Noise and Air Quality.

Impact on Vehicular Traffic

5.6. It is anticipated that the proposed traffic management measures introduced within the town centre will reduce eastbound and westbound traffic volumes along the R125 route through the town. As a consequence, it is also anticipated that traffic volumes will increase on the southern distributor route formed by the Woodlands Link Road, a short section of the R155 over the Broadmeadow River and the Meadowbank Hill road. Current volumes along this southern distributor route are low and it is considered that this distributor route has the capacity to take addition traffic volumes in line with its function as a relief road to the town.

5.7. The reduction in carriageway width and the introduction of traffic management measures where proposed will provide a significant benefit in terms of reduced speed and facilitating the ease of traffic movement from side roads.

Impact on Pedestrians

5.8. The proposed scheme will have an overall positive impact on pedestrians with a number of new footpaths and upgrades to existing footpaths including widening and resurfacing works and new crossings which will assist in providing a connected footpath network which links residential estates with key attractors such as the GAA Club, BMX Club, Soccer Club, Primary Schools, Secondary School and the town centre itself.

5.9. The implementation of traffic management measures will reduce traffic speeds and give pedestrians further encouragement to cross the road and street network in a safe and secure manner at key crossing points and desire lines. The scheme environment will also be more convenient and easier to use for disabled users, children and the elderly.

Impact on Cyclists

5.10. The scheme will significantly improve facilities for cyclists within the town of Ratoath. The scheme will provide for high quality continuous and attractive cycle facilities particularly along all key routes to schools such as the Dunsaughlin Road, Swords Road, Woodlands Link and Fairyhouse Road and these facilities will connect with proposed cycle facilities on the Meadowbank Hill Road which subject to separate planning permission. The cycle facilities will encourage schoolchildren to take up cycling in a safe and comfortable environment and assist to build confidence and competence within this age group. Thus helping to build a healthy future cycling culture and encouraging a long term modal shift to sustainable forms of transport.

5.11. Facilities on other routes such as the town centre and the Skryne Road and Curragha Road incorporate traffic management measures that will reduce traffic speeds and give cyclists more priority to cycling along the road and street network in a more safe and comfortable environment.

Impact on Road Safety

5.12. The proposed works will reduce speeds and increase driver awareness of both their surroundings and other road user, in particular vulnerable road users such as pedestrians and cyclists. The proposed works will also allow safer access and egress to and from side roads and particularly at the key intersection of the R155 / R125 junction at Supervalu.

5.13. The implementation of traffic management measures along the scheme resulting in reduced vehicular speeds thereby improved safety for all road users;

5.14. The scheme design will be subject to an independent Road Safety Audit and Road User Audit

Impact on Construction Traffic

5.15. During the construction phase, vehicular movement will increase in the immediate area, and temporary vertical elements such as hoarding or protective fencing, will be put in place. All construction impacts will be temporary, and will include the following:-

- Site preparation works and operations;
- Site infrastructure works and vehicular access;
- Construction traffic;
- Dust and other emissions;
- Temporary hoardings or fencing;
- Temporary site lighting;
- Temporary site accommodation cabins and huts.

5.16. Prior to commencement of the works, the Contractor should prepare a Construction Environmental Management Plan to set out site specific measures to avoid and minimise potential impacts on sensitive environmental receptors that could potentially occur during the construction phase.

Landscape and Visual

5.17. All works will take place within the existing roadway cross section. There will be a reduction in vehicular road carriageway space along some sections of the proposed scheme which will be complemented by a significant increase in pedestrian and cycle provision. These measures will significantly reduce the vehicular dominant feel to the existing roadway.

5.18. The significant increase in the public footpath space provision particularly at the R155 / R125 junction at Supervalu, will create the opportunity to introduce additional street features such as cycle parking stands, seating, landscaping and other elements which will be determined at the detail design stage of the project. At the same time, redundant street furniture can also be identified and removed to reduce street clutter.

Ecology

5.19. The proposed works located within Ratoath Town and its immediate approach roads do not lie within or immediately adjoining any ecologically sensitive areas. The majority of the works are proposed to take place within the existing road corridor.

5.20. An Ecology Constraints Report has been undertaken. This main findings of the report are summarised hereunder and the full report is contained under separate cover and accompanies this Planning Report.

In terms of construction impacts along the Broadmeadow River, where paths are being widened will result in an imperceptible impact, newly constructed paths would result in slight ecological impacts. It is considered however, that the provision of a path would reduce further trampling damage occurring from the informal paths within the wooded area and therefore on balance would result in a slight negative to potentially positive impact.

It is a requirement that the appointed contractor will prepare a Construction and Environmental Management Plan to focus in particular on how to prevent pollutants entering the Broadmeadow River during construction, how to minimise the loss of trees and impact of lighting through the wooded area and to identify areas of biodiversity gain within the final design. The CEMP shall be prepared with the input of a suitably qualified Ecologist.

Built and Cultural Heritage

5.21. A desktop study was undertaken to identify the architecture, archaeology and cultural heritage within the study area. Information was obtained from the Department of Arts, Heritage and the Gaeltacht's, Historic Environment Viewer.

5.22. The interactive map based database provides access to the records of the National Monuments Service "Sites and Monuments Record" (SMR) and the National Inventory of Architectural Heritage. The record of Protected Structures as contained in the Ratoath Local Area Plan 2009 – 2015 (Incorporating Draft Amendment Number 1) was also referred to during the search.

5.23. The outcome of the desktop exercise is described following, but in overall terms the proposed scheme is not predicted to have any significant negative heritage or archaeological impacts:

National Monuments Service

5.24. The desktop research indicated that there are 13 SMRs located near the extents of the proposed scheme. These records consist of the following:

5.25. ME044-034008 Cross (MH044-005): Market Cross damaged in 1922; in 1932 cross commemorating Eucharistic congress was erected on site, which was removed c. 1972.

5.26. ME044-034007 Architectural Fragment: No Description.

5.27. ME044-034002 Font (MH044-034): Octagonal font (diam. 0.44m, H 0.2m) with biconical stem outside RC church and close to motte (ME044-007001-).

5.28. ME044-034011 Cistern: No Description.

5.29. ME044-006 Church (MH044-006): 19th century church remains on site with 13th century effigy and 17th century graveyard.

5.30. ME044-00701 Motte and Bailey (MH044-00701): Flat topped earthen mound with remains of fosse and rectangular bailey. Fragments of font (1572) outside nearby RC church.

5.31. ME 044-034005 Tomb: To the south of the church tower within the old graveyard is the effigy of a knight with his head upon a tasseled cushion, with remains of foliate decoration in relief upon the edge of the slab at this position.

5.32. ME044-034015 Cultivation Ridges: No details available.

5.33. ME 044-034016 Excavation: No description available.

5.34. ME044-034014 Excavation: No description available.

5.35. ME044-034013 Excavation: No description available.

5.36. ME044-034012 Excavation: No description available.

5.37. ME044-034009 Excavation: No description available.

National Inventory of Architectural Heritage

5.38. Desktop research identified a number of NIAH records along the extents of the proposed scheme. These records consist of the following:

5.39. Reg. No. 14336012 House (MH044-302): Detached three-bay two-storey Tudor style house, built c.1890, with gabled breakfront bay to north-west. Pitched slate roof with rendered chimneystacks.

5.40. Reg. No. 14336014 House (MH044-309): Detached five-bay single-storey house, built c.1800, with gabled central porch.

5.41. Reg. No. 14336009 Shrine/oratory/grotto (MH044-306): Freestanding Marian grotto, built c.1955. Comprising of niche with a statue of the Blessed Virgin Mary with canopy above, set against mosaic screen wall, set on mosaic platform and steps, bounded by wrought-iron railings.

5.42. Reg. No. 14336006 Church/chapel (MH044-305): Detached church, commenced c.1820, remodeled and rebuilt c.1868 and c.1874. Comprising five-bay side elevations to the nave, with gabled entrance front c.1868 to the east, single-bay chancel to the west and vestry to the south, c.1874.

5.43. Reg. No. 14336007 Parochial House (MH044-303): Detached three-bay two-storey parochial house, built c.1869.. Square-headed and segmental-arched window openings with timber sash windows and decorative rendered surrounds.

5.44. Reg. No. 14336008 Parochial House (MH044-304): Detached six-bay two-storey outbuilding, built c.1870. Hipped slate roof. Squared stone walls. Timber sash windows with yellow brick dressings and granite sills. Two-bay single-storey outbuilding to south.

5.45. Reg. No. 14336003 Water Pump (MH044-308): Cast-iron water pump, c.1870, with foundry mark, banded shaft, fluted neck, cap and spout, and curved pumping handle.

5.46. Reg. No. 14336002 House (MH044-310): Detached seven-bay two-storey former house, built c.1780. Now in use as a nursing home.

5.47. Reg. No. 14336001 House: Detached three-bay two-storey house, built c.1800. Pair of cast-iron gates to site.

5.48. Reg. No. 14336013 House (MH044-301): Detached three-bay two-storey house, built c.1900, with flat-roofed central porch. Segmental-arched window openings with granite sills.

5.49. Reg. No. 14336011 Church/Chapel (MH044-307): Detached square-profile three-stage castellated and pinnacled Church of Ireland church tower, built c.1817, with the ruins of the church walls to the east. Graveyard to site. Dressed stone gate piers with pair of wrought-iron gates set in rubble stone wall.

Ratoath Record of protected Structures

5.50. Chapter 5 Built and Natural Heritage of the Ratoath LAP has been reviewed in order to identify any Records of Protected Structures (RPS) and any recorded Monuments (RM) which may be impacted by the proposed scheme. This review has highlighted a total of ten RPS's and four RM's proximate to the proposed scheme. However it is noted that all of these are already identified from the review of the online Historic Environment Viewer.

Conclusion and Recommendation

5.51. Whilst it is clear that there are a number of significant built heritage buildings, monuments and sites, it should be noted that the majority of these will not be impacted by the proposed scheme as its construction will predominantly take place within the curtilage of the existing roadway.

5.52. Notwithstanding, there is potential that previously unrecorded archaeological finds, features or deposits may exist in the areas where the proposed scheme will involve works within any previously undisturbed/greenfield roadside margins and particularly in vicinity of the Broadmeadow River. Therefore, it is recommended that a programme of archaeological monitoring take place during excavation works associated with the construction of the proposed scheme and in particular works associated with the proposed greenway.

Noise and Air Quality

5.53. There are no negative impacts predicted in terms of noise levels and air quality. Improving pedestrian and cyclist provision creates the potential to reduce noise levels and improve air quality due to an increased level of uptake in these more sustainable modes of transport and a potential reduction in car travel.

General Avoidance Measures

5.54. The environmental risks associated with the proposed works have been set out in the projects Appropriate Assessment (AA) Screening and the Ecology Constraint Reports (ECR). These risks primarily relate to the construction tasks proposed in close proximity to the River Boyne which have the potential to impact on the rivers environment.
The risks and the avoidance measures which will be implemented for the project are outlined below. This document, in conjunction with the AA and the ECR will be available to the successful contractor to facilitate the preparation of their Construction Management Plan for the project.

5.55. The project works are estimated to be completed over a number of years, subject and in line with funding being made available. The following general avoidance measures will be required by the Contractor for implementation over the projects duration:

1. The Contractor will be required to submit the following plans demonstrating their understanding and compliance with the environmental and ecological constraints of the project. These documents will be forwarded to the relevant Local Authority departments within Meath County Council for approval. The contents of these documents will form the basis of weekly audits to be carried out by the Employer's Representative during the construction works;

a. Construction Management Plan

b. Site Management Plan

c. Waste Management Plan

d. Chemical / Toxic Material Management Plan

e. Earthworks Management Plan

2. An Ecological and a archaeology Clerk of Works should be appointed to ensure that all avoidance measures are fully implemented in accordance with the approved Management Plans.

3. The Main Contractor will be required to demonstrate their accreditation under NSAI ISO 14000 “Environmental Management Systems” to be considered competent to carry out the project.

4. Works will be completed in accordance with the Fisheries Ireland guidance document “Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016)

The following conditions will be included in the contract issued to the successful tenderer. These clauses will also be included in the tender documentation issued: a. Construction vehicles are not permitted to enter the river; works are to be completed from the existing bridge structure which will be closed to traffic during construction.

b. The Contractor must avoid degradation, contamination or pollution of the river from spills, construction materials or site spoil.

c. Construction plant must be well maintained to avoid fuel spills to the river.

d. Construction plant shall be off appropriate size and specification i.e .smaller diggers and dumpers, for the constrained area of the proposed greenway.

e. Cleaning out of site plant must take place at a location isolated from the river, with no runoff to the river permitted.

f. The contractor must install appropriate environmental screens to prevent any construction runoff or waste during works to the river. The contractor must also consider the existing bridge drainage system and ensure construction runoff or waste is not permitted to be collected by this system.

e. The contractor will be required to notify Fisheries Ireland and the NPSW of the works seven days in advance of the works and within seven days of works completion.

5. The noise levels (see Note (i) below) scheduled below for periods outside the normal working hours will only be permitted when consent has been given to exceptional working. Otherwise there shall be no construction noise outside of normal working hours.
The noise level, Leq (see Note (ii) below) from all sources when measured 2.0m above the ground at any monitoring station shall either not exceed the appropriate level given in the Schedule or not exceed by more than 3 dB(A) the existing ambient noise level, Leq (see Note (iii) below), at the monitoring station measured over the same period, whichever level is the greater. The maximum sound level shall not exceed the level given in the Schedule below. Exceptionally, the Contractor may be given permission to carry out works which exceed the noise levels in the Schedule, provided that 5 working days’ notice of the date and timing of these works is given to the Employer’s Representative / MCC and the Contractor demonstrates that he intends to take all reasonable matters to mitigate the noise nuisance. After consultations with the Local Authority and any other interested bodies, a decision will be given within 3 working days of receipt of the notice.

The Contractor shall comply with the current national guidelines as specified in Transport Infrastructure Ireland Guidelines for the Treatment of Noise and Vibration in National Road Schemes (Revision 1, 25th October 2004). The Contractor shall adopt good site practice in accordance with BS 5228: Part 1: 1997 (Noise Control on

Construction and Open Sites and any similar British Standard or Code of Practice which may be considered relevant.

Without prejudice to the Contractor's obligations under the preceding paragraph the Contractor shall comply in particular with the following requirements:
(a) All vehicles and mechanical equipment shall be maintained in good and efficient working order and shall be fitted with effective exhaust silencers;
(b) All compressors shall be "sound reduced" models fitted with properly lined and sealed acoustic covers which shall be kept closed whenever the machines are in use and all ancillary pneumatic percussive tools shall be fitted with mufflers or silencers of the type recommended by the manufacturers;

(c) Machines in intermittent use shall be shut down in the intervening periods between works Works Requirements or throttled down to a minimum. Generators, or any other plant, shall not be left running / operational after hours unless in an emergency, and agreed with the Employer's Representative;

Where practicable, plant with directional noise characteristics shall be positioned to minimise noise at adjacent properties;
- Static machines shall be sited as far away as practicable from inhabited buildings;
- Where it is necessary to provide power for the running of traffic signals, pumps etc., at any time outside normal working hours, then the sources of such power shall be from mains electricity except if the Employer's Representative agrees in writing that alternative plant may be used, after consultation with MCC;
- Good relations with people living and working in the vicinity of the roadworks are important. People who are likely to be affected by the noise shall be informed, by letter drop or other appropriate means, of any works to be carried out outside normal working hours. Notification of the public shall take place at least one week prior to the commencement of Site works;
- The Contractor shall organise his operations with regard to the positioning of plant and the location of haul routes etc., so that it minimises construction noise to adjacent properties;
(i) The period referred to as 'night' for the purposes of the Contract shall be from 18:00 hours to 08:00 hours;

Transport Infrastructure Ireland guidelines provide indicative noise levels that are considered to be typically acceptable, though more stringent limits are appropriate where pre-construction noise levels are low. Limits are suggested for both the 1-hour "A" weighted equivalent continuous noise level (LAeq,1hr) and for the maximum noise level (LAmax). While limits are suggested for evening working and for working daytimes on Sundays and Bank Holidays it is assumed that the explicit permission of the Employer would be required before non-emergency works are conducted at these times.

The Contractor shall furnish such information as may be required by MCC in relation to noise levels emitted by plant or equipment used or installed on the Site or which the Contractor intends to use or install on the Site and also afford all reasonable facilities to enable such Authorities to carry out such site noise-monitoring as may be necessary.

The Employer's Representative shall have the right to order the Contractor to cease using any item of plant insufficiently silenced or generating noise levels in excess of those specified.

Compliance with these conditions and the other requirements of the Contract will not of itself constitute any grounds for defence against any proceedings, whereby any occupier of premises may complain to a Court of law of a noise nuisance.

Days and Times	Hours	dB $L_{Aeq,1hr}$	dB L_{Amax}
Monday to Friday	08:00 – 18:00	70	80
Monday to Friday	18:00 – 22:00	60	65
Saturday	08:00 – 17.00	65	75
Sundays and Public Holidays	00:00 – 24:00	60	65

Notes:

(i) Noise levels relate to free field conditions. Where noise control stations are located 1m from facades of buildings, the permitted noise levels can be increased by 3 dB(A).

(ii) The ambient noise level, Leq, at a noise control station is the total Leq from all the noise sources in the vicinity over the specified period.

(iii) The existing ambient noise level, Leq, at a control station is the total Leq from all the noise sources in the vicinity over the specified period prior to the commencement of the Works.

(iv) Maximum sound level is the highest value indicated on a sound level meter which means the requirements of BS 5969 Type 1 or 2 set to SLOW response and frequency weighting A.

6. Vibration

The vibrational limits reported below shall be complied with throughout the site, and the Contractor shall ensure that no exceedance of these limits shall occur within the site boundary.

The limits of vibrational amplitude and resultant peak particle velocity shall be limited to 2mm/sec.

The Contractor shall include for vibration monitoring at all locations where works are undertaken within 50m of an existing structure.

The Contractor shall provide equipment for monitoring vibrations both within and outside the site as directed by the Employer's Representative.

The Contractor shall comply with BS6472: 1992 Evaluations of Human Exposure to Vibration in Buildings (1Hz-80Hz). Any vibration monitoring carried out shall also be in compliance with BS6472:1992. The Contractor shall also adopt good site practice in accordance with BS 5228: Part 1: 1997.

Compaction of material on site shall be achieved by dead rolling only. The use of vibration rollers shall not be permitted on this Contract. This requirement does not relieve the Contractor of his duties under the Contract.

Following the appointment of a successful contractor to undertake the work, reference must be made to this document, the Construction Management Plan and the AA Screening & Ecology Reports on all construction drawings.

The above mitigation measures are to be implemented by the contractor in addition to all standard site regulations and legislative measures. The above list is not to be considered exhaustive by the contractor.

Deposition of Spoil or Rubbish within Sensitive Areas

5.56. There is potential during site preparation and the construction works for accidental deposition of spoil or rubbish within the sensitive areas. Grout, concrete and cement are toxic to fish (Eastern Regional Fisheries Board, date unknown) and certain activities can only be carried out within SAC's with the permission of the Minister for the Environment and Local Government.
These are called *Notifiable Actions* and the most relevant to the current proposed development is "Dumping rubbish or other materials or disposing of any chemicals or wastes in streams/rivers or into water-courses running into them".

Avoidance Measure

It will be stated explicitly in the contract documents and on relevant drawings that the construction site is located within a protected site and that dumping of any kind is an offence. The contractor will be required to hold toolbox talks to ensure that all operatives are aware that this is the case and are aware of the measures for disposing of any waste from site.
Prefabricated members will be utilised where possible to limit the potential for loose debris / waste material from construction entering the watercourse (existing bridge widening).
The removal of stone material from the bridge spandrel walls shall be undertaken manually in a controlled manner and all debris / loose material transferred to a skip to be held on site for disposal to a licensed waste disposal facility.
External access to the site will be restricted. All waste generated shall be segregated and deposed off site to suitable licensed tips via suitably licensed hauliers
It is critical that no debris, oils, or soil run off enters the river during the course of the construction of the new pedestrian walkways'.

During construction, standard best practice methods shall be utilised to minimise suspended solids or other pollutants entering the river and at a minimum the following measures should be adhered to: -
- Storage of material well away from the river;
- No refuelling of machinery in proximity to the river;
- Broken pavement and underlying fill to be stored well away from the river and to be kept covered to prevent run-off;
- Spill kits to be kept on site;
- During earth works, silt fences should be installed to prevent silts from entering the river.

Dust and Pollution

5.57. During construction if suitable preventative measures are not taken there is potential for pollution or dust to cause damage to the river.
Construction site offices are likely to be set up in close proximity to the bridge. Any diesel or fuels stored here would be located very close to the river and therefore need to be prevented from accidentally spilling into the aquatic habitat.
Measure should be planned for / taken for extreme weather events i.e. No soil run off into water course during heavy rain and/or a dust prevention plan in cases of extended hot weather for stockpiles and soil striped areas.

Avoidance Measure

Dust minimisation measures will be enforced to ensure there is no deposition of dust on surrounding habitats. Appropriate measures during site clearance and development will be taken to prevent movement of dust into adjacent habitats. Measure should be planned for / taken for extreme weather events i.e. No soil run off into water course during heavy rain and/or a dust prevention plan in cases of extended hot weather for stockpiles and soil striped areas.

These appropriate measures include the erection of nets under the cantilever structure and bunding of any waste prior to its removal from the site. All netting will be certified in accordance with IS EN 1263:1 2002 and nets will be fitted in accordance with IS EN 1263-2:2002. These standards will be contained with the Works Requirements (the Specification) to be issued with the Tender.
All fuel tanks will be fully bunded and located in a suitable area, away from the SAC.
All bunds will be tested in accordance with Environmental Protection Agency guidelines with tests being carried out under the supervision of the Employer's Representative.
The above measures will be stated explicitly in the contract documents and on relevant drawings.

Removal of Vegetation

5.58. Existing vegetation and grasses need to be removed from the green area's and the existing bridge structures as part of widening works to the small bridges. This material shall be segregated and removed to suitable licensed tip.
Herbicidal sprays should not be used prior to vegetation removal, since these would introduce potential for herbicides to enter the river system.

Avoidance Measure

All site clearance and vegetation removal will be carried out with perimeter netting in place to prevent debris or material being removed from falling into the Broadmeadow River. All netting will be certified in accordance with IS EN 1263:1 2002 and nets will be fitted in accordance with IS EN 1263-2:2002. These standards will be contained with the Works Requirements (the Specification) to be issued with the Tender.

All materials used on site require formal approval from the Employer's Representative via the submission of "Material Approval Requests". No herbicides will be used unless approved by the National Parks and Wildlife Service (NPWS) for use in proximity to the river.
The above measures will be stated explicitly in the contract documents and on relevant drawings.

Post construction, it is recommended that habitat enhancement measures be implemented as part of any landscaping proposals. This could include sowing native wildflower and grass mixtures adjacent to the newly constructed path on the northern side of the river.

Street Lighting / Artificial Lighting

5.59. Due to the presence of feeding bats in the area it is recommended that no new artificial night lighting should be installed if possible on the proposed pedestrian walkway. The AA Screening Report notes that if there is a "very strong need for lighting for safety purposes" that mercury and metal halides should be avoided. A proper lighting design should be carried out to upgrade existing and fill any gaps in the network, which is needed in order to maximise the safety of pedestrians and cyclist's new lighting is required for the proposed walkways. It should be noted that the majority of the route already have Public Lighting servicing them.

Avoidance Measure

The lighting will be designed to be sensitive to the needs of bats feeding on the watercourse and trees, specifically in accordance with the guidance set down in the publication "Bats and Lighting", as published by Bat Conservation Ireland in December 2010. Lighting will be directional and targeted to focus on the walkway areas, with minimal light spillage to the watercourse and foliage (<1 lux). All design and details will be agreed with the Meath County Council (MCC) Public Lighting Section and the NPWS and clearly detailed in the Tender / contract documentation.

The engineer will ensure that a lighting design is produced by the contractors' lighting supplier which complies with the specification agreed with MCC Public Lighting Section. Confirmation and an inspection of the lighting shall be undertaken on commissioning to ensure that the lighting complies with the specified design.
Additionally, it will be recommended to the Local Authority that the lighting shall be inspected periodically as part of a maintenance regime to ensure that the lighting remains operational in compliance with the specified design.

Invasive Exotic Species

5.60. There is a risk associated with movements of soil in or near the River Banks that invasive exotic species may be introduced to the waterway or riverbank. It should be noted that the AA Screening and the Ecology reports state that no invasive species were identified during the site inspections. However, given the due to the time that could elapse between planning and site works; it should be a requirement of the Contract, that the route of the proposed works is resurveyed for invasive plant species prior to the commencement of construction.

Avoidance Measure

For these proposed works the only proposal for soil movement is in the proposed Greenway routes. The extent of this is minimal along existing routes, most of which had manicured verges.

Measures to prevent disturbance to vegetation should be taken in order to prevent further spread of invasive species through disturbance of un-manicured / mature vegetation. A timber-framed plywood-faced hoarding will be constructed at the river bank to prevent spread of species through bank disturbance. All softwood timbers will be treated with suitable inert preservatives, as approved by the Employer's Representative, to protect them from deterioration in the wet environment. Similarly, the plywood facing will be constructed from 18 mm marine plywood to ensure maximum durability and robustness.
The successful contractors "Earthworks Management Plan" will outline as a minimum the disposal location of exported material, the source location of imported material, routes for haulage, methods for placing and stockpile locations / methods for the approval / appraisal of the Employer's Representative.

Reduction of Habitat Area

5.61. Along sections 1, 2, 3 and 5, there are existing paths in place which do not need to be widened and so will only require resurfacing. Therefore direct impacts on habitats will not occur as a result of the works. As noted above, however, the potential for lighting to impact on bats will be considered as part of the detailed design; it is recommended that a bat survey is undertaken to inform the final design of lighting along the proposed scheme and to identify where specific mitigation measures for bats will need to be integrated into the lighting design or operation.

Within section 6 there is an existing path, however, this will require widening and resurfacing. The habitat present (amenity grassland) however, is not of ecological value and the impact is classified as imperceptible.

Section 4 will require the construction of a new 3m wide path. It is proposed that the line of the new path will follow the existing beaten track and so will result in some loss of grassland habitat. This section is to be constructed at a remove from the river (ca. 20m – 40m) and for the most part and will also avoid the area of species poor wetter grassland. These areas of grassland are, however, classified as of no more than Local Importance (Local Value); construction of a new path should therefore result in no more than a localised slight ecological impact. Construction methods/proposals for pollution prevention and protection of vegetation to be retained (along the river and bordering the pathway) will be considered further at detailed design. The species poor wet grassland also offers an opportunity for biodiversity gain through appropriate

landscaping / habitat management, see for example http://www.biodiversityireland.ie/projects/irish-pollinator-initiative/all-ireland-pollinator-plan/.

In terms of indirect impacts, there is potential for impacts on the Broadmeadow River during the works. Sections 1 and 3 which require resurfacing are located close to the river. Also, the construction of the new section of pathway proposed in Sections 4 and 7 has the potential for runoff during construction which could potentially impact the river; as does the lengthening of the culvert on the Curragha Road. This will be considered in more detail when at detailed design. However, it will be a requirement of the Contract that all on-site works will be required to be undertaken in strict adherence to published best practice in order to prevent any negative impacts to the Broadmeadow River. Prior to construction the appointed Contractor will be required to prepare a Construction and Environmental Management Plan outlining how they propose to address pollution prevention and how this will be implemented and monitored on site.

A new footpath is proposed on the southern side of the Dunshaughlin Road; this is to be positioned within the existing footpath and verge. The advice of an ecologist should be sought should localised relocation of lighting poles be required. A new footpath is also proposed on western side of Curragha Road. This is to be positioned along the roadway within the existing roadside verge; it will require some hedge removal on the bend, and lengthening of a culvert carrying a stream (a tributary of Broadmeadow River) under the road.

During the preliminary ecological survey no evidence of badgers was identified along the study area. Likewise no otter holts were identified along the river during the survey;

however, it should be assumed that Otter are likely to use the river (there is a historical record of otter is recorded by www.nbdc.ie from the Broadmeadow River). By restricting all works to daylight hours (as otters are most active at dawn/dusk); by minimising any overnight lighting on site and preventing
negative impacts on water quality within the Broadmeadow River the potential for negative impacts on otter should be avoided. However,due to the time that could elapse between planning and site works; a pre-construction mammal survey should be undertaken to ensure that there have been no changes to the status of mammals along the works corridor.

There are three existing bridge crossings within the scheme, no widening works are proposed for these bridges as part of the scheme, just resurfacing; though as noted it is proposed to locally lengthen a culvert the Curragha Road.

Avoidance Measure

Where work is necessary close to vegetation the vegetation to be retained must be clearly marked so construction work does not extend beyond the agreed works area. Equally, when working close to mature trees appropriate care must be taken to prevent unnecessary damage to root zones or overhanging vegetation; see e.g. the NRA's Guidelines for the Protection and Preservation of Trees, Hedgerows, and Scrub prior to, during and post construction of National Road Schemes; or through soil compaction.

Post construction, it is recommended that habitat enhancement measures be implemented as part of any landscaping proposals. This could include sowing native wildflower and grass mixtures adjacent to the newly constructed path on the northern side of the river.

It will be a requirement of the contract that the appointed Contractor will be required to prepare a Construction and Environmental Management Plan which will focus in particular on preventing any pollutants entering the Broadmeadow River and its tributary; and on advising how the final design can minimise the loss of trees; protect water quality and inform the design of lighting. The Contractor will be required to outline how these measures will be implemented and supervised. The CEMP must be prepared with the input of a suitably qualified ecologist. The final design will also be required to identify areas of biodiversity gain within the final design; including

identification of where trees can be planted (number equalling or greater than the number removed) and opportunities for inclusion of biodiversity gain within landscaping proposals can be located.

6. *Mitigation Measures*

Guidance – to reduce impacts

6.1 During construction, standard best practice methods shall be utilised to minimise suspended solids or other pollutants entering the river. This is described in detail in the accompanying Outline Construction Environmental Plan. Ratoath Pedestrian and Cycling Improvement Plan prepared by Meath County Council (MCC, 2019). At a minimum the following measures should be adhered to: -

- Storage of material well away from the river;
- No refuelling of machinery in proximity to the river;
- Broken pavement and underlying fill to be stored well away from the river and to be kept covered to prevent run-off;
- Spill kits to be kept on site;
- During earth works, silt fences should be installed to prevent silts from entering the river.

6.2 Upgrade works to the pedestrian footpath and culvert on the Curragha Road will minimal and follow best practice guidance. Measures to be considered to protect local aquatic ecology of the Crackenstown Stream should follow;

- Guidelines for crossing of watercourses during the construction of National Road Schemes. National Roads Authority.
- Guidelines on protection of fisheries during construction works in adjacent to water. Inland Fisher Ireland 2016

6.3 In relation to the removal of trees for the works, this can only be completed outside of the bird breeding season which is 1st March – 31st August inclusive[1] and outside the active season for bats (April – September).

6.4 Where work is necessary close to vegetation, the vegetation to be retained must be clearly marked so construction work does not extend beyond the agreed works area. Equally, when working close to mature trees appropriate care must be taken to

[1] Dates may change with the result of the Heritage Bill currently being discussed in the Seanad (at time of writing).

prevent unnecessary damage to root zones or overhanging vegetation; Potential impacts on trees within the scheme have been assessed measures to reduce impact are outlined in pinch point areas; see Tree Survey Report (Appendix C) and Arboriculturally Impact Assessment (Appendix D). In general terms, when working close to vegetation the NRA's *Guidelines for the Protection and Preservation of Trees, Hedgerows, and Scrub prior to, during and post construction of National Road Schemes* should be considered to reduce impact on vegetation.

6.5 The following best practice guidance will be followed for construction in the vicinity of trees: -

- BS: 5837/2005 Trees in Relation to Construction
- BS 998/1989 Recommendations for Tree Work.
- NRA (2006). *Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, During and Post Construction of National Road Schemes*.

6.6 The removal of 59 Lime, Sycamore and Pedunculate Oak trees and compensatory planting along the Woodland Links road will be carried out in line with recommendations detailed in the Arboricultural assessment carried out by Cunnane Stratton Reynolds in 2019 (Appendix C):

- Removal/felling works as specified on Dwg No: 19277_T_102 (Appendix D), should be performed prior to project commencement, by reputable contractors in accordance with *Tree work. Recommendations* (BS 3998:2010) and current best practice;
- Removal of scrub vegetation and ivy clearance should preferably be performed in winter outside of the bird nesting season;
- Tree felling should be preceded by a competent assessment as to the presence of any protected wildlife species, where required specialist advice should be sought if necessary;
- Following above permitted, priority tree works, protective fencing (barriers) should be erected in the positions and alignments as indicated on the Tree Protection Plan Dwg No No19277_T_103 (Appendix D);
- Fencing should be signed 'Tree Protection Area – No Construction Access';
- Fencing is not to be taken down or re-positioned without written approval of the project Arborist;

- No excavation, plant or vehicle movement, materials handling, or soil storage is to be permitted within the fenced tree protection areas indicated on plan;

- Landscape works and installation of / work to boundary treatments within the Root Protection Area;

- Proposed landscaping works including new planting, shall be performed in accordance with *Trees in Relation to Design, Demolition and Construction – Recommendations* (BS 5837:2012). During these works, the ground around retained trees must not compacted by vehicles, nor be mechanically excavated for planting, nor be significantly altered in terms of ground levels;

- Compensatory tree planting will be carried out along the Woodland Links road to mitigate against the proposed removal of 59 Lime, Sycamore and Pedunculate Oak. 52no. native semi mature trees will be incorporating into the existing grassed verge including Sessile Oak *(Quercus petraea)* and Sliver Birch *(Betula pendula)* (See Figure 4.1 below). The number of trees to be replaced is slightly less than removed to ensure appropriate spacing specifications for root and canopy expansion;

- The guidance set out in the tree planting specification (See Appendix D) should be incorporated into in the main contractor's tender document for responsibility for the installation, costs and maintenance of tree planting and protection measures. The following items should be included in this document; tree minimum girth and height specifications; rooting specifications; topsoil and site preparation; plant material specifications; and planting timing (Later November – mid March);

- Additionally, a wildflower meadow will be established between the compensatory tree planting on the Woodland Links Road (See Section 5.1); and

- The proposed development will present an opportunity to implement a new native and sustainable tree planting design along the woodland links road. Once established the new planting scheme is aimed at providing high quality, diverse, long-term amenity tree cover, in keeping with the setting and proposed site use. The trees removed have low ecological value. No significant impacts to local ecological and all trees removed within this section will be replaced will similar broadleaf species.

6.7 Studies have found that Leisler's bat and pipistrelle bats can congregate around white mercury street lights and white metal halide lamps feeding on the insects attracted to the light. However, lighting can cause avoidance of an area for commuting bats and can prevent or reduce foraging for some species, including Myotis species[2]. Further, even bat species that have been shown to opportunistically forage in lit conditions have subsequently been recorded being impacted by artificial lighting. In cities, for example, common pipistrelles have been recorded avoiding gaps that are well lit, thereby creating a barrier effect[3]. Operational Lighting should not illuminate retained natural habitat features such as treelines and wooded areas. In order to minimise light pollution and impacts on bats within the proposed greenway it is recommended that the lighting within the greenway is designed in accordance with the current standards (of the time) at design stage and should include the following;

- Lighting should be directional; only shining on the track. This can be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvres and shields to direct the light to the intended area only;
- The intensity of the lighting on the pathway should be as low as guidelines permit; minimised at ground level and over-spill must be avoided;
- The National Cycle Manual quotes BS: 5489 which calls for an average luminance of 10 lux and a minimum luminance of 5 lux for footpaths and cycle paths at ground level; however, species such as e.g. Daubenton's bats seem to prefer a light level of less than 1 lux (Bat Conservation Ireland, 2010); and
- There are a number of schemes (walks / cycleways) where the issue of bats and lighting is being actively assessed. The results of such work should be reviewed to inform design of an appropriate lighting option at Ratoath.

6.8 A further option to consider is to manage the time when lights in are on in order to minimise impacts on bat usage. During the period from late September to early April Irish bat species are hibernating and thus impacts from lighting would be largely avoided. In contrast during the mid-summer period of May to August bats will be active; however, day length is longer and in particular the commuting period for most people would coincide with daylight hours; thus, at such times public lighting may not be required. This potentially leaves a period during parts of September and

[2] Stone E.L. (2013) Bats and Lighting: Overview of current evidence and mitigation.
[3] Bat Conservation Trust and Institute of Lighting Professionals (2018) Guidance Note 08/18: Bats and artificial lighting in the UK. ILP, Rugby

April (immediately before and after hibernation) when the need for lighting to facilitate public use of the greenway might conflict with bat usage.

6.9 The potential for lighting to impact on bats has been considered as part of the detailed design; the following recommendations were taken from the Bat Report (see Appendix B) and will be used to inform the final design of lighting along the proposed scheme (notably in Sections 3 & 4 of the greenway): -

- Avoiding light pollution: - Light spillage must not occur on the river, and light pollution must be avoided. This can be achieved by using e.g. low-level bollard lights, with hoods and cowls fitted to prevent light entering the river area and sky. It is particularly important that light pollution is kept to a minimum in the wooded section of the cycleway.

- Retain trees where possible: - Common and soprano pipistrelles were found feeding along the canopy of the trees to the south of the site. These trees provide shelter and cracks and crevices to roost in (Note: No felling of trees will be carrying out in this area).

- Install Bat boxes: - Four bat boxes should be erected along the route of the cycleway – Two 2FN Schwegler bat boxes and two NHBS Kent boxes. These should be placed on trees, at least 4m high, with a clear drop below (no underlying branches – as bats need to drop to start their flight). These can be purchased from www.nhbs.com.

- Management of vegetation: - to prevent loss of feeding, grasses and vegetation adjacent to the cycleway should not be mown during the summer months. Long grass and native plants allow insect diversity, which in turn provides food for bats. In particular, where the cycleway runs by the river, the area between the river and the cycleway should not be sprayed or cut.

- Consideration should be given to use of LED lighting (Lewanzik & Voigt, 2017); directional lighting / louvers; timing controls on operation etc.

6.10 Thus, in summary, lighting must be designed to prevent overspill of light outside the footprint of the proposed path and in particular to prevent light spillage over the nearby Broadmeadow River, which most likely provides a commuting and foraging corridor for bats.

Biodiversity Enhancement

6.11 In line with the All Ireland Pollinator plan, a wildflower meadow will be established between the compensatory tree planting on the Woodland Links Road. This meadow will be incorporated into the existing landscaping as a biodiversity enhancement feature. Areas disturbed following tree planting will be graded and seeded with an All-Ireland Pollinator Plan Wildflower mix, while existing intact grassed areas will be left unmown until September and managed annually in accordance with guidelines on the creation and management of a wildflower meadow[4]. If the species composition is found to be dominated by ornamental species within the sward, established species-rich plugs should be incorporated into the landscape plan to enhance species diversity within the sward. Plug compositions should be in line with All-Ireland Pollinator Plan guidelines. The overall aim of this feature is to form a continuous linear meadow running along the Woodland link road within the existing grassed verge.

6.12 It is worth considering, as part of an ongoing management program, the selective thinning of a limited number of young trees within Tree Group 1 on the R125 Dunshaughlin Road (See Appendix D). Removing those specimens which have bolted, and or are of relatively poor form, will facilitate improved development of other trees within the group which are currently overcrowded and have inadequate space for strong future development. Most of the lager trees within this group are heavily obscured by ivy, (which should be carefully removed to facilitate full inspection), however they appear to be in good physiological condition. Given their roadside location it would be prudent to consider a crown cleaning exercise to remove rubbing limbs, future compression forks and reduce the length of limbs overhanging adjoining carriageway along with any other imbalances in growth. Where appropriate enforcement planting of hazel should be considered.

6.13 Post construction, it is recommended that habitat enhancement measures be implemented as part of any landscaping proposals along the Greenway. This could include sowing native wildflower and grass mixtures adjacent to the newly constructed path on the northern side of the river. The installation of new path north of the woodland, could itself benefit the regeneration of an herbaceous field layer within the woodland due to the use of a dedicated path and thereby reducing footfall through the woodland.

6.14 As noted, in order to further enhance ecological pathways within the greenway along the Meadowbrook River; bat boxes will be erected along the cycleway. Vegetation along the greenway will be managed to promote native

[4] *How-to-guide Creating and management of a wildflower meadow.* All-Ireland Pollinator Plan 2015-2020

species-rich ground flora. Planting should seek to establish and / or maintain ecological connectivity through the site. Vegetation adjacent to the cycleway should not be mown during the summer months. Long grass and native plants allow insect diversity, which in turn provides food for bats. Where the cycleway runs by the river, the area between the river and the cycleway should not be sprayed or cut. A nature panel can be designed to explain the 'untidy' areas left for insect diversity and young bats. All trees along the Cycle Network should be maintained and damage to root zones must not occur incorporating small adjustments to the path alignment.

References

Bat Conservation Trust. (2008). *Bats and Lighting in the UK*. Bat Conservation Trust. Version 2, January.

Bat Conservation Ireland (2010). Bats and Lighting. Guidance Notes for planners, engineers, architects and developers. [http://www.noticenature.ie/files/BCIrelandGuidelines_Lighting.pdf]

Bat Conservation Trust / Institute of Lighting Professionals (2018). Bats and Artificial Lighting in the UK. Bats and the Built Environment Series. Guidance Note 08/18.

BS: 5837/2005. Trees in Relation to Construction.

BS: 998/1989. *Recommendations for Tree Work.*

Cunnane Stratton Reynolds (2019). *Tree Survey. Pedestrian/Cycles Scheme, Ratoath, Co Meath.* November 2019. Cunnane Stratton Reynolds Land Planning & Design.

Lewanzik, D. and Voigt, C.C. (2017). Transition from conventional to light-emitting diode street lighting changes activity of urban bats. *J. Appl. Ecol*. 54:264-271.

Meath County Council (2019). Outline Construction Environmental Plan. Ratoath Pedestrian and Cycling Improvement Plan.

National Roads Authority (NRA). (2006). *Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, During and Post Construction of National Road Schemes*.