

Connemara Greenway - Clifden to Oughterard

Environmental Impact Statement
Volume 2 -Appendices

May 2012





Connemara Greenway Project – Clifden to Oughterard

Environmental Impact Statement

Volume 2 - Appendices

DOCUMENT CONTROL SHEET

Client	Galway County Council					
Project Title	Connemara Greenway Project – Clifden to Oughterard					
Document Title	Environmental Impact Statement – Volume 2 Appendices					
Document No.	MGE0269RP0003					
This Document Comprises	DCS	TOC	Text	List of Tables	List of Figures	No. of Appendices
	1	-	140	-	-	4

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APPENDIX A
Consultation

Appendix A.1 - Constraints Stage Consultation Responses Received



Teagasc,
Head office,
Oak Park,
Carlow.

15th August 2011

Our Ref: MGE0269LT0003
File Ref: MGE0269 - 360

Re: Scoping of Environmental Assessment for the proposed Connemara Greenway, Co. Galway.

Dear Sir or Madam,

I am writing to you to inform you that RPS has been appointed by Galway County Council to provide the environmental consultancy services associated the above mentioned scheme.

It is proposed to develop a walking/cycle track (Greenway) along the existing dismantled Galway to Clifden railway. The principal study area for this project will be the old railway line from Oughterard to Clifden and immediate surrounding areas. The proposed corridor is shown in **Figure 1**.

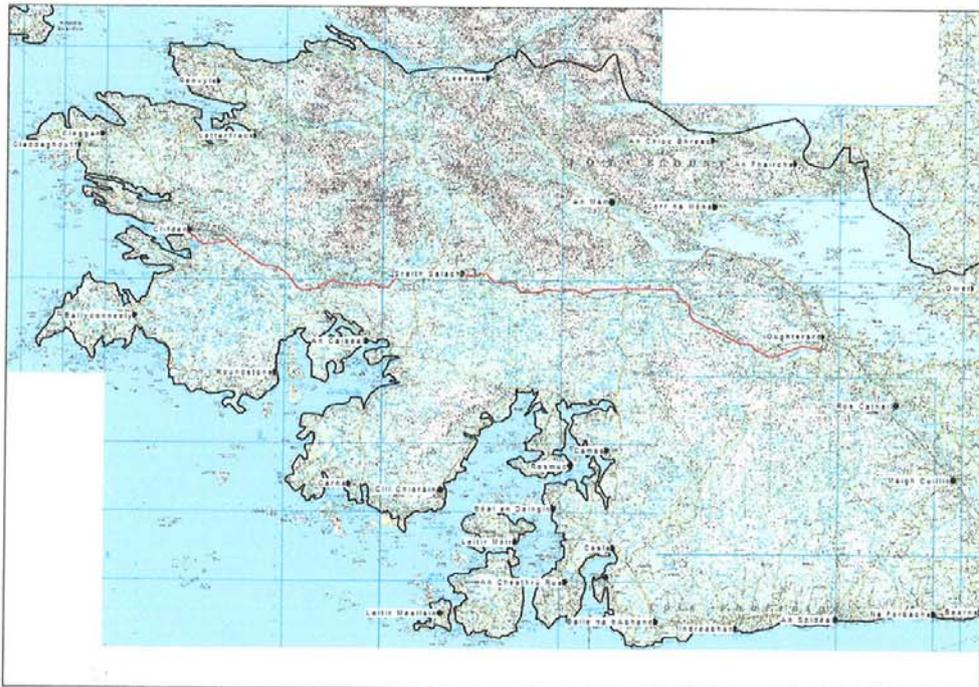


Figure 1 Old Railway Line between Connemara and Clifden, Route of the Proposed Connemara Greenway.

The route travels through a scenic and rugged rural environment dominated by the mountains, lakes and bog. The study area contains several environmental designations (Natura 2000 Sites) and as a result an Appropriate Assessment is required to be completed in order to comply with the Habitats Directives (92/43/EEC). The route runs through or lies adjacent to four candidate Special Areas of Conservation (cSACs), including the Twelve Bens/ Garraun Complex, Maumturk Mountains, Connemara Bog Complex cSAC and Lough Corrib cSAC.

The project is now being progressed to the design and planning stages. The following environmental stages form an integral part of this process:

Stage 1

- Part 1: Environmental Constraints Report
- Part 2: Screening for Appropriate Assessment

Stage 2

- Environmental Assessment of Viable Options
- Stage 2 Appropriate Assessment Natura Impact Statement (if deemed necessary as a result of the Stage 1 Appropriate Assessment Screening).

Stage 3

- Environmental Impact Assessment (EIA)

Stage 4

- Statutory Planning Process

RPS has commenced Stage 1, Part 1 of this process, Environmental Constraints Report.

If you would like to make a comment regarding Stage 1 of the scheme, please forward your correspondence to the undersigned no later than **15th September 2011**. It is our intention to consult with you again as the project progresses.

Please contact the undersigned directly if you have any queries in relation to the proposed scheme.

I trust this is satisfactory and I look forward to hearing from you.

Yours faithfully,



Paula Kearney,
Senior Scientist,
RPS,
Lyrr 2,
IDA Business & Technology Park,
Mervue,
Galway.
E-mail: paula.kearney@rpsgroup.com

Áras an Chontae,
Cnoc na Radharc, Gaillimh,
Áras an Chontae,
Prospect Hill, Galway.

Fón/Phone: (091) 509 000
Facs/Fax: (091) 509 010
Idirlíon/Web: www.galway.ie
www.gaillimh.ie

Iasachtaí/Deontais Tithíochta
Housing Loans/Grants
☎ (091) 509 301
✉ housing@galwaycoco.ie

Iarratais Tithíochta
Housing Applications
☎ (091) 509 300
✉ housing@galwaycoco.ie

Timpeallacht & Tréidliachta
Environment & Veterinary
☎ (091) 476 402
✉ environment@galwaycoco.ie

Bóithre & Iompar
Roads & Transportation
☎ (091) 509 309
✉ roads@galwaycoco.ie

Acmhainní Daonna
Human Resources
☎ (091) 509 303
✉ hr@galwaycoco.ie

Mótarcháin
Motor Taxation
☎ (091) 509 099
✉ motortax@galwaycoco.ie

Ceadúnais Tiomána
Driving Licences
☎ (091) 509 305
✉ motortax@galwaycoco.ie

Clár na dToghthóirí
Register of Electors
☎ (091) 509 310
✉ electors@galwaycoco.ie

Seirbhísí Uisce
Water Services
☎ (091) 476 401
✉ water@galwaycoco.ie

Pobal & Fiontar
Community & Enterprise
☎ (091) 746 860
✉ community@galwaycoco.ie

Pleanáil
Planning
☎ (091) 509 308
✉ planning@galwaycoco.ie

Deontais Ard Oideachais
Higher Education Grants
☎ (091) 509 310
✉ education@galwaycoco.ie

Leabharlann
Library
☎ (091) 562 471
✉ info@galwaylibrary.ie



Comhairle Chontae na Gaillimhe
Galway County Council

18th August, 2011

Paula Kearney,
Senior Scientist,
RPS Consulting Engineers,
Lyrr 2,
IDA Business & Technology Park,
Mervue,
Galway

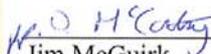
Recipient	
Register No.	4. Paula
RPS	19 AUG 2011
Project No.	
File Ref.	
PM	

**Re: Scoping of Environmental Assessment for the proposed Connemara
Greenway, Co. Galway**
Ref: MGE0269LT0003

A Chara,

We acknowledge receipt of your letter, dated 15th August 2011 and wish to advise you that the Environment Section does not wish to comment at this stage.

Mise, le meas,


Jim McGuirk
Environment Section

Tá míle fáilte roimh chomhfhreagras i nGaeilge.



Minutes of Meeting

Date:	19.1.12	Time:	2:30pm	Venue:	NPWS, Plaza Offices, Galway
Meeting Subject:	Progress Meeting	Minutes taken by: Paula Kearney			
		Electronic Reference: MGE0269MI0003			
Project:	Connemara Greenway Project	Project Reference: MGE0269			
		File Reference: 500			
Attendees	Noel Kirby (NPWS), Kurt Lydon (Galway County Council) and Paula Kearney (RPS)				
Item	Description	Action	Due Date		
1.0	<p>Progress</p> <ul style="list-style-type: none"> - PK outlined project progress. Constraints study and Appropriate Assessment Screening Report completed. - RPS awaiting comments back on AA Screening Report which will be finalised and sent to NPWS. - EIS well under way. - NK requested that a scope of the NIS be sent along with the AA report to get a formal response from the NPWS. <p>Greenway Development and Realignment of the N59</p> <ul style="list-style-type: none"> - KL stated that there is approximately 11.4km of the proposed Greenway that will be shared with the realignment of the N59 from Recess to Maam Cross. - Measures regarding drainage in this section will be incorporated into the road drainage. 	Galway Co Co RPS			
2.0	<ul style="list-style-type: none"> - NK stated that the meeting was to discuss any issues that the NPWS have in relation to the design and any other factors that need be considered in assessing the natural environment. 				
3.0	<p>NK highlighted the main issues to be considered;</p> <p>1. Connemara Bog Complex SPA</p> <ul style="list-style-type: none"> - NK queried as to whether we were aware of the new Connemara Bog Complex SPA designation which is contained within Connemara Bog Complex cSAC. The main species to be concerned with include breeding populations of Cormorant, Merlin, Golden Plover, and Common Gull. - PK stated that she had obtained the boundary of the designation and included the Natura 2000 site in the AA Screening Report. - NK stated that potential impacts to these species include disturbance during the construction and operation phase. - NK is to consult the rangers to identify if there are nesting sites near the proposed Greenway corridor. <p>2. Construction Management Plan</p> <ul style="list-style-type: none"> - NK requested that method statements and a construction management plan be included in the EIS/NIS. - This plan need to include the following; <ul style="list-style-type: none"> o Locations of access tracks 	NPWS			

Minutes of Meeting

	<ul style="list-style-type: none"> o Identification of additional access tracks where required o Compound Locations o Options for waste arisings on site during site clearance o Locations for disposal need to be identified. o Specification of surface dressing to be provided. o Management plan for invasive species. Potential issues with imported soil. <ul style="list-style-type: none"> - KL stated that the construction will be carried out linearly and no access issues have been identified to date. - KL will issue details of access locations to RPS for inclusion in the EIS - KL stated that it is likely that tar macadam will be the likely surface dressing. - KL will get the specification of the product and it will be assessed as a potential pollution source. - PK stated that locations of invasive species have been recorded and will be identified on maps <p>3. Landscaping</p> <ul style="list-style-type: none"> - PK stated that due to the open nature of the existing landscape that landscaping proposals will be minimal. - NK recommended that turves of existing vegetation be retained and replaced on cleared ground to maintain the seed bank and negate the requirement to import foreign vegetation. - NK suggested where bank stabilisation was required, biodegradable coir matting could be used. <p>4. Compound Locations</p> <ul style="list-style-type: none"> - KL said that there are old turning bays and areas which were used for the construction of the railway. He will mark these on a map for inclusion in the EIS. These locations will be the likely compounds for storage of plant, materials, washroom facilities and waste storage. - KL to provided locations to RPS <p>5. Fencing</p> <ul style="list-style-type: none"> - KL stated that fencing details have not been finalised due to differing landowner requirements. When finalised will be issued to RPS <p>6. Drainage</p> <ul style="list-style-type: none"> - NK stated that drainage details and locations of outfalls to be provided. Assess impacts of drain cleaning. Particular attention to be paid to Freshwater Pearl Mussel (FWPM) watercourses. <p>7. Bridge Refurbishment</p>	Galway Co Co	
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Minutes of Meeting

	<ul style="list-style-type: none">- NK stated specifications for construction methods, proposed work on structures at river crossing will need to be addressed. Particularly in relation to FWPM watercourses.- KL stated a structural engineer is reviewing the existing crossings and designing replacement or refurbishment measures at each location. Information to be provided to RPS when available.	Galway Co Co	
7.0	<p>A discussion was held regarding comfort stops, provision of litter bins, signage, seating facilities etc.</p> <ul style="list-style-type: none">- KL pointed out the requirement for comfort stops every 10km. There are facilities at Oughterard, Maam Cross, Recess, Ballynahinch and Clifden. However, there may opportunities for local enterprise with the support of LEADER to develop further facilities along the route.- KL stated that there will be no litter bins provided along the route, promoting the 'Leave No Trace' policy. Community wardens will be provided to patrol the Greenway.		

APPENDIX B
Bridge Assessment

Appendix B.1 - Bridge Assessment

Galway County Council

**Bridge Assessment for Galway
County Council**

Structural Review of 2 No. Bridges
on disused Galway/Clifden Railway
Line

Rep/219233/S001

issue1 | 16 March 2012

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 219233-00

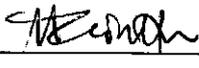
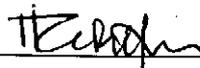
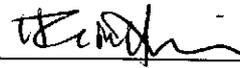
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Galway
Ireland
www.arup.com

ARUP

Document Verification

ARUP

Job title		Bridge Assessment for Galway County Council		Job number		219233-00	
Document title		Structural Review of 2 No. Bridges on disused Galway/Clifden Railway Line				File reference	
Document ref		Rep/219233/S001					
Revision	Date	Filename	Report Issue 1.docx				
Issue 1	16 Mar 2012	Description	Issue 1				
			Prepared by	Checked by	Approved by		
		Name	Hugh Griffin	Hugh Griffin	Hugh Griffin		
		Signature					
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		Description					
			Prepared by	Checked by	Approved by		
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5	Proposed New Structure for Athry Bridge	5

Appendices

Appendix A

Sketches 1- 3

Appendix B

Photographs Cloonbeg Bridge

Appendix C

Photographs Athry River Bridge

1 Introduction

1.1 Galway County Council engaged Arup to prepare a Structural Review Report on 2 No. Bridges (Cloonbeg Bridge and Athry River Bridge) on the disused Galway/Clifden Railway line. Specifically the brief includes (Ref Email Mr K Lydon 30 June 2011).

- A Structural Report on abutments of both bridges
- An assessment on the deck and beams of the Cloonbeg Bridge
- A plan for both bridges for new spans

1.2 A visual inspection of both bridge locations was carried out in December 2011 jointly by Mr Hugh Griffin (Arup) and Mr Kurt Lydon (Galway Co Co). The brief was further clarified as follows:

- The re-development of the bridges will form part of a greenway/cycleway suitable for pedestrians/cyclists
- The Cloonbeg existing bridge deck is to be retained
- The Athry bridge is to be rendered suitable for traffic by tractors and other small vehicles

2 Assessment of Cloonbeg Bridge

2.1 Abutments

- 2.1.1 A visual inspection of both abutments was carried out from the river bank. The river was in spate at the date of the inspection. The central pier could not be inspected (except from the bridge deck) at close range.
- 2.1.2 Both abutments and the central pier are constructed in masonry. There are no obvious cracks or bulges in any of the structures.
- 2.1.3 There was no obvious evidence of structural impairment due to scouring or other cause.

2.2 Bridge Deck and Beams

- 2.2.1 The bridge consists of two spans each of approximately 15.5m (based on information provided by Galway Co Co). As noted above each span is supported on a central masonry pier and on a masonry abutment at the rivers edge.
- 2.2.2 The existing bridge deck consists of two main steel beams (spaced approximately 4.3m apart) supporting steel transverse beams (at 1.25m centres) which in turn support a steel decking. The decking carries a concrete/granular filling. There is a significant build up of rubble debris and plant growth on the bridge decking. The existing arrangement is shown in Sketch 01.
- 2.2.3 The main steel beams are plate girders with stiffeners at 1.25m c/c (i.e. at each transverse beam). There is significant corrosion on the girders themselves and many of the stiffeners have rusted away. Rivets are also missing at plate connections. We do not consider that the girders are suitable as structural members although they are to be retained for historical reasons.
- 2.2.4 The transfer beams are similarly corroded in some locations particularly at connections to the girders. The steel decking has corroded through in some locations. We believe that the new pedestrian bridge should not rely on either the transverse beams or the existing decking although they will be retained.

3 Proposed New Structure for Cloonbeg Bridge

- 3.1 As noted earlier, the existing structure is not to be relied on. We propose to erect a new lightweight steel and timber structure over the existing. Details are shown in Sketch 02.
- 3.2 The design takes account of live loading from pedestrians and cyclists (5Kn/m^2) and no vehicular access is to be allowed onto the bridge.
- 3.3 The existing bridge structure is to be retained and maintained. Apart from the historical significance of the bridge, the dead weight is necessary to limit pedestrian generated vibrations to acceptable levels.
- 3.4 All debris must be removed from the existing deck. The existing bridge will act as a temporary platform for the construction of the new structure. Because of the restricted access to the bridge, it is likely that the main beams will arrive in sections and be spliced together insitu.
- 3.5 The details shown are for the purpose of illustrating the feasibility of construction. They are not to be used for construction.

4 Assessment of Athry Bridge

4.1 Abutments

- 4.1.1 A visual inspection of both abutments was carried out from the river bank. The river was in spate at the date of the inspection.
- 4.1.2 The abutments are constructed in masonry (measured at 520mm at top) and are currently acting as cantilevers as the bridge deck has been removed. There are no obvious cracks, bulges or lack of verticality in the abutment walls.
- 4.1.3 There was no obvious evidence of structural impairment due to scouring or other cause.

4.2 Bridge Deck

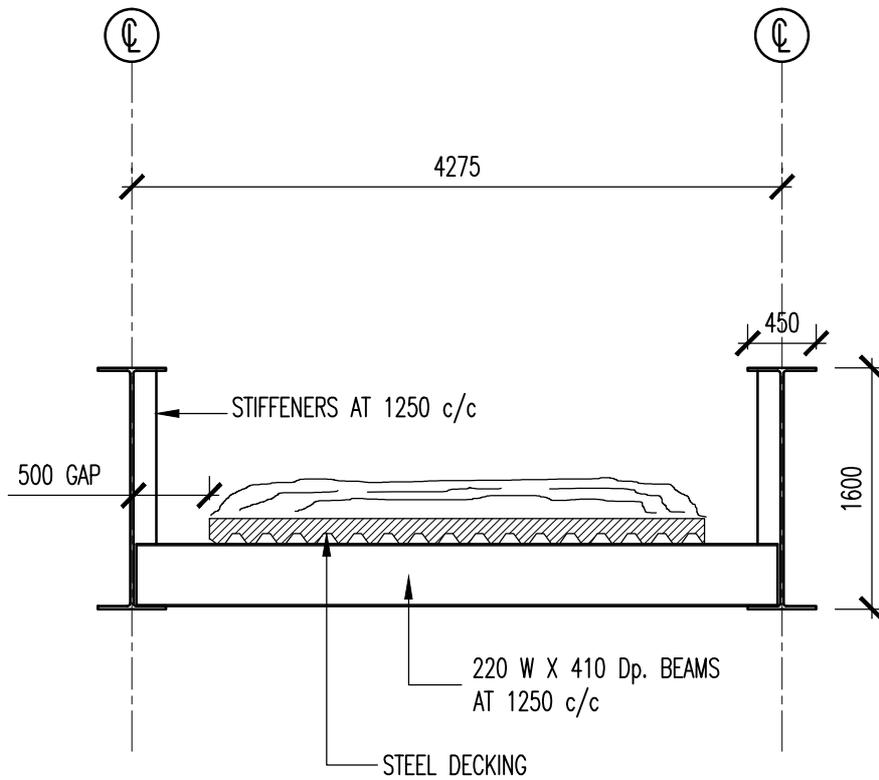
- 4.2.1 The original bridge deck has been removed and the bridge is not currently spanned.

5 Proposed New Structure for Athry Bridge

- 5.1 The bridge span is short (6m approx). We consider that the optimum design solution would involve the erection of a steel structure (3 no beams and metal decking) to act as a permanent shutter for an insitu concrete deck. Details are shown in Sketch 03.
- 5.2 The outline design is based on a single Gross Weight Vehicle of 7.5 tonnes giving rise to axel loads as set out in Annex D of BD21/01 (Assessment of Highway Bridges and Structures Vol 3 Section 4). If a heavier vehicle is considered appropriate then the design will need to be altered.
- 5.3 The details shown are for the purpose of illustrating the feasibility of construction. They are not to be used for construction.

Appendix A

Sketches 1- 3



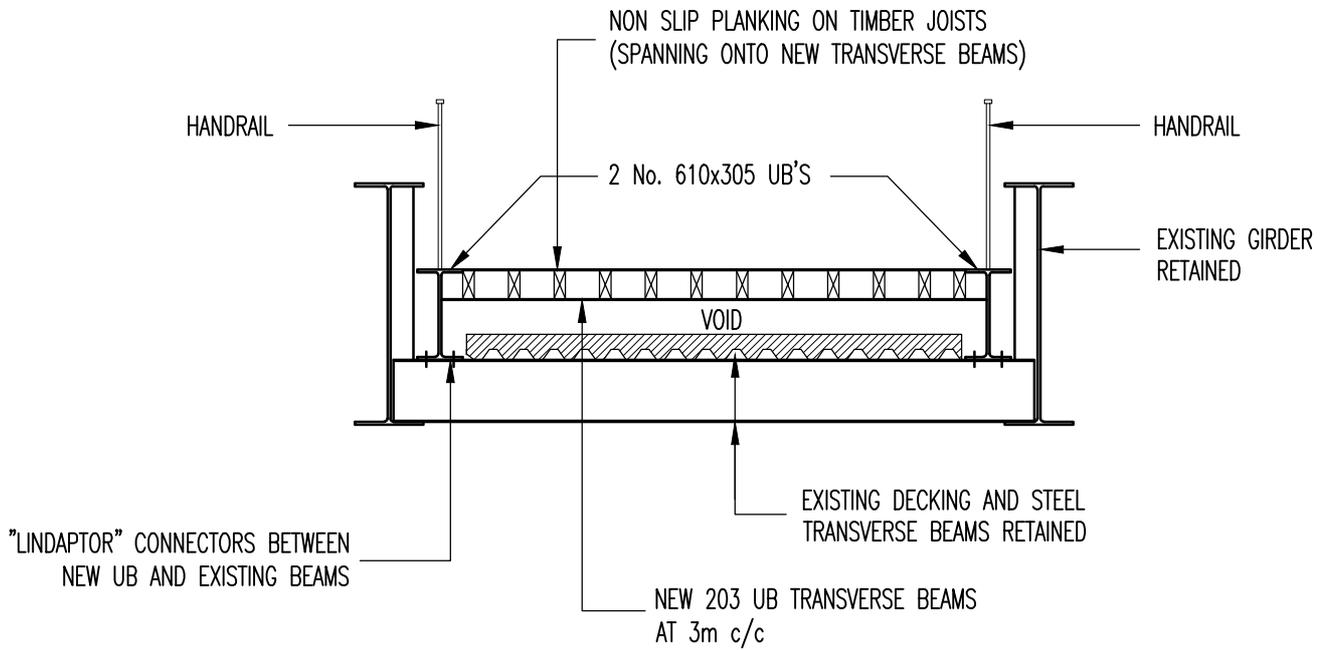
BRIDGE SECTION – EXISTING
(SCALE 1:50)

ARUP

Job Title CLOONBEG BRIDGE

Job No. 219233-00 Sketch No. 01 Rev.

Made By HG Date JAN 2012 Chd.



ALL EXISTING STEEL TO BE WIRE BRUSHED AND RECOATED
 ALL NEW STEEL TO BE GALVANISED
 ALL DEBRIS TO BE REMOVED FROM EXISTING BRIDGE

BRIDGE SECTION – PROPOSED (SCALE 1:50)

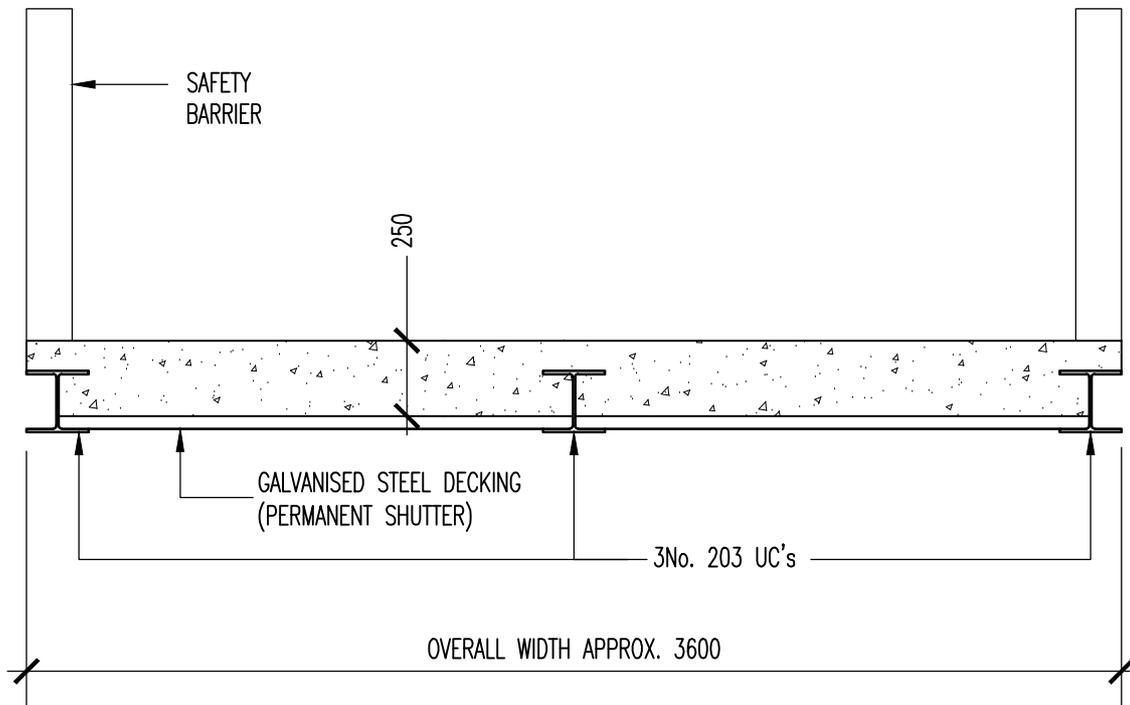
NOT TO BE USED FOR CONSTRUCTION

ARUP

Job Title CLOONBEG BRIDGE

Job No. 219233-00 Sketch No. 02 Rev.

Made By HG Date JAN 2012 Chd.



ALL STEEL TO BE GALVANISED

PROPOSED SECTION
(SCALE 1:25)

NOT TO BE USED FOR CONSTRUCTION

ARUP

Job Title ATHRY BRIDGE

Job No.	Sketch No.	Rev.
219233-00	03	

Made By	Date	Chd.
HG	JAN 2012	

Appendix B

Photographs Cloonbeg Bridge













Appendix C

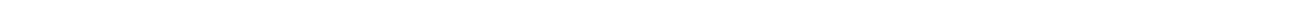
Photographs Athry River Bridge





APPENDIX C

Ecology



Appendix C.1 - NPWS Designated Sites - Site synopsis

SITE SYNOPSIS

SITE NAME: CONNEMARA BOG COMPLEX

SITE CODE: 002034

The Connemara Bog Complex is a large site encompassing the majority of the south Connemara lowlands, Co. Galway. The site is bounded to the north by the Galway-Clifden road and stretches as far east as the Moycullen-Spiddal road. Because of its large size the site contains a wide range of habitats. Extensive tracts of western blanket bog form the core interest, but there are also areas of heath, woodland, lakes, rivers and streams.

The Connemara Bog Complex is underlain predominantly by various Galway granites, with small areas along the northern boundary of Lakes Marble, schist and gneiss. The Roundstone bog area has a diverse bedrock geology composed mainly of the basic intrusive rock, gabbro. An area of rock, possibly Cambrian in age, called the Delaney Dome Formation occurs in the north-west of this area. Gabbro also occurs in the Kilkieran peninsula and near Cashel. The whole area was glaciated in the last Ice Age which scoured the lowlands of Connemara.

The site is a candidate SAC selected for active blanket bog and lagoons, both priority habitats on Annex I of the E.U. Habitats Directive. The site is also selected as a candidate SAC for floating river vegetation, wet and dry heath, alkaline fen, transition mires, lowland oligotrophic lakes, dystrophic lakes, Rhynchosporion, old Oak woodlands, *Molinia* meadows and reefs, all habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive - Atlantic Salmon, Otter, the plant Slender Naiad and the Marsh Fritillary butterfly.

The main habitat within this site is lowland Atlantic blanket bog. Most of the area is covered by blanket peat greater than one metre in depth. The Connemara Bog Complex is characterized by areas of deeper peat surrounded by rocky granite outcrops, covered by heath vegetation. The deeper peat areas are often covered by lakes and river systems. A mosaic of different communities therefore exists. These include, hummock/hollow systems, inter-connecting pools, Atlantic blanket bog pools, flushes, transition and quaking mires, freshwater marshes, lakeshore, lake and river systems. The key plant species of lowland blanket bog are Black Bog-rush (*Schoenus nigricans*), Purple Moor-grass (*Molinia caerulea*), Cross-leaved Heath (*Erica tetralix*), Deergrass (*Scirpus cespitosus*), Common Cottongrass (*Eriophorum angustifolium*), Bog Asphodel (*Narthecium ossifragum*), White Beak-sedge (*Rhynchospora alba*) and Bog Moss (*Sphagnum*) species.

Small patches of deciduous woodland and a large number of oligotrophic lakes add to the habitat diversity of the site. Also occurring within the site are several lagoons (a type of brackish lake) which display considerable variations in size, depth and salinity, resulting in a diverse assemblage of floral and faunal communities.

Nine legally protected plant species occur within this site (Flora (Protection) Order, 1999): Forked Spleenwort (*Asplenium septentrionale*), Parsley Fern (*Cryptogramma crispera*), Bog Hair-grass (*Deschampsia setacea*), Slender Cottongrass (*Eriophorum gracile*), Bog Orchid (*Hammarbya paludosa*), Slender Naiad (*Najas flexilis*), Heath Cudweed (*Omalotheca sylvatica*), Pillwort (*Pilularia globulifera*) and Pale Dog-violet (*Viola lactea*). The rare and threatened species, Dorset Heath (*Erica ciliaris*), Mackay's Heath (*Erica mackaiana*) and Green-winged Orchid (*Orchis morio*) also occur within this site. All the above species are listed in the Irish Red Data Book and Slender Naiad is listed on Annex II of the EU Habitats Directive.

The site is of national importance for wintering populations of Greenland White-fronted Geese. Small flocks (up to 30) are nowadays found on Roundstone Bog and also use the bogs between Recess and Maam Cross. In April 1989 a synchronised ground and air census of the Connemara bogs located 7 flocks of White-fronts, totalling 134-137 birds. In 1991/93 wintering numbers were considered to be not much more than 60 birds.

There is an internationally important breeding area for Cormorants at Lough Scannive with 218 pairs present in 1985 in a colony which is known to have existed pre-1968. Golden Plover, a species listed on Annex I of the EU Birds Directive, nests at up to four locations in the site, with a maximum of two pairs noted at any one location. Another Annex I species known to be present in the site is Merlin. Lough Naskanniva is an important inland breeding site for Common Terns (up to 60 pairs in 1977 and 1992) and Choughs, both of which are also Annex I species under the EU Birds Directive.

Atlantic Salmon, listed under Annex II of the E.U. Habitats Directive occurs in many of the rivers within the site. The Cashla and Ballynahinch systems are good examples of western acidic spate rivers which support the species. Good spawning and nursery grounds for the species occur in these systems. Arctic Charr occurs in a number of lakes within the site: Ballynahinch Lake, Glenicmurrin Lough and Lough Shindilla. The species has also been reported from Lough Oorid and Lough Glendollagh in the past, but has not been recorded from these lakes in recent years. Arctic Charr is listed in the Irish Red Data Book as being threatened.

Otter has been recorded as occurring in the Connemara Bog Complex. Irish Hare, another mammal listed in the Red Data Book, occurs on the site. Common Frog breeds on the site. It is listed in the Irish Red Data Book as internationally important and on Annex V of the EU Habitats Directive.

The main damaging operations and threats in the Connemara Bog Complex are peat-cutting, overgrazing and afforestation. Extensive peat extraction using 'Difco' machines has become common in the region in recent years and cutting by excavator and hopper is also increasing. The handcutting of peat is less threatening as it is usually on a much smaller scale but it still needs to be controlled within the site. Afforestation also threatens the site. Forestry affects habitat uniformity, lake and river catchments, nesting and feeding habitats for animals, and landscape integrity. Overgrazing and poaching by sheep and cattle is a widespread problem within the site,

with erosion of peat ensuing. The above operations are the most extensive but other threats and potentially damaging operations include land drainage and reclamation, fertilization, quarrying and dumping.

In summary, the Connemara Bog Complex encompasses a large area of relatively undamaged lowland Atlantic blanket bog of high conservation significance to Ireland as well as Europe. The site has nine protected and threatened Irish Red Data Book plant species. The site is internationally important for Cormorants and nationally important for Greenland White-fronted Geese and contains nesting sites for Golden Plover. The site supports several bird species listed on Annex I of the EU Birds Directive and a range of plant and animal species listed on Annex II of the EU Habitats Directive.

SITE SYNOPSIS

SITE NAME: CONNEMARA BOG COMPLEX SPA

SITE CODE: 004181

The Connemara Bog Complex SPA is a large site encompassing much of the south Connemara lowlands of Co. Galway. The site consists of three separate areas - north of Roundstone, south of Recess and north-west of Spiddal. It is underlain predominantly by a variety of igneous and metamorphic rocks including granite, schist, gneiss and gabbro. The whole area was glaciated during the last Ice Age which scoured the lowlands of Connemara.

The Connemara Bog Complex SPA is characterized by areas of deep peat surrounded by heath-covered rocky outcrops. The deeper peat areas are often bordered by river systems and the many oligotrophic lakes that occur, resulting in an intricate mosaic of various peatland/wetland habitats and vegetation communities; these include Atlantic blanket bog with hummock/hollow systems, inter-connecting pools, Atlantic blanket bog pools, flushes, transition and quaking mires, as well as freshwater marshes, lakeshore, lake and river systems.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Cormorant, Merlin, Golden Plover and Common Gull.

Lough Scannive, located within Roundstone Bog, supports a nationally important breeding population of Cormorant (160 breeding pairs in 2001). Other breeding birds using the site include Merlin and Golden Plover. A partial survey in 2009 recorded 8 pairs of Merlin at various locations throughout the site; 15 breeding locations for this species were recorded at the site in an earlier survey undertaken in 1985/86. A survey of upland birds in 2004 recorded 27 pairs of Golden Plover within the site. The numerous lakes scattered throughout the site provide suitable breeding locations for Common Gull (45 pairs in 2000); a survey in 2010 recorded 40 pairs of this species at the site.

The site is also utilised by a wintering population of Greenland White-fronted Goose; small flocks of up to 30 birds have been recorded at various locations within the site.

Connemara Bog Complex SPA is of high ornithological importance, in particular for its nationally important breeding populations of Cormorant, Merlin, Golden Plover and Common Gull. It is of note that three of the regularly occurring species, Greenland White-fronted Goose, Merlin and Golden Plover, are listed on Annex I of the E.U. Birds Directive.

30.11.2010

SITE SYNOPSIS

SITE NAME : LOUGH CORRIB

SITE CODE : 000297

Lough Corrib is situated to the north of Galway city and is the second largest lake in Ireland with an area of approximately 18,240 ha (the entire site is 20,556 ha). The lake can be divided into two parts: a relatively shallow basin, underlain by Carboniferous limestone, in the south and a larger, deeper basin, underlain by more acidic granite, schists, shales and sandstones, to the north. The surrounding lands are mostly pastoral farmland, to the south and east, and bog and heath, to the west and north. Rivers, mainly to the east of the site are included within the cSAC as they are important for Atlantic Salmon. These rivers include the Clare, Grange, Abbert, Sinking, Dalgan and Black to the east, as well as the Cong, Bealanabrack, Failmore, Cornamona, Drimneen and Owenriff to the west. In addition to the rivers and lake basin, adjoining areas of conservation interest, including raised bog, woodland, grassland and limestone pavement, have been incorporated into the site.

This site is of major conservation importance and includes 14 habitats listed on Annex I of the E.U. Habitats Directive. Six of these are priority habitats - petrifying springs, *Cladium* fen, active raised bog, limestone pavement, bog woodland and orchid-rich calcareous grassland. The other annexed habitats present include hard water lakes, lowland oligotrophic lakes, floating river vegetation, alkaline fens, degraded raised bogs, Rhynchosporion vegetation, *Molinia* meadows and old Oak woodlands. Species present on the site that are listed on Annex II of this directive are Sea Lamprey, Brook Lamprey, Atlantic Salmon, White-clawed Crayfish, Freshwater Pearl Mussel, Otter, Lesser Horseshoe Bat, Slender Naiad and the moss *Drepanocladus vernicosus*.

The shallow, lime-rich waters of the southern basin of the lake support one of the most extensive beds of Stoneworts (Charophytes) in Ireland, with species such as *Chara aspera*, *C. hispida*, *C. delicatula*, *C. contraria* and *C. desmacantha* mixed with submerged Pondweeds (*Potamogeton perfoliatus*, *P. gramineus* and *P. lucens*), Shoreweed (*Littorella uniflora*) and Water Lobelia (*Lobelia dortmanna*). These *Chara* beds are an important source of food for waterfowl. In contrast, the northern basin contains more oligotrophic and acidic waters, without *Chara* species, but with Shoreweed, Water Lobelia, Pipewort (*Eriocaulon septangulare*), Quillwort (*Isoetes lacustris*), Alternate Water-milfoil (*Myriophyllum alternifolium*) and Slender Naiad (*Najas flexilis*). The last-named is listed under the Flora (Protection) Order, 1999 and is an Annex II species under the EU Habitats Directive.

Large areas of reedswamp vegetation, dominated by varying mixtures of Common Reed (*Phragmites australis*) and Common Club-rush (*Scirpus lacustris*), occur around the

margins of the lake. Reeds swamp usually grades into species-rich marsh vegetation characterised by Slender Sedge (*Carex lasiocarpa*), Water Mint (*Mentha aquatica*), Water Horsetail (*Equisetum fluviatile*) and Bog Bean (*Menyanthes trifoliata*). Of particular note are the extensive beds of Great Fen-sedge (*Cladium mariscus*) that have developed over the marly peat deposits in sheltered bays, particularly in the south-east corner of the lake. Alkaline fen vegetation is more widespread around the lake margins and includes, amongst the typically diverse range of plants, the Slender Cottongrass (*Eriophorum gracile*), a species protected under the Flora (Protection) Order, 1999. Wet meadows dominated by Purple Moor-grass (*Molinia caerulea*) occur in seasonally flooded areas close to the lake shore. These support species such as Sharp-flowered Rush (*Juncus acutiflorus*), Jointed Rush (*J. articulatus*), Carnation Sedge (*Carex panicea*), Devil's-bit Scabious (*Succisa pratensis*), Creeping Bent (*Agrostis stolonifera*) and Tormentil (*Potentilla erecta*), amongst others.

This large site contains four discrete raised bog areas and is selected for active raised bog, degraded raised bog, Rhynchosporion and bog woodland. Active raised bog comprises areas of high bog that are wet and actively peat-forming, where the percentage cover of bog mosses (*Sphagnum* spp.) is high, and where some or all of the following features occur: hummocks, pools, wet flats, *Sphagnum* lawns, flushes and soaks. Degraded raised bog corresponds to those areas of high bog whose hydrology has been adversely affected by peat cutting, drainage and other land use activities, but which are capable of regeneration. The Rhynchosporion habitat occurs in wet depressions, pool edges and erosion channels where the vegetation includes White Beak-sedge (*Rhynchospora alba*) and/or Brown Beak-sedge (*R. fusca*), and at least some of the following associated species, Bog Asphodel (*Narthecium ossifragum*), Sundews (*Drosera* spp.), Deergrass (*Scirpus cespitosus*) and Carnation Sedge (*Carex panicea*).

At Addergoole, on the eastern shores of Lough Corrib, there is an important area of western raised bog. This bog area is one of the most westerly, relatively intact raised bogs in the country. There are also other substantial areas of raised bog along various tributaries of the Corrib in east Co. Galway, namely Slieve Bog, Lough Tee Bog and Killaclogher bog. The active parts of these bogs mostly correspond to the wettest areas, where there are well developed surface features with hummocks, lawns and pools. It is in such areas that Rhynchosporian vegetation is best represented. The dominant species is the aquatic bog moss *Sphagnum cuspidatum*, which is usually accompanied by Bogbean (*Menyanthes trifoliata*), White Beak-sedge, Bog Asphodel, Bog Cotton (*Eriophorum angustifolium*), Bog Sedge (*Carex limosa*) and Great Sundew (*Drosera anglica*). Brown Beak-sedge, a locally rare plant of wet bog pools, has been recorded from a number of the bog areas within the site. At Addergoole a substantial bog lake or soak occurs and this is infilling with large rafts of Rhynchosporion vegetation at present. This area is associated with an important area of wet bog woodland dominated by Downy Birch (*Betula pubescens*).

The largest part of the uncut high bog comprises degraded raised bog. Degraded bog is dominated by a raised bog flora which tends to be rather species-poor because of

disturbance and/or drying-out. The most conspicuous vascular plant species are usually Carnation Sedge (*Carex panicea*), Heather (*Calluna vulgaris*), Bog Cotton, Cross-leaved Heath (*Erica tetralix*), Bog Asphodel and Deergrass. Bog Rosemary (*Andromeda polifolia*) and Cranberry (*Vaccinium oxycoccos*), two species indicative of raised bog habitat, are frequent on both degraded and active areas of raised bog. *Sphagnum* cover is generally low within degraded areas due to a combination of drying-out and frequent burning.

Limestone pavement occurs along much of the shoreline in the lower Corrib basin and supports a rich and diverse flora, including Herb-robert (*Geranium robertianum*), Bloody Crane's-bill (*G. sanguineum*), Carline Thistle (*Carlina vulgaris*), Spring Gentian (*Gentiana verna*), Wild Thyme (*Thymus praecox*), Rustyback (*Ceterach officinarum*), Wood Sage (*Teucrium scorodonia*), Slender St. John's-wort (*Hypericum pulchrum*), Quaking-grass (*Briza media*) and Blue Moor-grass (*Sesleria albicans*). Areas of Hazel (*Corylus avellana*) scrub occur in association with exposed limestone pavement and these include species such as Hawthorn (*Crataegus monogyna*), Buckthorn (*Rhamnus catharticus*), Spindle (*Euonymus europaeus*) with occasional Juniper (*Juniperus communis*). Three Red Data Book species are also found in association with limestone scrub - Alder Buckthorn (*Frangula alnus*), Shrubby Cinquefoil (*Potentilla fruticosa*) and Wood Bitter-vetch (*Vicia orobus*), the latter is also protected under the Flora (Protection) Order, 1999.

Open areas of orchid-rich calcareous grassland are also found in association with the limestone exposures. These can support a typically rich vegetation, including many orchids such as Pyramidal Orchid (*Anacamptis pyramidalis*), Common Spotted-orchid (*Dactylorhiza fuchsii*), Early-purple Orchid (*Orchis mascula*), Frog Orchid (*Coeloglossum viride*), Fragrant Orchid (*Gymnadenia conopsea*), Marsh Helleborine (*Epipactis palustris*), Greater Butterfly-orchid (*Platanthera chlorantha*) and Irish Lady's-tresses (*Spiranthes romanzoffiana*). The latter is protected under the Flora (Protection) Order, 1999.

The Hill of Doon, located in the north-western corner of the lake, is a fine example of a Sessile Oak (*Quercus petraea*) woodland. The understorey is dominated by Sessile Oak, Holly (*Ilex aquifolium*) and occasional Juniper. There are occasional Yew (*Taxus baccata*) and Ash (*Fraxinus excelsior*) and a well developed ground layer dominated by Bilberry (*Vaccinium myrtillus*), Hard Fern (*Blechnum spicant*) and Wood Rush (*Luzula sylvatica*). Woodland also occurs on some of the islands in the lake.

The lake is rated as an internationally important site for waterfowl. Counts from 1984 to 1987 revealed a mean annual peak total of 19,994 birds. In the past a maximum peak of 38,281 birds was recorded. The lake supports internationally important numbers of Pochard (average peak 8,600) and nationally important numbers of the following species: Coot (average peak 6,756), Mute Swan (average peak 176), Tufted Duck (average peak 1,317), Cormorant (average peak 110) and Greenland White-fronted Goose (average peak 83). The latter species is listed on Annex I of Birds Directive. The Coot population is the

largest in the country and populations of Tufted Duck and Pochard are second only to Lough Neagh. 30-41 breeding pairs of Common Scoter occur on the lake (1995 data) as well as breeding populations of Arctic Tern and Common Tern. Other bird species of note recorded from or close to the lake recently include Hen Harrier, Whooper Swan, Golden Plover and Kingfisher. All of these species are listed on Annex I of the E.U. Birds Directive.

Otter and Irish Hare have been recorded regularly within this site. Both of these species are listed in the Red Data Book and are legally protected by the Wildlife Act 1976. Otter is also listed on Annex II of the E.U. Habitats Directive. Lough Corrib is considered one of the best sites in the country for otter, due to the sheer size of the lake and associated rivers and streams and also the generally high quality of the habitats. Atlantic Salmon (*Salmo salar*) use the lake and rivers as spawning grounds. Although this species is still fished commercially in Ireland, it is considered to be endangered or locally threatened elsewhere in Europe and is listed on Annex II of the E.U. Habitats Directive. Lough Corrib is also a well known fishing lake with a very good Trout (*Salmo trutta*) fishery. The lake has a population of Sea Lamprey (*Petromyzon marinus*), a scarce, though probably under-recorded species listed on Annex II of the E.U. Habitats Directive.

A population of Freshwater Pearl-mussel (*Margaritifera margaritifera*), a species listed on Annex II of the E.U. Habitats Directive, occurs within the site. White-clawed Crayfish (*Austropotamobius pallipes*), also listed on Annex II, is well distributed throughout Lough Corrib and its in-flowing rivers over limestone. A summer roost of Lesser Horseshoe Bat (*Rhinolophus hipposideros*), another Annex II species, occurs within the site - approximately 100 animals were recorded here in 1999.

The main threats to the quality of this site are from water polluting activities resulting from intensification of agricultural activities on the eastern side of the lake, uncontrolled discharge of sewage which is causing localised eutrophication of the lake, and housing and boating development, which is causing the loss of native lakeshore vegetation. The raised bog habitats are susceptible to further degradation and drying out due to drainage and peat cutting and, on occasions, burning. Peat cutting threatens Addergoole Bog and already a substantial area of it has been cut away. Fishing and shooting occur in and around the lake. Introduction of exotic crayfish species or the crayfish fungal plague (*Aphanomyces astaci*) could have a serious impact on the native crayfish population. The bat roost is susceptible to disturbance or development.

Despite this ongoing interference however, Lough Corrib is one the best examples of a large lacustrine catchment system in Ireland, with a range of habitats and species still well represented. The lake itself is internationally important for birds and is designated as a Special Protection Area.

SITE SYNOPSIS

SITE NAME: MAUMTURK MOUNTAINS

SITE CODE: 002008

The Maumturk Mountains are situated east of The Twelve Bens and west of the Maumtrasnas, between the Inagh Valley and the Leenaun/Maam road. The site is bounded to the north by Killary Harbour and to the south by the Galway/ Clifden road. Most of the mountains exceed 600 m in height and about half of the land within the site lies above an altitude of 250 m. In addition many rivers criss-cross the site. The main bedrock is quartzite in the south, which forms impressive cliffs but little mineral soil, and shales and slates in the northern area, which weather more easily. Bands of metamorphosed limestone (Lakes Marble Formation) occur at Lissoughter, Maumeen Gap at Knocknagur and Maamturkmore.

The site is a candidate SAC selected for blanket bog, a priority habitat on Annex I of the E.U. Habitats Directive. The site is also selected as a candidate SAC for lowland oligotrophic lakes, alpine heath, siliceous rocky and Rhynchosporion, all habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive – Slender Naiad and Atlantic Salmon.

Wet heath is widespread within the site on the margins of areas of blanket bog and on the lower slopes of mountains where peat depth is less than about 1 metre. The vegetation is typically dominated by Purple Moor-grass (*Molinia caerulea*), with Cross-leaved Heath (*Erica tetralix*) and Heather (*Calluna vulgaris*) locally subdominant. Other frequent species include Tormentil (*Potentilla erecta*), Heath Milkwort (*Polygala serpyllifolia*), Many-stalked Spike-rush (*Eleocharis multicaulis*), Bog Asphodel (*Narthecium ossifragum*) and the sedges *Carex echinata* and *C. panicea*. On drier, more steep slopes, dry heath is present with Bell Heather (*Erica cinerea*) a typical species. Overgrazing by sheep has greatly modified the structure and composition of the heath communities, with a reduction in Heather cover and in places the initiation of soil erosion.

Blanket bog also occurs within this site, some of which is intact and of good quality, with a particularly good example at Caher. Typical bog species are found, including Heather, Purple Moor-grass, Black Bog-rush (*Schoenus nigricans*), Bog Asphodel, Cross-leaved Heath, Bog Cotton (*Eriophorum angustifolium*), Carnation Sedge (*Carex panicea*), the moss *Racomitrium lanuginosum* and locally frequent hummocks of the bog mosses *Sphagnum fuscum* and *S. imbricatum*. In addition, the lichen flora is locally luxuriant and includes the rare *Cladonia rangiferina*. Flushes occur in some areas of the bog, such as on the south slope of Knocknagur. Here, species such as Pondweed (*Potamogeton polygonifolius*), Bulbous Rush (*Juncus bulbosus*), Jointed Rush (*Juncus articulatus*), Spike Rush (*Eleocharis multicaulis*) and various sedges (*Carex panicea*, *C. demissa*, *C. hostiana*) are found. At this location, the scarce Brown Beak-sedge (*Rhynchospora fusca*) is common in the surrounding bog.

Rhynchosporion vegetation is associated with the blanket bog in a few areas of the site. It is characterised by well developed inter-connecting pool systems with quaking carpets of *Sphagnum*. The pool areas are typically dominated by *Sphagnum cuspidatum* and *S. auriculatum*, with Bog Cotton, Bogbean (*Menyanthes trifoliata*), and Sundews (*Drosera anglica* and *D. intermedia*). The quaking flat areas are dominated by White-beaked Sedge (*Rhynchospora alba*), Bog Asphodel and Bog Cotton.

Oligotrophic lakes are well represented in this site, occurring mainly to the south-eastern sector of site near Maam Cross. The principal lakes are Lough Shindilla, Loughanillaun, Lough Nambrackboy, Lough Shannagrena, Maumwee Lough and Lehanagh Lough. Most of these are small to medium sized systems and are of good quality. Typical oligotrophic aquatic species occur, including Quillwort (*Isoetes lacustris*), Pipewort (*Eriocaulon aquaticum*), Water Lobelia (*Lobelia dortmanna*), Shoreweed (*Littorella uniflora*) and Water Milfoil (*Myriophyllum alterniflorum*). Spawning salmon and trout occur in at least Maumwee Lough.

Other habitats present include lowland blanket bog, siliceous quartzite scree, exposed rock, upland grassland on peaty and mineral substrates, river valleys and streams, lakes, and woodland on lake islands.

In areas where base-rich rocks occur at altitude, e.g. Maumeen Gap and Lissoughter, scarce plant species such as Mountain Avens (*Dryas octopetala*) and Alpine Meadow-rue (*Thalictrum alpinum*) and the Red Data Book species, Purple Saxifrage (*Saxifraga oppositifolia*), are found. The site supports a range of other scarce arctic-alpine/mountain plants, including Green Spleenwort (*Asplenium viride*), Brittle Bladder-fern (*Cystopteris fragilis*), Holly Fern (*Polystichum lonchitis*), Beech Fern (*Phegopteris connectilis*), Starry Saxifrage (*Saxifraga stellaris*), Roseroot (*Rhodiola rosea*), Cowberry (*Vaccinium vitis-idaea*), Mountain Sorrel (*Oxyria digyna*), Dwarf Willow (*Salix herbacea*), Lesser Twayblade (*Listera cordata*), Stiff Sedge (*Carex bigelowii*) and Juniper (*Juniperus communis*).

Several other Red Data Book plant species are also found on the site: Slender Cottongrass (*Eriophorum gracile*) and Slender Naiad (*Najas flexilis*) occur in single locations. There is an old record from near Maam Cross for Wood Bitter-vetch (*Vicia orobus*), but this has not been seen on the site in recent years. All of these species are legally protected (Flora Protection Order, 1999) and Slender Naiad is also listed on Annex II of the EU Habitats Directive. The threatened, Marsh Clubmoss (*Lycopodiella inundata*) also occurs within the site.

The site is very important for salmon, a species listed on Annex II of the EU Habitats Directive. The rivers and lakes, and especially the Bealnabrack system, provide high quality spawning and nursery rivers.

Arctic Charr has been recorded in Derryneen Lough and Lough Shindilla. However, only in Lough Shindilla are there recent records for this species. This fish species is listed in the Irish Red Data Book as being threatened in Ireland. The Irish Hare has been recorded from the site and is probably widespread; this endemic subspecies is

also listed in the Red Data Book as being threatened. Common Frog, also a Red Data Book species, breeds on the site. Birdlife on the site includes Dipper, Heron, Kestrel, Meadow Pipit, Raven, Snipe, Stonechat, Wheatear and Woodcock. Peregrine, a species listed on Annex I of the EU Birds Directive, occurs within the site.

The main damaging activities and threats to the Maumturk Mountains are overgrazing, peat-cutting and afforestation. Grazing, in particular by sheep, is widespread and quite severe within the site. This has resulted in the erosion of both lowland and mountain blanket bog and in the modification and destruction of heath communities, particularly in the southern half of the site. Peat-cutting, both by hand and by machine, has become more of a problem in recent years but is largely confined to areas of deep, lowland blanket bog. The above activities are the most extensive but other threats and potentially damaging activities include land drainage and reclamation, fertilization, quarrying and dumping.

This site is of interest as it is a good example of an extensive mountain landscape, containing blanket bog, large areas of heath, siliceous rocky vegetation, oligotrophic lakes and upland grassland. The areas of blanket bog at Teernakill and Caher are largely unaffected by overgrazing and are in very good condition. The presence of rare and protected plant species and of the scarce Arctic Charr adds to the interest of the site.

SITE SYNOPSIS

SITE NAME: THE TWELVE BENS/GARRAUN COMPLEX

SITE CODE: 002031

This is an extensive site situated in the north-west of Connemara, dominated by mountainous terrain. The site is bounded to the south by the Connemara Bog Complex, to the east by the Maumturk Mountains and to the north by Killary Harbour. Included within the site are the Twelve Bens mountain range, the mountains to the north of Kylemore (Doughruagh, Garraun and Benchoona), rivers including the Ballynahinch and Owenglin systems and an area of coastal heath and machair near Glassilaun. The site also includes some extensive tracts of lowland blanket bog which are continuous with the mountains. Most of the mountain summits reach a height in excess of 500 m, the highest being Ben Baun in the Twelve Bens which reaches 730 m. The site includes a large portion of the Connemara National Park and a Statutory Nature Reserve at Derryclare Wood.

Geologically, the site can be divided into two distinct parts. The Twelve Bens are composed of resistant quartzite with schists in the valleys while the mountains north of Kylemore are composed of gneiss and various types of sandstones and mudstones. There are also areas of gabbro (Doughruagh and Currywongaun), mica schist (Muckanaght) and marble outcrops (south of Kylemore Lough). The main soil type within the site is peat.

The site is a candidate SAC selected for active blanket bog a priority habitat on Annex I of the E.U. Habitats Directive. The site is also selected as a candidate SAC for, alpine heath, calcareous rocky, siliceous rocky and siliceous scree vegetation, lowland oligotrophic lakes, Rhynchosporion and old Oak woodlands all habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive - Freshwater Pearl Mussel, Atlantic Salmon, Otter and the plant Slender Naiad.

The predominant vegetation type on the site is upland blanket bog/heath dominated by Heather (*Calluna vulgaris*), Deergrass (*Scirpus cespitosus*), Cross-leaved Heath (*Erica cinerea*) and the mosses *Racomitrium lanuginosum* and *Sphagnum capillifolium*). In places this vegetation can be rich in liverwort species such as *Adelanthus lindenbergianus* and *Bazzania pearsonii*. This unusual type of species-rich dwarf shrub heath is almost confined to the mountains of the west of Ireland and Scotland and is particularly well developed in the Twelve Bens. Close to the mountain summits this blanket bog/heath is often very thin with a high proportion of outcropping bedrock.

Another important and widespread habitat is lowland blanket bog dominated by Purple Moor-grass (*Molinia caerulea*), Black Bog-rush (*Schoenus nigricans*), Cross-leaved Heath and the liverwort *Pleurozia purpurea*. These areas of lowland blanket

bog usually occur in the valleys between the mountains, e.g. the Gleninagh Valley. Rhynchosporion vegetation is well represented around pools, in wet hollows and in quaking and flush areas associated with the lowland blanket bog. White Beak-sedge (*Rhynchospora alba*) occurs in association with such species as Bog Cotton (*Eriophorum angustifolium*), Bogbean (*Menyanthes trifoliata*), Black Bog-rush (*Schoenus nigricans*), and a range of bog mosses, including *Sphagnum auriculatum* and *S. cuspidatum*.

The site contains a large range of others habitats, including upland grassland dominated by Sheep's Fescue (*Festuca ovina*) and Mat-grass (*Nardus stricta*), Sessile Oak (*Quercus petraea*) woodland, scree, oligotrophic (nutrient-poor) lakes, rivers, reedbeds, freshwater marshes, coastal heath, machair, sand dune and salt marsh.

A number of rare, Red Data Book plant species are found within the site: Alpine Saw-wort (*Saussurea alpina*), Holly Fern (*Polystichum lonchitis*), Purple Saxifrage (*Saxifraga oppositifolia*), and the legally protected (Flora Protection Order, 1999) Parsley Fern (*Cryptogramma crispa*). These are generally confined to mountains cliffs above 400 m, where a number of other scarce plant species, for example, Alpine Meadow-rue (*Thalictrum alpinum*), are also found. Other Red Data Book species have also been recorded from the site: Marsh Clubmoss (*Lycopodiella inundata*), Corncockle (*Agrostemma githago*) and the legally protected Heath Cudweed (*Omalotheca sylvatica*). The latter two species have not been recorded from the site in recent years. St. Dabeoc's Heath (*Daboecia cantabrica*), a species which in Ireland is restricted to Connemara and south Mayo, occurs commonly within the site.

The suite of lowland lakes that encircle the mountains represent some of the finest oligotrophic lakes in the country and two rare, Red Data Book plant species, Slender Naiad (*Najas flexilis*) and Pillwort (*Pilularia globulifera*) occur. Slender Naiad is rare in Europe and is listed on Annex II of the EU Habitats Directive.

The site contains several small areas of Sessile Oak woodland, a habitat which is particularly rare in Connemara. The best examples on the site of this habitat are found at Kylemore and on the north shore of Derryclare Lough. Derryclare Wood, a Statutory Nature Reserve, has been particularly well studied. It is composed mostly of Sessile Oak, with some Rowan (*Sorbus aucuparia*), Downy Birch (*Betula pubescens*) and occasional Ash (*Fraxinus excelsior*) forming the canopy layer. There is a well-developed lichen and fungus flora present. The fungal parasite, *Hemigrapha astericus*, a native of Australia and South America, was first recorded in the northern hemisphere from this wood. The Kylemore woods, though heavily infested by Rhododendron (*Rhododendron ponticum*), still retain a diverse flora and support interesting communities of mosses and liverworts, including such species as *Radula voluta*, *Lejeunea holtii*, *L. hibernica*, *L. flava* subsp. *moorei*, *Cephalozia hibernica*, *Teleranea nematodes*, *Campylopus setifolius*, *Oxystegus hibernicus*, *Grimmia hartmanii* and *G. funalis*.

Irish Hare, Otter, Freshwater Pearl-mussel and Common Frog have been recorded from the site. These species are protected under the 1976 Wildlife Act. The Owenglin River and Ballynahinch system supports an important population of Salmon and salmon nursery grounds. Arctic Charr, a species listed in the Irish Red Data Book

as threatened in Ireland, has been recorded from Lough Inagh, Kylemore Lough, Lough Muck and Lough Fee.

Birdlife reported from the site includes Raven, Wheatear, Stonechat, Meadow Pipit, Red Grouse, a declining species of Heather moorland, Snipe, Curlew, Woodcock, Hooded Crow, Twite, Ring Ouzel (the latter two both Irish Red Data Book species) and the EU Birds Directive Annex I species, Peregrine, Merlin, Golden Plover and Chough. The site provides excellent habitat for Peregrine and this species has traditionally bred at several locations within it.

The upland vegetation of the site is most threatened by overstocking with sheep and by afforestation with coniferous species.

The Twelve Bens/Garraun Complex includes a wide variety of habitat types, eight of which are listed on Annex I of the EU Habitats Directive, and populations of many rare or scarce plant and animal species. It is one of the largest and most varied sites of conservation interest in Ireland.

Appendix C.2 - Freshwater Pearl Mussel Survey

**A SURVEY FOR THE FRESHWATER PEARL MUSSEL
MARGARITIFERA MARGARITIFERA (L., 1758)
IN THE RIVERS THAT COULD POTENTIALLY BE IMPACTED
BY THE IMPROVEMENTS TO THE N59 CLIFDEN TO
OUGHTERARD ROAD, COUNTY GALWAY**

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1.0 Background

1.1 The European Union Directive on the Conservation of Natural and Semi-Natural Habitats and of Wild Fauna and Flora (Habitats Directive) lists the freshwater pearl mussel *Margaritifera margaritifera* under Annex II (species whose conservation requires the designation of special conservation areas) and Annex V (species whose taking in the wild and exploitation may be subject to management measures).

1.2 The freshwater pearl mussel has declined throughout its European range. It has been estimated that there was been a decline of more than 90% of individuals in European populations during the 20th Century and whilst large populations still occur, in most countries the mussel has declined dramatically or has become extinct. The freshwater pearl mussel is an endangered species (Pyle *et al.*, 1996; Byrne *et al.*, 2009; Moorkens, 2006a).

1.3 As part of proposals for the upgrading of the Clifden to Oughterard road system in County Galway, a survey of the river and stream systems that could potentially be affected by the construction and operation of the road for the pearl mussel *Margaritifera margaritifera* was undertaken.

1.4 This study has been carried out on behalf of RPS as part of a wider ecological assessment to determine where freshwater pearl mussels are present in the area of any proposed works and what mitigation measures will be necessary to be undertaken to protect any mussels from damage.

2.0 Methodology

2.1 This survey followed NPWS guidelines for the survey of this species (Anon., 2004). There is no standard survey method for finding every pearl mussel in a stretch of river, but the law of diminishing returns operates, where the more effort is put into surveying a small area of mussel habitat, the more mussels will be found (if they are present). Different techniques were applied according to the size of the watercourse surveyed.

2.2 Sections of rivers and streams were surveyed for distances ranging from 50m to 200m depending on the size of the watercourse, at locations in the immediate vicinity of proposed crossing points and at locations downstream.

2.3 For all watercourses, the survey was carried out by two experienced surveyors using standard perspex-bottomed viewing equipment within safe water depths (1.2 metre maximum) and with due regard to health and safety issues. The surveyors worked in parallel approximately 2-3 metres apart, thus allowing the entire river width to be surveyed. For smaller streams, only one surveyor was in the watercourse at any one time.

2.4 The work was carried out from 5th to 7th August 2010, in a bright dry period, when conditions were suitable for survey work to proceed.

3.0 Results

3.1 Descriptions, photographs and locations of survey sections are shown below.

Site 1: Owenglin River, Near Clifden L67668 50508

	
Photo 1.1: View upstream of bridge	Photo 1.2: View downstream of bridge
This was a tumbling, peaty river with cascades and series of weirs. There was very little potential pearl mussel habitat.	There were no live mussels or dead shells found.

Site 2: Owenglin River, East of Clifden L68042 50368

	
Photo 2.1: View downstream of bridge	Photo 2.2: View upstream of bridge
This section had a bedrock dominated substrate. There was very little potential pearl mussel habitat.	There were no live mussels or dead shells found.

Site 3: Owenglin River, East of Clifden L68165 50293

		
<p>Photo 3.1: View upstream</p>	<p>Photo 3.2: View downstream</p>	<p>Photo 3.3: Substrate</p>
<p>This section had a riffle run with a good mix of substrate with cobble, gravel and sand (and very little silt). There was a good bankside vegetation structure with overhanging trees and gorse scrub. This was considered to be potential pearl mussel habitat, but none were seen. Note: there is a waste water treatment unit for the nearby hotel at the bend in the river.</p>		<p>There were no live mussels or dead shells found.</p>

Site 4: Owenglin River, near Heritage Centre L73127 49386

<p>At this point the Owenglin is a shallow stream with pools and cascades, manipulated with revetted and ornamental banks. This is not suitable pearl mussel habitat.</p>	
<p>There were no live mussels or dead shells found.</p>	<p>Photo 4.1: Downstream of centre</p>

Site 5: Bridge GC-N59-022.00 at L74814 49038

This consisted of cascades with bedrock, a waterfall upstream of the road and a deep pool below. There was lots of rubbish in the river. The habitat is unsuitable for pearl mussels.

Site 6: Emlaghdauroe Bridge at L75781 48622

This was a mountain stream with no potential pearl mussel habitat.

Site 7: Lettery Bridge at L77817 48240

		
<p>Photo 7.1: View downstream towards bridge</p>	<p>Photo 7.2: View upstream</p>	<p>Photo 7.3: further upstream</p>
<p>This stream had a relatively steep gradient and good riffle runs. Good black cobble and gravel substrate was found in places. There was unimproved grassland with flushes adjacent to the stream. This had good potential for pearl mussels but none were seen.</p>		<p>There were no live mussels or dead shells found.</p>

Site 8: Glencoaghan River at Glencoaghan Bridge (GC-N59-025.00), just above Ballynahinch Lake at L79681 47609

		
<p>Photo 8.1: Poned section</p>	<p>Photo 8.2: Poned section</p>	<p>Photo 8.3: Swift flowing section</p>
<p>Deep peaty ponded river upstream of the road, with riffle section downstream of the road, shallow with fontinalis-covered boulders. Scoured with small areas of gravels, and then becomes ponded again downstream.</p>		<p>There were no live mussels or dead shells found.</p>

Site 9: Canal Bridge at L80263 47485



Photo 9.1: View upstream of bridge

Photo 9.2: View downstream of bridge

Scoured riffle sections with small areas of gravels, ponded in others.

There were no live mussels or dead shells found.

Site 10: Stream at Athry Lough at L81555 46611



Photo 10.1: View upstream of bridge

Photo 10.2: View downstream of bridge

Photo 10.3: Calcareous flush

Highly silted river, with *Myriophyllum* and filamentous algae common. Shallow, with pebble and sand substrate.

There were no live mussels or dead shells found.

Site 11: Weir Bridge at L83459 47587

<p>Ponded and silty with <i>Phragmites</i> and <i>Nuphar</i> in places. Bridge works in progress (see Photo 11.1).</p> <p>No suitable mussel habitat.</p>	
<p>There were no live mussels or dead shells found.</p>	<p>Photo 11.1: Downstream of bridge</p>

Site 12: Recess River at L86051 47168

	
<p>Photo 12.1: View upstream of bridge</p>	<p>Photo 12.2: View downstream of bridge</p>
<p>Riffle runs with suitable habitat interspersed with ponded areas with <i>Potamogeton</i>, <i>Nuphar</i>, <i>Phragmites</i>, <i>Menyanthes</i>, silted with filamentous algae</p>	<p>There were no live mussels or dead shells found.</p>

Site 13: Recess River just below confluence of Owentooey River and Caher River at L86939 47283

Freshwater pearl mussels : Present and Downstream

	
<p>Photo 13.1: View upstream of bridge</p>	<p>Photo 13.2: View downstream of bridge</p>
<p>Mixed habitats with areas of high water, strong flow, <i>Potamogeton</i> growth. Coniferous forestry on the south bank, rough sheep grazing on the north bank, areas of black cobble with stable sandy gravel.</p>	<p>A population of live pearl mussels was found in areas of suitable stable habitat.</p>

Site 14: Owentooey River at L87115 47589

Freshwater pearl mussels : Present and Downstream

<p>Good habitat of boulders, black cobble with stable sandy gravel. Good habitat upstream and downstream of the road.</p>	
<p>A good population of live pearl mussels was found both upstream and downstream of the road.</p>	<p>Photo 14.1: Owentooey River</p>

Site 15: Caher River at L87471 47034
Freshwater pearl mussels : Downstream

	
<p>Photo 15.1: View downstream of bridge</p>	<p>Photo 15.2: View upstream of bridge</p>
<p>Riffle runs with suitable pearl mussel habitat interspersed with ponded areas with <i>Potamogeton</i>, <i>Nuphar</i>, <i>Phragmites</i>, <i>Menyanthes</i>, silted with filamentous Algae.</p>	<p>There were no live mussels or dead shells found within the surveyed stretch, but live pearl mussels are found downstream.</p>

Site 16: Derrynreen Stream at L88633 46818
Freshwater pearl mussels : Present and Downstream

		
<p>Photo 16.1: View towards bridge</p>	<p>Photo 16.2: View upstream</p>	<p>Photo 16.3: Run with mussels</p>
<p>Generally good riffles with stable cobble & gravel substrate, some filamentous algae.</p>		<p>A good population of live pearl mussels was found downstream of the road.</p>

Site 17: Derrynreen Stream upstream of lake at L89189 46908
Freshwater pearl mussels : Present and Downstream

	
<p>Photo 17.1: Upstream of bridge</p>	<p>Photo 17.2: Downstream towards lake</p>
<p>Good riffle runs with stable cobble & gravel substrate.</p>	<p>A population of live pearl mussels was found upstream of the lake and downstream of the road.</p>

Site 18: Stream between side road and N59 at L89599 46650
Freshwater pearl mussels : Present and Downstream

	
<p>Photo 18.1: Downstream to bridge</p>	<p>Photo 18.2: Upstream</p>
<p>Good riffle runs with stable cobble & gravel substrate.</p>	<p>A population of live pearl mussels was found in riffles close to the footbridge.</p>

Site 19: Small tributary of the Owenriff system E of Glengowla at M09203 42498
Freshwater pearl mussels : Downstream

This tributary was too small to provide constant stable habitat for pearl mussels. There were no live mussels or dead shells found within the surveyed stretch, but live pearl mussels are found downstream in the Owenriff River.

Site 20: Bunowen River (GC-N59-039) at M08387 42358
Freshwater pearl mussels : Downstream

This was found to be a fast flowing shallow river with brightly coloured unstable cobbles that are unlikely to support a sustainable pearl mussel population.



There were no live mussels or dead shells found within the surveyed stretch, but live pearl mussels are found downstream in the Owenriff River.

Photo 20.1: Bunowen River u/s of bridge

Site 21: M05201 43266
Freshwater pearl mussels : Downstream

This small tributary of the Owenriff system was found to be too minor and unstable for pearl mussels.

There were no live mussels or dead shells found within the surveyed stretch, but live pearl mussels are found downstream in the Owenriff River.

Site 22: M04956 43322

Freshwater pearl mussels : Downstream

<p>This small tributary of the Owenriff system was found to be too steep and unstable for pearl mussels upstream, and ponded and boggy downstream. There was high quality acid flushing habitat in the surrounding land.</p>	
<p>There were no live mussels or dead shells found within the surveyed stretch, but live pearl mussels are found downstream in the Owenriff River.</p>	<p>Photo 22.1 Small Owenriff catchment tributary</p>

Site 23: Letterfore River M04202 43927

Freshwater pearl mussels : Downstream

<p>At Letterfore Bridge. This shallow river flows over a series of cascades followed by a steadier regime of shallow black pebble substrate. The river is unlikely to have enough water to support pearl mussels during drought periods.</p>	
	<p>Photo 23.1 Letterfore River</p>

<p>There were no live mussels or dead shells found within the surveyed stretch, but live pearl mussels are found downstream in the Owenriff River.</p>	
<p>Photo 23.2 Letterfore River below cascades.</p>	

Site 24: Owenree River M02250 45164

<p>This river was shallow and silted at the time of survey. The substrate was a combination of boulders, cobbles and gravel. The river is unlikely to have enough water to support pearl mussels during drought periods. Some filamentous algae was present.</p>	
<p>There were no live mussels or dead shells found within the surveyed stretch.</p>	<p>Photo 24.1 Owenree River</p>

Site 25: Owenwee River M02346 45079

<p>This river flows down a rather steep gradient with some cascades, pools and dark substrate of boulders, cobbles and gravel. Some filamentous algae was present.</p>	
<p>There were no live mussels or dead shells found within the surveyed stretch.</p>	<p>Photo 25.1 Owenwee River</p>

Site 26: Stream flowing east into Lough Shindilla L94489 46009

<p>This shallow river flows down from coniferous forestry. It is an upland turbulent stream with cascades.</p>
<p>There were no live mussels or dead shells found within the surveyed stretch.</p>

Site 27: Owenanookera River L93588 46343
Freshwater pearl mussels : Downstream

<p>This shallow river flows into Lough Oorid. It is shallow and laminar downstream of the road, and is very scoured with bright brown sandy substrate with some cobble and pebble. There are also <i>Schoenus nigricans</i> flushes downstream of the road with a good mix of brown mosses, <i>Carex viridula</i> and <i>Pinguicula vulgaris</i>.</p>	
<p>There were no live mussels or dead shells found within the surveyed stretch, however <i>Margaritifera</i> is present downstream.</p>	<p>Photo 27.1 Owenanookera River</p>

Site 28: Stream at L92770 46247
Freshwater pearl mussels : Downstream

<p>This shallow river of 1.5m wide is ponded with emergent weed. This is not suitable pearl mussel habitat.</p>	
<p>There were no live mussels or dead shells found within the surveyed stretch, however <i>Margaritifera</i> is present downstream.</p>	<p>Photo 28.1 Ponded stream</p>

Site 29: Stream at L91680 46274
Freshwater pearl mussels : Downstream

This was a very minor gully and was unsuitable habitat for pearl mussels.

Site 30: Stream at L91652 45983
Freshwater pearl mussels : Downstream

This river is deep and ponded with emergent *Phragmites* reeds and aquatic growths of *Nuphar*. This is currently not suitable pearl mussel habitat, although a record of live pearl mussels has been found in the vicinity in the past (Ross, 1988). The river may have been deepened or otherwise altered since that record in 1983.



Photo 30.1 Ponded stream upstream

There were no live mussels or dead shells found within the surveyed stretch, however *Margaritifera* is present downstream.



Photo 30.2 Ponded stream downstream

Site 31: Stream at L91527 46262
Freshwater pearl mussels : Downstream

This river is shallow with low flows at the time of the survey. The substrate was even and highly compacted.

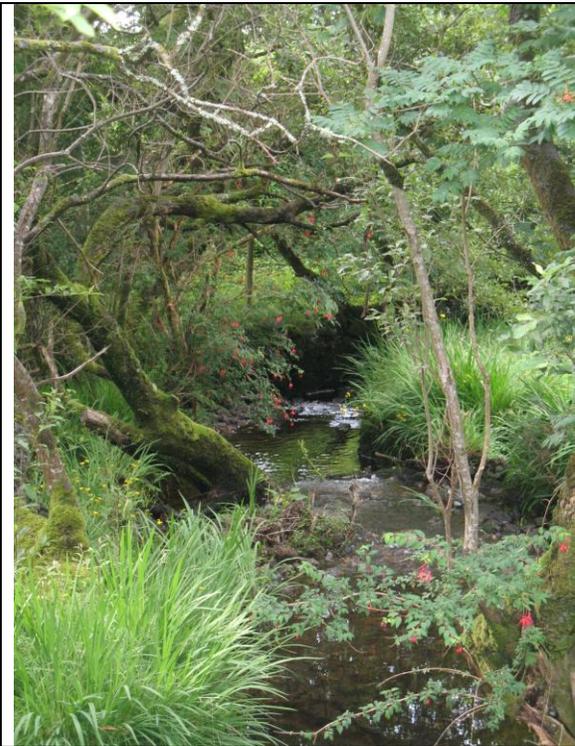


Photo 31.1 Compacted stream

There were no live mussels or dead shells found within the surveyed stretch, however *Margaritifera* is present downstream.



Photo 31.2 Shallow, compacted substrate

Site 32: Streams at Cloonoppeen Bridge at L90360 46091

Freshwater pearl mussels : Present and Downstream

<p>This is a complex of two streams which join together to flow towards Derryneen Lough. The south limb has very stable cobble and gravel substrate and flows in a north westerly direction. The bridge over this stream has been improved with a widened pavement.</p>	
	<p>Photo 32.1 South limb stream</p>
<p>The south limb stream meets the northern limb stream and both streams are somewhat ponded with <i>Potamogeton</i> common.</p>	
	<p>Photo 32.2 South limb meets north limb with ponded conditions</p>

<p>Further upstream, the north limb is shallower, with compacted cobble and gravel and highly silted conditions. There is a major coniferous forest in its upper catchment</p>	
	<p>Photo 32.3. North limb habitat</p>
<p>Below the confluence of the two streams the river flows faster and the habitat becomes more suitable for mussels. There is some growth of <i>Myriophyllum</i>, and some filamentous algae, but the physical substrate is good, although not in ideal condition.</p> <p>A population of living pearl mussels was found to occur within the survey area in the 150m below the confluence.</p>	
	<p>Photo 32.4. Habitat below confluence</p>

Additional Note: Owenriff River

Freshwater pearl mussels : Present and Downstream

A survey was not undertaken in the Owenriff River, as this river has had very substantial recent surveys. The river has a very large, reproducing population of freshwater pearl mussels which is considered to be one of the top populations for this species in the world (Moorkens *et al.*, 2007; Moorkens, 2004, 2005, 2006b, 2007, 2008, 2009).

4.0 DISCUSSION

4.1 Of the 32 watercourses surveyed for this project, 6 were found to have pearl mussels present, and 11 were found to have pearl mussels downstream. Thus, over half of the road improvements in the smaller streams will require the utmost mitigation to prevent siltation. In addition, the road is close the Owenriff River during its final 6 kilometres to Oughterard, and mitigation to prevent damage by siltation or pollutants will be of extreme importance in order not to negatively affect this world renowned SAC.

Increases in sediment movement through rivers and its settlement onto the river bed cause formerly clean gravels to become clogged with fine sediment. This prevents oxygen movement into the waters in the river bed that feed the juvenile mussels, and they quickly die. Each time siltation of gravels occurs, all juvenile mussels below five years of age are killed, and therefore a very low level of silt entering the river is essential on an ongoing basis (Moorkens, 1999; Moorkens *et al.*, 2007).

As with siltation, nutrient enrichment can have serious and ongoing impacts on juvenile mussels. Increased inputs of dissolved nutrients to pearl mussel rivers tend to lead to filamentous algal and macrophyte growth, which can decay to form organic silt.

The key issue with assessment of potential risks to the streams and rivers that support *Margaritifera*, or have *Margaritifera* downstream from any road improvements is management of silt and pollutants. If the construction of the proposed improvements was to result in the release of silt or pollutants such as concrete into the pearl mussel population area of river, through the pathway of smaller streams or rivers, there would be a negative impact on the pearl mussel population. A sub-basin management plan for the Owenriff River has been prepared under the auspices of the wider Water Framework Directive plans. This plan is proposing measures to reduce the current siltation and nutrient levels to improve the population's function, reproduction and juvenile survival levels. Therefore new sources of siltation would be contrary to the improvements that would be conferred by measures taken in the sub-basin plan.

However, if measures could be taken during construction to remove the risk of siltation to the river, then the road improvements would not pose a threat to the mussel population. A full method statement should be prepared showing how the construction of any significant road improvements could be undertaken with no release of silt. This would probably involve multiple silt fence/curtains at the **source** of the siltation (at road works areas), with a methodology that would allow for accumulated silt removal without silt entering the streams leading to the pearl mussel populations, by staged removal of silt fencing.

In addition, it is important to ensure that direct drainage to streams and rivers with pearl mussel populations does not occur, as it would remain a risk of pollution and siltation throughout the operational phase. A methodology of how this is to be achieved along with the construction mitigation should also be presented in the Appropriate Assessment that will be required for the works within the Owenriff Catchment.

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Appendix C.3 – Bat Survey

PROPOSED N59 CLIFDEN TO OUGHTERARD ON-LINE UPGRADE PROJECT, CO. GALWAY

BAT FAUNA STUDY

Prepared for

RPS Consulting Engineers

By

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2nd November 2010



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BAT FAUNA STUDY

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SUMMARY

Upgrading of the existing N59 road between Clifden and Oughterard towns in west Co. Galway is proposed. The proposed carriageway is c. 46km in extent and runs through a low-lying landscape of blanket bog, heath and agricultural grasslands.

This report details the findings and recommendations of a bat study carried out along the route in October 2010. The study was accompanied by an evaluation of habitats in relation to bat distribution and abundance as well as a desk study of known bat presence and activity in the area.

At the west, the area is comprised mainly of low-lying bog and heath habitats with improved or wet grasslands with associated hedgerows and tree lines at the east. Scrub areas are not common, but do occur, along with coniferous plantations. Deciduous woodlands are uncommon but do occur as isolated pockets and these, along with the many local watercourses and water bodies, are the most favourable habitats for bats in the area.

Bat activity in the area was widespread and mainly associated with watercourses, water bodies, hedgerows, tree lines and wooded areas and five bat species were encountered (all bats are protected species) in the area of the proposed route and two others are known to occur locally and others can be expected.

Structures along the route, including 20 bridges and a derelict dwelling were surveyed for bats or signs of their presence. Although some showed potential for bat use, no roosts were found.

Bat species within the survey area will be affected by both the construction phase and subsequent existence of new corridors across the landscape and loss of foraging sites and commuting habitat may displace certain species. Loss of areas of improved agricultural grassland within the route will have a negligible or minor impact on bats. Watercourses should not be significantly impacted by the proposed development and thus bats are likely to continue using them. The main impact on bats arises through the loss of woodlands, hedgerows and trees along the route which are widely used by these animals. Habitat creation will ameliorate certain impacts.

Mitigation measures to safeguard these protected animals are given as part of this report. These include both general and specific measures for protection of bat species, such as limiting season of disturbance, habitat retention and/or replacement where appropriate, provision of alternative roosting sites, work methodologies for bridge upgrading and structure removal, prevention of pollution incidents and limiting run-off from the site during construction.

As the proposed realignment is mainly along the carriageway of the existing N59, the impacts on bats are expected to be negligible to minor if the given mitigation measures are fully implemented and all bat species recorded locally are expected to persist.



TERRESTRIAL FAUNA

1. RECEIVING ENVIRONMENT

1.1 Introduction

1.1.1 Background

Aardwolf Wildlife Surveys was commissioned by *RPS Consulting Engineers*, of the Lyrr Building, IDA Business and Technology Park, Mervue, Galway to carry out a specific study of the bat fauna along the 46km route of the proposed on-line upgrade of the existing N59 Clifden to Oughterard road in Connemara, Co. Galway. Approximately 20% of the planned upgrade will be off-line.

It is well known that these protected animals utilise road verges and associated tree lines and hedgerows as feeding areas and commuting zones between roosts and between roosts and feeding areas. All species of Irish bat have been noted to feed along roads and lanes, field boundaries and woodland edge habitats.

The construction of a new road may adversely affect bats in a number of ways. For instance, construction often entails the removal of vegetation that was previously used by bats. This may impact bats through the creation of open space barriers that bats may be unwilling to cross eventually resulting in a local population decline as bats are prevented from reaching preferred foraging areas. Vehicles using new corridors may also kill bats. Bat roosts in trees or buildings within or immediately adjacent to the road route corridor may have to be removed. The removal of hedgerows and tree lines and the loss of mature trees, draining of wet areas and provision of artificial lighting all affect the availability of invertebrate prey and feeding areas. It is essential therefore that study of bat activity at sites of such development be undertaken to identify any conflict zones and hence to avoid or reduce impacts through mitigation to safeguard these animals.

To comprehensively research and so understand the existing behaviour of bats along the chosen route of the proposed N59 realignment, the approach detailed in the *National Roads Authority's Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes* (NRA 2006a) is being followed.

This report details the results of an on-site study undertaken during the autumn season in October 2010. Reference is made to previous existing records of bat activity and known roosts in the local area sourced from *Bat Conservation Ireland's* (BCIreland) National Bat Records Database and the *National Parks and Wildlife Service's* (NPWS) National Lesser Horseshoe Bat Database. Recommendations for mitigation and enhancement measures in relation to bats are given.

1.1.2 Route location

The area is covered by Ordnance Survey Discovery Series Map numbers 37, 44 and 45.

The section of the existing N59 route proposed for upgrading is within Connemara beginning just east of Clifden town at National Grid Reference L671 505 and runs east through lowlands at the foot of the Twelve Pins Mountains, passing through the village of Recess, to end at the western



boundary of Oughterard town at National Grid Reference M107 427. Elevation along the route varies from 20m to 70m above sea level with the road rising slowly from west to east.

1.2 Bat assessment

This report presents the results of a bat survey and assessment undertaken along the proposed route. The bat fauna occurring within the study area is described and the likely impacts of the development on bat species discussed. Recommendations for mitigation measures are given where necessary and on-line habitats are assessed in relation to bat survey.

The general format of this report is in accordance with guidelines recommended by the EPA (2002) - *Guidelines on the Information to be contained in Environmental Impact Statements*.

The NRA has recently produced a series of guidelines for bats, which have been referred to:

National Roads Authority (2006a) *Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes*. National Roads Authority: www.nra.ie

National Roads Authority (2006b) *Guidelines for the Treatment of Bats during the Construction of National Road Schemes*. National Roads Authority: www.nra.ie

1.2.1 Survey methodology

The present survey and assessment was carried out by Conor Kelleher of *Aardwolf Wildlife Surveys* on the 10th, 11th and 12th of October 2010.

Areas likely to be of interest for bats along the route and in the wider landscape were identified and selected from mapping and aerial photography and assessed, in daylight, on the ground. The nature and type of habitats present are indicative of the species likely to be present. These areas were again visited during the hours of darkness and bat activity was recorded using a heterodyne (*Pettersson D200*) and heterodyne/Frequency Division bat detector (*BATBOX Duet*). Areas of suitable habitat were walked on foot listening for bats with detector, while the wider area of the proposed road was surveyed from a vehicle driven at 20 kph with a detector mounted on the hedge side of the vehicle. Bats were identified by their ultrasonic calls coupled with behavioural and flight observations.

Nocturnal bat activity is mainly bi-modal taking advantage of increased insect numbers on the wing in the periods after dusk and before dawn, with a lull in activity in the middle of the night. This is particularly true of 'hawking' species – i.e. bats which capture prey in the open air. However, 'gleaning' species remain active throughout the night as prey is available on foliage for longer periods. The prime periods for detecting bat activity, therefore, are two hours after dusk and again for a shorter period before dawn.

The field survey was supplemented by evaluation of relevant literature and reviews of the *National Parks and Wildlife Service* (NPWS) National Lesser Horseshoe Bat Roost Database and *Bat Conservation Ireland's* (BCIreland) National Bat Records Database.

1.2.2 Survey constraints

There were no climatic or seasonal constraints on survey assessment as fieldwork was undertaken during a period of high day temperatures of 17° to 20° Celsius. These fell to 11° and 13° Celsius after nightfall and, although survey was in October, bat activity was high due to the mild conditions.



1.3 General description of area

The study area is located in west Co. Galway between the towns of Clifden and Oughterard in Connemara. Most of the route corridor is in flat or gently undulating lowland immediately south of the Twelve Pins Mountains. The principal agricultural land use in the area is for permanent grassland pasture, grazed by cattle, sheep and horses. Coniferous plantations are widespread in the area and water bodies are numerous.

1.4 Brief description of habitats present

1.4.1 Heath and blanket bog

Heath (Plate 2) and blanket bog are dominant in the area especially at the west of the route and the low vegetation associated with these habitats provide the broad and open landscape of Connemara.

1.4.2 Agricultural grasslands

Grasslands in the immediate area include improved pastures used for grazing with field size varying along the route. Wet grasslands also occur in poorly drained areas. These too are mainly used for grazing livestock.

1.4.3 Hedgerows and tree lines

Hedgerows are absent over much of the route and their quality varies considerably where they do occur. Tree lines and hedgerows are best in areas of improved grasslands at the eastern end of the route near Oughterard.

1.4.4 Coniferous woodland

Much of the wet heath and bog areas adjacent to the route have been planted with coniferous forestry. These woodlands are composed of immature or semi-mature stands forming dense areas with little or no ground flora and are often scrubby at the edges (Plates 4 & 7).

1.4.5 Deciduous woodland

Deciduous woodland is rare along the route but does occur in isolated pockets as at the townland of Lettershea and in the central area near the village of Recess (Plate 14). Individual mature trees are also present such as oak *Quercus* spp. at Lettershea (Plate 8).

1.4.6 Watercourses and water bodies

The proposed route is within the catchment of innumerable Loughs, mountain streams and rivers of various sizes which flow toward Lough Corrib to the east and various bays to the west and south where they enter the sea.

1.4.7 Built land and roads

Apart from the existing N59 carriageway, there are many minor roads on-site and tracks that serve as access to farms and houses within the survey area. Disused cottages and houses are also adjacent to the proposed route such as that at Recess (Plate 16).



1.5 Bat fauna – desk study results

The review of existing records of bat species in the area of the proposed route realignment reveals that seven of the ten known Irish species have been observed on or immediately adjacent to the study site. These include common *Pipistrellus pipistrellus* and soprano *P. pygmaeus* pipistrelle, Leisler's *Nyctalus leisleri*, brown long-eared *Plecotus auritus*, Daubenton's *Myotis daubentonii*, Natterer's *M. Nattereri* and lesser horseshoe *Rhinolophus hipposideros* bats as shown in Table 1 below. Further information on the Irish bat species is given in Appendix 1 and 2.

Table 1: Adjudged status of Irish bat species within the study area

Common name	Scientific name	Occurrence	Known roosts	Source
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	Present	No	BCIreland
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	Present	No	BCIreland
Nathusius' pipistrelle	<i>Pipistrellus nathusii</i>	Potential – rare	No	BCIreland
Leisler's	<i>Nyctalus leisleri</i>	Present	No	BCIreland
Brown long-eared	<i>Plecotus auritus</i>	Present	Yes	BCIreland
Lesser horseshoe	<i>Rhinolophus hipposideros</i>	Present	Yes	BCIreland
Daubenton's	<i>Myotis daubentonii</i>	Present	Yes	BCIreland
Natterer's	<i>Myotis nattereri</i>	Present	No	BCIreland
Whiskered	<i>Myotis mystacinus</i>	Potential	No	BCIreland
Brandt's	<i>Myotis brandtii</i>	Potential – rare	No	BCIreland

Roosts of some of these species have also been identified in the area and these are shown in Table 2 below. These were sourced from both the NPWS National Lesser Horseshoe Bat Roost Database and BCIreland's National Bat Records Database. A description of the various roost categories is given in Appendix 3. No roosts are currently known within the proposed route corridor.

Table 2: Known bat roosts adjacent to the study area

Bat species	Roost description	Roost category	Numbers	Distance
Lesser horseshoe	Gatehouse, Ross	Maternity	49	9km southeast
Lesser horseshoe	Ice house, Ross	Hibernation	30	9km southeast
Lesser horseshoe	House, Knockbane	Satellite/Maternity	10	6km east
Lesser horseshoe	House, Oughterard	Maternity	32	3km east
Lesser horseshoe	Cave/mine, Moycullen	Night/Hibernation	1	10km southeast
Daubenton's	Eamonn King's Bridge, Clifden	Night/Hibernation	1	3km south
Unidentified	Riverside Bridge, Clifden	Night/Hibernation	1	1km west
Unidentified	Tonwee Bridge, Oughterard	Night/Hibernation	1	1km northeast

1.6 Bat fauna – field study results

The key locations of importance for bats for commuting and foraging along the proposed route include water bodies, watercourses, woodlands, tree lines and hedgerows. Additional habitats include areas of scrub and scattered trees. Older, mature trees in the area also offer roosting opportunities for bats. Some of these and indeed younger trees also have ivy cover that may be used for roosting by bats on occasion. Older buildings and structures such as bridges offer potential for summer and winter roosting and underground structures have potential as hibernation roosts.



1.6.1 Bat activity findings

The detector surveys within the study area recorded five bat species including common and soprano pipistrelle, Leisler's, Daubenton's and brown long-eared bats.

The pipistrelles were widespread throughout the study area especially along rivers and within the deciduous woodland areas although they also occurred along the edges of coniferous plantations. They were especially active in wooded areas adjacent to water bodies.

Brown long-eared bat was noted hunting to the east of Recess village near the Owentooey River and at Lettershea within the wooded area south of the existing N59 road. This species roosts in trees and buildings; it is a very quiet bat which produces very weak echolocation pulses and sometimes hunts without emitting sounds and so can be missed by detector. It is a common species throughout Ireland and is expected to be widespread in the local area even where undetected.

Leisler's bat, which forages over agricultural landscapes, scrub and woodland as well as urban areas, was detected flying over Clifden, Ballynahinch Lake, Recess, Maam Cross and Oughterard.

Daubenton's bat, which forages over open water, was present over the Owenglin, Owentooey and Owenriff Rivers and Derryclare, Glendollagh and Ardderry Loughs. This species travels over considerable distances along watercourses and, given the expanse of watercourses and water bodies in the local area, it is expected to be widespread.

Although not observed during the present surveys, Natterer's bat is known to occur locally and whiskered/Brandt's *M. mystacinus/M.brandtii* bats are expected to occur occasionally but there are no extant records for these two species. The whiskered bat is an uncommon but widespread species in Ireland. Brandt's bat is the most recent bat species to be found in Ireland being only discovered in 2003 (Mullen, 2007). Records of the species are few to date and, since it cannot be distinguished from the whiskered bat by detector, it is probably often misidentified or overlooked.

The lesser horseshoe bat was not observed but it is known to occur at the east of the route where the habitat is more favourable for the species. The distribution range of this species is restricted to the west of Ireland and it is only known from Counties Mayo, Galway, Clare, Limerick, Kerry and Cork (Kelleher, 2004). However, single specimens have recently been discovered in Lough Key, near Boyle, Co. Roscommon in 2004 (B. Keeley, pers. comm.) and in Tobercurry, Co. Sligo in 2008 (C. Kelleher, pers. obs.), two counties where their low numbers may have caused their presence to be overlooked until now. The species is difficult to detect because of its highly directional and weak echolocation so its presence may go unnoticed. The nearest known roosts of the species to the proposed route are included in Table 2 above.

The remaining Irish bat species, Nathusius' pipistrelle, may occur in the area occasionally, however, to date, its known roosts are restricted to north-east Ireland but it is being recorded more often, probably as a result of climate change, with more animals of this highly migratory species arriving from the continent, and with increased use of bat detectors in Ireland. The species has yet to be recorded in the area of the proposed road realignment but potential exists for its occasional occurrence.

Bat species observed during the present survey along with location and activity noted are given in Table 3 below.



Table 3: Observations of bat species within the study area

Bat species	Location	Activity	Habitat
Common pipistrelle	Throughout area	Foraging & commuting	Hedgerows, tree lines, woodland, scrub, rivers, vegetated lake edges
Soprano pipistrelle	Throughout area	Foraging & commuting	Hedgerows, tree lines, woodland, scrub, rivers, vegetated lake edges
Brown long-eared	Recess, Lettershea	Foraging	Woodland
Leisler's	Clifden, Ballynahinch Lake, Recess, Maam Cross, Oughterard	Foraging & commuting	Built-up areas, fields, water body
Daubenton's	Owenglin River, Owentooey River, Owenriff River, Derryclare Lough, Glendollagh Lough, Ardderry Lough	Foraging & commuting	Water courses and water bodies

1.6.2 Structure survey results

Several structures along the proposed route realignment were inspected for their potential to harbour bat roosts including 20 bridges and a derelict two-storey dwelling. Each of these is listed in Table 4 below along with its location, Chainage and adjudged potential to be used by bats. Plate numbers of photographs in Appendix 5 are also given.

The structures varied in their favourability for use by bats. Some of the bridges have been completely sealed with concrete beneath their arches which prevents bat use while others have many very deep crevices between stonework in which bats can secrete themselves. Some bridges are very low and are therefore prone to flooding and this, coupled with the higher risk of predation for bats roosting at low levels, ensures that these structures are avoided by these animals. At least one structure (GC-N59-028-00) is unfavourable for bat use as both sides are completely vegetated which prevents their access. Bat tubes (artificial roost units) are present in two structures: unnamed bridge GC-N59-022-00 (Plates 5 & 6) and Buns Kavanaugh Bridge GC-N59-035-00 (Plate 18) but no bats were present within these units at time of survey.

A derelict, two-storey property immediately adjacent to the existing N59 road at Recess was also inspected but no evidence of bat presence was found. Although no bats or their signs were observed, the building has potential to be used by bats on occasion.

None of the structures inspected showed evidence of bat presence at time of survey but this is understandable as bat use of such structures is mainly confined to the summer and winter seasons.

Table 4: Structures investigated for potential as bat roosting locations

Structure	Plate	Townland	Chainage	Bat roost potential
Bridge GC-N59-020-00	1	Killymongaun	223650.000	Limited but some crevices present



Structure	Plate	Townland	Chainage	Bat roost potential
Bridge GC-N59-021-00	3	Lettershea	230750.000	Nil – low, prone to predation and flooding
Bridge GC-N59-022-00	5 & 6	Lettershea	231200.000	Bat tubes present
Emlaghdauroe Bridge GC-N59-023-00	9	Emlaghdauroe	232380.000	High potential – many crevices
Lettery Bridge GC-N59-024-00	10	Lettery	234420.000	Nil – sealed
Glencoaghan Bridge GC-N59-025-00	11	Derrynavglau	236530.000	Nil – no suitable bat access
Canal Bridge GC-N59-026-00	12	Derrynavglau	237120.000	Nil – sealed
Weir Bridge GC-N59-027-00	13	Lissoughter	241070.000	Nil – sealed
Bridge GC-N59-028-00		Lissoughter	242900.000	Nil – no suitable bat access - vegetated
Bridge GC-N59-029-00	15	Caher	244900.000	Nil – sealed
Derelict dwelling	16	Recess	244740.000	No evidence of bat presence
Bridge GC-N59-030-00	17	Derryneen	246440.000	Nil – no suitable bat access
Cloonoppeen Bridge GC-N59-031-00		Derryneen	248490.000	Nil – low, prone to predation and flooding
Bridge GC-N59-032-00		Shannakeela	249400.000	Nil – low, prone to predation and flooding
Bridge GC-N59-033-00		Shannakeela	249490.000	Nil – low, prone to predation and flooding
Bridge GC-N59-034-00		Shannakeela	250130.000	Nil – low, prone to predation and flooding
Bunskannive Bridge GC-N59-035-00	18	Bunskannive	251770.000	Bat tube present
Lurgan Bridge GC-N59-036-00	19	Derroogh North	254810.000	Limited but some crevices present
Bridge GC-N59-037-00		Tullaghaboy	261500.000	Limited but some crevices present
Letterfore Bridge GC-N59-038-00		Letterfore	263300.000	Limited but some crevices present
Glengowla Bridge GC-N59-039-00		Glengowla	268340.000	Nil – no suitable bat access

1.7 Overall assessment of scientific interest of area for bats

The principal areas of ecological interest in relation to bats present on or near the route include:

1. Rivers and Loughs: these large watercourses and water bodies provide foraging habitat and commuting routes across the area for bats. Such watercourses and water bodies are considered as of high local or national value.
2. Deciduous woodlands: although uncommon within the study area especially at the west, broadleaved woodlands provide roosting, foraging and commuting opportunities for bats. Considered as of high local value.
3. Coniferous woodlands and associated scrub: although dense, these habitats provide foraging and commuting areas for bats along their edges. Considered as of moderate local value.



1.7.1 Heath and bog

The lack of shelter within heath and bog habitats due to their low vegetation is unfavourable for bats but, in calm summer weather, the flowering plants may attract night-flying insects for bat consumption. Therefore, these may be considered as of moderate local value in relation to bats.

1.7.2 Agricultural areas and associated hedgerows and tree lines

Most of the agricultural areas may be considered as of low or negligible interest from a bat perspective. The habitats on site are low-grade and widespread. However, a few of the hedgerows on site at the east are relatively diverse and therefore of low local value being used for both commuting and foraging.

1.7.3 Coniferous woodland and scrub

Scrub and coniferous woodland habitats at the west of the route provide areas where insect prey can accumulate for bat foraging. However, because of the presence of deciduous woodland and the connectivity of hedgerows and tree lines at the east of the route these are less important in this area. Therefore, these may be considered as of moderate local value in relation to bats.

1.7.4 Deciduous woodland

Stands of deciduous trees only occur in small, isolated pockets within the study area but, where these are present, bat diversity and activity is heightened. Therefore, these may be considered as of high local value in relation to bats.

1.7.5 Watercourses and water bodies

Rivers and streams, and their associated riparian habitat provide important wildlife corridors for a number of mammalian (including bats), avian, and invertebrate species of conservation interest, and their quality should be maintained. The watercourses form part of the Lough Corrib catchment, portions of which are included in SAC designations.

1.8 Legal status - bats

All Irish bat species are protected under the Wildlife Act (1976) and Wildlife Amendment Act (2000). Also, the EC Directive on The Conservation of Natural habitats and of Wild Fauna and Flora (Habitats Directive 1992), seeks to protect rare species, including bats, and their habitats and requires that appropriate monitoring of populations be undertaken. Across Europe, they are further protected under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982), which, in relation to bats, exists to conserve all species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was instigated to protect migrant species across all European boundaries. The Irish government has ratified both these conventions.

All Irish bats are listed in Annex IV of the Habitats Directive and the lesser horseshoe bat is further listed under Annex II.

The current status and legal protection of the known bat species occurring in Ireland is given in Table 5 below.

Table 5: Legal status and protection of the Irish bat fauna



Common and scientific name	Wildlife Act 1976 & Wildlife (Amendment) Act 2000	Irish Red List status	Habitats Directive	Bern & Bonn Conventions
Common pipistrelle <i>Pipistrellus pipistrellus</i>	Yes	Least Concern	Annex IV	Appendix II
Soprano pipistrelle <i>P. pygmaeus</i>	Yes	Least Concern	Annex IV	Appendix II
Nathusius pipistrelle <i>P. nathusii</i>	Yes	Least Concern	Annex IV	Appendix II
Leisler's bat <i>Nyctalus leisleri</i>	Yes	Near Threatened	Annex IV	Appendix II
Brown long-eared bat <i>Plecotus auritus</i>	Yes	Least Concern	Annex IV	Appendix II
Lesser horseshoe bat <i>Rhinolophus hipposideros</i>	Yes	Least Concern	Annex II Annex IV	Appendix II
Daubenton's bat <i>Myotis daubentonii</i>	Yes	Least Concern	Annex IV	Appendix II
Natterer's bat <i>M. nattereri</i>	Yes	Least Concern	Annex IV	Appendix II
Whiskered bat <i>M. mystacinus</i>	Yes	Least Concern	Annex IV	Appendix II
Brandt's bat <i>M. brandtii</i>	Yes	Data Deficient	Annex IV	Appendix II

NB: Destruction, alteration or evacuation of a known bat roost is a notifiable action under current legislation and a derogation licence **has** to be obtained from the National Parks and Wildlife Service **before** works can commence.

Furthermore, it should be noted that any works interfering with bats and especially their roosts, including for instance, the installation of lighting in the vicinity of the latter, may only be carried out under a licence to derogate from Regulation 23 of the Habitats Regulations 1997, (which transposed the EU Habitats Directive into Irish law) issued by NPWS. The details with regards to appropriate assessments, the strict parameters within which derogation licences may be issued and the procedures by which and the order in relation to the planning and development regulations such licences should be obtained, are set out in Circular Letter NPWS 2/07 "Guidance on Compliance with Regulation 23 of the Habitats Regulations 1997 - strict protection of certain species/applications for derogation licences" issued on behalf of the Minister of the Environment, Heritage and Local Government on the 16th of May 2007 - reproduced in Appendix 4.

2. Potential impacts of proposed development on bats

Bat species within the survey area will be affected by both the construction phase and subsequent existence of the upgraded and realigned road corridor across the landscape. Loss of foraging sites and commuting habitat may displace certain species apart from Leisler's bat which is a high flying species so will not be impacted unduly by the road scheme.

2.1 Impacts on bat fauna

The results of the present study indicate that a diverse range of bat species use the landscape surrounding the proposed route and the key impacts on these animals arise through loss of potential roosts, loss of feeding areas and disruption of commuting routes.



A variety of habitats occur along the route, which vary in their importance for bats. The loss of areas of improved agricultural grassland will have a negligible or minor impact on bats. Watercourses should not be significantly impacted by the proposed development and thus bats are likely to continue using them. The main impact on bats arises through loss of woodland, hedgerows and tree lines along the route which are widely used by these animals.

Bats are often faithful to a particular roost site from year to year. Structures occupied by bats are typically maternity roosts where females congregate to give birth. The loss of such sites can have serious implications for a colony as there may be no other suitable sites in the area. The loss of roosts is believed to be one of the major factors contributing to declines in bat populations throughout Europe. Due to the large number of watercourses and water bodies in the area, the section of N59 proposed for realignment includes several bridges. The upgrading of these structures needs to be undertaken with sensitivity as the potential of these structures to harbour bats is high in some cases and mitigation measures are required to safeguard animals present at time of construction.

No extant bat roosts were identified in any of the on-site structures but several of these show potential for bat use also, large deciduous trees on or adjacent to the scheme may harbour bats occasionally especially if ivy covered. Mitigation measures are given to safeguard any bats present in such sites.

2.2 Potential impacts on surrounding areas

2.2.1 Adjoining areas

In general, the proposed development is expected to have negligible impact on bats in surrounding areas through habitat loss.

2.2.2 Water bodies and watercourses

The development is within the catchment of several large water bodies and there could be downstream impacts on these via on-site watercourses however, providing that measures are taken to minimise sedimentation and pollution of watercourses during construction and operation phases, there should be no long-term significant impacts.

3. Mitigation measures

Standard mitigation measures, as would apply to any large-scale development, will need to be adopted in the upgrading of the existing carriageway and construction of off-line sections. These include limiting season of disturbance to trees and vegetation so as to reduce impacts on breeding species, to provide for habitat replacement and measures to reduce pollution and sedimentation into watercourses during construction and operation phases. Specific measures are required to protect bats on-site.

The following mitigation measures are in line with the NRA Guidelines on provisions for the conservation of bats during the planning and construction of roads (2006). Reference is made to the NRA Guidelines (*Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes*) and the *Guidelines for the Treatment of Bats during the Construction of National Road Schemes*).



Buildings

Should any buildings on or adjacent to the route require removal, they shall first be surveyed for bat presence. If bats are found, the following measures will be implemented:

Any work or demolition of buildings or structures identified as bat roosts or having the greatest potential for bat use shall preferably be undertaken within the winter months - November to March – as bat numbers are then known to be fewer in buildings. This would reduce impact to bats present on-site.

A sufficient number of *Schwegler* bat boxes shall be erected at a suitable nearby location one month prior to demolition to provide an alternative roosting site for the bats.

Demolition of structures where bat signs are observed shall be done carefully with the expectation that bats may be found. The roof of such structures shall be carefully removed by hand to protect any animals which may be beneath. If discovered, bats shall be retained in a box until dusk then released on site.

Bridges

Any re-pointing or pressure grouting of existing bridges identified as having potential for bat use shall only proceed after a further inspection of the structure for bats and measures taken to protect any animals found to be present. Some crevices beneath existing bridges shall be retained for bat use during such works according to best practice bat mitigation measures for bridge works (see *Billington, G. E. & Norman, G. M. 1997, Highways Agency 2001 and Joint Nature Conservation Committee 2004 and Shiel, C. 1999*). This can be easily done at no extra cost and without affecting the integrity of structures. Studies have shown that bats use a variety of crevice sizes in bridges from 13mm to 70mm in width to 350mm to 1m in depth for summer roosts and deeper for winter hibernation sites.

Widening of the existing N59 carriageway

Widening of the existing carriageway shall be carried out on the least ecologically sensitive side of the road i.e. woodlands and mature trees adjacent to the carriageway shall be avoided.

Potential bat roosts in trees

Several species of bats roost in trees. Where possible, tree lines and mature trees that are located immediately adjacent to the line of the proposed route or are not directly impacted shall be avoided and retained intact. Overall impacts on these sites shall be reduced through modified design and sensitivity during construction. Any existing mature trees adjacent to the corridor and any construction sites to be retained shall be protected from root damage by machinery by an exclusion zone of at least 7 metres or equivalent to canopy height. Such protected trees shall be fenced off by adequate temporary fencing prior to other works commencing.

Mature trees, which are to be removed, shall ideally be felled in the period late August to late October, or early November, in order to avoid the disturbance of any roosting bats as per NRA guidelines and also to avoid the bird nesting seasons. Tree felling shall be completed by Mid-November at the latest because bats roosting in trees are very vulnerable to disturbance during their hibernation period (November – April). Ivy covered trees, once felled, shall be left intact on-site for 24 hours to allow any bats beneath the foliage to escape prior to disposal.

Lighting restrictions

In general, artificial light creates a barrier to commuting bats so lighting shall be minimised along the proposed realignment especially at areas of interest for bat species. Lighting shall especially be avoided at bridges as this would impact on foraging and commuting Daubenton's bats and may also prevent use of installed bat tubes. Where lighting is required, directional lighting (i.e. lighting which only shines on the road and not nearby countryside) shall be used to prevent overspill. This shall 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.



Compensation for loss of commuting routes

Linear features such as hedgerows and tree lines serve as commuting corridors for bats (and other wildlife) and these shall be retained and/or replaced where possible. Any bank side vegetation along watercourses requiring removal shall be replaced with native shrubs/trees after works. Native plant species attract more insects than non-native species. This is especially important adjacent to bridges identified as having bat roosting potential.

4. Conclusions

As the proposed realignment is mainly along the carriageway of the existing N59, the impacts on bats are expected to be negligible to minor if the given mitigation measures are fully implemented and all bat species recorded locally are expected to persist.



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6. APPENDICES

6.1 APPENDIX 1: bat ecology

Introduction

The bat is the only mammal that is capable of true flight using modified hands and arms which are covered by a supple membrane of skin. This ability has allowed bats to exploit aerial insect prey and avoid predation. As the largest mammalian group after the rodents (to which they are not related), bats are very successful and have diversified into over 1,200 species worldwide, representing almost a quarter of all mammal species. Within such diversification, they have evolved a range of hunting strategies, means of reproduction, roosting behaviours and social interactions (Kunz, 1982). They are found throughout the world and in every continent apart from Antarctica.

Bats are classified within the Order Chiroptera (meaning 'Hand-wing') and this is further divided into two Superfamilies: the Megachiroptera and Microchiroptera. The former are mainly fruit-eaters while the latter are predominantly insectivorous. Of these, 49 bat species are currently known in Europe.

Irish bat species

In Ireland, ten species of bat are currently known to be resident. These are classified into two Families: the Rhinolophidae (Horseshoe bats) and the Vespertilionidae (Common bats). The lesser horseshoe bat *Rhinolophus hipposideros* is the only representative of the former Family in Ireland. All the other Irish bat species are of the latter Family and these include three pipistrelle species: common *Pipistrellus pipistrellus*, soprano *P. pygmaeus* and Nathusius' *P. nathusii*, four *Myotis*: Natterer's *Myotis nattereri*, Daubenton's *M. daubentonii*, whiskered *M. mystacinus*, Brandt's *M. brandtii*, the brown long-eared *Plecotus auritus* and Leisler's *Nyctalus leisleri* bats.

Individual species accounts with distribution maps are given in Appendix 2.

Hunting with sound

The microbats are unique as they use a type of sonar, called echolocation, by which they hunt their prey. This is a stream of sound produced at high frequencies which allows the animal to build-up a complete 'sound picture' of their surroundings. These sounds are produced well beyond the range of human hearing. Using these sounds, the bats are able to detect the clutter of nearby leaves, hear an insect, know how fast it is travelling, how fast its wings are beating, whether it is hard or soft bodied etc. before closing in for the catch. Although bats use this method to find their way around, they also use their eyes to see in low light levels.

All the European bat species feed exclusively on insects and/or spiders and a pipistrelle, weighing only 4 to 8 grams, will eat up to 3,500 insects every night. This allows the bat to increase its body weight by 50% each night but this is immediately burned off through calorie consumption while flying. Such feeding ensures a build up of fat in the form of brown adipose tissue between the shoulder blades of the bat which acts as a winter fuel store to keep the animal alive while in hibernation.

Roosting behaviour



Bats naturally roost in caves and trees but some species have recently adapted to using man-made structures for roosting. Being social animals, these roosts can reach substantial numbers in the peak period of bat activity in mid-summer and especially if the roost has been selected as a maternity site. These nursery roosts are mainly composed of breeding females but often they include some non-breeding females and males that may be the previous season's young still with their mother. Males are more solitary and form smaller roosts apart from the females.

For summer roosts, bats seek warm temperatures but, for hibernation in winter, they require constant temperatures of only 5° or 6°C and humid surroundings to keep from dehydrating. In mild winters, bats will emerge from such sites to hunt should insects be on the wing.

Breeding and longevity

In autumn, male bats attract females by song flights and form harems with up to 20 females being defended by a male. After mating, the males take no further part in the rearing of the young.

Irish bats can produce one young per year but, more usually, only one young is born in spring every two years (Boyd & Stebbings, 1989). There is no fixed pregnancy period and gestation is governed by ambient temperature. The slow rate of reproduction by bats inhibits repopulation in areas of rapid decline. Although bats have been known to live for twenty or more years, this is rare as most die in their first and the average lifespan, in the wild, is four years. The survival of the young is closely linked to climate and poor weather in spring and summer can result in high infant mortality.

Threats

All bat species are in decline as they face many threats to their highly developed and specialised lifestyles. Many bats succumb to poisons used as woodworm treatments within their roosting sites (Racey, P. A. & Swift, S. 1986). Agricultural intensification, with the loss of hedgerows, tree lines, woodlands and species-rich grasslands have impacted bat species also. Habitual roosting or hibernation sites in caves, mines, trees and disused buildings are also often lost to development. Summer roosts are prone to disturbance from vandals. Agricultural pesticides accumulate in their prey, reaching lethal doses (Jefferies, D. J. 1972). Chemical treatments in cattle production sterilise dung thus ensuring that no insects can breed within it to be fed upon by bats. Likewise, river pollution, from agricultural runoff, reduces the abundance of aquatic insects. Road building, with the resultant loss of foraging and roosting sites is a significant cause in the reduction of bat populations across Europe.

Extinction

As recently as 1992, the greater mouse-eared bat *Myotis myotis* became the first mammal to become extinct in Britain since the wolf in the 18th century.

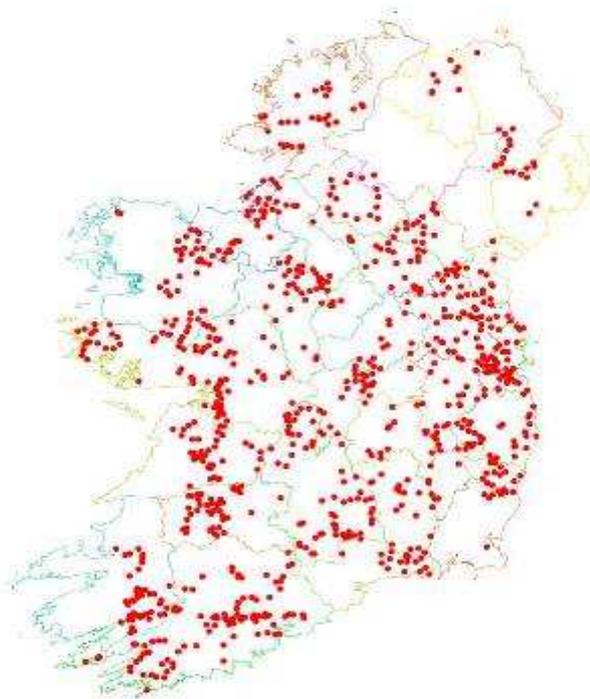
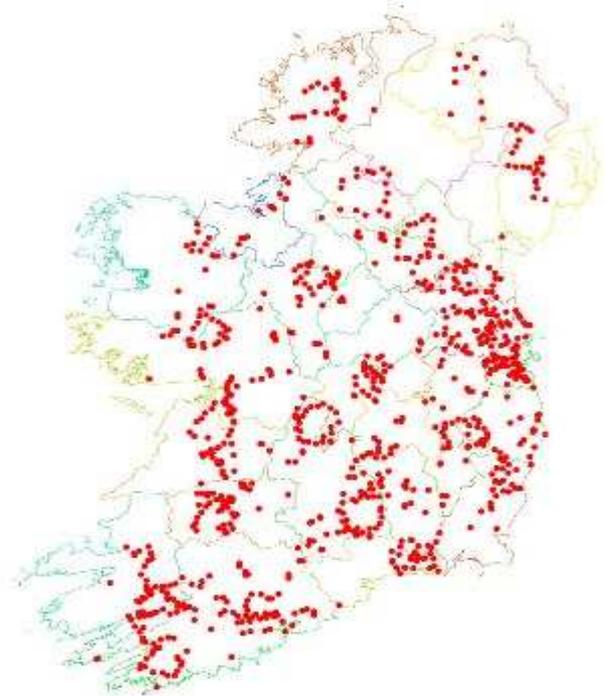


6.2 APPENDIX 2: description of bat species known or expected on-site

Brief species accounts and current known distribution (maps from *Bat Conservation Ireland*)

Common pipistrelle *Pipistrellus pipistrellus*

This species was only recently separated from its sibling, the soprano or brown pipistrelle *Pipistrellus pygmaeus*, which is detailed below (Barratt, E. M. et al, 1997). The common pipistrelle's echolocation calls peak at 45 kHz. The species forages along linear landscape features such as hedgerows and treelines as well as within woodland.



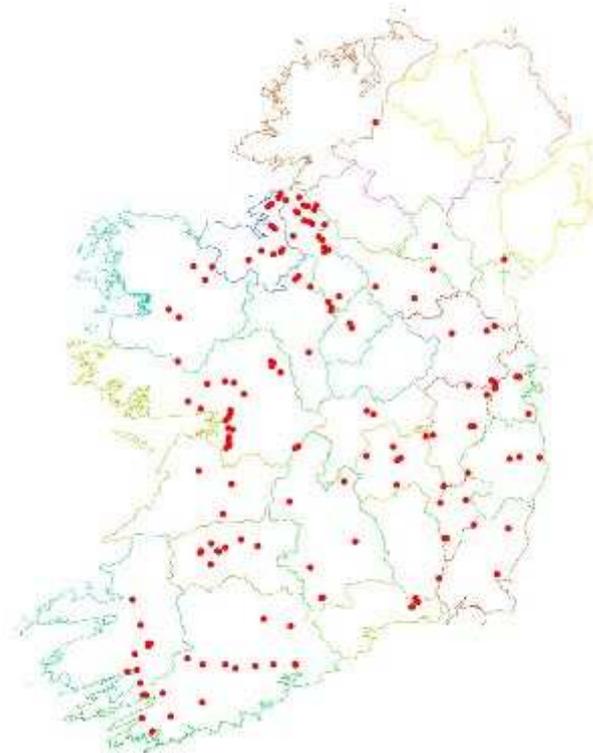
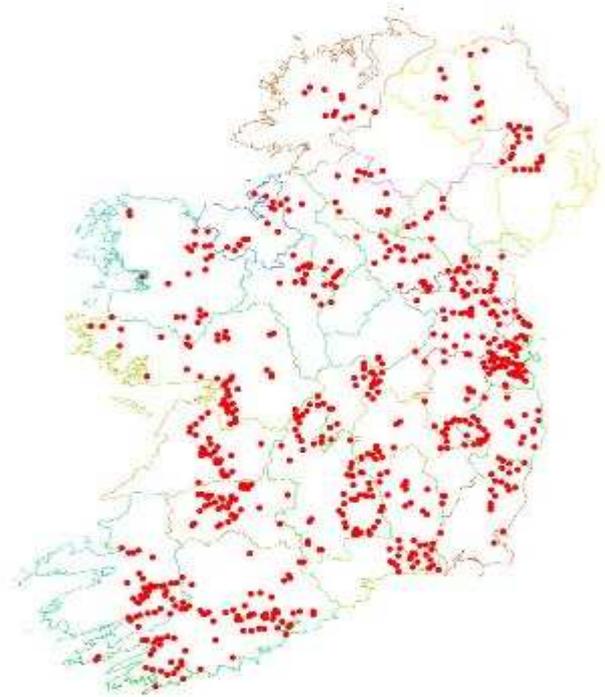
Soprano pipistrelle *Pipistrellus pygmaeus*

The soprano pipistrelle's echolocation calls peak at 55 kHz, which distinguishes it readily from the common pipistrelle. The pipistrelles are the smallest and most often seen of our bats, flying at head height and taking small prey such as midges and small moths. Summer roost sites are usually in buildings but tree holes and heavy ivy are also used. Roost numbers can exceed 1500 animals in mid-summer.



Leisler's bat *Nyctalus leisleri*

This species is Ireland's largest bat, with a wingspan of up to 320mm; it is also the third most common bat, preferring to roost in buildings, although it is sometimes found in trees and bat boxes. It is the earliest bat to emerge in the evening, flying fast and high with occasional steep dives to ground level, feeding on moths, caddis-flies, and beetles. The echolocation calls are sometimes audible to the human ear being around 15 kHz at their lowest. The audible chatter from their roost on hot summer days is sometimes an aid to location. This species is uncommon in Europe and Ireland holds the largest national population. The species is considered as *Internationally Important*.



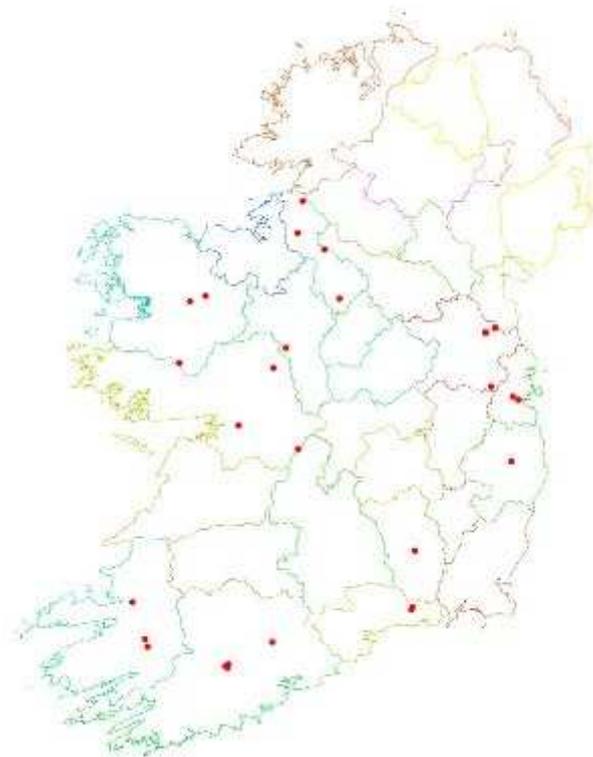
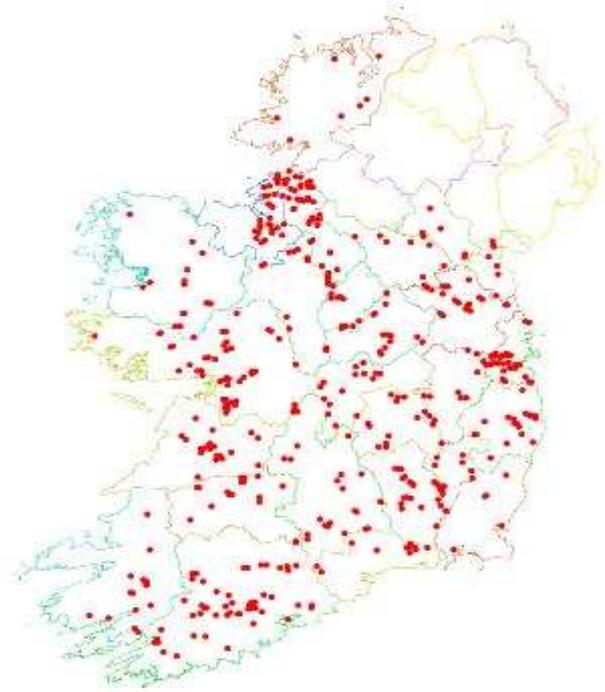
Natterer's bat *Myotis nattereri*

This species has a slow to medium flight, usually over trees but sometimes over water. They follow hedges and tree lines to their feeding sites, consuming flies, moths and caddis-flies. Natterer's bats are frequently recorded in hibernation sites in winter but there are few records of summer roosts. Those that are known are usually in old stone buildings but they have been found in trees and bat boxes. The status of the Natterer's bat has not been determined but it is classed as *Threatened* and is listed in the *Irish Red Data Book* (Whilde, A 1993).



Daubenton's bat *Myotis daubentonii*

This bat species feeds close to the surface of water, either over rivers, canals, ponds, lakes or reservoirs, but can also be found foraging in woodlands. Flying at 15 kilometres per hour, it gaffs insects with its over-sized feet as they emerge from the surface of the water - feeding on caddis flies, moths, mosquitoes, midges etc. It is often found roosting beneath bridges or in tunnels and also makes use of hollows in trees.



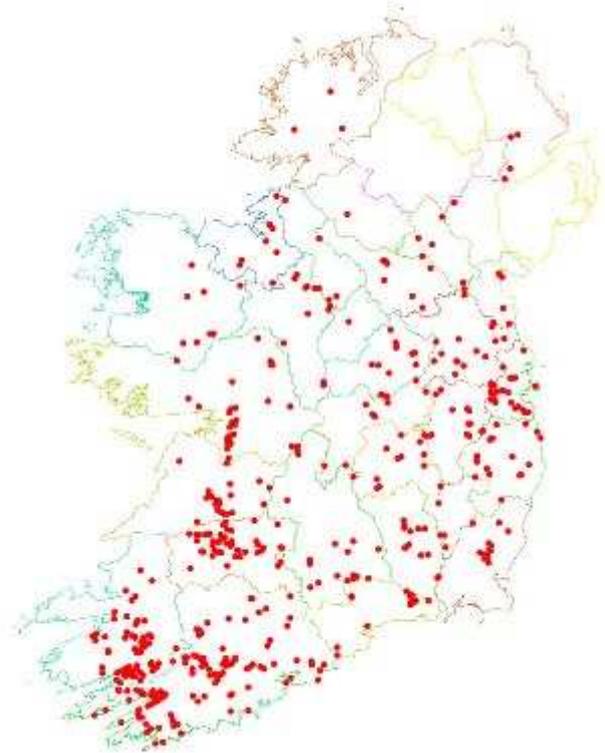
Whiskered bat *Myotis mystacinus*

This species, although widely distributed, has been rarely recorded in Ireland. It is often found in woodland, frequently near water. Flying high, near the canopy, it maintains a steady beat and sometimes glides as it hunts. It also gleans spiders from the foliage of trees. Whiskered bats prefer to roost in buildings, under slates, lead flashing or exposed beneath the ridge beam within attics. However, they also use cracks and holes in trees and sometimes bat boxes. The status of the species has not been determined but it is classed as *Threatened* and is listed in the *Irish Red Data Book* (Whilde, A 1993).



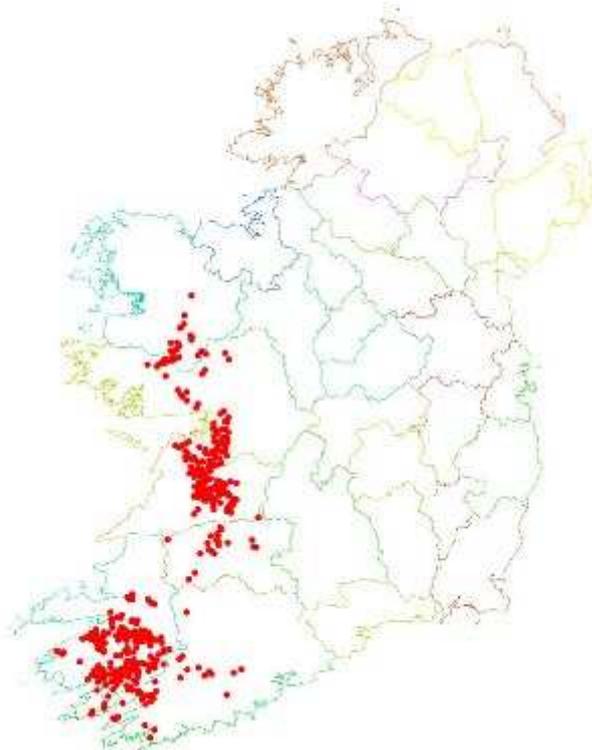
Brown long-eared bat *Plecotus auritus*

This species of bat is a 'gleaner', hunting amongst the foliage of trees and shrubs, and hovering briefly to pick a moth or spider off a leaf, which it then takes to a sheltered perch to consume. They often land on the ground to capture their prey. Using its nose to emit its echolocation, the long-eared bat 'whispers' its calls so that the insects, upon which it preys, cannot hear its approach (and hence, it needs oversized ears to hear the returning echoes). As this is a whispering species, it is extremely difficult to monitor in the field as it is seldom heard on a bat detector. Furthermore, keeping within the foliage, as it does, it is easily overlooked.



Lesser horseshoe bat *Rhinolophus hipposideros*

This species is the only representative of the Rhinolophidae family in Ireland. It differs from our other species in both habits and looks, having a unique nose leaf with which it projects its echolocation calls. It is also quite small and, at rest, wraps its wings around its body. Lesser horseshoe bats feed close to the ground, gleaning their prey from branches and stones. They often carry their prey to a perch to consume, leaving the remains beneath as an indication of their presence. The echolocation call of this species is of constant frequency and, on a bat detector, sounds like a melodious warble. Its distribution is restricted to the western Atlantic seaboard counties of Mayo, Galway, Clare, Limerick, Kerry and Cork (Kelleher, C. 2004). However, single specimens have recently been

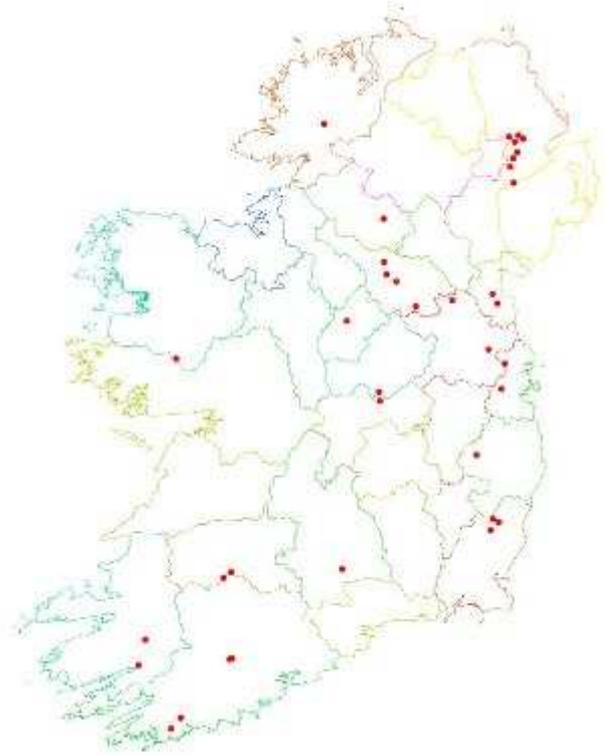


discovered in Lough Key, near Boyle, Co. Roscommon in 2004 (B. Keeley, pers. comm.) and in Tobercurry, Co. Sligo in 2008 (C. Kelleher, pers. obs.), two counties where their low numbers may have caused their presence to be overlooked in the past. This species is considered as *Internationally Important* and it is an Annex II species under the *EC Habitats Directive 1992*.



Nathusius' pipistrelle *Pipistrellus nathusii*

Nathusius' pipistrelle is a recent addition to the Irish fauna and, so far, has only been recorded from the north of the island in Cos. Antrim, Down and Longford (Richardson, P. 2000) but is assumed to be spreading as the known resident population is enhanced in the autumn months by an influx of animals from Scandinavian countries. There is a likelihood, therefore, that this species may occur in the area as a vagrant especially in the autumn months. However, it was not observed during the present survey. The status of the species has not been determined.



Brandt's bat *Myotis brandtii* (No map)

This sibling species to the whiskered bat is known from four specimens found to date in Cos. Wicklow (Mullen, 2007), Cavan, Clare (B. Keeley pers. comm.) and Tipperary (Kelleher, 2006b). A fifth specimen was identified in Killarney National Park, Co. Kerry in August 2005 (Kelleher, C. 2005 & 2006a). Its status is unknown.



6.3 APPENDIX 3: bat roost definitions (as defined by Schofield 1996)

Maternity roost

Where 20 or more bats reside between May and August and where the young are born and suckled.

Satellite roost

Generally less than 20 adults and in close proximity to maternity roosts.

Transitional roost

Used by bats prior to and after leaving maternity roosts in April and October.

Night roost

Where bats are found between the months of March and November. These can also harbour a few individuals during the day but usually less than 5.

Hibernation roost

Used by bats between October and March.



6.4 APPENDIX 4: NPWS Circular Letter 2/07


AN ROINN COMHSHAOIL, OIDHREACHTA AGUS RIALTAIS AITIÚIL
DEPARTMENT OF THE ENVIRONMENT, HERITAGE
AND LOCAL GOVERNMENT

Circular Letter NPWS 2/07

16 May, 2007

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**Guidance on Compliance with Regulation 23
of the Habitats Regulations 1997
– strict protection of certain species/ applications for derogation licences.**

A chara,

I am directed by the Minister for the Environment, Heritage and Local Government to refer to the EU Habitats Directive, to the Habitats Regulations 1997-2005 which transpose that directive into Irish law,¹ and to Ireland's obligations under that Directive.

The Directive, and the implementing Regulations, require that certain species listed in Annex IV of the Habitats Directive are strictly protected. A list of these species is appended.

These species are not necessarily associated with areas subject to a specific nature designation: in the case of bat species and otters they may be found anywhere throughout the country.

Under Regulation 23 of the Habitats Regulations 1997, any person who, in regard to the animal species listed in Annex IV of the Habitats Directive-

*“(a) deliberately captures or kills any specimen of these species in the wild,
(b) deliberately disturbs these species particularly during the period of breeding, rearing, hibernation and migration,
(c) deliberately takes or destroys the eggs from the wild, or
(d) damages or destroys a breeding site or resting place of such an animal,
shall be guilty of an offence.”*

¹ Council Directive 92/43/EEC of 21 May 1992, on the conservation of natural habitats and of wild flora and fauna, the European Communities (Natural Habitats) Regulations, 1997 (S.I. No. 94 of 1997), the European Communities (Natural Habitats) (Amendment) Regulations, 1998, (S.I. No. 233 of 1998), and the European Communities (Natural Habitats) (Amendment) Regulations, 2005, (S.I. No. 378 of 2005).

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Regulation 21 provides corresponding protection for Annex IV plant species.

The carrying out of any work that has the potential to disturb these species, and for which a derogation licence has not been granted, may constitute an offence under Regulation 21 or 23 of the Habitats Regulations.

It should be noted that in the case of Regulation 23 (d), it is not necessary that the action should be deliberate for an offence to occur. This places an onus of due diligence on anyone proposing to carry out an action or project that might result in such damage or destruction.

A particular concern arises regarding works carried out by or on behalf of local authorities themselves, including works of maintenance or repair.

Examples of cases that are likely to require assessment are the removal of trees and other habitat during the construction of roads or other infrastructure, the modification of the courses of rivers, drainage and discharge of water, and even the re-pointing or replacement of masonry in bridges, walls and other structures where bats are likely to roost, etc.

Procedure to be followed

Local authorities must ensure that they, their staff and their agents comply fully with the requirements of the Directive and the Regulations as follows:

1. In advance of any works, an appropriate initial assessment should be carried out by a person competent to identify where a risk of damage or disturbance to an Annex IV species may exist (e.g. by an appropriately qualified ecologist). The fact that such an assessment has been carried out should be recorded and kept with the papers associated with the project.
2. Projects where a risk is identified should be subject to an appropriate scientific assessment. It will be necessary to identify alternatives or modifications that will avoid that risk.
3. Where it is not possible to identify a means of avoiding the risk completely, the question of seeking a derogation licence from the Minister under Regulation 23 of the Habitats Regulations should be considered if it is desired, notwithstanding, to proceed with the action or project.
4. The Minister is empowered, within strict parameters, to grant a license for derogation from complying with the requirements of the provisions of section 21 of the Wildlife Act 1976 and Regulations 23 and 24 of the Habitats Regulations. The scope of the Minister's powers to grant derogation licences is set out in Regulation 23, as follows:

Where there is no satisfactory alternative and the derogation is not detrimental to the maintenance of the populations of the species to which the Habitats Directive relates at a favourable conservation status in their natural range, the Minister may, in respect of those species, grant a licence to one or more persons permitting a



derogation from complying with the requirements of the provisions of section 21 of the Principal Act and Regulations 23 and 24 where it is—

(a) in the interests of protecting wild fauna and flora and conserving natural habitats, or

(b) to prevent serious damage, in particular to crops, livestock, forests, fisheries and water and other types of property, or

(c) in the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment, or

(d) for the purpose of research and education, of repopulating and re-introducing these species and for the breeding operations necessary for these purposes, including the artificial propagation of plants,

(e) to allow, under strictly supervised conditions, on a selective basis and to a limited extent, the taking or keeping of certain specimens of the species to the extent (if any) specified therein, which are set out in the First Schedule.

6. Any application for a derogation licence (to be submitted to Mr Jamie Mulleady of this Department at: Species and Regulations Unit, National Parks and Wildlife Service, 7 Ely Place, Dublin 2 email: Jamie.mulleady@environ.ie) should address the criteria referred to in the above paragraph as well as proposed scientifically-based mitigation measures to address any potential impact on the identified Annex IV species. A decision on an application will be made on the basis of the information and proposals submitted and best scientific knowledge.

7. An application for such a derogation licence should be made in advance of seeking approval under Part 8 or 10 of the Planning and Development Regulations, 2001, as amended, or seeking planning permission for works. This will ensure that full consideration can be given to the impacts of the proposed project on the species and to avoid the possibility of delay to the proposed project or of a refusal of a derogation licence which would prevent the works being carried out as planned.

8. The obligation to obtain a derogation licence is additional to the requirement to notify the Minister of a proposed development which may have an impact on nature conservation to the Minister under article 82(3)(n) and others of the Planning and Development Regulations, 2001 (as amended). Local authorities should notify the Minister (Development Applications Unit) in any case where it appears that a proposed development may pose a risk to Annex IV species.

9. Should a problem be identified regarding Annex IV species in the course of works, this should be reported immediately to the National Parks and Wildlife Service. No further work that might impact on such species should take place unless a derogation licence has been obtained.



Applications for planning permission

Issues concerning damage or disturbance to Annex IV species also arise in the context of applications for planning permission for proposed development, e.g. proposals to renovate older houses. The responsibility of avoiding disturbance or damage to Annex IV species, or of obtaining an appropriate derogation licence, rests with the developer.

However, planning authorities should note that in any case where it appears that a proposal may pose a risk to Annex IV species, the planning application should be referred to the Minister under article 27(1)(n) of the Planning and Development Regulations 2001 (as amended). This referral should be done in the appropriate manner for applications having impacts on nature conservation sites. Planning authorities could also take the opportunity afforded by any pre-application discussions to alert prospective applicants to the requirements in relation to Annex IV species.

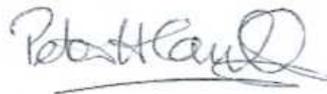
Further information

Species Action Plans, which set out specific measures for the monitoring and protection of these species, have been or are being prepared. They are published on www.npsw.ie or can be obtained from Species Unit (Tel: 01 888 3212). Guidelines in regard to bats are available at www.npsw.ie.

General questions in relation to the protection of Annex IV species or require any further information on an application for a derogation licence should be referred to Species Unit (01 8883214). Specific queries regarding a proposed project, location or species should be referred to the appropriate National Parks and Wildlife Service Divisional Ecologist or to the Regional Manager (contact details http://www.npws.ie/media/Media_4976_en.pdf).

If you have any questions in relation to the referral of a planning application, please contact Development Applications Unit (Tel: 01 8883181)

Is mise le meas,



Peter Carvill,
Assistant Principal Officer.

To: all County and City Managers, Directors of Services for Planning, Town Clerks



6.5 APPENDIX 5: photographic record



Plate 1: View east along existing N59 at Chainage 223650 over bridge GC-N59-020-00



Plate 2: View of planned off-line area across wet heath north of existing N59 at Chainage 229600



Plate 3: Low bridge GC-N59-021-00 at Chainage 230750



Plate 4: Immature coniferous plantation to south of existing N59 at Chainage 231100



Plate 5: One of two bat tubes installed on bridge GC-N59-022-00 at Chainage 231200



Plate 6: View beneath bridge GC-N59-022-00 at Chainage 231200 showing second bat tube



Plate 7: View of coniferous plantation with deciduous edge along existing road at Chainage 230400



Plate 8: Mature oak tree to north of existing N59 at Chainage 232500



Plate 9: View beneath Emlaghdauroe Bridge GC-N59-023-00 at Chainage 232380



Plate 10: View beneath Lettery Bridge GC-N59-024-00 at Chainage 234420



Plate 11: View beneath Glencoaghan Bridge GC-N59-025-00 at Chainage 236530



Plate 12: Canal Bridge GC-N59-026-00 at Chainage 237120



Plate 13: Weir Bridge GC-N59-027-00 at Chainage 241070



Plate 14: Mature deciduous woodland at Chainage 243200



Plate 15: Bridge GC-N59-029-00 over the Owentooy River east of Recess village at Chainage 244900



Plate 16: Derelict two-storey dwelling immediately south of existing road at Chainage 244740



Plate 17: Bridge GC-N59-030-00 at Chainage 246440



Plate 18: View beneath Bunsconnive Bridge GC-N59-035-00 at Chainage 251770 - bat tube at right



Plate 19: View beneath Lurgan Bridge GC-N59-036-00 at Chainage 254820

Appendix C.4 - Characterisation of Potential Impacts to Key Ecological Receptors

Characterisation of Potential Impacts to Annex I Habitats within the Study Area (ER1) and Determination of Significance of Impacts

ER1: Lough Corrib cSAC/pNHA (Site Code: 000297) and Lough Corrib SPA (Site Code: 004042): principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
Land-take	<p>The proposed Greenway will pass through Lough Corrib cSAC/pNHA/SPA in the townlands of Canrawer, Glengowla East and Glengowla West.</p> <p>The land-take within this cSAC will be confined to the existing disused rail line and so land-take will be confined to habitats which have been planted or have colonised the rail track. Approximately 2km of the proposed Greenway will involve land-take within this cSAC. At an average of 5m wide this is a total of 1ha approximately. The total area of this Natura 2000 site is 20,556ha. Therefore the total land-take is 0.005% of the total cSAC area.</p>	No direct or indirect operational phase impacts are expected on these sites – No impacts.	<p>This ecological receptor is considered to be of international importance.</p> <p>The proposed Greenway lies within the cSAC/pNHA and so there will be minor land-take from this site. Therefore effects are considered – ‘Significant’.</p> <p>A large-scale spillage of a pollutant such as cement or hydrocarbon during the construction phase of the proposed Greenway would have an impact on the aquatic environment of the lakes and rivers within the Lough Corrib cSAC/pNHA and Lough Corrib SPA, its qualifying habitats and species – ‘Significant’.</p>
Annex I aquatic habitats which are qualifying interests of Lough Corrib cSAC are considered- Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) (3110) and Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. (3140)	<p>No direct impacts are expected on Lough Corrib itself – ‘No impact’.</p> <p>However there may be indirect effects on qualifying aquatic habitats. The proposed Greenway crosses the Bunowen and Owenriff Rivers which are hydrologically connected to Lough Corrib. Any release of pollutants to these watercourses during construction may impact on aquatic habitats in Lough Corrib. This would result in a ‘Temporary Significant Negative’ impact. However this habitat is not known to occur in the</p>	No direct or indirect operational phase impacts are expected on these sites – No impacts.	<p>There may be some direct loss of a small section of Wet Grassland habitat if the alternative route in the townland of Glengowla West is taken. Direct loss of Wet Grassland habitat is considered ‘Significant on a Local Level’.</p> <p>Any impacts to the qualifying species of the Lough Corrib cSAC/pNHA and Lough Corrib SPA would affect the integrity of the site as a whole. The qualifying species of the Lough Corrib cSAC/pNHA and Lough Corrib</p>

ER1: Lough Corrib cSAC/pNHA (Site Code: 000297) and Lough Corrib SPA (Site Code: 004042): principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
	northern basin of Lough Corrib therefore is considered an extremely unlikely chance of this impacts occurring.		SPA are discussed separately and in detail in the sections below. There are potential impacts on Atlantic Salmon (<i>Salmo salar</i>), Otter (<i>Lutra lutra</i>), Marsh Fritillary (<i>Euphydryas aurinia</i>) and Slender Naiad (<i>Najas flexilis</i>) – ‘Significant’.
Qualifying Habitat - Depressions on peat substrates of the Rhynchosporion.	<p>The proposed Greenway runs adjacent to a number of areas of Cutover Bog which may contain this qualifying habitat. None of this habitat however lies within the land-take of the Greenway development and therefore there will be no direct impacts. No direct impacts are expected on these sites – No impacts.</p> <p>There may be indirect impacts to this habitat through alteration of the hydrological regime in the adjacent to the habitat which may be a ‘Permanent Slight Negative’ impact. There is an extremely unlikely chance of this impact occurring.</p>		<p>Overall, it is considered likely that the potential impacts of the proposed Greenway development on the Lough Corrib cSAC/pNHA and Lough Corrib SPA, if unmitigated, would affect the integrity of the site as a whole.</p> <p>Therefore, as the site is of International Importance, the overall potential impact is considered to be ‘Significant on an International Level.’</p>

ER1: Lough Corrib cSAC/pNHA (Site Code: 000297) and Lough Corrib SPA (Site Code: 004042): principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
HH3 Wet Heath	<p>The proposed Greenway development follows the disused railway line through an area of Wet Heath habitat 320m east of where the route crosses the Owenriff River for the first time. None of this habitat however lies within the land-take of the Greenway development and therefore there will be no direct impacts. No direct impacts are expected on these sites – No impacts.</p> <p>There may be indirect impacts to this habitat through alteration of the hydrological regime in the adjacent to the habitat which may be a 'Permanent Moderate Negative' impact. There is an extremely unlikely chance of this impact occurring.</p>	No direct or indirect operational phase impacts are expected on these sites – No impacts.	
GS4 Wet Grassland - at the alternative route between Ch.46+200 and Ch.46+550 in the townland of Glengowla West, approximately 4km west of Oughterard where close to one of the points where the route crosses the Owenriff River.	<p>The proposed Greenway passes through an area of 'Wet Grassland' in the townland of Glengowla West. Loss of some - approximately 1050m² (5m x 210m) - of this habitat will occur. This will result in a 'Permanent Significant Negative' impact. There is a near-certain chance of this impact occurring</p>	No direct or indirect operational phase impacts are expected on these sites – No impacts.	

ER1: Lough Corrib cSAC/pNHA (Site Code: 000297) and Lough Corrib SPA (Site Code: 004042): principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
<p>Qualifying Species of the site (Annex II Species): Several species listed on Annex II of the EU Habitats Directive are mentioned in the Site Synopsis for Lough Corrib cSAC/pNHA and Lough Corrib SPA including; Atlantic Salmon (<i>Salmo salar</i>), Otter (<i>Lutra lutra</i>), Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>) and Slender Naiad (<i>Najas flexilis</i>). These species are discussed individually below.</p>	<p>Impacts to Atlantic Salmon (<i>Salmo salar</i>), Otter (<i>Lutra lutra</i>), Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>) and Slender Naiad (<i>Najas flexilis</i>) are more likely than impacts on the other qualifying species of the site.</p> <p>Impacts to Annex II species are discussed separately, and in detail below</p>	<p>Impacts to Annex II species are discussed separately, and in detail, below.</p>	

Characterisation of Potential Impacts to the Maumturk Mountains cSAC/pNHA Habitats (ER2) and Determination of Significance of Impacts

ER2: Maumturk Mountains cSAC/pNHA (Site Code: 002008),- principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
<p>Land-take</p>	<p>The land-take within this cSAC will be largely confined to the existing disused rail line and so land-take will be confined to habitats which have been planted or have colonised the rail track. However there will be landtake of other habitats where the Greenway runs offline. Approximately 3.2km of the proposed greenway will involve land-take within this cSAC. At an average of 5m wide this is a total of 1.6ha approximately. The total area of this Natura 2000 site is 13,493ha. Therefore the total land-take is 0.01% of the total cSAC area.</p>	<p>No direct or indirect operational phase impacts are expected on these sites – No impacts.</p>	<p>This ecological receptor is considered to be of International Importance. There may be some direct loss of a small section of qualifying habitat, 'active Blanket bog* (7130)' of the Maumturk Mountains cSAC. If there will be direct loss of Annex I qualifying habitat this impact is considered 'Significant on an International Level'.</p> <p>There may be some direct loss of a small section of PB4 Cutover Bog habitat. If there is direct loss of this habitat this impact is considered</p>

ER2: Maumturk Mountains cSAC/pNHA (Site Code: 002008),- principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
	This will result in a 'Permanent Slight Negative' or 'Imperceptible' impact. There is a near-certain chance of this impact occurring.		'Significant on a Local Level' . The areas of qualifying habitats within 50m of the greenway could be affected by drainage. However, the drainage measures proposed for the greenway will enhance existing drainage bog and so alteration of the hydrological regime will be minimal. Therefore the impact will not be significant – 'Not Significant' .
<p>Qualifying habitat – 7130 Blanket bog (*active only) habitat within the designated site affected by the proposed Greenway development.</p> <p>Although there are numerous locations where this habitat occurs in close proximity to the proposed Greenway, the majority of habitat areas are situated on the other side of the existing N59. There is one area of 'active Blanket bog' adjacent to the proposed Greenway on the R336 in the townland of Lurgan, between Ch.35+000 and Ch.35+100.</p>	<p>An area of 135m active Blanket Bog is located approximately 450m north of Maam Cross on the west side of the R336. If the Greenway will be located on the eastern side of the R336 so as to avoid direct impacts to this 'active Blanket bog'. Therefore there will be no direct impacts.</p> <p>There may be indirect impacts to some of this habitat through alteration of the hydrological regime in the bog. This would result in a 'Permanent Moderate Negative' impact. There is an extremely unlikely chance of this impact occurring.</p>	No direct or indirect operational phase impacts are expected on these sites – No impacts .	<p>A large-scale spillage of a pollutant such as cement or hydrocarbon during the construction phase of the proposed Greenway would have an impact on the aquatic environment of the lakes within the Maumturk Mountains cSAC, most of which correspond to the EU Annex I habitat 3110 Oligotrophic waters containing</p>

ER2: Maumturk Mountains cSAC/pNHA (Site Code: 002008),- principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
<p>Qualifying habitat – 3110 Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>), including, Illion Lough and Lough Shindilla.</p>	<p>The proposed Greenway development runs alongside a number of lakes classified as 3110 Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>). No direct impacts are expected on these sites – No impacts.</p> <p>Potential 'Indirect Temporary Significant Negative' impacts are possible however, in the form of hydrocarbon contamination and siltation from upgrading works via connecting watercourses and drains. There is a near certain chance of this impact occurring. The worst case scenario would be a large scale spillage of a contaminant such as diesel or cement which would have an 'Indirect Short-term Significant Negative' impact on the aquatic environment of these lakes. There is a probable chance of this impact occurring.</p>	<p>No direct or indirect operational phase impacts are expected on these sites – No impacts.</p>	<p>very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>). Therefore the impact will be Significant.</p>

ER2: Maumturk Mountains cSAC/pNHA (Site Code: 002008),- principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
<p>Qualifying habitat – 4010 Northern Atlantic wet heaths with Erica tetralix</p> <p>Although there are a number of locations where this habitat occurs in close proximity to the proposed Greenway, the majority of habitat areas are situated on the other side of the existing N59.</p>	<p>The proposed Greenway development passes along the edge of an area of Wet Heath approximately 2.3km west of Maam Cross. None of this habitat however lies within the land-take of the Greenway development and therefore there will be no direct impacts. No direct impacts are expected on these sites – No impacts.</p> <p>There may be indirect impacts to 6.5ha of this habitat through alteration of the hydrological regime resulting in a 'Permanent Moderate Negative' impact. There is an extremely unlikely chance of this impact occurring.</p>	<p>No direct or indirect operational phase impacts are expected on these sites – No impacts.</p>	
<p>Qualifying habitat - 7150 Depressions on peat substrates of the Rhynchosporion</p> <p>It is possible that this habitat occurs throughout the bog habitat within the study area, but definite examples were found adjacent to Athry Lough.</p>	<p>Some pockets of this habitat type were recorded within areas of Cutover Bog in the vicinity of the proposed construction works. None of this habitat however lies within the land-take of the Greenway development and therefore there will be no direct impacts. No direct impacts are expected on these sites – No impacts.</p> <p>There may be indirect impacts to areas of this habitat through alteration of the hydrological regime resulting in a 'Permanent Slight Negative' impact. There is an extremely unlikely chance of this impact occurring.</p>	<p>No direct or indirect operational phase impacts are expected on these sites – No impacts.</p>	<p>Any impacts to the qualifying species of the Maumturk Mountains cSAC would affect the integrity of the site as a whole. The qualifying species of the Maumturk Mountains cSAC are discussed separately and in detail in the sections below. There are potential indirect impacts on Atlantic Salmon (<i>Salmo salar</i>) and Slender Naiad (<i>Najas flexilis</i>) – 'Significant'.</p>

ER2: Maumturk Mountains cSAC/pNHA (Site Code: 002008),- principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
<p>PB4 Cutover Bog</p> <p>There are numerous locations where this habitat occurs in close proximity to the proposed Greenway. There are three areas of 'Cutover Bog' adjacent to the proposed Greenway on the R336 in the townland of Lurgan, between Ch.35+000 and Ch.35+100. Two of these areas are on the west side of the R336 while one is on the east side of the R336.</p>	<p>The proposed Greenway may pass through the edge – approx. 130m - of an area of 'Cutover Bog PB4' north of Maam Cross on the west side of the R336. If the Greenway runs along the west side of the R336 at this location there will be loss of some 'Cutover Bog'. If the Greenway runs along the east side of the R336 at this location there will be loss of some – approx. 65m - 'Cutover Bog PB4'. This will result in a 'Permanent Significant Negative' impact. There is a near-certain chance of this impact occurring.</p> <p>There may be indirect impacts to areas of this habitat through alteration of the hydrological regime resulting in a 'Permanent Slight Negative' impact. There is an extremely unlikely chance of this impact occurring.</p>	<p>No direct or indirect operational phase impacts are expected on these sites – No impacts.</p>	
<p>Qualifying species of the site (Annex II Species):</p> <p>Several species listed on Annex II of the EU Habitats Directive are mentioned in the Site Synopsis for Maumturk Mountains cSAC/pNHA including; Atlantic Salmon (<i>Salmo salar</i>), and Slender Naiad (<i>Najas flexilis</i>). These species are discussed individually below.</p>	<p>Impacts to Annex II species are discussed separately, and in detail, below.</p>	<p>Impacts to Annex II species are discussed separately, and in detail, below.</p>	

Characterisation of Potential Impacts to the Twelve Bens/Garraun Complex cSAC Habitats (ER3) and Determination of Significance of Impacts

ER3: The Twelve Bens/Garraun Complex cSAC - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
Land-take	<p>The proposed Greenway runs through The Twelve Bens/Garraun Complex cSAC south of Derryclare Lough and encompassing 0.8ha (1600m length x 5m average width) of this cSAC. This is the only area of the designated site which will be directly affected. The total area of the Twelve Bens/Garraun Complex cSAC is 16110ha. Therefore only 0.005% will be included in the landtake. However the Greenway will be entirely contained within the existing disused rail line. This will result in a 'Permanent Slight Negative' or 'Imperceptible' impact. There is a near-certain chance of this impact occurring.</p>	<p>No direct or indirect operational phase impacts are expected on these sites – No impacts.</p>	<p>This ecological receptor is considered to be of ecological importance. There will be direct loss of qualifying habitat – inactive Blanket bog (7130)', one of the qualifying features of the Twelve Bens/Garraun Complex cSAC. Further areas of qualifying habitats within 50m of the Greenway could be affected by drainage. However any changes in drainage will be minimal and so impacts will be minimal. Because there will be direct loss of Annex I qualifying habitat this impact is considered 'Significant on an International Level'.</p>
<p>Qualifying habitat – 7130 Blanket bog habitat within the designated site affected by the proposed Greenway.</p>	<p>A proposed offline section of the proposed Greenway veers south between Ch.19+950 and Ch.20+030, in the townland of Garroman, immediately west of Glendollagh Lough and the existing N59, to avoid a dwelling. An area of intact 'inactive Blanket bog' is found near this location. The Greenway will be confined to an existing track through scrub at this location thus avoiding the Blanket bog (7130)' habitat.</p> <p>There is a large area of inactive blanket bog to the south of the proposed greenway, west of Glendollagh Lough. Approximately 150m of the Greenway runs adjacent.</p>	<p>No direct or indirect operational phase impacts are expected on these sites – No impacts.</p>	<p>A large-scale spillage of a pollutant such as cement or hydrocarbon during the construction phase of the proposed Greenway would have an impact on the aquatic environment of the lakes within the Connemara Bog Complex cSAC – 'Significant'.</p> <p>Any impacts to the qualifying species of the Connemara Bog Complex cSAC would affect the integrity of the site as a whole. The qualifying species of the This ecological receptor is considered to be of International Importance. Connemara Bog Complex cSAC are discussed separately and in detail in the sections below. There are potential impacts on Atlantic Salmon</p>

ER3: The Twelve Bens/Garraun Complex cSAC - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
	<p>This adjacent area may be affected through alteration of the hydrological regime in the bog. 'Permanent Slight Negative' impact. There is an extremely unlikely chance of this impact occurring.</p> <p>There is an area of active blanket bog to the north of the proposed greenway, west of Glendollagh Lough. Approximately 330m of the Greenway at this location runs adjacent to this habitat. In addition, the proposed Greenway runs adjacent to approximately 270m of active bog adjacent to the south shore of Derryclare Lough. This adjacent area may be affected through alteration of the hydrological regime in the bog. 'Permanent Slight Negative' impact. There is an extremely unlikely chance of this impact occurring.</p>		<p>(<i>Salmo salar</i>), Otter (<i>Lutra lutra</i>), Marsh Fritillary (<i>Euphydryas aurinia</i>) and Slender Naiad (<i>Najas flexilis</i>) - Significant.</p> <p>Overall, it is considered likely that the potential impacts of the proposed Greenway on the Connemara Bog Complex cSAC, if unmitigated, would affect the integrity of the site as a whole.</p> <p>Therefore, as the site is of International Importance, the overall potential impact is considered to be 'Significant on an International Level' in the absence of avoidance and mitigation measures.</p>
<p>Qualifying habitat – 3110 Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>), Derryclare Lough</p>	<p>The proposed Greenway scheme runs alongside Derryclare Lough which is classified as 3110 Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>). No direct impacts are expected on this site – No impacts.</p> <p>Potential 'Indirect Temporary Significant Negative' impacts are possible however, in the form of hydrocarbon contamination and siltation from upgrading works via connecting watercourses and drains.</p>	<p>No direct or indirect operational phase impacts are expected on these sites – No impacts.</p>	

ER3: The Twelve Bens/Garraun Complex cSAC - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
	<p>There is a near certain chance of this impact occurring. The worst case scenario would be a large scale spillage of a contaminant such as diesel or cement which would have an 'Indirect Short-term Significant Negative' impact on the aquatic environment of this lake. There is a probable chance of this impact occurring.</p>		
<p>Qualifying habitat - 7150 Depressions on peat substrates of the Rhynchosporion</p>	<p>There may be pockets of this habitat type within areas of Cutover Bog in the vicinity of the proposed Greenway works. There may be no direct loss of a small amount of this habitat during the construction phase of the development - No impacts. This adjacent area may be affected through alteration of the hydrological regime in the bog. 'Permanent Slight Negative' impact. There is an extremely unlikely chance of this impact occurring.</p>	<p>No direct or indirect operational phase impacts are expected on these sites – No impacts.</p>	
<p>HH1 Dry Siliceous Heath</p>	<p>The proposed Greenway passes through an area of 'HH1 Dry Heath' between Ch.19+950 and Ch.20+030, in the townland of Garroman, immediately west of Glendollagh Lough and the existing N59. Loss of approximately 150m² (5m x 30m) - of this habitat will occur. This will result in a 'Permanent Significant Negative' impact. There is a near-certain chance of this impact occurring.</p>	<p>No direct or indirect operational phase impacts are expected on these sites – No impacts.</p>	
<p>Qualifying species of the site (Annex II Species):</p>	<p>Impacts to Annex II species are discussed separately, and in detail,</p>	<p>Impacts to Annex II species are discussed separately, and in detail,</p>	

ER3: The Twelve Bens/Garraun Complex cSAC - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
Several species listed on Annex II of the EU Habitats Directive are mentioned in the Site Synopsis for Connemara Bog Complex cSAC including; Atlantic Salmon (<i>Salmo salar</i>), Otter (<i>Lutra lutra</i>), Slender Naiad (<i>Najas flexilis</i>) and Freshwater Pearl-mussel (<i>Margaritifera margaritifera</i>). These species are discussed individually below.	below.	below.	

Characterisation of Potential Impacts to the Connemara Bog Complex cSAC (ER4) and Determination of Significance of Impacts

ER4: Connemara Bog Complex cSAC - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
Land-take	The proposed Greenway encompasses 8ha (16000m length x 5m average width) of the Connemara Bog Complex cSAC. This is the only area of the designated site which will be directly affected. The total area of the Connemara Bog Complex is 48998ha. Therefore only 0.016% will be included in the landtake. This will result in a ' Permanent Slight Negative ' or ' Imperceptible ' impact. There is a near-certain chance of this impact occurring.	No direct or indirect operational phase impacts are expected on these sites – No impacts .	This ecological receptor is considered to be of ecological importance. There will be no direct loss of qualifying features of the Connemara Bog Complex cSAC. The areas of these habitats within 50m of the Greenway could be affected by drainage. However, drainage is already in place and so impacts will be minimal. Therefore this impact will not be significant – ' Not Significant '. A large-scale spillage of a pollutant such as cement or hydrocarbon during the construction phase of the proposed Greenway would have an impact on the aquatic environment of the lakes within the Connemara Bog Complex cSAC – ' Significant '.

ER4: Connemara Bog Complex cSAC - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
<p>Qualifying habitat – 7130 Blanket bog habitat within the designated site affected by the proposed Greenway.</p>	<p>The proposed Greenway does not traverse any areas of Blanket Bog therefore there will be no direct loss of this habitat during the construction phase of the development - No impacts.</p> <p>The proposed route passes adjacent to active blanket bog in the townlands of Knocknacalliagh, Emlaghmore, Athry, Derryadd east, and Shannakinlougha. These areas of habitat may be affected through alteration of the hydrological regime in the bog. 'Permanent Moderate Negative' impact. There is an extremely unlikely chance of this impact occurring.</p>	<p>No direct or indirect operational phase impacts are expected on these sites – No impacts.</p>	<p>Any impacts to the qualifying species of the Connemara Bog Complex cSAC would affect the integrity of the site as a whole. The qualifying species of the This ecological receptor is considered to be of International Importance. Connemara Bog Complex cSAC are discussed separately and in detail in the sections below. There are potential impacts on Atlantic Salmon (<i>Salmo salar</i>), Otter (<i>Lutra lutra</i>), Marsh Fritillary (<i>Euphydryas aurinia</i>) and Slender Naiad (<i>Najas flexilis</i>) - Significant.</p>
<p>Qualifying habitat – 3110 Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>), including Ballynahinch Lake, Athry Lough, Lough na Cúige Rua, Glendollagh Lough, Oorid Lough, Arderry Lough and Lough Bofin.</p>	<p>The proposed Greenway scheme runs alongside numerous lakes classified as 3110 Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>). No direct impacts are expected on these sites – No impacts.</p> <p>Potential 'Indirect Temporary Significant Negative' impacts are possible however, in the form of hydrocarbon contamination and siltation from upgrading works via connecting watercourses and drains. There is a near certain chance of this impact occurring. The worst case scenario would be a large scale spillage of a contaminant such as diesel or cement which would have an 'Indirect Short-term Significant Negative' impact on the aquatic</p>	<p>No direct or indirect operational phase impacts are expected on these sites – No impacts.</p>	<p>Overall, it is considered likely that the potential impacts of the proposed Greenway on the Connemara Bog Complex cSAC, if unmitigated, would affect the integrity of the site as a whole.</p> <p>Therefore, as the site is of International Importance, the overall potential impact is considered to be 'Significant on an International Level' in the absence of avoidance and mitigation measures. There is an unlikely/probable chance of this impact occurring.</p>

ER4: Connemara Bog Complex cSAC - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
	environment of these lakes. There is a probable chance of this impact occurring.		
Qualifying habitat – 4030 European Dry Heaths.	Some small pockets of European Dry Heaths, one of the qualifying habitats of the site, were recorded in the vicinity of the proposed Greenway. There will be no direct loss of this habitat during the construction phase of the development - No impacts.	No direct or indirect operational phase impacts are expected on these sites – No impacts.	
Qualifying habitat - 7150 Depressions on peat substrates of the Rhynchosporion	Some pockets of this habitat type were recorded within areas of Cutover Bog in the vicinity of the proposed Greenway. There will be no direct loss of this habitat during the construction phase of the development - No impacts.	No direct or indirect operational phase impacts are expected on these sites – No impacts.	
Qualifying species of the site (Annex II Species): Several species listed on Annex II of the EU Habitats Directive are mentioned in the Site Synopsis for Connemara Bog Complex cSAC including; Atlantic Salmon (<i>Salmo salar</i>), Otter (<i>Lutra lutra</i>), Marsh Fritillary (<i>Euphydryas aurinia</i>) and Slender Naiad (<i>Najas flexilis</i>). These species are discussed individually below.	Impacts to Annex II species are discussed separately, and in detail, below.	Impacts to Annex II species are discussed separately, and in detail, below.	

Characterisation of Potential Impacts to Watercourses within the Study Area (ER5) and Determination of Significance of Impacts

ER5: Watercourses within the study area - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
ER5a - Water quality	Potential 'Indirect, Temporary Significant Negative' impacts are possible, in the form of hydrocarbon contamination and siltation from works entering protected watercourses directly or via connecting streams or drains. There is a near certain chance of these impacts occurring. The worst case scenario would be a large scale spillage of a contaminant such as diesel or cement which would have an 'Indirect, Short-term Major Negative' impact on the aquatic environment of the watercourses in the area and their associated species. There is a probable chance of this impact occurring.	No direct or indirect operational phase impacts are expected on these sites – No impacts.	<p>This ecological element is considered to be of International Importance.</p> <p>A large-scale spillage of a pollutant such as cement or hydrocarbon during the construction phase of the development would have an impact on the aquatic environment of the receiving watercourses – 'Significant'.</p> <p>There are also potential indirect impacts on the designated sites in the study area, as all of the watercourses and drainage ditches are hydrologically linked to these sites, and so may act as conduits for pollution – 'Significant'.</p>
ER5b - Aquatic species within the watercourse (including the Annex II species Atlantic Salmon, otter and Freshwater Pearl Mussel – discussed below)	<p>Many of the watercourses within the study area contain species of conservation concern, such as Atlantic Salmon, otter and Freshwater Pearl Mussel.</p> <p>Impacts to Annex II species are discussed separately, and in detail below</p>	Impacts to Annex II species are discussed separately, and in detail below.	<p>Overall, it is considered likely that the potential impacts of the proposed Greenway on the watercourses in the study area, if unmitigated, have the potential to alter the integrity of the watercourses, and the designated sites within which they lie (or lie upstream of).</p> <p>Therefore, as these watercourses are of International Importance, the overall potential impact is considered to be 'Significant on an International Level' in the absence of avoidance and mitigation measures.</p>

Characterisation of Potential Impacts to Annex I Habitats within the Study Area (ER6) and Determination of Significance of Impacts

ER6: Annex I habitats - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
<p>ER6a – 7130 Blanket Bog (Active* and Inactive)</p>	<p>No Blanket Bog occurs within the proposed land-take. Therefore no direct construction phase impacts are expected on these sites – No impacts.</p> <p>Numerous areas of blanket bog occur on either side of the proposed Greenway outside of the proposed works. These areas may be affected by indirect potential impacts on the hydrological regime. The resulting impact will be ‘Permanent Significant Negative’. There is an extremely unlikely chance of these impacts occurring.</p>	<p>No direct or indirect operational phase impacts are expected on these sites – No impacts.</p>	<p>This ecological receptor is considered to range between County to International Importance. There is no blanket bog within the landtake, but there are potential indirect impacts to bog throughout the study area due to impacts on hydrological regimes. This impact is therefore considered to be ‘Significant on a National Level’ in the absence of avoidance and mitigation measures.</p>
<p>ER6b - 7150 Depressions on peat substrates of the Rhynchosporion (within Cutover Bog habitat)</p>	<p>There will be no direct loss of this habitat type during the construction phase of the proposed Greenway. This habitat type occurs in small pockets within areas of intact and Cutover Bog. As these areas are small, and occur within a mosaic of other habitats, it was not possible to quantify the extent of impact on this Annex I habitat. The resulting impact will be ‘Permanent Slight Negative’. There is an extremely unlikely chance of these impacts occurring.</p>	<p>No direct or indirect operational phase impacts are expected on these sites – No impacts.</p>	<p>This ecological receptor is considered to be of County to International Importance. It was not possible to quantify the impacts on this habitat, but this habitat is very limited within the study area and occurs in small pockets within other habitats. This impact is therefore not considered to be significant on an International Level but is considered to be ‘Significant on a Local Level’ in the absence of avoidance and mitigation measures. There is a near-certain chance of this impact occurring.</p>

ER6: Annex I habitats - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
<p>ER6c - 4010 Northern Atlantic Wet Heaths with <i>Erica tetralix</i></p>	<p>There will be no direct loss of this habitat type during the construction phase of the proposed Greenway – 'No impact'.</p> <p>These areas may be affected by potential indirect impacts on the hydrological regime. The resulting impact will be 'Permanent Significant Negative'. There is an extremely unlikely chance of these impacts occurring.</p>	<p>No direct or indirect operational phase impacts are expected on these sites – No impacts.</p>	<p>This ecological receptor is considered to be of County to International Importance. None of this habitat type occurs within the landtake, but there are potential for indirect impacts to further areas due to impacts on hydrological regimes. This impact is therefore considered to be 'Significant on a County Level' in the absence of avoidance and mitigation measures. There is a near-certain chance of this impact occurring.</p>
<p>ER6d – 4030 European Dry Heaths</p>	<p>There will be no direct loss of this habitat type during the construction phase of the proposed Greenway – 'No impact'.</p>	<p>No direct or indirect operational phase impacts are expected on these sites – No impacts.</p>	<p>This ecological element is considered to be of International Importance. No impacts are expected to this habitat</p>
<p>ER6e - 3110 Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>)</p>	<p>No direct impacts are expected on this habitat, as these lakes are located outside the proposed landtake – 'No impact'.</p> <p>Potential 'Indirect, Temporary Significant Negative' impacts are possible, in the form of hydrocarbon contamination and siltation from upgrading works entering lakes via connecting watercourses and drains. There is a near certain chance of these impacts occurring. The worst case scenario would be a large scale spillage of a contaminant such as diesel or cement which would have an 'Indirect, Short-term Significant Negative' impact on the aquatic environment of a lake and its associated species. There is a probable chance of these impacts occurring.</p>	<p>No direct or indirect operational phase impacts are expected on these sites – No impacts.</p>	<p>This ecological receptor is considered to be of International Importance, as the lakes in question are considered to be 'best examples' of this habitat type. If unmitigated, a major environmental incident such as a large scale spillage of a contaminant such as diesel or cement would have an impact on this habitat and its associated species, and thus significantly affect its integrity. This impact is therefore considered to be 'Significant on an International Level' in the absence of avoidance and mitigation measures.</p>

ER6: Annex I habitats - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
<p>ER6f - 91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles.</p>	<p>Small areas of woodland which correspond to the Annex I habitat are found fringing lakes and on islands within the study area. As these woodlands are located outside the proposed land-take – 'No impact'.</p>	<p>No direct or indirect operational phase impacts are expected on these sites – No impacts.</p>	<p>The dismantled railway runs through these woodlands. Some tree saplings are growing within the landtake of the greenway. The main areas of native woodland will not be directly impacted by the Greenway. Therefore the impacts are not significant.</p>
<p>ER6g - 91E0 Alluvial Forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i></p>	<p>Small areas of woodland which correspond to the Annex I habitat are found fringing lakes and rivers within the study area. As these woodlands are located outside the proposed land-take – 'No impact'.</p>	<p>No direct or indirect operational phase impacts are expected on these sites – No impacts.</p>	<p>These woodlands will not be directly impacted by the Greenway.</p>
<p>ER6h - 7210 Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i></p>	<p>Some of this habitat was found close to, but not within, the proposed Greenway route. No direct impacts are expected on this habitat – 'No impact'.</p> <p>However potential indirect impacts in the form of run-off of pollutants would have a Temporary, Significant Negative impact on the aquatic environment of this habitat.</p>	<p>No direct or indirect operational phase impacts are expected on these sites – No impacts.</p>	<p>This ecological receptor is considered to be of International Importance. If unmitigated, a major environmental incident such as a large scale spillage of a contaminant such as diesel or cement would have an 'impact on this habitat and its associated species, and thus significantly affect its integrity. This impact is therefore considered to be 'Significant on County Level' in the absence of avoidance and mitigation measures. There is an unlikely chance of this impact occurring.</p>

Characterisation of Potential Impacts to Annex II Species (EU Habitats Directive) and Annex I species (EU Birds Directive) Within the Study Area (ER7) and Determination of Significance of Impacts

ER7: Annex II Species (EU Habitats Directive) and Annex I species (EU Birds Directive) - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
<p>ER7a – Freshwater Pearl Mussel</p>	<p>If the construction of the proposed Greenway was to result in the release of silt or pollutants such as concrete or hydrocarbons into the pearl mussel population area of river, through the pathway of drainage ditches, smaller streams or rivers.</p> <p>The worst case scenario would be a large scale spillage of a contaminant such as diesel or cement which would have an 'Indirect, Short-term Significant Negative' impact on the aquatic environment of this species. There is a probable chance of this impact occurring.</p>	<p>No direct or indirect operational phase impacts are expected on these sites – No impacts.</p>	<p>This ecological receptor is considered to be of International Importance. The species is listed on Annex II of the EU Habitats Directive and has undergone a major decline (approximately 90%) in Europe in the last century. Many of the watercourses in the area contain Freshwater Pearl Mussels. The Owenriff River has a very large population of Freshwater Pearl Mussels which is considered to be one of the top populations of this species in the world. Thus impacts on this species are considered to be 'Significant on an International Level' in the absence of avoidance and mitigation measures.</p>

ER7: Annex II Species (EU Habitats Directive) and Annex I species (EU Birds Directive) - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
ER7b – Otter	<p>No Otter holts were found within the land-take of the proposed scheme, and so there will be no direct impacts to this species – ‘No impact’.</p> <p>However, a release of contaminants to watercourses in the area would have an ‘Indirect Temporary Significant Negative’ impact on this species, as it would reduce the quality of its foraging habitat. There is a probable chance of this impact occurring.</p>	No direct or indirect operational phase impacts are expected on these sites – No impacts .	This ecological receptor is considered to be of International Importance. The species is listed on Annex II of the EU Habitats Directive and is known to be widespread in the area. Though there will be no direct impacts to this species, the potential release of contaminants to watercourses would have an impact on the population within this area. This impact is therefore considered to be ‘Significant on an International Level’ in the absence of avoidance and mitigation measures.
ER7c - Atlantic Salmon	Atlantic Salmon is known to occur within Derryneen Lough and the Owenglin River. The latter has been confirmed as a salmonid spawning and nursery area. Release of contaminants in the form of hydrocarbon contamination and siltation from upgrading works into these waterbodies either directly or via connecting watercourses or drains which would result in a ‘Temporary Major Negative’ impact on this species. There is a near certain chance of these impacts occurring.	No direct or indirect operational phase impacts are expected on these sites – No impacts .	This ecological receptor is considered to be of International Importance. The species is listed on Annex II of the EU Habitats Directive and has undergone a major decline in recent years. The potential ‘impacts are considered to be ‘Significant on an International Level’ in the absence of avoidance and mitigation measures.

ER7: Annex II Species (EU Habitats Directive) and Annex I species (EU Birds Directive) - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
<p>ER7d - Lesser Horseshoe Bat</p>	<p>Lesser Horseshoe Bat is known to occur in the area, but no potential roost sites were found within the land-take. Therefore no direct impacts are expected on this species – 'No impact'.</p> <p>However, lighting during night-working on the road may lead to a 'Temporary Slight Negative' impact due to disturbance of this species' commuting routes. There is a probable chance of this impact occurring.</p> <p>As the proposed works are all on the current disused rail line, there will be no permanent disruption of commuting routes – 'No impact'.</p>	<p>'No impacts' are expected on Lesser Horseshoe Bat at the operational stage.</p>	<p>This ecological receptor is considered to be of International Importance. Though this species is considered to be of International Importance, the potential impacts to this species are not considered to be significant at the international level. There may be some disturbance to this species as a result of lighting during night-work, but this impact will be temporary and slight. This impact is therefore not considered to be significant, even on a local level – 'Not Significant'.</p>
<p>ER7e – Marsh Fritillary</p>	<p>There will be no loss of habitat for this species – 'No impact'.</p>	<p>'No impact' on Marsh Fritillary is expected at the operational stage.</p>	<p>N/A</p>
<p>ER7f – Kerry Slug</p>	<p>The Kerry Slug was not sighted within the land-take during site surveys, but is known to occur in the Oughterard area. There will be no loss of suitable habitat for this species – 'No impact'.</p>	<p>'No impact' on the Kerry Slug is expected at the operational stage.</p>	<p>N/A</p>

ER7: Annex II Species (EU Habitats Directive) and Annex I species (EU Birds Directive) - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
<p>ER7g - Kingfisher: This species may occur within the study area</p>	<p>This species has been recorded in the Owenriff River but no nests were found in proximity to the Greenway. Therefore no direct impacts are expected on this species – 'No impact'.</p> <p>However, construction on the road may lead to a 'Temporary Slight Negative' impact due to disturbance of this species' foraging routes. There is a probable chance of this impact occurring.</p>	<p>'No impact' on the Kingfisher is expected at the operational stage.</p>	<p>This ecological receptor is considered to be of International Importance. Though this receptor is considered to be of International Importance, the potential impacts to this species are not considered to be significant at the international level. This impact is therefore not considered to be significant, even on a local level – 'Not Significant'.</p>
<p>ER7h – Merlin</p>	<p>There are no breeding records for this species within 1km of the proposed development. Therefore no direct impacts are expected on this species – 'No impact'.</p> <p>However, construction on the road may lead to a 'Temporary Slight Negative' impact due to disturbance of this species' foraging routes. There is a probable chance of this impact occurring.</p>	<p>'No impact' on Merlin is expected at the operational stage.</p>	<p>This ecological receptor is considered to be of International Importance. Though this receptor is considered to be of International Importance, the potential impacts to this species are not considered to be significant at the international level. This impact is therefore not considered to be significant, even on a local level – 'Not Significant'.</p>

ER7: Annex II Species (EU Habitats Directive) and Annex I species (EU Birds Directive) - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
ER7i – Golden Plover	<p>There are no breeding records for this species in proximity to the proposed development. Therefore no direct impacts are expected on this species – 'No impact'.</p> <p>However, construction on the road may lead to a 'Temporary Slight Negative' impact due to disturbance of this species' foraging routes. There is a probable chance of this impact occurring.</p>	'No impact' on Golden Plover is expected at the operational stage.	This ecological receptor is considered to be of International Importance. Though this receptor is considered to be of International Importance, the potential impacts to this species are not considered to be significant at the international level. This impact is therefore not considered to be significant, even on a local level – 'Not Significant' .

Characterisation of Potential Impacts to Faunal Species protected under the Irish Wildlife Acts (ER8) and Determination of Significance of Impacts

ER8: Faunal Species protected under the Irish Wildlife Acts - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
ER8a – Badger	No badger setts were found within or near the land-take of the Greenway. Therefore no impacts are expected on this species – 'No impacts' .	As the proposed Greenway will be used by cyclists and walkers the route will not create a division of territorial boundaries – 'No impacts' .	N/A
ER8b - Bat Species	There will be minimal loss of woodland, hedgerows and tree lines along the route corridor of the proposed Greenway which are widely used by these animals. Large deciduous trees on or adjacent to the proposed Greenway may harbour bats occasionally, especially if ivy covered. Felling of these trees may result in loss of potential bat roosts and a 'Permanent Significant	Upgrading of existing bridges, e.g. re-pointing or pressure grouting, may result in loss of roosting potential for Daubenton's bats 'Permanent Significant Negative' impact. However the replacement of bridges and new structures may provide new roosting opportunities to local bat species, as recorded on the Westport Mulranny Greenway. There is an extremely unlikely	This species is considered to be of National Importance. A number of potential impacts to bat species have been identified, and due to the length of the proposed Greenway, these impacts could affect bats over a large area. Therefore, this impact is considered to be 'Significant on a National Level' in the absence of avoidance and mitigation measures.

ER8: Faunal Species protected under the Irish Wildlife Acts - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
	<p>Negative impact. There is a near certain chance of these impacts occurring.</p> <p>Potential damage to or destruction of bat roosts during upgrading of the bridges within the study area may also result in a Permanent Significant Negative impact. Bridges throughout the Greenway route were deemed unsuitable as bat roosts. There is an extremely unlikely chance of these impacts occurring.</p> <p>Lighting during night-works may cause some temporary disruption of local bat populations' flight paths and lead to a Temporary Slight Negative impact. There is a near certain chance of these impacts occurring.</p> <p>Pollution of watercourses may also result in knock-on impacts to bats.</p>	chance of these impacts occurring.	
ER8c - Deer species	There is a record for Fallow Deer (<i>Dama dama</i>) in Grid Square M14, but no deer have been recorded in the vicinity of the proposed works. Therefore, no impacts are expected on deer species at the construction stage – No impacts .	No impacts are expected on deer species at the operational stage'.	N/A
ER8d - Irish Hare	There will be no loss of habitat for this species as a result of the proposed Greenway – No impacts .	No impacts are expected on the Irish hare at the operational stage.	N/A

ER8: Faunal Species protected under the Irish Wildlife Acts - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
ER8e - Pine Marten	There will be no loss of habitat for this species as a result of the proposed Greenway – 'No impacts' .	'No impacts' are expected on Pine Marten at the operational stage.	N/A
ER8f - Red Squirrel	There are no records for this species within the study area, though it is possible that it is present. There is no felling of woodland proposed so no loss of potential habitat for this species – 'No impacts'	'No impacts' are expected on Red Squirrel at the operational stage.	N/A
ER8g – Stoat	There will be no loss of habitat for this species as a result of the proposed Greenway – 'No impacts' .	'No impacts' are expected on stoat at the operational stage.	N/A
ER8h – Hedgehog	There will be no loss of habitat for this species as a result of the proposed Greenway – 'No impacts' .	'No impacts' are expected on hedgehog at the operational stage.	N/A
ER8i - Pygmy Shrew	There will be no loss of habitat for this species as a result of the proposed Greenway – 'No impacts' .	'No impacts' are expected on Pygmy Shrew at the operational stage.	N/A
ER8j – Common Lizard	There will be no loss of habitat for this species as a result of the proposed Greenway – 'No impacts' .	'No impacts' are expected on Common Lizard at the operational stage.	N/A
ER8k – Common Frog	Release of contaminants to watercourses during the construction stage would negatively affect this species. This will result in a 'Temporary Significant Negative' impact. There is a probable chance that this impact will occur.	'No impacts' are expected on Common Frog at the operational stage.	This species is considered to be of National Importance. Potential pollution of watercourses during the construction phase would have an impact on the population of Frogs along the proposed Greenway. This impact is therefore considered to be 'Significant on a National Level' in the absence of avoidance and mitigation measures.
ER8l – Smooth Newt	Smooth Newt was not found during surveys. Release of contaminants to watercourses during the construction stage would negatively affect this	'No impacts' are expected on Smooth Newt at the operational stage.	This species is considered to be of National Importance. Potential pollution of watercourses during the construction phase could impact on

ER8: Faunal Species protected under the Irish Wildlife Acts - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
	species. This will result in a 'Temporary Significant Negative' impact. There is a probable chance that this impact will occur.		Smooth Newt along the proposed Greenway. This impact is therefore considered to be 'Significant on a National Level' in the absence of avoidance and mitigation measures.

Characterisation of Potential Impacts to Flora Protection Order (FPO) Species (ER9) and Determination of Significance of Impacts

ER9: Flora Protection Order (FPO) Species - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
ER9a – Bog Hair-grass	There will be no loss of habitat for this species as a result of the proposed Greenway – 'No impacts' .	'No impacts' are expected on Bog Hair-grass at the operational stage.	N/A
ER9b - Slender Cottongrass	There will be no loss of habitat for this species as a result of the proposed Greenway – 'No impacts' .	'No impacts' are expected on Slender Cottongrass at the operational stage.	
ER9c – Bog Orchid	There will be no loss of habitat for this species as a result of the proposed Greenway – 'No impacts' .	'No impacts' are expected on Bog Orchid at the operational stage.	

Characterisation of Potential Impacts to Bird Species (ER10) and Determination of Significance of Impacts

ER10: BoCCI Bird Species-principal elements of ecological value	Construction-phase Impacts	Operational Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
Snipe, Swallow, Whooper Swan and Chaffinch	There may be some 'Temporary Slight Negative' impacts due to disturbance in the area.	'No impacts' on these bird species are expected during the operational stage.	These ecological receptors are considered to be of National Importance. There will be a slight impact to this species in the form of temporary disturbance during construction works, but this is not considered to be significant, even on a local level – 'Not Significant' .

Characterisation of Potential Impacts to the Hedgerow Network in the Study Area (ER11) and Determination of Significance of Impacts

ER11 – Hedgerow Network: principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
<ul style="list-style-type: none"> • General floristic value • Bird nesting potential • Value as ‘wildlife corridors’ • Value as foraging and navigational routes for bats 	There may be some loss of Hedgerows as a result of the construction of the Greenway – ‘Permanent Slight Negative’ .	‘No impacts’ on any hedgerow network: principal elements of ecological value are expected during the operational stage.	This habitat is considered to be of Local Importance – Higher Level. Any loss of this habitat would be considered ‘Significant at a Local Level’ .

Characterisation of Potential Impacts to the Treelines in the Study Area (ER12) and Determination of Significance of Impacts

ER12 – Treelines within the Study Area: principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
<ul style="list-style-type: none"> • General floristic value • Bird nesting potential • Value as ‘wildlife corridors’ • Value as foraging and navigational routes for bats • Potential as bat roosts 	There may be some loss of Treelines as a result of the construction of the Greenway – ‘Permanent Slight Negative’ .	‘No impacts’ on any hedgerow network: principal elements of ecological value are expected during the operational stage.	This habitat is considered to be of Local Importance – Higher Level. Any loss of this habitat would be considered ‘Significant at a Local Level’ .

Characterisation of Potential Impacts to Wet Grassland GS4 throughout the study area (ER13) and Determination of Significance of Impacts

ER13: Wet Grassland GS4 throughout the study area - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
General floristic value	There may be loss of some of this Wet Grassland GS4 habitat where it has encroached onto the disused rail line. This will result in a ‘Permanent Slight Negative’ impact. There is near certain chance that this impact will occur.	No direct or indirect operational phase impacts are expected on these sites – No impacts .	This ecological receptor is considered to be of Local Importance (Higher Value). Limited amounts of this habitat will be lost, however. Therefore the impact is not considered to be significant, even on a local level – ‘Not Significant’ .

Characterisation of Potential Impacts to Acid Grassland GS3 throughout the study area (ER14) and Determination of Significance of Impacts

ER14: Acid Grassland GS3 throughout the study area - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
General floristic value	There may be loss of some of this Acid Grassland GS3 habitat where it has encroached onto the disused rail line. This will result in a 'Permanent Slight Negative' impact. There is near certain chance that this impact will occur.	No direct or indirect operational phase impacts are expected on these sites – No impacts.	This ecological receptor is considered to be of Local Importance (Higher Value). Limited amounts of this habitat will be lost, however. Therefore the impact is not considered to be significant, even on a local level – 'Not Significant' .

Characterisation of Potential Impacts to Mesotrophic Lake (ER15) and Determination of Significance of Impacts

ER15: Mesotrophic Lake - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
Water quality	No direct impacts are expected on this habitat – 'No Impact' . Potential 'Indirect, Temporary Significant Negative' impacts are possible, in the form of hydrocarbon contamination and siltation from upgrading works entering the lake directly or via connecting streams or drains. There is a near certain chance of these impacts occurring. The worst case scenario would be a large scale spillage of a contaminant such as diesel or cement which would have an 'Indirect, Short-term Significant Negative' impact on the aquatic environment of the lake and its associated species. There is a probable chance of these impacts	No operational discharges are proposed to rivers, streams or (connecting drains) containing these species – 'No impact'	This ecological receptor has been deemed to be of International Importance due to the Annex II species it supports. If unmitigated, a major environmental incident such as a large scale spillage of a contaminant such as diesel or cement would have an impact on this habitat and its associated species, and thus significantly affect its integrity. This impact is therefore considered to be 'Significant on Local Level' .

ER15: Mesotrophic Lake - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
	occurring.		
Aquatic species within the lake	A reduction in water quality in the lake due to hydrocarbon contamination and siltation from upgrading works would in turn have a negative impact on the aquatic species within the lake. Potential 'Indirect, Temporary Significant Negative' impacts on aquatic species in the lake are probable if pollution occurs.	No operational discharges are proposed to rivers, streams or (connecting drains) containing these species – 'No impact'	

Characterisation of Potential Impacts to Wet Willow Alder Ash Woodland (ER16) and Determination of Significance of Impacts

ER16: Wet Willow Alder Ash woodland - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
General floristic value	<p>There will be no direct loss of this habitat - 'No impacts.'</p> <p>There would be the potential for 'Direct/Indirect Permanent Significant Negative' impacts on the woodland habitat on either side of the proposed Greenway a result of construction activities, e.g. physical damage to trees, trampling of ground flora, compaction of soil in the vicinity of the roots and alterations to local hydrology. There is a near certain chance that these impacts would occur, and would affect this habitat.</p>	No direct or indirect operational phase impacts are expected on these sites – No impacts.	<p>This ecological receptor is considered to be of Local Importance (Higher Value).</p> <p>Potential for impacts on woodland either side of the track due to construction activities which may result in the loss of foraging habitats for a local bat population and thereby be considered significant, though there will be no direct loss of roosts – 'Significant'.</p> <p>Damage to any nests containing eggs or chicks would also be</p>

ER16: Wet Willow Alder Ash woodland - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
Bird nesting potential	If the felling of trees is not timed appropriately, nests containing eggs or young chicks could be destroyed. This will result in a 'Permanent Significant Negative' impact. There is a near certain chance that this impact will occur.	'No impacts' on bird nesting potential are expected at the construction stage. Visual and noise disturbance may result in a reduction in bird nesting potential. This will result in a 'Permanent Moderate Negative' impact. There is a near certain chance of this impact occurring.	significant, as these are protected under the Wildlife Act – 'Significant' . The overall impact on this ecological receptor is therefore considered to be Significant on a Local Level .
Bat species in the area	This woodland habitat might be used by bats for foraging. The loss of woodland would result in a direct loss of foraging habitat which would have an Indirect 'Permanent Moderate Negative' impact on bats in the area. There is a near certain chance of this impact occurring.	'No impacts' on bat species in this site are expected during the operational stage.	

Characterisation of Potential Impacts to Dry Calcareous / Neutral Grassland (ER17) and Determination of Significance of Impacts

ER17: Dry Calcareous / Neutral Grassland GS1 - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
General floristic value	There may be loss of some small areas of this Dry Calcareous / Neutral GS1 habitat where it has encroached on the disused rail line. This will result in a 'Permanent Moderate Negative' impact. There is a probable chance of this impact occurring.	No direct or indirect operational phase impacts are expected on these sites – No impacts .	This ecological receptor is considered to be of Local Importance (Higher Value). Only small areas of this habitat will be lost. Therefore the impact is not considered to be significant, even on a local level – 'Not Significant' .

Characterisation of Potential Impacts to this Cutover Bog PB4 (ER18) and Determination of Significance of Impacts

ER18: Cutover Bog PB4 (offline between Ch.4+050 and Ch.4+300 at Gowland West) - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
General floristic value	<p>Loss of some - approximately 1250m² (5m x 250m) - of this Cutover Bog PB4, habitat. This will result in a 'Permanent Significant Negative' impact. There is a near-certain chance of this impact occurring.</p> <p>These areas may be affected by indirect potential impacts on the hydrological regime of cutover bog habitat adjacent to the proposed Greenway. The resulting impact will be 'Permanent Moderate Negative'. There is a probable chance of these impacts occurring.</p>	No direct or indirect operational phase impacts are expected on these sites – No impacts.	<p>This ecological receptor is considered to be of Local Importance (Higher Value).</p> <p>There is a near-certain chance that approximately 1250m² of this habitat will be permanently lost due to the Greenway construction and probable chance of some of this habitat being affected through altered hydrology therefore the overall impact on this ecological receptor is considered to be Significant on a Local Level.</p>

Characterisation of Potential Impacts to this Cutover Bog PB4 (ER19) and Determination of Significance of Impacts

ER19: Cutover Bog PB4 (offline between Ch.35+000 and Ch.35+100 at Lurgan) - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
General floristic value	<p>Loss of some - approximately 250m - of this Cutover Bog PB4, habitat. This will result in a 'Permanent Significant Negative' impact. There is a near-certain chance of this impact occurring.</p> <p>These areas may be affected by indirect potential impacts on the hydrological regime of cutover bog habitat adjacent to the proposed Greenway. The resulting impact will be 'Permanent Moderate Negative'. There is a probable chance of these impacts occurring.</p>	No direct or indirect operational phase impacts are expected on these sites – No impacts .	<p>This ecological receptor is considered to be of Local Importance (Higher Value).</p> <p>There is a near-certain chance that approximately 1250m² of this habitat will be permanently lost due to the greenway construction and probable chance of some of this habitat being affected through altered hydrology therefore the overall impact on this ecological receptor is considered to be Significant on a Local Level.</p>

Characterisation of Potential Impacts to this Cutover Bog PB4 (ER20) and Determination of Significance of Impacts

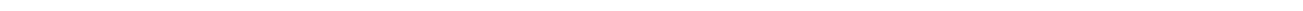
ER20: Cutover Bog PB4 (offline at Ch.35+450 at Lurgan) - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
<p>General floristic value</p>	<p>Loss of some - approximately 1500m² (5m x 300m) - of this Cutover Bog PB4, habitat. This will result in a 'Permanent Significant Negative' impact. There is a near-certain chance of this impact occurring.</p> <p>These areas may be affected by indirect potential impacts on the hydrological regime of cutover bog habitat adjacent to the proposed Greenway. The resulting impact will be 'Permanent Moderate Negative'. There is a probable chance of these impacts occurring.</p>	<p>No direct or indirect operational phase impacts are expected on these sites – No impacts.</p>	<p>This ecological receptor is considered to be of Local Importance (Higher Value).</p> <p>There is a near-certain chance that approximately 1500m² of this habitat will be permanently lost due to the greenway construction and a probable chance of some of this habitat being affected through altered hydrology therefore the overall impact on this ecological receptor is considered to be Significant on a Local Level.</p>

Characterisation of Potential Impacts to Reed and Large Sedge Swamp FS1 habitat throughout the study area (ER21) and Determination of Significance of Impacts

ER21: Reed and Large Sedge Swamp FS1 throughout the study area - principal elements of ecological value	Construction Phase Impacts	Operational Phase Impacts	Ecological Significance of Impact in the Absence of Avoidance or Mitigation Measures
General floristic value	<p>There will be no direct loss of this habitat - No impacts.</p> <p>These areas may be affected by indirect potential impacts on the hydrological regime of cutover bog habitat adjacent to the proposed Greenway. The resulting impact will be 'Permanent Moderate Negative'. There is a probable chance of these impacts occurring.</p>	<p>No direct or indirect operational phase impacts are expected on these sites – No impacts.</p>	<p>This ecological receptor is considered to be of Local Importance (Higher Value).</p> <p>There is a near-certain chance that approximately 1500m² of this habitat will be permanently lost due to the greenway construction and a probable chance of some of this habitat being affected through altered hydrology therefore the overall impact on this ecological receptor is considered to be Significant on a Local Level.</p>

APPENDIX D

Archaeology, Architectural and Cultural Heritage



Appendix D.1 RMP Sites within the Surrounding Area

AH No.:	AH 2
RMP No.:	GA035-023
Townland:	Clifden
Parish:	Omey
Barony:	Ballynahinch
NGR:	65990, 250670
Classification:	Court house
Dist. from development:	c. 280m north (Points 1-2)
Description:	No information in file.
Reference:	SMR File

AH No.:	AH 5
RMP No.:	GA035-062
Townland:	Clifden
Parish:	Omey
Barony:	Ballynahinch
NGR:	65908, 250562
Classification:	Town
Dist. from development:	To immediate north (Points 1-2)
Description:	No information in file.
Reference:	SMR File

AH No.:	AH 6
RMP No.:	GA035-021
Townland:	Clifden
Parish:	Omey
Barony:	Ballynahinch
NGR:	65965, 250430
Classification:	Prison
Dist. from development:	c. 85m north-west (Points 1-2)
Description:	No information in file.
Reference:	SMR File

AH No.:	AH 7
RMP No.:	GA035-017
Townland:	Clifden
Parish:	Omey
Barony:	Ballynahinch
NGR:	66020, 250482
Classification:	Prison
Dist. from development:	c. 80m north (Points 1-2)
Description:	No information in file.
Reference:	SMR File

AH No.:	AH 8
RMP No.:	GA035-003 & 004
Townland:	Ardagh
Parish:	Ballindoon
Barony:	Ballynahinch
NGR:	66920, 249397
Classification:	Bridge and mill
Dist. from development:	c. 210m south-west (Points 1-2)
Description:	No information on bridge. File notes that mill is named as 'Old Mill' on the first edition OS map but the site had not been visited by the survey team as of September 2009.
Reference:	SMR File

AH No.:	AH 9
RMP No.:	GA035-002
Townland:	Ardagh
Parish:	Ballindoon
Barony:	Ballynahinch
NGR:	67420, 249252
Classification:	Mass rock
Dist. from development:	c. 275m south (Points 1-2)
Description:	No information in file.
Reference:	SMR File

AH No.:	AH 10
RMP No.:	GA035-052
Townland:	Killymongaun
Parish:	Moyrus
Barony:	Ballynahinch
NGR:	67830, 249496
Classification:	Burial
Dist. from development:	c. 30m south (Points 1-2)
Description:	In rough pasture c. 30m south of the Dúinín road, between it and Loch Doire Mhicín. It consists of a rectangular grave (L 3m, W 1.2m) outlined by small stones and aligned east-west. Said locally to be the grave of the man the curate shot, linking it with a story of Fr. Myles Prendergast shooting the spy who was tracking him when he was on the run after the 1798 rebellion (ref. T Robinson)
Reference:	SMR File

AH No.:	AH 11
RMP No.:	GA036-017
Townland:	Munga
Parish:	Ballindoon
Barony:	Ballynahinch
NGR:	70877, 248239
Classification:	Enclosure
Dist. from development:	c. 55m south-west (Points 4-5)

Description:	The site consists of a sub-circular enclosure similar in every way to GA036-016. The site is in very poor condition.
Reference:	SMR File

AH No.:	AH 12
RMP No.:	GA036-016
Townland:	Munga
Parish:	Ballindoon
Barony:	Ballynahinch
NGR:	70797, 248224
Classification:	Enclosure
Dist. from development:	c. 135m south-west (Points 4-5)
Description:	The site consists of a sub-circular enclosure similar in every way to GA036-015. It is 32m in diameter and its banks are 0.4m in height and 0.6m in width. The site is in very poor condition.
Reference:	SMR File

AH No.:	AH 13
RMP No.:	GA036-015
Townland:	Munga
Parish:	Ballindoon
Barony:	Ballynahinch
NGR:	70721, 248213
Classification:	Enclosure
Dist. from development:	c. 230m south-west (Points 4-5)
Description:	The site is located in flat bogland and consists of the poor remains of a sub-circular enclosure. The site is composed entirely of bog on which it is raised. The height of the bank is a maximum of 0.40m by 0.6m wide. The dimensions of the site north-south are 32m, east-west 34m. It may be relatively modern in date.
Reference:	SMR File

AH No.:	AH 14
RMP No.:	GA050-009
Townland:	Derryadd West
Parish:	Moyrus
Barony:	Ballynahinch
NGR:	75854, 246164
Classification:	Church
Dist. from development:	c. 235m south-east (Points 5-6)
Description:	No information in file.
Reference:	SMR File

AH No.:	AH 15
RMP No.:	GA036-010
Townland:	Cloonbeg
Parish:	Moyrus
Barony:	Ballynahinch
NGR:	76357, 246945
Classification:	Enclosure

Dist. from development:	c. 60m north (Points 6-7)
Description:	The site lies north of the road running through Ballynahinch wood. The site could not be located due to the dense forest cover. On the second edition OS map the east-west axis of the enclosure was c. 30m.
Reference:	SMR File

AH No.:	AH 16
RMP No.:	GA036-002
Townland:	Ballynahinch
Parish:	Moyrus
Barony:	Ballynahinch
NGR:	76324, 247135
Classification:	Country house
Dist. from development:	c. 255m NNW (Points 6-7)
Description:	The site is situated to the south of Ballynahinch lake on the west bank of the Owenmore or Ballynahinch river which drains the lake southwards to Bertaghboy Bay. The site overlooks landscaped gardens and islands to the east and north. The site is in good condition and is presently being used as a hotel. Bence-Jones records that the castle was built in the 18th century by Richard Martin, who owned much of Connemara. The house was sold due to high debts. And it was eventually acquired by the famous cricketer 'Ranji' otherwise Maharaja Ranjitsinhji, Jam Sahib of Nawangar.
Reference:	SMR File

AH No.:	AH 17
RMP No.:	GA036-003
Townland:	Ballynahinch
Parish:	Moyrus
Barony:	Ballynahinch
NGR:	76416, 247148
Classification:	Standing stone
Dist. from development:	c. 245m north (Points 6-7)
Description:	The site lies on the south side of the driveway to Ballynahinch castle. The site is situated c. 50m to the east of the castle. May be ornamental and related to the landscaping of the gardens around Ballynahinch castle. The stone is a pillar stone measuring 2.06m high and is roughly triangular in plan.
Reference:	SMR File

AH No.:	AH 20
RMP No.:	GA036-011
Townland:	Killeen
Parish:	Moyrus
Barony:	Ballynahinch
NGR:	76819, 247116
Classification:	Designed landscape feature?
Dist. from development:	c. 235m NNW (Points 6-7)
Description:	Site first identified as a tree copse surrounded by an enclosure on the OS map however it was not identified on inspection and therefore it has not been possible to determine the exact nature of the site.
Reference:	SMR File

AH No.:	AH 21
RMP No.:	GA036-013
Townland:	Killeen
Parish:	Moyrus
Barony:	Ballynahinch
NGR:	76969, 246848
Classification:	Crannog, possible
Dist. from development:	c. 85m NNW (Points 7-8)
Description:	The site is located in the east half of Killeen Lough. The site consists of a small triangular island, possibly a crannog. The maximum north-south axis is 15m and the maximum east-west axis is 20m – both measured from the second edition of the OS 6" map. The island is c. 0.40m above the level of the water and is fairly even. It is overgrown with trees. No traces of stone walls or a palisade were noted.
Reference:	SMR File

AH No.:	AH 22
RMP No.:	GA036-012
Townland:	Killeen
Parish:	Moyrus
Barony:	Ballynahinch
NGR:	77145, 246835
Classification:	Non antiquity?
Dist. from development:	c. 100m north (Points 7-8)
Description:	Site first identified as a sub-circular clump of trees surrounded by an enclosure on the OS map; however it was not identified on inspection therefore it is not possible to determine the exact nature of the site.
Reference:	SMR File

AH No.:	AH 23
RMP No.:	GA037-006
Townland:	Killeen
Parish:	Moyrus
Barony:	Ballynahinch
NGR:	77959, 246782
Classification:	Crannog
Dist. from development:	c. 160m north (Points 7-8)
Description:	Noted by Kinahan, G.H. in 1872 a possible crannóg on the northern portion of Ballinafad Lough, which lies south of Ballinahinch Lough as a circle of stones with a small island near its centre is visible.
Reference:	SMR File

AH No.:	AH 25
RMP No.:	GA037-005
Townland:	Garroman
Parish:	Moyrus
Barony:	Ballynahinch

NGR:	84606, 247405
Classification:	Non antiquity
Dist. from development:	c. 265m south (Points 12-13)
Description:	Marked as a fairy hill on the first and second edition OS map. The site consists of a striking natural mound, roughly oval in shape. The mound is a glacial construct.
Reference:	SMR File

AH No.:	AH 26
RMP No.:	GA037-010
Townland:	Lissoughter
Parish:	Moyrus
Barony:	Ballynahinch
NGR:	85574, 247141
Classification:	Water mill
Dist. from development:	c. 280m south-west (Points 12-13)
Description:	No information in file.
Reference:	SMR File

AH No.:	AH 27
RMP No.:	GA038-004
Townland:	Cappaghoosh
Parish:	Moyrus
Barony:	Ballynahinch
NGR:	88035, 246738
Classification:	Burial ground
Dist. from development:	c. 80m SSW (Points 12-13)
Description:	No information in file.
Reference:	SMR File

AH No.:	AH 28
RMP No.:	GA038-010
Townland:	Boheeshal
Parish:	Moyrus
Barony:	Ballynahinch
NGR:	89915, 246358
Classification:	Stone row
Dist. from development:	c. 155m north-east (Points 12-13)
Description:	No information in file.
Reference:	SMR File

AH No.:	AH 31
RMP No.:	GA039-009
Townland:	Derreennagusfoor
Parish:	Kilcummin
Barony:	Moycullen
NGR:	100781, 246612

Classification:	Burial ground
Dist. from development:	c. 185m north (Points 19-20)
Description:	Marked on the second edition OS map as 'Crukaunnapostha' (Infants Burial Ground). The site is situated in undulating boggy terrain c. 185m north of the road along former railway line. An oval hillock with a ragged limestone outcrop (or big half buried erratic) at its north-west end, beside which (on its southern side) are some small stones perhaps outlining two or three small rectangular graves of a thorn tree.
Reference:	SMR File

AH No.:	AH 33
RMP No.:	GA054-036
Townland:	Glengowla West
Parish:	Kilcummin
Barony:	Moycullen
NGR:	107999, 241710
Classification:	Lead mine
Dist. from development:	c. 130m NNE (Points 25-27)
Description:	Lead mines marked as disused on the 1890-1900 OS map. No trace survives of the mines. The area they once occupied is now an undulating small field of pasture and is grass covered.
Reference:	SMR File

AH No.:	AH 34
RMP No.:	GA054-034
Townland:	Glengowla East
Parish:	Kilcummin
Barony:	Moycullen
NGR:	108237, 241840
Classification:	Ringfort
Dist. from development:	c. 290m north (Points 25-27)
Description:	Poorly preserved univallate cashel with level interior lies at the south end of a slight natural ridge and overlooks lower scrub and bogland to the north-east. The enclosing element is formed by a base of rock and stone and is grass covered. The interior of the cashel is level and featureless and there are no obvious external related features.
Reference:	SMR File

AH No.:	AH 35
RMP No.:	GA054-035
Townland:	Glengowla East
Parish:	Kilcummin
Barony:	Moycullen
NGR:	108674, 241777
Classification:	Ringfort
Dist. from development:	c. 80m NNW (Points 25-27)
Description:	Lead mines marked as disused on the 1890-1900 OS map. No trace survives of the

	mines. The area they once occupied is now undulating small field of pasture. Locals confirmed their presence but could not elaborate. (Since SMR inspection, the mines have been opened up as part of a tourist attraction. Spoil from them has been dumped on the former railway track).
Reference:	SMR File

AH No.:	AH 39
RMP No.:	GA054-017
Townland:	Claremount
Parish:	Kilcummin
Barony:	Moycullen
NGR:	110902, 242628
Classification:	Copper mine
Dist. from development:	c. 125m east (Point 29)
Description:	No information in file
Reference:	SMR File

AH No.:	AH 40
RMP No.:	GA054-018
Townland:	Claremount
Parish:	Kilcummin
Barony:	Moycullen
NGR:	110975, 242579
Classification:	Quarry
Dist. from development:	c. 200m ESE (Point 29)
Description:	No information in file. A circular enclosure is marked here on the second edition OS map.
Reference:	SMR File

AH No.:	AH 42
RMP No.:	GA054-010
Townland:	Canrawer West
Parish:	Kilcummin
Barony:	Moycullen
NGR:	111132, 242446
Classification:	Well
Dist. from development:	c. 260m north (Points 27-30)
Description:	No information in file.
Reference:	SMR File

AH No.:	AH 44
RMP No.:	GA054-00901/02
Townland:	Canrawer West
Parish:	Kilcummin

Barony:	Moycullen
NGR:	111472, 242366
Classification:	Enclosure and souterrain
Dist. from development:	c. 205m north (Points 27-30)
Description:	Highlighted as hachured area on first edition OS map. Now totally destroyed, located in a modern pasture field. A cave is annotated on the first OS map. There is no sign of this now – probably removed due to land improvement.
Reference:	SMR File

AH No.:	AH 45
RMP No.:	GA054-011
Townland:	Canrawer West
Parish:	Kilcummin
Barony:	Moycullen
NGR:	111434, 247309
Classification:	Worked stone
Dist. from development:	c. 150m north (Points 27-30)
Description:	At the base of the roadside wall and forming part of the wall in a piece of worked stone. Reminiscent of a bullaun stone.
Reference:	SMR File

AH No.:	AH 46
RMP No.:	GA054-008
Townland:	Canrawer West
Parish:	Kilcummin
Barony:	Moycullen
NGR:	111571, 241976
Classification:	Burial ground
Dist. from development:	c. 120m south (Points 27-30)
Description:	Marked as a workhouse burial ground on the 1890-1900 OS map. The site was situated in a sub-rectangular field aligned northwest-southeast. The headstones are similar to those found in Children's Burial Ground, simple unmarked stone slabs.
Reference:	SMR File

Appendix D.2: Stray Finds within the Surrounding Area

Information on artefact finds from the study area in County Galway has been recorded by the National Museum of Ireland since the late 18th century. Location information relating to these finds is important in establishing prehistoric and historic activity in the study area.

Museum No:	2009:213
Townland:	Clifden
OS Sheet	35
Parish:	Omey
Barony:	Ballynahinch
Find:	Roughout Stone
Find place:	Found in garden during landscaping
Description:	Possible roughout leaf shaped unpolished stone with a pointed oval profile. The butt is flat and the point is broken off.
Reference:	NMI Topographical Files

Museum No:	R.469
Townland:	Clifden
OS Sheet	35
Parish:	Omey
Barony:	Ballynahinch
Find:	Bronze Bowl, Beaten and spun
Find place:	Not specified
Description:	Bronze basin heavily patinated all over. It was raised from a single sheet; the base is flat except for a hollow central boss. The walls are straight and more or less vertical. Diameter internal 31.3cm, Height 9.2cm, Thickness at rim 1mm. Find circumstances unknown.
Reference:	NMI Topographical Files

Museum No:	2009:212
Townland:	Clifden
OS Sheet	35
Parish:	Omey
Barony:	Ballynahinch
Find:	Polished stone axehead
Find place:	Found in garden during landscaping.
Description:	Polished stone axehead of a fine grained green stone, straight splayed sides and oval profile with flattened sides. Surface is polished with isolated rough patches. Blade and butt show signs of damage and chipping.
Reference:	NMI Topographical Files

Museum No:	2000:1
Townland:	Clifden
OS Sheet	35
Parish:	Omey
Barony:	Ballynahinch
Find:	Polished stone axehead
Find place:	Found during digging in garden.
Description:	Polished stone axehead
Reference:	NMI Topographical Files

Museum No:	2004:205
Townland:	Ballynahinch
OS Sheet	36
Parish:	Moyrus
Barony:	Ballynahinch
Find:	Architectural Fragment
Find place:	Dislodged from a building
Description:	Stone architectural fragment, inscribed block of trapezoidal shape. The inscription bears the letters RM with a small diamond form separating them. Originally the stone appears to have been a rectangular block but was spilt diagonally later.
Reference:	NMI Topographical Files

Museum No:	1973:205
Townland:	Ballynahinch
OS Sheet	36
Parish:	Moyrus
Barony:	Ballynahinch
Find:	Hammerstone
Find place:	Found at unknown depth in a sand pit.
Description:	Hammerstone
Reference:	NMI Topographical Files

Museum No:	1941:1418
Townland:	Shannakeela
OS Sheet	38, 52
Parish:	Moyrus
Barony:	Ballynahinch
Find:	Vessel
Find place:	Bog
Description:	Decorated bog butter vessel
Reference:	NMI Topographical Files

Museum No:	1941:1417
Townland:	Sannakeela
OS Sheet	38, 52
Parish:	Moyrus
Barony:	Ballynahinch
Find:	Wooden beetle
Find place:	Bog
Description:	Folk-life object
Reference:	NMI Topographical Files

Museum No:	1941:1416
Townland:	Shannakeela
OS Sheet	38, 52
Parish:	Moyrus
Barony:	Ballynahinch
Find:	Wooden paddle

Find place:	Bog
Description:	Wooden paddle
Reference:	NMI Topographical Files

Museum No:	1998:36
Townland:	Derreighter
OS Sheet	53
Parish:	Kilcummin
Barony:	Moycullen
Find:	Wooden vessel containing butter
Find place:	Found cutting turf in a bog
Description:	Fragments of a wooden vessel containing bog butter recovered from bog.
Reference:	NMI Topographical Files

Museum No:	1998:35
Townland:	Derreighter
OS Sheet	53
Parish:	Kilcummin
Barony:	Moycullen
Find:	Bog Butter
Find place:	Found cutting turf in a bog
Description:	Bog butter in a wooden vessel.
Reference:	NMI Topographical Files

Museum No:	1989:41
Townland:	Derreighter
OS Sheet	53
Parish:	Kilcummin
Barony:	Moycullen
Find:	Wooden Vessel
Find place:	2ft deep in a bog
Description:	Wooden vessel fragment of a single piece of cylindrical vessel, it appears to be unfinished. Height 25.5cm, estimate of diameter 21cm.
Reference:	NMI Topographical Files

Museum No:	1989:40
Townland:	Derreighter
OS Sheet	53
Parish:	Kilcummin
Barony:	Moycullen
Find:	Wooden vessel
Find place:	2ft deep in a bog
Description:	Wooden vessel, single pieces cylindrical shape with slightly convex side walls. The lid is also made from a single piece of wood. Height 26.5cm, Diameter at rim 22.5–24.5cm, Diameter of lid 21cm, Thickness 10mm.
Reference:	NMI Topographical Files

Museum No:	1985:39
Townland:	Derreighter
OS Sheet	53

Parish:	Kilcummin
Barony:	Moycullen
Find:	Bog butter
Find place:	1–1.5m deep in a bog
Description:	Bog butter sample.
Reference:	NMI Topographical Files

Museum No:	1985:12
Townland:	Rusheeny
OS Sheet	54
Parish:	Kilcummin
Barony:	Moycullen
Find:	Mether, wooden mether roughout
Find place:	Found 15 inches deep in a bog.
Description:	Carved from a single block of wood. Circular base and square top with a sutswelling in the mid-section. Two trapezoidal shaped lugs on opposite sides formed of reversed areas of wood. Max Height 20.4cm, Dimensions at top 11.6cm x 11.2cm. Max Dimensions at base 11.2cm. Average thickness 2cm.
Reference:	NMI Topographical Files

Museum No:	1985:9-10
Townland:	Rusheeny
OS Sheet	54
Parish:	Kilcummin
Barony:	Moycullen
Find:	Wooden vessel roughout
Find place:	Found 15 inches deep in a bog
Description:	Wooden vessel roughout. Two incomplete wooden vessels Dimensions 1985:9 Max Height 26cm, Diameter at rim 20cm, Thickness at rim 1.8cm, Diameter at base 11.5cm. Dimensions 1985:10 Height 27.5cm, Diameter at rim 20.5cm, Thickness at rim 3cm, Diameter at base 15cm.
Reference:	NMI Topographical Files

Appendix D.3: Protected Structures and NIAH Structures within the Surrounding Area

BH No.:	2
RPS No.:	597
NIAH No.:	30325027
Townland:	Clifden/ Ardbear
Parish:	Omey/ Moyrus
Barony:	Ballynahinch
NGR:	66036, 250387
Classification:	Bridge
Dist. from development:	0m (Points 1-2)
Description:	<p>NIAH Description Triple-span road bridge, built 1789, having two round arches to south and single camber arch to north. Rubble stone piers and voussoirs with triangular-plan rubble stone cutwaters with concrete reinforcing to base. Rubble stone parapet walls and arch surrounds. Round overflow arch to south.</p> <p>NIAH Appraisal This picturesque road bridge traversing the Owenglen River to the south of the town displays skilled local craftsmanship and attention to detail, providing an insight into eighteenth-century bridge building. It compliments the landscape in which it is set and is still an essential transport link for the area.</p>
Categories of Special Interest:	Architectural, technical
Rating:	Regional
Reference:	NIAH Survey: County Galway

BH No.:	3
RPS No.:	598
NIAH No.:	30325033
Townland:	Clifden/ Ardbear
Parish:	Omey/ Moyrus
Barony:	Ballynahinch
NGR:	65952, 250368
Classification:	Bridge
Dist. from development:	75m west (Points 1-2)
Description:	<p>NIAH Description Single-arch rubble limestone road bridge, built 1819, over rocky ravine of Owenglin River. Cut-stone block piers and voussoirs to elliptical arch with rubble stone soffit and parapet, latter having concrete capping. Tarmacadam road surface. Recent memorial plaque set into road side of parapet wall. Recent pedestrian bridge located to west. Ruined mill to north, with disused millstone set into rocky edge of ravine.</p> <p>NIAH Appraisal This picturesque and dramatically sited road bridge traversing the Owenglin River to the south of the town displays skilled craftsmanship, providing an insight into nineteenth-century bridge-building. It compliments the landscape in which it is set and is still an essential transport link for the area.</p>
Categories of Special Interest:	Architectural, technical
Rating:	Regional
Reference:	NIAH Survey: County Galway

BH No.:	4
RPS No.:	N/A
NIAH No.:	30325028
Townland:	Ardbear
Parish:	Moyrus
Barony:	Ballynahinch
NGR:	66080, 250371
Classification:	House
Dist. from development:	c. 25m east (Points 1-2)
Description:	<p>NIAH Description Detached four-bay two-storey house, built c.1880, having recent pitched roof porch (north). Pitched slate roof with rendered chimneystacks and replacement uPVC rainwater goods. Roughcast rendered walls, with smooth rendered platbands to corners. Square-headed window openings having tooled limestone sills, raised render reveals and replacement tripartite timber sliding sash six-over-six pane windows. Square-headed door opening to porch with timber glazed door. Rubble limestone enclosing wall to north and west having roughcast rendered piers to pedestrian gate with wrought-iron gate and arch and galvanised steel replacement gate.</p> <p>NIAH Appraisal This is one of the town's few detached medium-size houses. It has retained its overall form and has timber sliding sash windows and limestone sills.</p>
Categories of Special Interest:	Architectural
Rating:	Local
Reference:	NIAH Survey: County Galway

BH No.:	5
RPS No.:	805
NIAH No.:	30325029-32
Townland:	Ardbear
Parish:	Moyrus
Barony:	Ballynahinch
NGR:	66149, 250432
Classification:	Bridge
Dist. from development:	90m ENE (Points 1-2)
Description:	<p>Description A terrace of four houses. All three-bay two-storey structures, built c. 1880. Pitched slate roofs, rendered chimneystacks and some cast-iron and some replacement uPVC rainwater goods. Rendered walls with render plinth. Square-headed window openings with rendered sills, red brick block-and-start surrounds with red brick arches and two-over-two pane timber sliding sash windows and one ground floor window being double sash window (some windows have been replaced with Upvc). Square-headed door opening to entrance with moulded red brick block-and start surrounds, red brick arch, replacement timber panelled doors and overlight and concrete steps.</p> <p>Appraisal This house forms part of a terrace of similar houses that is an interesting part of the townscape.</p>
Categories of Special Interest:	Architectural

Rating:	Regional
Reference:	NIAH Survey: County Galway

BH No.:	21
RPS No.:	N/A
NIAH No.:	30403612
Townland:	Cloonbeg/ Killeen
Parish:	Moyrus
Barony:	Ballynahinch
NGR:	75922, 246506
Classification:	Railway Bridge
Dist. from development:	0m (Points 5-6)
Description:	<p>NIAH Description Double-span railway bridge, erected 1895, now disused. Land ends of bridge comprise broken-coursed rubble limestone revetments with flanking parapets and having margined rock-faced quoins, string course and copings, and flanked by sloping buttresses. Pier to river with similar construction and detailing and having battered sides and round-nosed cutwater. Superstructure of bridge is steel girder with riveted plate and having corrugated sheet sections to bridge bed covered with gravel and earth. Bridge surface overgrown and in poor condition.</p> <p>NIAH Appraisal This rail bridge serves to illustrate the expansion of the rail network in the country at the end of the 19th century and the opening up of further areas of trade and commerce. The use of stone and steel as materials of construction attest to the strength of economy and industry in the late Victorian era.</p>
Categories of Special Interest:	Architectural, technical
Rating:	Regional
Reference:	NIAH Survey: County Galway

BH No.:	22
RPS No.:	N/A
NIAH No.:	30403610-11
Townland:	Derryvickrone/ Killeen
Parish:	Moyrus
Barony:	Ballynahinch
NGR:	75896, 246567
Classification:	Bridge
Dist. from development:	0m (Points 5-6a-6)
Description:	<p>NIAH Description Two, single-arched road bridges, built c. 1810, spanning the Owenmore River. Comprises irregular coursed rubble stonework with dressed limestone piers carrying chamfered pecked and margined limestone string course to base of parapet. Dressed limestone segmental arch with gunnelled concrete soffit. Margined and rock-faced limestone copings to parapets. Stone steps give access to north-eastern river bank adjacent to bridges.</p> <p>NIAH Appraisal These bridges attest to the expansion of the road network in the early nineteenth century and thereby also increased the possibility to improve commerce and communications in an area that was up until then difficult to traverse. They are solidly constructed to serve their function, but with finer</p>

	details to the piers and string course they also has an aesthetic value.
Categories of Special Interest:	Architectural, technical
Rating:	Regional
Reference:	NIAH Survey: County Galway

BH No.:	24
RPS No.:	623, 624
NIAH No.:	30403613-15
Townland:	Cloonbeg
Parish:	Moyrus
Barony:	Ballynahinch
NGR:	76039, 246621
Classification:	Ballynahinch Station
Dist. from development:	c. 10m north-west (Points 6-7)
Description:	<p>NIAH Description: Station House Detached former railway station and stationmaster's house, built c. 1895, now used as private residence. Road elevation faces north-east. Building comprises two-storey house having three-bay front and two-bay rear elevations, with single-storey station proper attached to south-west and having four-bay road and multiple-bay trackside elevation, latter also having canted-bay window and projecting canopy. Gable-fronted north-east bay of front elevation of house projects slightly. Pitched artificial slate roofs with carved and tooled limestone copings to gables, red brick chimneystacks having grey brick upper portions topped with margined rock-faced copings. Exposed king-post trusses to gables. Square-profile cast-iron and replacement uPVC rainwater goods. Platform canopy supported on ornate cast-iron brackets on tooled limestone corbels. Red brick walls with chamfered brick plinth and having black brick bands. Camber-arched window and door openings throughout with moulded brick surrounds, black brick voussoirs and hood-mouldings. Some windows to station and to ground floor of house are paired. Window openings have tooled limestone sills and replacement timber windows. Replacement timber doors. Oculus to upper gable of south-west elevation has moulded black brick surround and stained glass. Concrete coping for platform is <i>in situ</i>. Situated next to road with former signal box to north and engine shed to south-west.</p> <p>Appraisal This well executed building attests to its former importance as a hub of transport and commerce at the end of the 19th and early part of the 20th centuries. The use of moulded and differently coloured brickwork and ornately cast canopy brackets significantly adds to the aesthetic quality of this otherwise functional building.</p> <p>NIAH Description: Former shed Detached single-bay former goods shed, built 1895, now in use as private residence, and having recessed single-bay former office to north-east end having lower roof. Recent additions to rear and to south-west end. Pitched slate roof with decoratively tiled ridge, brick chimneystack, tooled limestone copings to gables and cast-iron and replacement aluminum rainwater goods. Dormer windows to south-west end of front and rear elevations and recent skylight towards middle of roof. Coursed rubble limestone walls with block and start brick quoins. Round oculus windows to gables with red brick surrounds and stained glass. Segmental-arched vehicular entrance to road elevation with block-and-start brick surround and replacement double-leaf timber battened doors having original iron runner for sliding doors. Other doors and windows are recent additions. Appraisal This solidly built structure was designed for use as a goods shed during the</p>

	<p>heyday of the Connemara railway. The construction methods and style of the time are apparent in the round windows in the gables. It forms a group with the other railway structures at the former Ballynahinch Railway Station.</p> <p>NIAH Description: Signal Box</p> <p>Detached two-storey signal box, erected 1895, now used as outbuilding in grounds of private house. Pitched slate roof with decorative tiled ridge, decoratively carved timber bargeboards with timber finials to gables, and replacement uPVC rainwater goods. Lined and ruled render to ground floor with steel casing in south-east elevation still present for signal mechanism. Horizontal timber lapped boarding to upper floor, with fixed timber-framed ribbon windows to each elevation. Glazed timber door to first floor of north-west elevation with recent timber balcony and ramp giving access. Replacement timber battened door to ground floor of south-east elevation.</p> <p>Appraisal</p> <p>This modest signal box is part of the group of railway buildings of the former Ballynahinch Railway Station. It retains most of its historic fabric and contributes to the architectural diversity of this otherwise bleak landscape.</p>
Categories of Special Interest:	Architectural, technical, social
Rating:	Regional
Reference:	NIAH Survey: County Galway

BH No.:	25
RPS No.:	621
NIAH No.:	30403608-09
Townland:	Killeen
Parish:	Moyrus
Barony:	Ballynahinch
NGR:	76660, 246886
Classification:	Gate lodge, level crossing & demesne entrance
Dist. from development:	To the immediate north (Points 6-7)
Description:	<p>NIAH Description: Gate lodge</p> <p>Detached three-bay L-plan single-storey with dormer floor gate lodge, built c. 1870, having two-stage tower to south-west corner and box-bay window to north end of front elevation. Now in use as private residence and considerably extended in late 20th century to rear and to east by single and two-storey blocks in similar style to original building. Pitched slate roofs having tiled ridges, crow-step gables to bays of front and south elevations with render mouldings including coat of arms and laurel wreath, square-profile cast-iron rainwater goods with decorative brackets, projecting rendered chimneystacks. Painted lined and ruled rendered walls having moulded string course between floors of front and south elevations and to tower. Base batter and rendered battlemented parapet to tower. Square-headed window openings to ground floor and triangular-headed windows to first floor, with one-over-one pane timber sliding sash windows with chamfered render surrounds, label-mouldings and lacking sills. Paired windows and battlemented parapet to box-bay window. Square-headed fixed lights to lower stage of tower and triangular-headed openings to upper stage, with chamfered surrounds and lacking sills. Entrance doorway has chamfered surround and shouldered head, with label-moulding having human masks, and timber panelled door. Building sited next to entrance gates of Ballinahinch Castle.</p> <p>Appraisal</p> <p>This unusually ornate gate lodge is of similar construction to that at the north-western entrance to the Ballynahinch estate. Its Gothic Revival style</p>

	<p>evokes the architecture of the medieval period. The attention to detail and the skill of the artisans involved are evident and the rendered details are notable.</p> <p>NIAH Description: Entrance Quadrant south entrance gateway to Ballinahinch Castle, built c. 1850, with vehicular entrance and one pedestrian entrance. Rock-faced granite sweep walls and piers with stepped cement-topped copings supporting decorative cast-iron railings and gates. Piers have tooled margins and cement copings. Camber-headed pseudo-lights to piers flanking entrances. Piers to road have blind openings. (It should be noted that the construction of the railway is likely to have led to a remodeling of the entrance, which is not marked on the first edition. The entrance structures, which include a secondary pair of gate pillars on the northern side of the level crossing is more likely to be contemporary with the construction of railway in the 1890s. Similarly, the gate lodge is well set back from the road and the gates, on the northern side of the railway. As such, it seems more likely that the lodge was built at the same time as the railway, rather than in the 1870s).</p> <p>Appraisal This imposing gateway is indicative of the wealth, influence and importance of the Ballynahinch estate. The gateway forms a significant group with the accompanying gate lodge. Good-quality craftsmanship is evident in the stonework and ironwork.</p>
Categories of Special Interest:	Architectural, artistic
Rating:	Regional
Reference:	NIAH Survey: County Galway

BH No.:	29
RPS No.:	N/A
NIAH No.:	30403702
Townland:	Ballinafad
Parish:	Moyrus
Barony:	Ballynahinch
NGR:	79124, 246691
Classification:	School
Dist. from development:	To the immediate south (Points 9-10)
Description:	<p>NIAH Description Detached four-bay single-storey T-plan former school, built 1830, with central two-bay entrance projection to front added 1925. Now in use as house. Pitched replacement artificial slate roof with rendered chimneystack and replacement uPVC rainwater goods. Painted rendered walls, plinth and painted limestone date plaque to front of projection and with rendered soffit to eaves. Square-headed window openings having concrete sills, six-over-six pane timber sliding sash windows to front and rear elevations, fixed timber windows with single-pane awnings to projection. Square-headed door openings to sides of projection having stone steps and battened timber doors. Rubble stone and timber boundary walls with rubble gate piers having concrete capping and decorative wrought-iron pedestrian gate.</p> <p>NIAH Appraisal This building is a typical example of an early nineteenth-century rural school house, with an early twentieth-century addition, the latter constructed after the formation of the Free State in 1922. The school has been converted to a house and still retains much of its historic fabric, such as the varied timber windows and doors.</p>
Categories of Special Interest:	Architectural, social

Interest:	
Rating:	Regional
Reference:	NIAH Survey: County Galway

BH No.:	42
RPS No.:	N/A
NIAH No.:	30403707
Townland:	Garroman/ Lissoughter
Parish:	Moyrus
Barony:	Ballynahinch
NGR:	83471, 247593
Classification:	Railway Bridge
Dist. from development:	c. 60m south of the N59 (Points 12-13)
Description:	<p>NIAH Description Single-span cast-iron girder railway bridge, dated 1893, over Bealnacarra River. Limestone block piers with limestone and recent concrete block copings supporting riveted wrought and cast-iron girder bridge with riveted parapet wall having maker's mark to girder in south elevation. Recent wrought-iron railing and gates to west elevation. Rubble-stone and earth abutments to east and west.</p> <p>Appraisal This example of late 19th-century engineering was erected for the Midland Great Western Railway Company and is part of the defunct Galway to Clifden branch. The structure was made by Joseph Westwood & Co. Engineers and Contractors, London. The bridge has been well maintained and is in good structural condition.</p>
Categories of Special Interest:	Architectural, technical
Rating:	Regional
Reference:	NIAH Survey: County Galway

BH No.:	44
RPS No.:	628
NIAH No.:	30403708-09
Townland:	Lissoughter
Parish:	Moyrus
Barony:	Ballynahinch
NGR:	83570, 247619
Classification:	Recess Railway station
Dist. from development:	c. 15m south of the N59 (Points 12-13)
Description:	<p>NIAH Description: Station House Detached railway station house, built 1895, comprising T-plan two-storey stationmaster's house having two-bay front elevation and three-bay trackside elevation, with five-bay single-storey waiting room to east and multiple-bay single-storey lean-to addition to west. Canted-bay to front of stationmaster's house with windows to both floors. Now used as private house. Pitched pantile roofs with decorative terracotta ridge tiles to station house and waiting room with lead cladding to raised copings to gables, rendered chimneystacks, cast-iron and replacement uPVC rainwater goods with cast-iron ventilation pipes having decorative caps. Sheet metal and felt coverings</p>

to flat roofed additions. Timber bargeboards to gables with exposed king-post truss to canted bay. Pebble-dashed walls with painted rendered plinth. Camber-headed window openings having rendered architraves, concrete sills and recent external timber shutters. Two-over-two pane timber sliding sash windows to front and rear elevations, two-pane timber casement windows to rear, and four-by-four timber casement windows to west elevation. Square headed window openings with concrete sills having one-over-one pane timber sliding sash windows to rear and west elevations of flat-roofed addition to west elevation, two-over-two pane timber sliding sash windows to front elevation of additional canted-bay window and to west elevation of addition, two-over-one pane timber sliding sash windows to front elevation, twelve-pane timber casement windows to conservatory. Oculus to east elevation with timber louver. Camber-headed door opening with rendered architrave, timber glazed door with bipartite overlight to rear elevation, battened timber door with overlight to east elevation. Square-headed door openings with rendered architraves, double-leafed timber glazed doors and battened timber door with overlight to front elevation (to interior of additional conservatory), louvered and panelled door to west elevation. Single-stage water tower to west of station house having shallow pitched replacement roof, coursed stone block walls with red-brick quoins, round-headed door to front and window openings to sides, with red-brick block-and-start surrounds and concrete sills, internal iron railing to north elevation. Rubble-stone boundary walls to site with rubble-stone piers and stone block capping to east marking railway line. Rubble-stone boundary walls to north with rubble-stone piers with rusticated limestone capping and wrought-iron gates.

NIAH Appraisal: Station House

Built on the Galway to Clifden railway line, this structure was an important part of the communication and transport network of Connemara. The building retains much of its historic fabric, most notably the timber sash windows and doorways but also cast-iron down pipes and ventilation pipes which feature Victorian decorated caps. The building is unusual for having red-clay tiles and ridge tiles. A water tower located on the property along with a neighbouring goods shed and outbuildings are part of a common plan that is found in nearly all railway stations throughout the country built during the Age of Steam.

NIAH Description: Goods Shed

Freestanding five-bay single-storey former goods shed, built c. 1890, having multiple recent additions including lean-to conservatory to front, pitched roofed addition to east side with catslide roof to rear and lean-to roofed porch to rear elevation. Now in use as house. Pitched artificial slate roof with recent roof-lights, rendered coping to gables, rendered chimneystack and replacement uPVC rainwater goods. Pitched artificial slate roof to east addition with catslide, slate lean-to roofs to additional conservatory and porch with uPVC rainwater goods. Coursed rusticated limestone walls having red-brick quoins. Oculus to east and west elevations, now blocked, having red-brick surrounds. Recently inserted square-headed window openings with concrete lintels, surrounds and sills with timber casement windows. Square-headed door opening within former camber-headed carriage-way with red-brick arch and surround now blocked with concrete. Square-headed doorway to rear elevation with remains of wrought-iron sliding door. Ruinous single-bay single-storey outbuilding to east with square-headed window opening having tri-partite timber casement window to front elevation. Square-headed door opening to west elevation. Outbuilding overlooks square recessed area to south possibly denoting former location of railway line. Small complex of ruinous outbuildings to south-east including two-bay single storey outbuilding with flat-roofed extension to rear elevation, pitched slate roof with rendered coping, red-brick walls, polychrome capped plinth, camber-headed window openings with red-brick arches, square-headed window opening with camber headed timber casement window to

	<p>rear elevation with stone sill and two-by-two timber casement windows to front. Camber-headed door openings having red-brick arches, battened and panelled timber door to east elevation. Two-bay single-storey outbuilding to east with lean-to roof, painted rendered walls, square-headed window opening to front elevation, square-headed door openings having battened timber doors to front and north elevations. Final outbuilding is of single-bay single-storey configuration with pitched slate roof having rendered coping, painted rendered walls and square-headed door opening with battened timber door. All three outbuildings linked together by red-brick and rendered boundary wall. Rubble-stone boundary wall to site with rusticated limestone block piers with rusticated limestone capping to entrance.</p> <p>NIAH Appraisal: Goods Shed</p> <p>This fine building is part of a the Recess station complex on the now disused Galway to Clifden railway line. It has a simple design but was a functional structure that played an important role in the era of steam locomotives. The rusticated stone block construction and red-brick detail work enliven the character of the building. The inclusion of oculus to both side elevations is a common feature that is found throughout railway architecture in Ireland. The complex of smaller outbuildings associated with the railway further enhance the aesthetic character of this station.</p>
Categories of Special Interest:	Architectural, artistic, social
Rating:	Regional
Reference:	NIAH Survey: County Galway

BH No.:	50
RPS No.:	N/A
NIAH No.:	30403703
Townland:	Lissoughter
Parish:	Moyrus
Barony:	Ballynahinch
NGR:	85693, 247434
Classification:	Railway bridge
Dist. from development:	c. 40m south of the N59 (Points 12-13)
Description:	<p>NIAH Description</p> <p>Railway bridge, built c. 1895, over disused galway to Clifden railway line. Single segmental arch having rock-faced voussoirs, rubble walling to spandrels and parapets, moulded string course between arch and parapets, and margined rock-faced coping stones to parapets. Bridge gives access over former railway line to Lissoughter Lodge.</p> <p>Appraisal</p> <p>This is a finely constructed railway bridge, accomplished detailing evident in the quality of the string course and copings. It stands as a reminder of the now disused railway line from Galway City to Clifden.</p>
Categories of Special Interest:	Architectural, technical
Rating:	Regional
Reference:	NIAH Survey: County Galway

BH No.:	51
RPS No.:	626
NIAH No.:	30403705
Townland:	Lissoughter

Parish:	Moyrus
Barony:	Ballynahinch
NGR:	85679, 247340
Classification:	Lissoughter Lodge
Dist. from development:	c. 130m south of the N59 (Points 12-13)
Description:	<p>NIAH Description Detached three-bay single-storey house, built c. 1880, having three-bay side elevations, flat-roofed porch to front, and multiple-bay single-storey L-plan addition to rear. Hipped slate roof with rendered eaves course and rendered chimneystacks. Rendered walls with rendered plinth course. Square-headed window openings having painted sills and two-over-two pane timber sliding sash windows to end bays of front elevation, margined one-over-one pane windows to sides of porch, and timber casement windows elsewhere. Set in own grounds with terrace to west of house having brick retaining wall and flight of limestone steps with plinth walls having piers with limestone caps leading down to gardens to west. Site accessed through wrought-iron farm gate set between brick piers having limestone caps, at south end of bridge over disused railway line, with similar gates to road at north-west.</p> <p>Appraisal This modest rural house is notable for its squat single-storey form and the retention of varied timber sash and casement windows. Its setting, at the east end of Garroman Lolugh, is impressive.</p>
Categories of Special Interest:	Architectural
Rating:	Regional
Reference:	NIAH Survey: County Galway

BH No.:	54
RPS No.:	N/A
NIAH No.:	30403710
Townland:	Caher
Parish:	Moyrus
Barony:	Ballynahinch
NGR:	87018, 247472
Classification:	Roman catholic church
Dist. from development:	c. 30m north of the N59 (Points 12-13)
Description:	<p>NIAH Description Freestanding Roman Catholic Church, built 1922, comprising of five-bay double-height nave with bowed and square break front side chapels to side elevations, bowed corner to north-west, single-bay double-height chancel to east elevation, double-height porch to west elevation with two-stage tower to south elevation and single-storey sacristy to north elevations of nave and chancel with extension to east elevation housing boiler room. Sheet metal and felt flat roofs to nave, chancel, chapels and sacristy with rendered lean-to roofs to side-chapels of north elevation. Painted roughcast rendered walls with rendered plinth, smooth rendered walls to east elevation of extension, raised render arcaded corbels to eaves of nave, chancel and side chapels and stepped rendered buttresses to all elevations. Raised round-headed render panels to each bay surrounding windows. Bowed wall to east elevation of chancel with render string course. Recessed rounded headed window openings with render sills with ventilation slats having lead-lined stained-glass windows to north and south elevations of nave, chancel, bell</p>

	<p>tower, side chapels, sacristy and front elevation of sacristy. Tripartite lead-lined stained-glass window with stained-glass over light to east elevation of chancel. Oculus window openings with stained-glass windows surmounting openings to side elevations of nave. Square headed window opening having stained-glass windows to north-west elevation of bowed corner. Rose windows to west elevation of porch having limestone curvilinear tracery with stained-glass. Round headed door openings with rendered architrave, recessed doorcase, concrete steps and double-leaf battened timber door with stained-glass overlight to south elevation of tower and rendered architrave, recessed doorcase, concrete ramp with battened timber door to front elevation of sacristy. Square headed door opening to north elevation of extension having battened timber with galvanised metal louvre overlight. Concrete capping to two-stage tower having painted roughcast rendered walls and plinth. Three round-headed arches to second stage with render hood mouldings extending as string course to south, east and west elevations. Recessed round-headed niches to east and west elevations having rendered architrave and rendered cross. Six-bay single-storey house to north-east of chapel with hipped artificial slate roof. Grotto containing Marian statue located to the south-east of chapel. Painted rendered boundary walls and piers with rendered capping.</p> <p>NIAH Appraisal</p> <p>This early 20th-century chapel contributes significantly to the diversity of the architectural heritage of Connemara. The building follows a classical Romanesque design style and features a number of unusual elements, the bowed corner the north-east is designed for the inclusion of a round staircase. The façade of the church is enlivened by the variety of side-chapels, the presence of buttresses that frame each section of the building, the decorative corbels which mock an arcade that is typically found in Romanesque architecture. The attention to detail with the use of paint to highlight particular elements enhances the overall character of the building.</p>
Categories of Special Interest:	Architectural, artistic, social
Rating:	Regional
Reference:	NIAH Survey: County Galway

BH No.:	75 & 76
RPS No.:	N/A
NIAH No.:	30403902
Townland:	Lurgan or Shindilla
Parish:	Kilcummin
Barony:	Moycullen
NGR:	97672, 246398 97854, 246398
Classification:	Level crossing cottage and Maam Cross Station
Dist. from development:	Both to immediate south of route where it follows from Points 14-16-19
Description:	<p>NIAH Description</p> <p>Complex of buildings and platforms forming railway station complex, built 1896, comprising water tower, goods shed, platforms and gate keepers house. Now disused. Recent outbuildings to site. Detached single-bay two-stage water tower to west end of central platform. Roofless, having corbelled red brick ceaves courses and overhanging cast-iron girders for water tank, latter now removed. Roughly dressed coursed limestone block walls with red brick block-and-start quoins and red brick dressings to openings. Oculus to front elevation, round-headed window opening to north side, latter with concrete sills. Round-headed door opening to front. Detached single-bay</p>

	<p>double-height goods store located to south-west of water tower, having two-bay single-storey office annex to west side elevation and set on limestone block platform. Pitched slate roofs with tooled limestone copings and having red brick chimneystack to office. Roughly dressed coursed limestone block walls with red brick block-and-start quoins and red brick dressings to openings. Oculi to upper gables. Square-headed window opening to front elevation of annex having margined rock-faced lintel, stone sill and wrought-iron bars. Square-headed door opening to same elevation having margined rock-faced lintel. Segmental-arch vehicular-width door openings to long sides of goods shed with corrugated-iron sheet doors. Detached three-bay single-storey gate keepers house to opposite side of road having projecting lean-to porch to front. Pitched slate roof with slate cat-slide to porch, concrete copings to gables, red brick chimneystack and cast-iron rainwater goods. Painted rendered coursed rubble stone walls with plinth and red brick block-and-start quoins. Camber-headed window openings having red brick voussoirs and block-and-start surrounds, tooled limestone sills and six-over-six pane timber sliding sash windows. Square-headed door opening to north side elevation of porch having tooled limestone lintel and red brick surrounds with steps.</p> <p>NIAH Appraisal</p> <p>Maam station, opened in 1896, is located on the Galway to Clifden line and was built by the Midlands Great Western Railway Company. It was one of the larger stations on the line and had a cattle platform to serve the local stockmen. Although the station house has been replaced by modern buildings, most of the ancillary buildings survive and retain their architectural value. The water tower is an example of a building of necessity when all trains were powered by steam and every station across had similar structures. The inclusion of a gate keeper's house demonstrates the importance of both road and rail transport in the area at that time. Its history is also intertwined with the history of the Irish State, when in the early 1920s a consignment of arms arrived at the station, intended for the Irish Volunteers. Despite its closure in 1935, this complex is of significant architectural merit and continues to define the manmade landscape.</p>
Categories of Special Interest:	Architectural, technical
Rating:	Regional
Reference:	NIAH Survey: County Galway

BH No.:	87
RPS No.:	N/A
NIAH No.:	30405301
Townland:	Letterfore/ Leam West
Parish:	Kilcummin
Barony:	Moycullen
NGR:	102227, 244605
Classification:	Railway bridge
Dist. from development:	0m (Points 20-21)
Description:	<p>NIAH Description</p> <p>Single-span former railway bridge, built c. 1890, now disused, over Glashanasmearany River. Limestone block abutments having recessed splayed rubble limestone flanking walls retaining earth and stone embankment, with roughly dressed limestone copings to abutments. Riveted iron girder bridge with wrought-iron rail tracks having concrete spacing blocks.</p> <p>NIAH Appraisal</p>

	The construction of this bridge, through the use of iron girders and high quality masonry to the abutments, displays substantial technical and engineering merit. Built by the Midland Great Western Railway, this bridge was part of the Galway to Clifden branch line and is a reminder of the engineering achievements accomplished during the late 19th century.
Categories of Special Interest:	Architectural, technical
Rating:	Regional
Reference:	NIAH Survey: County Galway

BH No.:	100
RPS No.:	N/A
NIAH No.:	30405303-04
Townland:	Leam East
Parish:	Kilcummin
Barony:	Moycullen
NGR:	105402, 242742
Classification:	National School & teacher's cottage
Dist. from development:	To the immediate north-west of alternate route (Points 22-23)
Description:	<p>NIAH Description: School Detached four-bay single-storey school, dated 1877, later used as chapel with return to north-west used as chancel, and with projecting gabled porch to front elevation. Now disused. Pitched slate roofs having rendered chimneystacks, cast-iron and replacement uPVC rainwater goods. Painted rendered walls with plinth, date-plaque to porch gable. Square-headed window openings having tooled stone sills and timber casement windows. Trio of blocked windows to north-west return, with stone sills. Square-headed door opening with chamfered and rendered stone blocks halfway up jambs, stone step and replacement timber door. Timber pews visible to interior. Small former toilet block to north-west with single-pitch roof. Iron girder frame with bell to south-east. Rubble-stone boundary walls with squared rubble stone piers, tooled limestone capping and wrought iron gates to south-east.</p> <p>NIAH Appraisal: School This simply designed and unassuming building is in a good state of preservation. The retention of historic fabric such as tooled limestone window sills enhances the building. The reuse of the building as a church is quite unusual and adds to its social significance and the quirky inscription to the date-plaque adds interest.</p> <p>NIAH Description: Teacher's Cottage Detached two-bay single-storey former schoolteacher's house, with dormer attic, built c. 1880, and having gabled windbreak to front elevation and recent flat-roof addition to rear. Pitched slate roof with rendered chimneystack and cast-iron rainwater goods. Painted rendered walls with rendered plinth. Square-headed window openings having concrete sills, both floors of gables having six-over-six pane timber sliding sash windows and narrow fixed timber windows, and front elevation having bipartite four-over-four pane timber sliding sash window. Square headed doorway having cast-iron boot scrape, battened timber door and overlight. Recent two-bay single-storey garage with pitched artificial slate roof to south-east. Rubble stone boundary walls with timber gate to south-east.</p> <p>NIAH Appraisal: Teacher's Cottage This aesthetically pleasing house contributes to the diversity of the architectural heritage of the area. The house was originally associated with Leam School close by. It retains historic fabric such as a slate roof and</p>

	timber sash windows. The variety of windows enhances the character of the house whilst the unusual fenestration of the front elevation further enhances the building. A further point of interest is that the surrounding area is known as one of the locations used in the film 'The Quiet Man', the nearby bridge now known as 'The Quiet Man Bridge'.
Categories of Special Interest:	Architectural, social, historical
Rating:	Regional
Reference:	NIAH Survey: County Galway

BH No.:	101
RPS No.:	N/A
NIAH No.:	30405305
Townland:	Leam East/ Derryerglinna
Parish:	Kilcummin
Barony:	Moycullen
NGR:	105387, 242695
Classification:	'The Quiet Man' Bridge
Dist. from development:	0m of alternate route (Points 22-23)
Description:	<p>NIAH Description Double-arch hump-back rubble-stone road bridge, built c. 1800. irregular arches, larger being to south end, roundish to east elevation and more pointed to west, and smaller north arch being cambered to west and pointed round to east. Rubble-abutments and river pier, latter having remains of pointed cut-water. Voussoirs and keystones to arches and partially rendered rubble stone soffits. Rubble-stone parapet walls, with recent rubble-stone repair work to pier and abutments.</p> <p>NIAH Appraisal This unique bridge which sits in a picturesque landscape makes an important contribution to the architectural heritage of West Galway. Dating from the late 18th century, its good state of preservation attests to the craftsmanship of the builders who used only locally available stone during the construction. The location of the bridge at the end of Lough Adrehid affords excellent views of the surrounding mountains whilst the irregularity and rubble-stone construction distinguishes this bridge from others in the area. The bridge is also a famous tourist attraction as it is known as the 'Quiet Man Bridge' where the famous 1950s film 'The Quiet Man' was filmed.</p>
Categories of Special Interest:	Architectural, social, technical
Rating:	Regional
Reference:	NIAH Survey: County Galway

BH No.:	108
RPS No.:	N/A
NIAH No.:	30405306
Townland:	Glengowla West
Parish:	Kilcummin
Barony:	Moycullen
NGR:	106991, 242104
Classification:	Vernacular cottage
Dist. from development:	To immediate north-east of NRA cycle route (Points 24-26)
Description:	

	<p>NIAH Description Detached three-bay single-storey vernacular house, built c. 1800, having slightly lower addition to north end with lean-to shed extension. Pitched thatched roof with scolloped raised ridge, low rendered chimneystacks and rendered verges. Rendered walls. Square-headed window and door openings with replacement fittings. Walling and roofing of addition similar to house. Lawn to rear of house and garden and yard to front. Shed opposite and at right angle to house has rubble stone walls and lean-to roof, with more recent concrete-walled shed attached to west having partly thatched roof. Road boundary is rubble stone wall with hedge, metal pedestrian gate with rendered piers, and more recent vehicular gate.</p> <p>NIAH Appraisal This is a good example of a typical thatched house of the district. The retention of a thatched roof and relatively small window openings helps preserve the vernacular character of the building. The gardens and road boundary serve to enhance the setting of the house and outbuildings.</p>
Categories of Special Interest:	Architectural, technical
Rating:	Regional
Reference:	NIAH Survey: County Galway

BH No.:	123
RPS No.:	272
NIAH No.:	30326018
Townland:	Cregg
Parish:	Kilcummin
Barony:	Moycullen
NGR:	111863, 242080
Classification:	Oughterard Station
Dist. from development:	100m east of Point 30
Description:	<p>NIAH Description Detached three-bay two-storey L-plan former railway stationmaster's house, built 1895, having four-bay single-storey former ticket office and waiting room to west with single-storey storage block to west and having more recent flat-roof addition to angle of L-plan house. Pitched slate roofs with cut limestone and grey-brick chimneystacks, timber eaves and cast-iron box-profile and replacement uPVC rainwater goods. Snecked rusticated ashlar limestone walls with stretcher-bond red brick bands, tooled limestone eaves course and rusticated limestone plinths to original buildings. Snecked rusticated limestone walls to east addition with glazed timber above. Lined-and-ruled rendered walls to eastern additions. Camber-headed window openings, forward projection of stationmaster's house having triple window to first floor and double window to ground. Mainly two-over-two pane timber sliding sash windows with grey brick voussoirs with torus-moulded hood-mouldings, label-stops and cut limestone sills, and timber panelled internal shutters. Replacement timber casement windows to west gable. Blind oculus to upper west gable with grey-brick surround. Segmental-headed door opening to front elevation concealed behind recent porch having timber panelled door with overlight, dressed grey brick voussoirs and remains of hood-moulding and label-stops. Square-headed door openings elsewhere having replacement timber panelled doors and ashlar limestone lintels. Multiple-bay former goods shed, with various recent additions, having similar walling to station, segmental-arch and square-headed openings with red-brick surrounds, square-headed blocked up and others partly blocked and</p>

	<p>having replacement timber windows. Blocked oculus window opening to west gable of goods shed having grey brick dressings and torus-moulded voussoirs. Rectangular-plan two-stage former water tower to south-west, having snecked rusticated limestone walls, round doorway with remains of metal fanlight, and round window to upper stage, with red brick surrounds, and having metal water tank to roof. Former goods platform to north having coursed snecked dressed limestone walling with stone segmental retaining arches, and with roughly coursed rubble limestone walling to east end. Limestone retaining wall to south.</p> <p>Appraisal</p> <p>This fine Victorian-era railway station has retained its original character and is an important feature of the district. The architectural design and style of the building is one which was employed throughout the county and further afield during the late 19th century. The fine façade is much enhanced by the excellent masonry work, brick banding and the retention of original features such as timber sash windows, stone sills and cast-iron rainwater goods.</p>
Categories of Special Interest:	Architectural, technical, social
Rating:	Regional
Reference:	NIAH Survey: County Galway

Appendix D.4: Legislative Framework Protecting the Archaeological Resource

Protection of Cultural Heritage

The cultural heritage in Ireland is safeguarded through national and international policy designed to secure the protection of the cultural heritage resource to the fullest possible extent (Department of Arts, Heritage, Gaeltacht and the Islands 1999, 35). This is undertaken in accordance with the provisions of the *European Convention on the Protection of the Archaeological Heritage* (Valletta Convention), ratified by Ireland in 1997.

The Archaeological Resource

The *National Monuments Act 1930 to 2004* and relevant provisions of the *National Cultural Institutions Act 1997* are the primary means of ensuring the satisfactory protection of archaeological remains, which includes all man-made structures of whatever form or date except buildings habitually used for ecclesiastical purposes. A National Monument is described as 'a monument or the remains of a monument the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto' (National Monuments Act 1930 Section 2).

A number of mechanisms under the National Monuments Act are applied to secure the protection of archaeological monuments. These include the Register of Historic Monuments, the Record of Monuments and Places, and the placing of Preservation Orders and Temporary Preservation Orders on endangered sites.

Ownership and Guardianship of National Monuments

The Minister may acquire national monuments by agreement or by compulsory order. The state or local authority may assume guardianship of any national monument (other than dwellings). The owners of national monuments (other than dwellings) may also appoint the Minister or the local authority as guardian of that monument if the state or local authority agrees. Once the site is in ownership or guardianship of the state, it may not be interfered with without the written consent of the Minister.

Register of Historic Monuments

Section 5 of the 1987 Act requires the Minister to establish and maintain a Register of Historic Monuments. Historic monuments and archaeological areas present on the register are afforded statutory protection under the 1987 Act. Any interference with sites recorded on the register is illegal without the permission of the Minister. Two months notice in writing is required prior to any work being undertaken on or in the vicinity of a registered monument. The register also includes sites under Preservation Orders and Temporary Preservation Orders. All registered monuments are included in the Record of Monuments and Places.

Preservation Orders and Temporary Preservation Orders

Sites deemed to be in danger of injury or destruction can be allocated Preservation Orders under the 1930 Act. Preservation Orders make any interference with the site illegal. Temporary Preservation Orders can be attached under the 1954 Act. These perform the same function as a Preservation Order but have a time limit of six months, after which the situation must be reviewed. Work may only be undertaken on or in the vicinity of sites under Preservation Orders with the written consent, and at the discretion, of the Minister.

Record of Monuments and Places

Section 12(1) of the 1994 Act requires the Minister for Arts, Heritage, Gaeltacht and the Islands (now the Minister for the Environment, Heritage and Local Government) to establish and maintain a record of monuments and places where the Minister believes that such monuments exist. The record comprises a list of monuments and relevant places and a map/s showing each monument and relevant place in respect of each county in the state. All sites recorded on the Record of Monuments and Places receive statutory protection under the National Monuments Act 1994. All recorded monuments on the proposed development site are represented on the accompanying maps.

Section 12(3) of the 1994 Act provides that 'where the owner or occupier (other than the Minister for Arts, Heritage, Gaeltacht and the Islands) of a monument or place included in the Record, or any other person, proposes to carry out, or to cause or permit the carrying out of, any work at or in relation to such a monument or place, he or she shall give notice in writing to the Minister of Arts, Heritage, Gaeltacht and the Islands to carry out work and shall not, except in the case of urgent necessity and with the consent of the Minister, commence the work until two months after the giving of notice'.

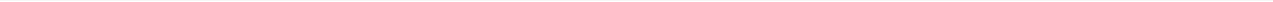
Under the National Monuments (Amendment) Act 2004, anyone who demolishes or in any way interferes with a recorded site is liable to a fine not exceeding €3,000 or imprisonment for up to 6 months. On summary conviction and on conviction of indictment, a fine not exceeding €10,000 or imprisonment for up to 5 years is the penalty. In addition they are liable for costs for the repair of the damage caused.

In addition to this, under the *European Communities (Environmental Impact Assessment) Regulations 1989*, Environmental Impact Statements (EIS) are required for various classes and sizes of development project to assess the impact the proposed development will have on the existing environment, which includes the cultural, archaeological and built heritage resources. These document's recommendations are typically incorporated into the conditions under which the proposed development must proceed, and thus offer an additional layer of protection for monuments which have not been listed on the RMP.

The Planning and Development Act 2000

Under planning legislation, each local authority is obliged to draw up a Development Plan setting out their aims and policies with regard to the growth of the area over a five-year period. They cover a range of issues including archaeology and built heritage, setting out their policies and objectives with regard to the protection and enhancement of both. These policies can vary from county to county. The Planning and Development Act 2000 recognises that proper planning and sustainable development includes the

protection of the archaeological heritage. Conditions relating to archaeology may be attached to individual planning permissions.



APPENDIX D.5: Legislation Framework Protecting the Architectural Resource

The main laws protecting the built heritage are the *Architectural Heritage (National Inventory) and National Monuments (Miscellaneous Provisions) Act 1999* and the *Local Government (Planning and Development) Acts 1963-1999*, which has now been superseded by the *Planning and Development Act, 2000*. The Architectural Heritage Act requires the Minister to establish a survey to identify, record and assess the architectural heritage of the country. The background to this legislation derives from Article 2 of the 1985 Convention for the Protection of Architectural Heritage (Granada Convention). This states that:

For the purpose of precise identification of the monuments, groups of structures and sites to be protected, each member state will undertake to maintain inventories of that architectural heritage.

The National Inventory of Architectural Heritage (NIAH) was established in 1990 to fulfil Ireland's obligation under the Granada Convention, through the establishment and maintenance of a central record, documenting and evaluating the architecture of Ireland (NIAH Handbook 2005:2). As inclusion in the inventory does not provide statutory protection, the survey information is used in conjunction with the *Architectural Heritage Protection Guidelines for Planning Authorities* to advise local authorities on compilation of a Record of Protected Structures as required by the *Planning and Development Act, 2000*.

Protection under the Record of Protected Structures and County Development Plan

Structures of architectural, cultural, social, scientific, historical, technical or archaeological interest can be protected under the Planning and Development Act, 2000, where the conditions relating to the protection of the architectural heritage are set out in Part IV of the act. This act superseded the Local Government (Planning and Development) Act, 1999, and came into force on 1st January 2000.

The act provides for the inclusion of Protected Structures into the planning authorities' development plans and sets out statutory regulations regarding works affecting such structures. Under new legislation, no distinction is made between buildings formerly classified under development plans as List 1 and List 2. Such buildings are now all regarded as 'Protected Structures' and enjoy equal statutory protection. Under the act the entire structure is protected, including a structure's interior, exterior, attendant grounds and also any structures within the attendant grounds.

The act defines a Protected Structure as (a) a structure, or (b) a specified part of a structure which is included in a Record of Protected Structures (RPS), and, where that record so indicates, includes any specified feature which is in the attendant grounds of the structure and which would not otherwise be included in this definition. Protection of the structure, or part thereof, includes conservation, preservation, and improvement compatible with maintaining its character and interest. Part IV of the act deals with architectural heritage, and Section 57 deals specifically with works affecting the character of Protected Structures or proposed Protected Structures and states that no works should materially affect the character of the structure or any element of the structure that contributes to its special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. The act does not provide specific criteria for assigning a special interest to a structure. However, the National Inventory of Architectural Heritage (NIAH) offers guidelines to its field workers as to how to designate a building with a special interest, which are not mutually exclusive. This offers guidance by example rather than by definition:

Archaeological

It is to be noted that the NIAH is biased towards post-1700 structures. Structures that have archaeological features may be recorded, providing the archaeological features are incorporated within post-1700 elements. Industrial fabric is considered to have technical significance, and should only be attributed archaeological significance if the structure has pre-1700 features.

Architectural

A structure may be considered of special architectural interest under the following criteria:

- Good quality or well executed architectural design
- The work of a known and distinguished architect, engineer, designer, craftsman
- A structure that makes a positive contribution to a setting, such as a streetscape or rural setting
- Modest or vernacular structures may be considered to be of architectural interest, as they are part of the history of the built heritage of Ireland.
- Well designed decorative features, externally and/or internally

Historical

A structure may be considered of special historical interest under the following criteria:

- A significant historical event associated with the structure
- An association with a significant historical figure
- Has a known interesting and/or unusual change of use, e.g. a former workhouse now in use as a hotel
- A memorial to a historical event.

Technical

A structure may be considered of special technical interest under the following criteria:

- Incorporates building materials of particular interest, i.e. the materials or the technology used for construction
- It is the work of a known or distinguished engineer
- Incorporates innovative engineering design, e.g. bridges, canals or mill weirs
- A structure which has an architectural interest may also merit a technical interest due to the structural techniques used in its construction, e.g. a curvilinear glasshouse, early use of concrete, cast-iron prefabrication.
- Mechanical fixtures relating to a structure may be considered of technical significance.

Cultural

A structure may be considered of special cultural interest under the following criteria:

- An association with a known fictitious character or event, e.g. Sandycove Martello Tower, which featured in Ulysses.
- Other structure that illustrate the development of society, such as early schoolhouses, swimming baths or printworks.

Scientific

A structure may be considered of special scientific interest under the following criteria:

- A structure or place which is considered to be an extraordinary or pioneering scientific or technical achievement in the Irish context, e.g. Mizen Head Bridge, Birr Telescope.

Social

A structure may be considered of special social interest under the following criteria:

- A focal point of spiritual, political, national or other cultural sentiment to a group of people, e.g. a place of worship, a meeting point, assembly rooms.
- Developed or constructed by a community or organisation, e.g. the construction of the railways or the building of a church through the patronage of the local community
- Illustrates a particular lifestyle, philosophy, or social condition of the past, e.g. the hierarchical accommodation in a country house, philanthropic housing, vernacular structures.

Artistic

A structure may be considered of special artistic interest under the following criteria:

- Work of a skilled craftsman or artist, e.g. plasterwork, wrought-iron work, carved elements or details, stained glass, stations of the cross.
- Well designed mass produced structures or elements may also be considered of artistic interest.

(From the NIAH Handbook 2003 & 2005 pages 15-20)

The Local Authority has the power to order conservation and restoration works to be undertaken by the owner of the protected structure if it considers the building to be in need of repair. Similarly, an owner or developer must make a written request to the Local Authority to carry out any works on a protected structure and its environs, which will be reviewed within three months of application. Failure to do so may result in prosecution.

Appendix D.6: Impact Assessment and the Cultural Heritage Resource

Potential Impacts on Archaeological and Historical Remains

Impacts are defined as 'the degree of change in an environment resulting from a development' (Environmental Protection Agency 2003: 31). They are described as profound, significant or slight impacts on archaeological remains. They may be negative, positive or neutral, direct, indirect or cumulative, temporary or permanent.

Impacts can be identified from detailed information about a project, the nature of the area affected and the range of archaeological and historical resources potentially affected. Development can affect the archaeological and historical resource of a given landscape in a number of ways.

- Permanent and temporary land-take, associated structures, landscape mounding, and their construction may result in damage to or loss of archaeological remains and deposits, or physical loss to the setting of historic monuments and to the physical coherence of the landscape.
- Archaeological sites can be affected adversely in a number of ways: disturbance by excavation, topsoil stripping and the passage of heavy machinery; disturbance by vehicles working in unsuitable conditions; or burial of sites, limiting accessibility for future archaeological investigation.
- Hydrological changes in groundwater or surface water levels can result from construction activities such as de-watering and spoil disposal, or longer-term changes in drainage patterns. These may desiccate archaeological remains and associated deposits.
- Visual impacts on the historic landscape sometimes arise from construction traffic and facilities, built earthworks and structures, landscape mounding and planting, noise, fences and associated works. These features can impinge directly on historic monuments and historic landscape elements as well as their visual amenity value.
- Landscape measures such as tree planting can damage sub-surface archaeological features, due to topsoil stripping and through the root action of trees and shrubs as they grow.
- Ground consolidation by construction activities or the weight of permanent embankments can cause damage to buried archaeological remains, especially in colluviums or peat deposits.
- Disruption due to construction also offers in general the potential for adversely affecting archaeological remains. This can include machinery, site offices, and service trenches.

Although not widely appreciated, positive impacts can accrue from developments. These can include positive resource management policies, improved maintenance and access to archaeological monuments, and the increased level of knowledge of a site or historic landscape as a result of archaeological assessment and fieldwork.

Predicted Impacts

The severity of a given level of land-take or visual intrusion varies with the type of monument, site or landscape features and its existing environment. Severity of impact can be judged taking the following into account:

- The proportion of the feature affected and how far physical characteristics fundamental to the understanding of the feature would be lost;
 - Consideration of the type, date, survival/condition, fragility/vulnerability, rarity, potential and amenity value of the feature affected;
 - Assessment of the levels of noise, visual and hydrological impacts, either in general or site specific terms, as may be provided by other specialists.
-

Appendix D.7: Mitigation Measures and the Cultural Heritage Resource

Potential Mitigation Strategies for Cultural Heritage Remains

Mitigation is defined as features of the design or other measures of the proposed development that can be adopted to avoid, prevent, reduce or offset negative effects.

The best opportunities for avoiding damage to archaeological remains or intrusion on their setting and amenity arise when the site options for the development are being considered. Damage to the archaeological resource immediately adjacent to developments may be prevented by the selection of appropriate construction methods. Reducing adverse effects can be achieved by good design, for example by screening historic buildings or upstanding archaeological monuments or by burying archaeological sites undisturbed rather than destroying them. Offsetting adverse effects is probably best illustrated by the full investigation and recording of archaeological sites that cannot be preserved *in situ*.

Definition of Mitigation Strategies

Archaeological Resource

The ideal mitigation for all archaeological sites is preservation *in situ*. This is not always a practical solution, however. Therefore a series of recommendations are offered to provide ameliorative measures where avoidance and preservation *in situ* are not possible.

Full Archaeological Excavation involves the scientific removal and recording of all archaeological features, deposits and objects to the level of geological strata or the base level of any given development. Full archaeological excavation is recommended where initial investigation has uncovered evidence of archaeologically significant material or structures and where avoidance of the site is not possible.

Archaeological Test Trenching can be defined as 'a limited programme... of intrusive fieldwork which determines the presence or absence of archaeological features, structures, deposits, artefacts or ecofacts within a specified area or site on land or underwater. If such archaeological remains are present test trenching defines their character and extent and relative quality.' (IFA 2001c, 1)

Archaeological Monitoring can be defined as a 'formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons within a specified area or site on land or underwater, where there is possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive.' (IFA 2001b, 1)

Underwater Archaeological Assessment consists of a programme of works carried out by a specialist underwater archaeologist, which can involve wade surveys, metal detection surveys and the excavation of test pits within the sea or riverbed. These assessments are able to access and assess the potential of an underwater environment to a much higher degree than terrestrial based assessments.

Architectural Resource

The architectural resource is generally subject to a greater degree of change than archaeological sites, as structures may survive for many years but their usage may change continually. This can be reflected in the fabric of the building, with the addition and removal of doors, windows and extensions. Due to their often more visible presence within the landscape than archaeological sites, the removal of such structures can sometimes leave a discernable 'gap' with the cultural identity of a population. However, a number of mitigation measures are available to ensure a record is made of any structure that is deemed to be of special interest, which may be removed or altered as part of a proposed development.

Conservation Assessment consists of a detailed study of the history of a building and can include the surveying of elevations to define the exact condition of the structure. These assessments are carried out by Conservation Architects and would commonly be carried out in association with proposed alterations or renovations on a Recorded Structure.

Building Survey may involve making an accurate record of elevations (internal and external), internal floor plans and external sections. This is carried out using a EDM (Electronic Distance Measurer) and GPS technology to create scaled drawings that provide a full record of the appearance of a building at the time of the survey.

Historic Building Assessment is generally specific to one building, which may have historic significance, but is not a Protected Structure or listed within the NIAH. A full historical background for the structure is researched and the site is visited to assess the standing remains and make a record of any architectural features of special interest. These assessments can also be carried out in conjunction with a building survey.

Written and Photographic record provides a basic record of features such as stone walls, which may have a small amount of cultural heritage importance and are recorded for prosperity. Dimensions of the feature are recorded with a written description and photographs as well as some cartographic reference, which may help to date a feature.

Appendix D.8: Photographs for Archaeology, Architectural and Cultural Heritage



Plate 1 – A section of the proposed route within Killymongaun (Points 1-2), facing east



Plate 2 – Railway embankment within Gowlan West (Points 2-3), facing south-east



Plate 3 – Route of alternate greenway between Points 3 and 4, facing south-east



Plate 4 – River valley that forms the townland boundary between Derrylea and Munga (Points 4-5), facing east



Plate 5 – The proposed route and former railway within townland of Derrylea (Points 4-5), facing south-east



Plate 6 – An example of the proposed route and former railway within townland of Emlaghmore (Points 4-5), facing west



Plate 7 – Small oval lough to immediate north of former railway (Points 4-5), within the townland of Emlaghmore, facing ENE



Plate 8 – Lough Fadda, to the south of the proposed route (Points 4-5), within the townland of Derryvickrune, facing south-west



Plate 9 – Forestry track (alternate route Points 5-6), facing west



Plate 10 – Railway embankment and proposed route in the townland of Killeen (Points 7-8), facing west



Plate 11 – Railway cutting within the townland of Ballinafad (Points 9-10), facing west



Plate 12 – Proposed route and railway as it passes to the south of Lough Nabrucka (Points 9-10), facing east



Plate 13 – Proposed route and railway within the townland of Athry (Points 9-10), facing north-east



Plate 14 - Proposed route and railway within the townland of Athry (Points 10-11), facing north-east



Plate 15 - Proposed route and railway within the townland of Garroman (Points 10-11), facing WNW



Plate 16 – Proposed route and railway within the townland of Bunscanniff (Points 13-14), facing ESE



Plate 17 – Proposed route and railway to the immediate north of Lough Shindilla (Points 13-14), facing WSW



Plate 18 – Proposed route and railway within the townland of Shannaunafeola (Points 13-14), facing east



Plate 19 – Path of railway within the townland of Lurgan or Shindilla (Points 14-16), facing east



Plate 20 – Existing farm track between Points 14 and 15, facing WSW



Plate 21 – Proposed route and railway within the townland of Lurgan or Shindilla (Points 19-20), facing west towards Maam Cross



Plate 22 – Proposed route and railway within the townland of Derreenagusfoor (Points 19-20), facing west



Plate 23 – Proposed route and railway, within the townland of Bunnakill (Points 19-20), facing south-east



Plate 24 – Proposed route and railway to the north-west of Point 20, facing north-west



Plate 25 – Section of the proposed route and railway to the south of Point 20, facing south



Plate 26 - Proposed route and railway within the townland of Leam West (Points 20-21), facing SSE



Plate 27 - Proposed route and railway, now a public road, within the townland of Leam West (Points 21-22), facing north-west



Plate 28 – Proposed route to the south of Point 24, facing NNW



Plate 29 – Path of proposed route to the south of the railway line, prior to joining with Point 25, facing east



Plate 30 - Proposed route and railway, to the east of the Owenriff River (Points 25-27), facing west



Plate 31 – Proposed route and railway at Glengowla Mines (GA054-035), showing spoil on track bed (facing west)



Plate 32 – Proposed route and railway to the east of Point 27, facing WSW



Plate 33 – Proposed route and railway within the townland of Claremount (Points 27-30), facing WSW



Plate 34 – Proposed route and railway within overgrown cutting (Points 27-30), facing west



Plate 35 – BH 2, Ardbear Old Bridge (Point 1-2), facing west



Plate 36 – BH 6, ruined building (Point 1-2), facing south-west



Plate 37 – BH 7, level crossing cottage (Points 3-4), facing south-east



Plate 38 – BH 10, ruined farm house (Points 4-5), facing south-west



Plate 39 – Eastern elevation of BH 11, bridge/tunnel (Points 4-5), facing WNW



Plate 40 – BH 13, culvert (Points 4-5), facing ENE



Plate 41 – BH 14, stone culvert (Points 4-5), facing north-west



Plate 42 – BH 16, stone culvert (Points 4-5), facing north



Plate 43 – BH 17, large culvert (Points 4-5), facing north



Plate 44 – BH 19, culvert (Points 4-5), facing east



Plate 45 – BH 21, railway bridge (Points 5-6), facing south-east



Plate 46 – The northern arch of Cloonbeg Bridge (BH 22) (Points 5-6a-6), facing west



Plate 47 – BH 23, site of level crossing (Points 5-6a-6), facing ESE



Plate 48 – BH 24, Ballynahinch Station House and signal box (Points 6-7), facing ESE



Plate 49 – BH 25, gate lodge, level crossing and recessed entrance (Points 6-7), facing north-east



Plate 50 – BH 28, level crossing cottage (Points 7-8), facing west



Plate 51 – BH 30, arched culvert
(Points 9-10), facing north-east



Plate 52 – BH 30, square headed culvert (Points 9-10), facing north-west



Plate 53 – BH 31, north-east stone abutment at railway bridge (Points 9-10), facing NNW



Plate 54 – BH 33, culvert (Points 9-10), facing south-east



Plate 55 – BH 34, level crossing cottage (Points 10-11), facing north-east



Plate 56 – BH 36, culvert (Points 10-11), facing south-east



Plate 57 – BH 38, culvert (Points 10-11), facing south-east



Plate 58 – BH 39, culvert (Points 10-11), facing south-east



Plate 59 – BH 42, railway bridge (Points 12-13), facing south



Plate 60 – BH 43, road bridge (Point 12-13), facing ENE



Plate 61 – BH 44, Recess Station House (Points 12-13), facing south



Plate 62 – BH 45, 19th century house at Lissoughter (Points 12-13), facing north



Plate 63 – BH 46, 'Connemara' Monument (Points 9-10), facing south-west



Plate 64 – BH 54, Catholic Church (Points 12-13), facing north



Plate 65 – BH 55, derelict vernacular house (Points 12-13), facing south-east



Plate 66 – BH 58, derelict house (Points 12-13), facing south-east



Plate 67 – BH 59, possible former stables (Points 12-13), facing ENE



Plate 68 – BH 60, vernacular cottage (Points 12-13), facing north



Plate 69 – BH 70, stone culvert (Points 13-14), facing north-west



Plate 70 – BH 71, stone culvert/ accommodation bridge (Points 13-14), facing north-west



Plate 71 – BH 72, culvert (Point 13-14), facing north-west



Plate 72 – BH 75, level crossing cottage (Points 14-15-16), facing south-west



Plate 73 – BH 76, remains of station at Maam Cross (Points 16-19), facing west



Plate 74 – BH 78, vernacular cottage (Points 17-18), facing north-east



Plate 75 – BH 80, culvert (Points 19-20), facing south-west



Plate 76 – BH 81, culvert/ accommodation bridge (Points 19-20), facing NNW



Plate 77 – BH 83, culvert (Points 19-20), facing south



Plate 78 – BH 84, culvert (Points 19-20), facing south



Plate 79 – BH 84, re-used level crossing gate (Points 19-20), facing south-east



Plate 80 – BH 85, vernacular house (Points 19-20), facing north



Plate 81 – BH 86, level crossing cottage (Points 19-20), facing north-east



Plate 82 – BH 87, railway bridge (Points 20-21), facing north-east



Plate 83 – BH 93, vernacular cottage (Points 21-22), facing north



Plate 84 – BH 100, Leam National School (Points 22-23), facing north-west



Plate 85 – BH 100, Teacher's cottage (Points 22-23), facing north-west



Plate 86 – BH 101, renovated level crossing cottage (Points 22-23), facing ESE



Plate 87 – BH 104 (with BH 103 in background), ‘The Quiet Man’ Bridge (Points 22-23), facing SSW



Plate 88 – BH 108, vernacular cottage (Points 24-26), facing north-west



Plate 89 – BH 109, railway bridge (Points 24-25-26), facing north-east



Plate 90 – BH 112, eastern abutment of railway bridge, with track (Points 25-27), facing north



Plate 91 – BH 114, vernacular house (Points 25-27), facing north



Plate 92 – BH 116, railway bridge (Points 25-27), facing south-west



Plate 93 – BH 117, access bridge (Points 27-30), facing north-west



Plate 94 – BH 118, railway bridge (Points 27-30), facing north-west



Plate 95 – BH 119, concrete lined pit (Points 27-30), facing north



Plate 96 – BH 120, railway bridge (Points 27-30), facing west



Plate 97 – BH 121, accommodation bridge (Points 27-30), facing north



Plate 98 – BH 122, level crossing cottage (Points 27-30), facing south-east



Plate 99 – BH 123, the water tower at Oughterard Station (Points 27-30), facing east



Plate 100 – BH 123, Oughterard station house (Points 27-30), facing ESE