



ENVIRONMENTAL BALANCE IN DESIGN AND CONSTRUCTION



KERRY COUNTY COUNCIL

ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) / ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR THE SOUTH KERRY GREENWAY, CO. KERRY

VOLUME 2 – MAIN EIAR/EIS

CHAPTER 11 – BIODIVERSITY

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11 BIODIVERSITY

11.1 INTRODUCTION

This chapter describes the existing biodiversity and ecological characteristics of the proposed South Kerry Greenway, and assesses the potential impacts of the project on biodiversity. **The project is detailed in Chapter 3 of this EIAR.** A Natura Impact Statement (NIS) has also been undertaken for the project. **(Available in Volume 5 of this EIAR).** This ecological impact assessment was carried out with regard to the following publications:

- Guidelines on information to be contained in Environmental Impact Statements (EPA, 2002; 2017 (draft));
- Guidelines for Ecological Impact Assessment in the United Kingdom published by the Institute of Ecology and Environmental Management (IEEM, 2006);
- Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland published by the Institute of Ecology and Environmental Management (IEEM, 2016); and
- Environmental Assessment and Construction Guidelines (NRA, 2009)
- The following legislative framework was also considered;
 - EC Habitats Directive Council Directive No. 92/43/EEC (Annex I, II, IV);
 - EC Birds Directive Council Directive No. 79/409/EC (Annex I, II);
 - The Wildlife (Amendment) Act, 2000;
 - The Planning and Development Act, 2000

11.1.1 Scope of Assessment

Kerry County Council proposes to develop the South Kerry Greenway from Reenard in the South West to Glenbeigh in the North East of the Iveragh Peninsula in County Kerry. The proposed Greenway follows the route of an abandoned railway line, approximately aligned with the N70 national secondary road. The Greenway will be ca. 32 km long with a two-way shared cycling and walking route. The specific objectives of this assessment were to:

- Undertake baseline ecological surveys of the route corridor and evaluate the nature conservation importance of the route;
- Evaluate the nature conservation importance of the ecological resources identified using a scientifically robust and objective methodology based on current international best practice;
- Assess the direct, indirect and cumulative ecological implications or impacts of the project during its lifetime;
- Where possible propose mitigation measures to remove or reduce those impacts at the design and construction stage; and
- Achieve the best possible biodiversity outcome from a change in current land use.

11.2 METHODOLOGY

11.2.1 Desk Study

A desktop study was carried out to collate and review available information, datasets and documentation pertaining to the natural environment of the site and the geographical area extending away from it. The publications, datasets and resources consulted included the following:

- Ordnance Survey Ireland (OSI) aerial photography and 1:50000 mapping
- National Parks and Wildlife Service (NPWS) online datasets and literature
- National Biodiversity Data Centre (NBDC) online mapping
- Bat Conservation Ireland (BCI) – online resources
- BirdWatch Ireland - online resources
- BirdLife International – online resources
- Irish Red Data Book for Vascular Plants (Curtis and McGough, 1988)
- Proposed Red Data List of Vascular Plants Consultation Document (Kingston, 2005)
- Ireland Red List No. 11 Vascular Plants (Wyse-Jackson, 2016)
- Teagasc Soil area maps (at NBDC on-line mapping)
- Geological Survey Ireland (GSI) area maps
- Environmental Protection Agency (EPA) water quality data and on-line mapping
- South Western River Basin District (SWRBD) datasets (Water Framework Directive).
- Inland Fisheries Ireland (IFI) publications and online resources
- Other information sources and reports footnoted in the course of the report

11.2.2 Consultation

Consultation letters were sent to the following agencies:

- Inland Fisheries Ireland (IFI);
- An Taisce;
- The Environmental Protection Agency (EPA)
- Bat Conservation Ireland (BCI); and
- Department of Environment, Heritage and Local Government (The development application unit - DAU).

Responses were received from IFI and BCI. Aquatic ecology surveys were undertaken in consultation with IFI. A full list of consultees is available in **Chapter 4 of this EIAR**.

Data requests were submitted to NPWS and BCI for records of any rare or protected flora and fauna/ bats and bat roosts, in the area surrounding the proposed Greenway (**Refer to Appendix 11.1, Volume 3 of this EIAR – Ecological Field Surveys Report**).

Bat data was received from BCI which was used to inform the desk-top study. Both BCI and NPWS were consulted in relation to the Lesser Horseshoe Bat during the course of the field surveys and assessment.

NPWS was consulted on various aspects of the project and ecological surveys throughout the assessment.

11.2.3 Field surveys

11.2.3.1 Scoping

A walkover was undertaken in conjunction with the initial habitat surveys to identify general ecological features along the proposed Greenway route. Walkovers, desk studies and consultations were used to inform the scope and survey requirements of the project. The study area encompassed the proposed route corridor, proposed route options, the adjacent lands and the features of ecological importance as identified during desk studies along the route.

The Ecology Field Surveys report (available in **Appendix 11.1, Volume 3 of this EIAR**) details the methodology and results of the ecology surveys undertaken in the study area between 2013 and 2017.

11.2.3.2 Habitat survey

Habitats were categorised according to the Heritage Council's '*A Guide to Habitats in Ireland*' (Fossitt, 2000) to level 3. In addition to habitat identification, each habitat was assessed for its ecological significance, based on the National Roads Authority (NRA) Site Evaluation Scheme (NRA, 2009) (available in **Appendix 11.2, Volume 3 of this EIAR**). Table 11.5 in Section 11.4.4.1 below lists the habitat types recorded in the study area.

11.2.3.3 Mammal Survey

The habitat types recorded throughout the survey area were used to assist in identifying the fauna considered likely to utilise the area. The route was checked for tracks and signs of mammals as per Bang and Dahlstrom (2004)¹, with particular emphasis on protected species Otter (*Lutra lutra*) and Badger (*Meles meles*) owing to the suitability of the landscape for these species. Targeted surveys for otter and badger were undertaken at suitable locations along the route. **Refer to Appendix 11.1, Volume 3 of this EIAR** for survey details and results.

11.2.3.4 Bat Survey

Bat surveys within the study area were carried out in five phases:

1. Desk study
2. Data request (BCI)
3. Roost surveys
4. Transect (activity) surveys
5. Passive automated (activity) surveys.

Refer to Appendix 11.1, Volume 3 of this EIAR for survey details and results.

11.2.3.5 Bird survey

Bird transect surveys were undertaken in the study area between 2013 and 2017 during both the winter and breeding seasons. All birds observed or heard calling within the study area were recorded. IWeBS counts at the Valentia River Estuary were undertaken annually from 2015 to 2017. **Refer to Appendix 11.1, Volume 3 of this EIAR** for survey details and results.

¹ Bang P, Dahlstrom P. (2004) *Animal Tracks and Signs*. Oxford University Press Inc., New York, 264 pp.

11.2.3.6 Kerry slug surveys

Kerry slug metric trap surveys were undertaken under NPWS licence (C132/2014) in 2014. Kerry slug surveys and habitat assessments were carried out under licence (C008/2016) in 2016. A Kerry slug habitat assessment survey was undertaken in April 2018 to determine the extent of suitable habitat for the Kerry slug within the final route alignment and compulsory purchase order (CPO) boundary **Refer to Appendix 11.1, Volume 3 of this EIAR** for survey details and results. Kerry slug is assessed in the NIS, available in **Volume 5 of this EIAR**.

11.2.3.7 Aquatic surveys

An aquatic ecology survey of the watercourses intersecting and draining the Greenway was undertaken in 2017 which included:

- Fish habitat assessment
- Biological sampling and water quality assessment
- Freshwater pearl mussel surveys

Refer to Appendix 11.1, Volume 3 of this EIAR - Aquatic ecology surveys report.

11.3 ECOLOGICAL VALUE

The value of the ecological receptors was determined using the ecological evaluation guidance given in the National Roads Authority (NRA – now TII) Ecological Assessment Guidelines as outlined in **Appendix 11.2, Volume 3 of this EIAR** (NRA, 2009). This evaluation scheme seeks to provide value ratings for ecological receptors, with values ranging from locally important to internationally important. Internationally important receptors would include Special Areas of Conservation (SAC) or Special Protected Areas (SPA) while those of national importance would include proposed Natural Heritage Areas (pNHA) and Natural Heritage Areas (NHA).

This evaluation scheme is aimed at assessing the value of sites. It has been adapted here to assess the value of habitats and fauna occurring within the study area. The value of habitats is assessed based on its condition, size, rarity, conservation and legal status. The value of fauna is assessed on its biodiversity value, legal status and conservation status. Biodiversity value is based on its national distribution, abundance or rarity, and associated trends. The evaluation scheme identifies key ecological receptors to the project.

11.3.1.1 Assessing Impact Significance

Once the value of the identified ecological receptors was determined, the potential effect or impact of the project on the identified key ecological receptors was assessed. This was carried out with regard to the criteria outlined in the latest available impact assessment guidelines. The impacts were assessed under a number of parameters such as magnitude, extent, duration and reversibility. Once impacts are defined, their significance was categorised using EPA Guidelines.

The criteria used to assess the potential significance follow EPA guidance (EPA, 2002). See Tables 11-1 and 11-2 over.

Table 11-1: Significance of Impacts (EPA, 2002)

Significance of impacts	Definition
<i>Imperceptible</i>	An impact capable of measurement but without significant consequences.
<i>Slight Effects</i>	An impact which causes noticeable changes in the character of the environment without affecting its sensitivities.
<i>Moderate Effects</i>	An impact that alters the character of the environment in a manner that is consistent with existing and emerging trends.
<i>Significant Effects</i>	An impact which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
<i>Profound Impact</i>	An impact which obliterates sensitive characteristics.

Table 11-2: Duration of Impacts (EPA, 2002)

Duration of impacts	Definition
<i>Short-term impact</i>	Impact lasting one to seven years
<i>Medium-term impact</i>	Impact lasting seven to fifteen years
<i>Long-term impact</i>	Impact lasting fifteen to sixty years
<i>Permanent impact</i>	Impact lasting over sixty years
<i>Temporary impact</i>	Impact lasting for one year or less

11.4 EXISTING ENVIRONMENT

11.4.1 Overview of existing environment

The route of the proposed Greenway incorporates the major engineering elements of the old railway line including the tunnels at Drung Hill, Gleensk Viaduct and Caherciveen Railway Bridge. Sections of the former railway line have been incorporated into the N70 National Secondary Road during previous improvement and realignment works. There are also a number of locations where, due to more recent existing development, it is not possible to follow the route of the old railway. In these locations, a route options study was conducted to determine the optimum alternative route that would preclude potential environmental impacts. It is estimated that approximately 43 % of the route will be locally diverted 'off-line' on greenfield lands or along the road.

The predominant landuse in the area is agriculture with most land associated with the Greenway being grazed by sheep and cattle. The majority of the route traverses through areas mapped, on the NBDC's on-line mapviewer, as either **Pasture** or **Bog** but it also traverses through some areas mapped as **Other Agricultural**. One section of the route, mapped as transecting through **Forestry**², passes through Behy Wood to the immediate west of Glenbeigh village which is mapped, on the NBDC mapper as being a Mature Spruce/Pine Mix (1998). The Valentia River **Estuary** will be crossed via the Caherciveen Railway Bridge. Some habitation is present in areas adjacent to the route corridor but this is generally well dispersed with some ribbon development of housing present.

² Habitat nomenclature derived from Corine Landcover (2006) classes as mapped at: <http://maps.biodiversityireland.ie/#/Map> [accessed 16/02/17]

The route will traverse Caherciveen town which is mapped as **Urban**. The section of the route between Caherciveen and Reenard is coastal where the route traverses agricultural land, predominantly, adjacent to the shoreline. Some unmanaged pockets of the abandoned railway have become overgrown and encroached by thickets of dense gorse and willow scrub. Land reclamation and clearance has been on-going during the course of ecology surveys along the route.

11.4.2 Water Crossings

The Greenway interacts with two large rivers along its route, namely the Behy, and the Ferta. These rivers drain to two Natura 2000 sites, at either end of the route corridor, as follows³:

- River Behy (drains to the Castlemaine Harbour SAC)
 - The route intersects a number of headwater tributary streams of the Behy
- River Ferta (drains to the Valencia Harbour/Portmagee Channel SAC)
 - As it contours south westwards along the lower slopes of Knocnadobar towards Caherciveen the existing rail bed intersects a number of first order tributary streams of the Ferta.

There are a total of 38 streams and rivers (32 1st order streams) as mapped by the EPA which will be crossed by the Greenway as shown in Figures 1 and 2.

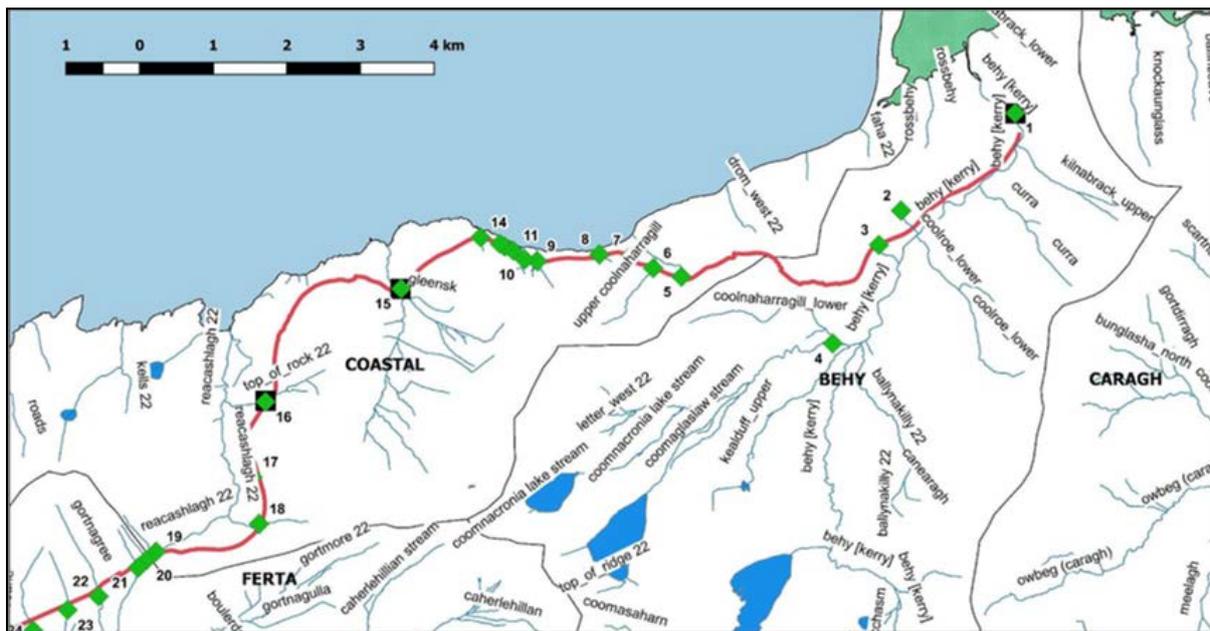


Figure 1: Watercourses intersected by and draining the route corridor (eastern section)

³ Stream mapping from <http://gis.epa.ie/Envision> and <http://maps.biodiversityireland.ie/#/Map>

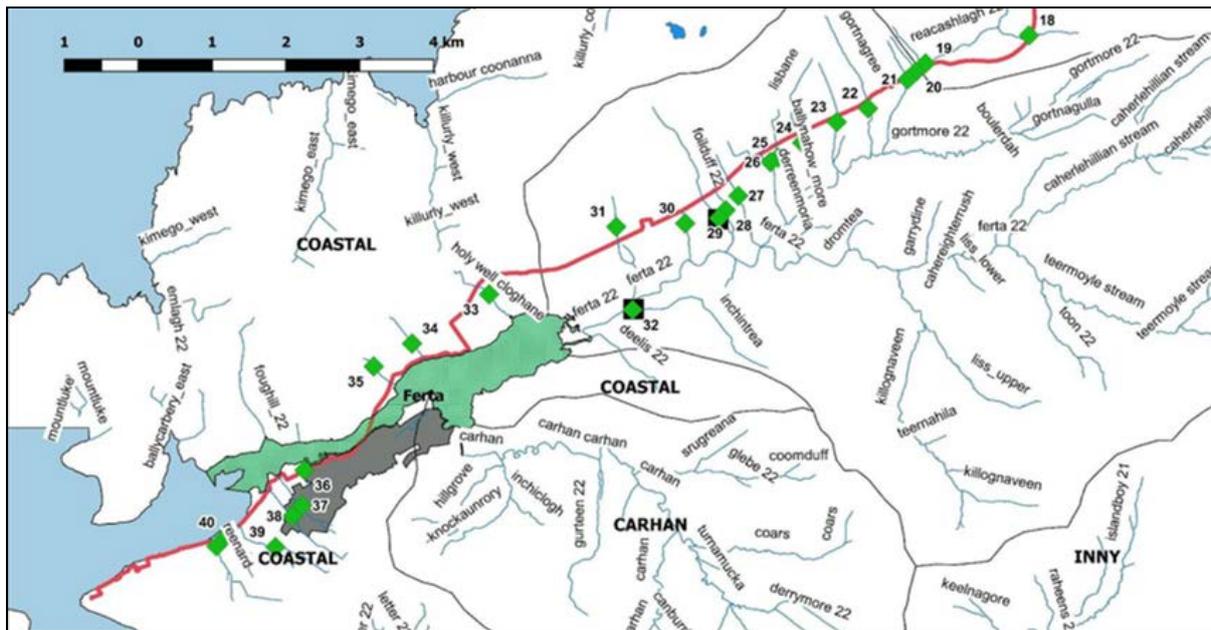


Figure 2: Watercourses intersecting and draining the route corridor (western section)

The largest watercourse crossed by the Greenway will be the 4th order Gleensk stream. watercrossings are discussed in more detail in **Chapter 13, Volume 2 of this EIAR**. Detailed method statements for water crossings including bridges and culverts are available in **Appendix 2, Volume 3 of this EIAR - Construction Methodology Report**.

EPA records indicate that the water quality of the Behy River at Behy Bridge is Q4 ‘Good’ status. The main channel of the Ferta River at sampling station ‘Bridge ENE of Derreenmoira’ is Q4 ‘Good’ status while further downstream at Deelis Bridge it is Q3-4 ‘Moderate’ status. The closest sampling station on the River Ferta, ‘Deelish Br (Tidal)’ has a rating of Q3-4⁴. The lower reaches of the River Ferta are classified under WFD as ‘Moderate’. The transitional waterbody (Valencia River Estuary) is ‘1b – possibly at risk of not achieving good status’. Coastal waterbody score of Valentia Harbour is ‘2b – strongly expected to achieve good status’. The WFD status of both water bodies are classified as ‘Not Monitored’.

Refer to the Aquatic Ecology Survey report available in Appendix 11.1, Volume 3 of this EIAR – for water quality assessment and aquatic habitat assessment of the watercourses intersecting and draining the Greenway.

11.4.3 Designated Sites

A total of 8 Natura 2000 sites (SAC’s and SPA’s) occur within 10km of the project. 7 pNHA’s and 1 NHA occur within 10km. 1 Ramsar site and 3 Nature Reserves occur within 10km of the project. Tables 11-3 and 11-4 below present details of the key ecological features of the designated sites in the area, and gives their distance and direction from the study area. Refer to **Appendix 11.3, Volume 3 of this EIAR** for maps of the designated sites within 10km of the Greenway route.

⁴ <http://gis.epa.ie/Envision> [accessed 17/11/17]

Table 11-3: Designated sites located within 10km of the Study Area

Name	Site Code	Key Features	Closest distance (and direction) of the designated site from the proposed Greenway
Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC and pNHA	000365	<p>Species</p> <ul style="list-style-type: none"> • Kerry slug • Freshwater pearl mussel • Marsh fritillary • Sea lamprey • Brook lamprey • River lamprey • Twaite shad • Salmon • Lesser horseshoe bat • Otter • Killarney fern • Slender naiad <p>Habitats</p> <ul style="list-style-type: none"> • Oligotrophic waters containing very few minerals of sandy plains • Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or of the <i>Isoto-Nanojuncetea</i> • Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation • Northern Atlantic wet heaths with <i>Erica tetralix</i> • European dry heaths • Alpine and Boreal heaths • <i>Juniperus communis</i> formations on heaths or calcareous grasslands • Calaminarian grasslands of the <i>Violetalia calaminariae</i> • <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils • Blanket bog (*active only) • Depressions on peat substrates of the <i>Rhynchosporion</i> • Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in British Isles • Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> • <i>Taxus baccata</i> woods of the British Isles 	The Greenway intersects this SAC in 2 locations at Drung Hill. The total length of intersection between the Greenway and the SAC is 1.1km.
Iveragh Peninsula SPA	004154	<ul style="list-style-type: none"> • Fulmar • Peregrine • Kittiwake • Guillemot • Chough 	The Greenway intersects this SPA in 2 locations at Drung Hill and Mount Foley. The total length of intersection between the

Name	Site Code	Key Features	Closest distance (and direction) of the designated site from the proposed Greenway
			Greenway and the SAC is 3.2km.
Castlemaine Harbour SPA	004029	<ul style="list-style-type: none"> • Red-throated Diver • Cormorant • Light-bellied Brent Goose • Wigeon • Mallard • Pintail • Scaup • Common Scoter • Oystercatcher • Ringed Plover • Sanderling • Bar-tailed Godwit • Redshank • Greenshank • Turnstone • Chough • Wetlands & Waterbirds 	1.2km to the north west
Castlemaine Harbour SAC and pNHA	000343	<p>Species</p> <ul style="list-style-type: none"> • Sea lamprey • River lamprey • Salmon • Otter • Petalwort <p>Habitats</p> <ul style="list-style-type: none"> • Estuaries • Mudflats and sandflats not covered by seawater at low tide • Annual vegetation of drift lines • Perennial vegetation of stony banks • Salicornia and other annuals colonizing mud and sand • <i>Spartina</i> swards • Atlantic salt meadows • Mediterranean salt meadows • Embryonic shifting dunes • Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) • Fixed coastal dunes with herbaceous vegetation (grey dunes) • Dunes with <i>Salix repens</i> ssp. <i>argentea</i> • Humid dune slacks • Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> 	1.2km to the north west
Valencia Harbour / Portmagee Channel SAC	002262	<ul style="list-style-type: none"> • Mudflats and sandflats not covered by seawater at low tide • Large shallow inlets and bays • Reefs 	The Greenway is located adjacent to this SAC where it is contiguous to the Reenard shoreline

Name	Site Code	Key Features	Closest distance (and direction) of the designated site from the proposed Greenway
Lough Yganavan and Lough Nambrackdarrig SAC and pNHA	000370	Species <ul style="list-style-type: none"> • Kerry slug Habitats <ul style="list-style-type: none"> • Fixed coastal dunes with herbaceous vegetation (grey dunes) • Oligotrophic waters containing very few minerals of sandy plains 	3.9km to the north east
Dingle Peninsula SPA	004153	<ul style="list-style-type: none"> • Fulmar • Peregrine • Chough 	10.0km to the north
Ballinskelligs Bay and Inny Estuary SAC	000335	Species <ul style="list-style-type: none"> • Petalwort Habitats <ul style="list-style-type: none"> • Estuaries • Mudflats and sandflats not covered by seawater at low tide • Atlantic salt meadows • Mediterranean salt meadows 	10.0km to the south
Knockroe Bog NHA	000366	<ul style="list-style-type: none"> • Peatland 	6.4km south east
Valencia River Estuary pNHA	001383	<ul style="list-style-type: none"> • Birds, mudflats, saltmarsh and grassland 	The Greenway is located adjacent to this pNHA where it is contiguous to the Reenard shoreline. The Greenway crosses this pNHA via the Caherciveen Railway Bridge.
Doulus Head to Cooncrome Harbour pNHA	001350	<ul style="list-style-type: none"> • Birds 	2.9km north west
Glanleam Wood pNHA	001353	<ul style="list-style-type: none"> • Semi-natural woodlands/sub-tropical species/ ferns 	2.3km west
Valencia Island Cliffs pNHA	001382	<ul style="list-style-type: none"> • Birds 	2.9km west

Table 11-4: Classified Ramsar Site within 10km of the study area

Site name	Designation rationale	Distance (and direction) of the designated site from the proposed Greenway
Castlemaine Harbour Ramsar Site 31E116	The estuary of two rivers at the head of Dingle Bay and a complex of mudflats, sandbanks, and saltmarshes protected from the sea by extensive dunes. The mudflats support one of the four largest <i>Zostera</i> beds in Ireland providing food for various species of wintering waterbirds, including internationally important numbers of the goose <i>Branta bernicla hrota</i> . Ramsar site no. 470.	3km to the north

A Natura Impact Statement (NIS) was prepared to assess the potential impacts of the project to the integrity of Natura 2000 sites (SACs and SPAs). This was done in accordance with Article 6 of the 'Habitats' Directive (92/43/EEC). The NIS is available in **Volume 5 of this EIAR**.

11.4.3.1 Other Designated Sites

Nature Reserves

Lough Nambrackdarrig

Located 4.3km north east of the Greenway at Glenbeigh this nature reserve forms part of Lough Yganavan and Lough Nambrackdarrig SAC and pNHA (site code: 000370).

Lough Yganavan

Located 5.2km north east of the Greenway at Glenbeigh this nature reserve forms part of Lough Yganavan and Lough Nambrackdarrig SAC and pNHA (site code: 000370).

Castlemaine Harbour

Located 5.2km north of the Greenway at Glenbeigh this nature reserve forms part of Castlemaine Harbour SAC and pNHA (site code: 000343).

Maps showing the location of the above mentioned designated sites in relation to the proposed Greenway are available in **Appendix 11.3, Volume 3 of this EIAR**.

11.4.4 Evaluation of Existing Environment

11.4.4.1 Rare and protected flora

The study area lies within Ordnance Survey National 10km grid squares V47, V48, V58, V68 and V69. Searches of the databases available at the NPWS and the NBDC for species of conservation interest were carried out for rare and protected flora. The 10km grid square was searched for records of plant species protected under the Flora (Protection) Order of 2015 and the Irish Red Data Book (Curtis and McGough, 1988) and those included in new red data list (Wyse-Jackson *et al.*, 2016). Table 11-5 hereunder lists the rare and protected flora records from the aforementioned databases for the grid squares encompassing the route.

Table 11-5: Records for rare and protected species of flora in 10km grid squares V47, V48, V58, V68 and V69

Plant Name	Date of record	Grid square	Level of protection	Favoured habitat and distribution in Ireland ⁵	Potential suitable habitat within the study area and records of the species during surveys
Allseed <i>Radiola linoides</i>	1987-1999	V48 V69	Red Data List 2016 = 'Near Threatened'	Damp sandy or peaty ground; locally frequent near the west coast (of Ireland) very rare elsewhere.	Peaty ground adjacent to the route. Particularly along the Mountain Stage. Species not recorded during surveys.

⁵ Parnell, J; Curtis, T; and Cullen, E. (2012): Webb's an Irish Flora. Hardback, 8th Edn (March 2012), Trinity College Dublin.

Plant Name	Date of record	Grid square	Level of protection	Favoured habitat and distribution in Ireland ⁵	Potential suitable habitat within the study area and records of the species during surveys
Alpine Saw-wort <i>Saussurea alpina</i>	Pre-1970	V68	Irish Red Data Book (1988) IUCN = Vulnerable; IRDB TN = 4 (Rare) Red Data List 2016 = 'Vulnerable'	Mountain cliffs and ledges, above 300m, very rare and local (in Ireland), mostly in the extreme west.	Sub optimal habitat along the route. Records date from pre-1970. Species not recorded during surveys.
Autumn Gentian <i>Gentianella amarella</i>	Pre-1970	V58	Red Data List 2016 = 'Near Threatened'	Calcareous pastures, dry banks and sandy gravelly places, occasional in the centre of Ireland rare elsewhere.	Sub optimal habitat along the route. Species not recorded during surveys.
	1987-1999	V69			
Bog Orchid <i>Hammarbya paludosa</i>	1987-1999	V69	Irish Red Data Book (1988) IUCN = Endangered; IRDB TN = 8 (Rare) RI Protected Species Flora Protection Order Species Red Data List (2016) = Near Threatened	Wet usually spongy bogs, usually in tufts of Sphagnum moss.	Peaty ground adjacent to the route. Particularly along the Mountain Stage. Species not recorded during surveys.
	Pre-1970	V47			
Blue-eyed-grass <i>Sisyrinchium angustifolium (bermudiana)</i>	1987-1999	V69	Irish Red Data Book (1988) IUCN = not threatened; IRDB TN = 5 (Rare) Red Data List 2016 = Least Concern	Damp grassland and stony lake-shores in the west and centre (of Ireland); occasional and rare elsewhere.	Wet grassland recorded along the footprint of the route was generally species poor and marginal. There were some more diverse examples of this habitat type adjacent to the route. Species not recorded during surveys.
	Pre-1970	V48			
Chaffweed <i>Centunculus minimus (Anagallis minima)</i>	1987-1999	V58 V68 V69	Red Data List (2016) = Near Threatened	Lake-shores, damp and sandy places near the sea. Occasional in Kerry and the extreme north (of Ireland); very	Sub-optimal habitat along the route. Some limited potential along the coastal section of the route. However the species was not recorded during

Plant Name	Date of record	Grid square	Level of protection	Favoured habitat and distribution in Ireland ⁵	Potential suitable habitat within the study area and records of the species during surveys
				rare elsewhere.	surveys.
Chamomile <i>Chamaemelum nobile</i>	1987-1999	V68	Red Data List (2016) = Near Threatened	Roadsides, pastures, heaths, lake-shores and waste ground, frequent in the south-west (of Ireland), rare elsewhere.	Chamomile was recorded along the coastline of the Valencia River outside the footprint of the route corridor.
Corky-fruited water-dropwort <i>Oenanthe pimpinelloides</i>	1987-1999	V47	Irish Red Data Book (1988) IUCN = Vulnerable IRDB Rare	Damp ground near coasts. Rare in Ireland.	Sub-optimal habitat along the route. Potential habitat along coastal section of route. Species not recorded during surveys.
	2011		Red Data List (2016) = Near Threatened		
Corncockle <i>Agrostemma githago</i>	Pre-1970	V69	Extinct Red Data List (2016) = Waiting List	Arable weed associated with cornfields. Extinct in Ireland.	Habitat along the route unsuitable. Species not recorded during surveys.
Cowslip <i>Primula veris</i>	1987-1999	V48	Irish Red Data Book (1988) IUCN = not threatened; IRDB TN = 8 (Rare)	Pastures; frequent in the centre of Ireland, rather rare in the north-east and south-west.	Sub-optimal habitat along the route. Hedgerows, field boundaries and small sections of woodland adjacent to the route offers potential habitat for the species. Species not recorded during surveys.
	Pre-1970	V47	Red Data List (2016) = Least Concern		
Common Cudweed <i>Filago vulgaris</i>	Pre-1970	V58	Red Data List (2016) = Vulnerable	Dry banks and sandy ground; scattered and more frequent, in the south-east (of Ireland), formally more frequent, now declining.	Rocky shallow soil along sections of the route offers some potential habitat for the species. Records date from pre 1970 within grid square V58. The species was not

Plant Name	Date of record	Grid square	Level of protection	Favoured habitat and distribution in Ireland ⁵	Potential suitable habitat within the study area and records of the species during surveys
					recorded during surveys.
Dotted Sedge <i>Carex punctata</i>	1970-1986	V48	Red Data List (2016) = Least Concern	Rocky and grassy ground near the sea; occasional in the south-west (of Ireland) and in west County Galway; one station in west County Donegal; unknown elsewhere.	Potential habitat along the coastline of the route outside the footprint of the development. Species not recorded during surveys.
	1987-1999	V58			
	Pre-1970	V47			
Irish Lady's-tresses <i>Spiranthes romanzoffiana</i>	1957	V58	Irish Red Data Book (1988) IUCN = Endangered; IRDB TN = 7 (Rare) RI Protected Species Flora Protection Order Species Red Data List (2016) = Near Threatened	Damp meadows, lake shores and boggy ground in the south west (of Ireland), and west, where it is spreading, and north-east (around Lough Neagh).	Wet grassland recorded along the footprint of the route was generally species poor and marginal. Overall there is limited potential suitable habitat along the route. Species not recorded during surveys.
	1984	V69			
Irish spleenwort <i>Asplenium trichomanes</i>	Pre-1970	V47	Red Data List (2016) = Least Concern	Frequent on limestone rocks and walls throughout Ireland.	Records confined to the south and east of the country. Species not recorded during surveys.
Meadow brome <i>Bromus commutatus</i>	Pre-1970	V47	Red Data List (2016) = Near Threatened	Damp unimproved meadows and on roadsides. Rare in Ireland.	Potential habitat along road verges and unmanaged areas. Species not recorded during surveys.
Killarney Fern <i>Trichomanes speciosum</i>	1961 Also noted more recently in NPWS 2013 distribution	V68	Annex II and IV species Irish Red Data Book (1988) IUCN =	Beside waterfalls, in crevices between boulders, under overhanging rocks, on tree	Sub-optimal habitat along the route. One waterfall was recorded between Tunnels 2 and 3 at the mountain stage. The area was

Plant Name	Date of record	Grid square	Level of protection	Favoured habitat and distribution in Ireland ⁵	Potential suitable habitat within the study area and records of the species during surveys
	map		Endangered; IRDB TN = 8 (Rare) RI Protected Species	trunks and in damp, usually dark, sheltered situations.	searched for the Killarney fern during ecological survey but the species was not noted. Species not recorded during surveys.
	1983	V58	Flora Protection Order Species Red Data List (2016) = Least Concern		
Large-flowered Butterwort <i>Pinguicula grandiflora</i>	1987-1999	V58 V68 V69	Red Data List (2016) = Least Concern	Bogs, flushes, wet rocks and mountain heaths; very frequent in Counties Kerry and Cork, rare in Counties Limerick and Clare, unknown elsewhere.	Sub-optimal habitat along the route. Species not recorded during surveys.
	18/06/2011	V68E			
Pennyroyal <i>Mentha pulegium</i>	1906	V69	Irish Red Data Book (1988) IUCN = Endangered; IRDB = (Vulnerable) RI Protected Species Flora Protection Order Species Red Data List (2016) = Endangered	Damp sandy places occasional in Counties Kerry and Cork; very rare elsewhere.	Sub-optimal habitat along route. Limited habitat at coastal areas of route. The species was not recorded during surveys.
Pillwort <i>Pilularia globulifera</i>	1959	V58	Irish Red Data Book (1988) IUCN = Endangered; IRDB TN = 6 (Rare) RI Protected Species Flora Protection Order Species Red Data List (2016) = Vulnerable	Margins of lakes, ponds and slow moving rivers; very rare and largely confined to the north and the west (of Ireland).	Sub-optimal habitat along route. Limited suitable habitat along route. The species was not recorded during surveys.

Plant Name	Date of record	Grid square	Level of protection	Favoured habitat and distribution in Ireland ⁵	Potential suitable habitat within the study area and records of the species during surveys
Sea Pea <i>Lathyrus japonicus ssp.maritimus</i>	1987-1999	V69	Irish Red Data Book (1988) IUCN = Data deficient; IRDB TN = Indeterminate	Sand-dunes and shingle beaches.	Sub-optimal habitat along route. Limited potential habitat for this coastal species along the route. The species was not recorded during surveys.
	1992	V58	RI Protected Species Flora Protection Order Species Irish Red Data List (2016) = Vulnerable		
Small Cudweed <i>Filago minima</i>	1987-1999	V69	Irish Red Data Book (1988) IUCN = Vulnerable; IRDB TN = 7 (Rare) RI Protected Species Flora Protection Order Species Red Data List (2016) = Near Threatened	Sandy and gravelly places, frequent in the north, south east and south west (of Ireland); rare elsewhere.	Sub-optimal habitat along route. Limited potential habitat for this coastal species The species was not recorded during surveys.
Small-flowered Catchfly <i>Silene gallica</i>	Pre-1929	V69	Irish Red Data List = Vulnerable	Arable fields, mainly on sandy soils; rare.	Sub-optimal habitat along route. Record from Botanical Society of Britain and Ireland (BSBI) from pre 1929. Limited potential habitat. Species not recorded during surveys.
Small-white Orchid <i>Pseudorchis albida</i>	1892	V68 V69	Irish Red Data Book (1988) IUCN = Endangered; IRDB TN = 11 (Vulnerable) RI Protected Species Flora protection	Upland pasture and heaths very rare.	Sub-optimal habitat along route. Record from Lough Coomasaham circa. 1892. Limited potential habitat. The species was not recorded during surveys.

Plant Name	Date of record	Grid square	Level of protection	Favoured habitat and distribution in Ireland ⁵	Potential suitable habitat within the study area and records of the species during surveys
			order species. Irish Red Data List (2016) = Vulnerable		
St Patrick's Cabbage <i>Saxifraga spathularis</i>	1987-1999	V47 V48 V59 V68 V69	Irish Red Data List = Least Concern	Woods, shady rocks and mountains; locally abundant in the west (of Ireland) and south-west, rare.	Species recorded in shaded areas and rocky banks adjacent to the route particularly east of the Mountain Stage.

Of the 24 species listed in Table 11-5, only two species, namely Chamomile and St. Patricks Cabbage, were recorded in the study area during field surveys. Chamomile was recorded along the coastline of the Valentia River Estuary outside the footprint of the route corridor. St Patricks Cabbage was frequent on stone garden walls and shaded areas adjacent to the route west of Glenbeigh and east of Kells station where it was associated mostly with disturbed ground. Neither of these species is listed as a Flora Protection Order species, both are listed in the Irish Red List (2016) as 'Near Threatened' and 'Least Concern', respectively.

11.4.4.2 Habitat evaluation

The main habitat types occurring along the proposed Greenway route have been evaluated below in Table 11-6 for their conservation importance, based on the NRA evaluation scheme (see **Appendix 11.2, Volume 3 of this EIAR**). Overall, the habitats occurring in the study area are heavily impacted by human influence and are degraded due to intensive management and modification. Those selected as key ecological receptors are those which are evaluated to be of at least local importance (higher value). These habitats often occur in complicated mosaics along the route. A habitat map of the proposed Greenway route is available in **Appendix 11.3, Volume 3 of this EIAR**.

Table 11-6: Habitats recorded within the study area

Habitat Type	Ecological value	Rationale	Ecological Receptor
Habitats within the footprint of the proposed route corridor			
Hedgerows (WL1)	Locally important (higher value)	Habitat with ecological and biodiversity value. Hedgerows in the study area are in various states of management.	Yes
Treelines (WL2)	Locally important (higher value)	Habitat with ecological and biodiversity value. Treelines in the study area are in various states of management.	Yes

Habitat Type	Ecological value	Rationale	Ecological Receptor
Earth banks (BL2)	Locally important (higher value)	Limited ecological and biodiversity value. Earth banks in the study area are in various states of management.	Yes
Earth banks (BL2) and Scrub (WS1)	Locally important (higher value)	Habitat with ecological and biodiversity value.	Yes
Buildings and artificial surfaces (BL3)	Locally important (lower value)	Highly modified habitat with low ecological value.	No
Buildings and artificial surfaces (BL3) and Hedgerow (WL1)	Locally important (lower value)	Highly modified habitat with low ecological value.	No
Buildings and artificial surfaces (BL3) and Scrub (WS1)	Locally important (lower value)	Highly modified habitat with low ecological value.	No
Buildings and artificial surfaces (BL3) and Amenity grassland (GA2)	Locally important (lower value)	Highly modified habitat with low ecological value.	No
Buildings and artificial surfaces (BL3), Amenity grassland (GA2) and Treelines (WL2)	Locally important (lower value)	Highly modified habitat with low ecological value.	No
Exposed sand, gravel or till (ED1) and Dry calcareous and neutral grassland (GS1)	Locally important (lower value)	Highly modified habitat with low ecological value. Marginal along the Behy woodland pathway.	No
Exposed sand, gravel or till (ED1), Neutral grassland (GS1) and Ornamental/non-native shrub (WS3)	Locally important (lower value)	Highly modified habitat with low ecological value.	No
Spoil and bare ground (ED2)	Locally important (lower value)	Highly modified habitat with low ecological value.	No
Spoil and bare ground (ED2) and Scrub (WS1)	Locally important (lower value)	Highly modified habitat with low ecological value.	No
Recolonising bare ground (ED3)	Locally important (lower value)	Highly modified habitat with low ecological value.	No
Recolonising bare ground and scrub (WS1)	Locally important (lower value)	Highly modified habitat with low ecological value.	No
Improved agricultural grassland (GA1)	Locally important (lower value)	Highly modified habitat with low ecological value.	No

Habitat Type	Ecological value	Rationale	Ecological Receptor
Wet improved agricultural grassland (GA1 Wet)	Locally important (lower value)	Highly modified habitat with low ecological value.	No
Improved agricultural grassland (GA1) and scrub (WS1)	Locally important (lower value)	Highly modified habitat with low ecological value.	No
Improved agricultural grassland (GA1), Recolonising bare ground (ED3) and Scrub (WS1)	Locally important (lower value)	Highly modified habitat with low ecological value.	No
Improved agricultural grassland (GA1), Amenity grassland (GA2) and Scrub (WS1)	Locally important (lower value)	Highly modified habitat with low ecological value.	No
Improved agricultural grassland (GA1) and Dry-humid acid grassland (GS3)	Locally important (lower value)	Highly modified habitat with low ecological value.	No
Improved agricultural grassland (GA1) and Wet grassland (GS4)	Locally important (lower value)	Highly modified habitat with low ecological value.	No
Improved Agricultural Grassland (GA1), Wet Grassland (GS4) and Exposed sand, gravel or till (ED1)	Locally important (lower value)	Highly modified habitat with low ecological value.	No
Improved agricultural grassland (GA1), Wet grassland (GS4) and Scrub (WS1)	Locally important (higher value)	Biodiversity value. Periodically grazed/managed.	Yes
Improved agricultural grassland (GA1) and Scrub (WS1)	Locally important (lower value)	Highly modified habitat with low ecological value.	No
Improved agricultural grassland (GA1) Rank	Locally important (lower value)	Highly modified habitat with low ecological value.	No
Amenity grassland (GA2)	Locally important (lower value)	Highly modified habitat with low ecological value.	No
Neutral grassland (GS1)	Locally important (lower value)	Highly modified habitat with low ecological value.	No
Neutral grassland (GS1) and Spoil and bare ground (ED2)	Locally important (lower value)	Highly modified habitat with low ecological value.	No
Neutral grassland (GS1) and Dry-humid acid	Locally important	Biodiversity value. Periodically	Yes

Habitat Type	Ecological value	Rationale	Ecological Receptor
grassland (GS3)	(higher value)	grazed/managed.	
Neutral grassland (GS1), Wet grassland (GS4) and Scrub (WS1)	Locally important (higher value)	Biodiversity value. Periodically grazed/managed.	Yes
Neutral grassland (GS1) and Dry siliceous heath (HH1)	Locally important (higher value)	Biodiversity value. Periodically grazed/managed.	Yes
Neutral grassland (GS1) and Scrub (WS1)	Locally important (higher value)	Biodiversity value. Marginal and common in the greater area. Periodically grazed/managed.	Yes
Grassy verge (GS2)	Locally important (higher value)	Biodiversity value. Marginal habitat common in the greater area.	Yes
Grassy verge (GS2) and Scrub (WS1)	Locally important (higher value)	Biodiversity value. Marginal habitat common in the greater area.	Yes
Grassy verge (GS2) Scrub (WS1) and Wet willow-alder-ash woodland (WN6)	Locally important (higher value)	Biodiversity value. Marginal habitat. Woodland is immature and occurs on the wetter part of the railway embankment adjacent farmland.	Yes
Grassy verge (GS2) Wet Heath (HH3) and Scrub (WS1)	Locally important (higher value)	Biodiversity value. Marginal and common in the greater area. Periodically grazed/managed.	Yes
Dry-humid acid grassland (GS3)	Locally important (higher value)	Biodiversity value. Marginal and common in the greater area. Periodically grazed/managed.	Yes
Dry-humid acid grassland (GS3) and Wet grassland (GS4)	Locally important (higher value)	Biodiversity value. Marginal and common in the greater area. Periodically grazed/managed.	Yes
Dry-humid acid grassland (GS3) Wet grassland (GS4) and Wet heath (HH3)	Locally important (higher value)	Biodiversity value. Marginal and common in the greater area. Periodically	Yes

Habitat Type	Ecological value	Rationale	Ecological Receptor
		grazed/managed.	
Dry-humid acid grassland (GS3) Wet grassland (GS4) and Scrub (WS1)	Locally important (higher value)	Biodiversity value. Marginal and common in the greater area. Periodically grazed/managed.	Yes
Dry humid acid grassland (GS3) and Dense bracken (HH1)	Locally important (lower value)	Highly modified habitat with low ecological value.	No
Wet grassland (GS4)	Locally important (higher value)	Biodiversity value. Marginal and common in the greater area. Periodically grazed/managed.	Yes
Wet grassland (GS4) and Recolonising bare ground (ED3)	Locally important (lower value)	Highly modified habitat with low ecological value.	No
Wet grassland (GS4) Dense bracken (HD1) and Scrub (WS1)	Locally important (lower value)	Diminished ecological value.	No
Wet grassland (GS4) and Wet heath (HH3)	Locally important (higher value)	Biodiversity value. Marginal and common in the greater area. Periodically grazed/managed.	Yes
Wet grassland (GS4) Wet heath (HH3) and Scrub (WS1)	Locally important (higher value)	Biodiversity value. Marginal and common in the greater area. Periodically grazed/managed.	Yes
Wet grassland (GS4) and Scrub (WS1)	Locally important (higher value)	Biodiversity value. Marginal and common in the greater area. Periodically grazed/managed.	Yes
Dense bracken (HD1)	Locally important (lower value)	Low ecological value	No
Dense bracken (HD1) and Scrub (WS1)	Locally important (lower value)	Diminished ecological value	No
Dry siliceous heath (HH1) degraded	Locally important (higher value)	Biodiversity value. Marginal where it is intersected by the route corridor. Common habitat in the area. Periodically grazed/managed. Extends	Yes

Habitat Type	Ecological value	Rationale	Ecological Receptor
		into Killarney National Park SAC on the higher slopes of Mount Foley/Drung Hill outside the development area.	
Dry siliceous heath (HH1) and Dense bracken (HD1) grazed	Locally important (higher value) to International importance*	Marginal where it occurs upslope and adjacent to the proposed gabions at Drung Hill. Diminished ecological value. Occurs within Killarney National Park SAC and Iveragh Peninsula SPA.	Yes
Dry siliceous heath (HH1) and Wet heath (HH3)	Locally important (higher value) to International importance*	Occurs within Killarney National Park SAC and Iveragh Peninsula SPA on lower slopes of Mount Foley/Drung Hill. Marginal where it is intersected by the route corridor. Biodiversity value. Common habitat in the area. Periodically grazed and managed.	Yes
Dry siliceous heath (HH1), Wet heath (HH3) and Dense bracken (HD1) grazed	Locally important (higher value) to International importance*	Occurs above the abandoned railway at Mountain Stage/Drung Hill. Adjoins the Killarney National Park SAC. Overlaps with the Iveragh Peninsula SPA. Diminished ecological value.	Yes
Wet heath (HH3) degraded	Locally important (higher value)	Marginal where it is intersected by the route corridor. Biodiversity value. Common habitat in the area. Periodically grazed and managed. Large areas extend uphill at Mount Foley/Drung Hill. A short section (c. 100m) of boardwalk will be installed through this habitat type at Coolnaaharragill, chainage Ch 27,580 to 27,680.	Yes
Wet heath (HH3)	Locally important	Biodiversity value.	Yes

Habitat Type	Ecological value	Rationale	Ecological Receptor
Exposed siliceous rock (ER1) and Scrub (WS1)	(higher value)	Marginal and common in the greater area. Periodically grazed/managed.	
Wet heath (HH3) and Lowland blanket bog (PB3)	Locally important (higher value) to International importance*	Occurs within Iveragh Peninsula SPA. Marginal where it is intersected by the route corridor. Biodiversity value. Common habitat in the area. Periodically grazed and managed.	Yes
Wet heath (HH3) and Scrub (WS1)	Locally important (higher value)	Biodiversity value. Marginal and common in the greater area. Periodically grazed/managed.	Yes
Lowland blanket bog (PB3) degraded	Locally important (higher value)	Marginal where it is intersected by the route corridor. Biodiversity value. Common habitat in the area. Periodically grazed and managed.	Yes
Lowland blanket bog (PB3) and Wet grassland (GS4) degraded	Locally important (higher value)	Biodiversity value. Marginal and common in the greater area. Periodically grazed/managed.	Yes
(Mixed) broadleaved woodland (WD1)	Locally important (higher value)	Biodiversity value. Marginal where it occurs adjacent the N70 on the lower western slope of Mount Foley and at Behy wood adjacent the Behy River.	Yes
(Mixed) broadleaved/conifer woodland (WD2)	Locally important (higher value) to County importance	Biodiversity value. Marginal where is occurs adjacent the N70 on the lower western slope of Mount Foley.	Yes
Oak-birch-holly woodland (WN1)	Locally important (higher value)	Biodiversity value. Marginal where is occurs west of the Gleensk viaduct.	Yes
Riparian woodland	Locally important	Biodiversity value. Willow and alder woodland strips	Yes

Habitat Type	Ecological value	Rationale	Ecological Receptor
(WN5)	(higher value)	along the banks of rivers and stream intersecting the route.	
Wet willow-alder-ash woodland (WN6)	Locally important (higher value)	Biodiversity value. Marginal in sections west of Glenbeigh, occurs in mosaic with scrub and grassland.	Yes
Bog woodland (WN7)	Locally important (higher value)	Biodiversity value. Occurs on the lower slopes of Beenmore Mountain adjacent the N70.	Yes
Conifer plantation (WD4)	Locally important (higher value)	Biodiversity value. Largest area of this habitat occurs west of Glenbeigh in the Behy woodland.	Yes
Scrub (WS1) and Conifer plantation (WD4)	Locally important (higher value)	Diminished ecological value. Marginal adjacent to the Behy wood pathway.	Yes
Ornamental/non-native shrub (WS3)	Locally important (lower value)	Diminished ecological value. Associated with the walkway/gardens at Golden's.	No
Scrub (WS1)	Locally important (higher value)	Biodiversity value. Intermittent along the route, varying species composition.	Yes
Valuable habitats adjacent to the route corridor			
Upland/eroding rivers (FW1)	Locally important (higher value) to National Importance	Route intersects drains, stream and rivers of varying degrees of ecological value. All watercourses can act as a conduit of pollution to downstream ecological receptors and designated areas.	Yes
Lowland blanket bog (PB3)	County importance to International importance*	Large areas of blanket bog extend away from the route/development area towards the upslope SAC at Drunh Hill, east of the Gleensk viaduct. Lowland blanket bog occurs within the Iveragh Peninsula SPA at Mount Foley, extending away from the route.	Yes

Habitat Type	Ecological value	Rationale	Ecological Receptor
Dry heath (HH1)	County importance to International importance*	Upland heath habitats extend upslope of the route/development area into the SAC/SPA at Mountain Stage/Drung Hill.	Yes
Wet heath (HH3)	County to National importance	Upland wet heath habitats extend upslope of the route/development area to the east of Gleensk viaduct.	Yes
Reed bed and large sedge swamp (FS1)	National importance	A small section of naturally formed reed bed swamp fringes the estuary. Within the Valentia River Estuary pNHA	Yes
Upper saltmarsh (CM2)	National importance	A small section of upper saltmarsh fringes the estuary. Within the Valentia River Estuary pNHA	Yes
Sheltered rocky shore (LR3)	National importance to International importance*	The dominant habitat type along the shoreline to the north of the Reenard peninsula. Occurs within Valentia River Estuary pNHA and the Valentia Harbour / Portmagee Channel SAC.	Yes
Shingle and gravel shores (LS1)	National Importance	Occurs within the Valentia River Estuary pNHA.	Yes
Estuaries (MW4)	National importance to International importance*	The estuary is within the boundary of the Valentia River Estuary pNHA and Valencia Harbour / Portmagee Channel SAC.	Yes

* Note: habitats extending into Natura 2000 site designation

11.4.5 Evaluation of Existing Fauna

Records for fauna were retrieved from the NPWS and the NBDC online mapping, as well as from NPWS data requests and field surveys. The Greenway route lies within the 10km grid squares V47, V48, V58, V68 and V69. A number of protected native fauna species were recorded during ecological field surveys (**Refer to Appendix 11.1, Volume 3 of this EIAR**). Table 11-7 lists the rare and/or protected fauna records from the database searches and field surveys which are considered to be key ecological receptors.

Table 11-7: Fauna recorded during the desktop study and field surveys

Species	Indication of National Distribution	Records from desktop and ecological survey	Level of Protection	Ecological Receptor
Badger (<i>Meles meles</i>)	Throughout the country	<p>A number of NBDC records for badger within the 10km grid squares encompassing the Greenway route. Potential foraging habitat identified along the route.</p> <p>No setts were recorded within the route corridor. However, there were observations of trails entering Behy Woodland (2014) and areas of scrub along the route (Drom West 2017). No setts identified during surveys.</p> <p>It is likely that badgers use some habitats along the route for foraging and/or commuting.</p>	<p>Irish Red Data Book: 'Least Concern'. Wildlife (Amendment) Act (2000).</p>	Yes
Hedgehog (<i>Erinaceus europaeus</i>)	Throughout the country	<p>A number of NBDC records for hedgehog within the 10km grid squares encompassing the Greenway route. This species was not recorded during field surveys.</p> <p>It is likely that hedgehog use some habitats along the route for foraging, commuting and/or shelter.</p>	<p>Irish Red Data Book: 'Least Concern'. Overall conservation status (NPWS 2013) is 'favourable' Wildlife (Amendment) Act (2000). Berne Convention Appendix III.</p>	Yes
Irish (mountain) hare (<i>Lepus timidus hibernicus</i>)	Throughout the country	<p>Of the five 10km grid squares occupying the proposed route V47 and V69 lie within the distribution of the species while V48, V68 and V58 all lie within the range of the species (NPWS,</p>	<p>Irish Red Data Book: 'Least Concern'. Wildlife (Amendment)</p>	Yes

Species	Indication of National Distribution	Records from desktop and ecological survey	Level of Protection	Ecological Receptor
		2013). 2 no. Irish mountain hares were recorded outside the route corridor during ecological surveys in improved agricultural grassland. It is likely that Irish (mountain) hare use some habitats along the route for foraging, shelter and/or commuting.	Act (2000). Annex V Habitats Directive. Berne Convention Appendix III.	
Irish stoat (<i>Mustela erminea</i>)	Throughout the country	Record 1.1km north of the Behy Woodland [V650911 – Atlas of mammals in Ireland 2011 - 2015 (13/04/2012)]. This species was not recorded during field surveys. Likely to be present particularly in sections of woodland and scrub intermittent along the route.	Irish Red Data Book: 'Least Concern'. Wildlife (Amendment) Act (2000). Berne Convention Appendix III.	Yes
Otter (<i>Lutra lutra</i>)	Throughout the country	Several historic records along the proposed route all recorded in 1980 as part of the Otter survey of Ireland 1982 (the River Behy, as well as many of the tributary rivers of the River Ferta). Of the 10km grid squares occupying the proposed route V48, V68 and V69 all lie within the distribution of otter. V47 and V58 lie within the range of the species (NPWS, 2013). An otter holt was recorded within an old dilapidated stonewall field boundary along the Reenard shoreline between an area of saltmarsh (within Valencia River Estuary pNHA, site code 001383) and reed bed east of Mannix Point Camping and Caravan Park (2014). There were several signs of extensive use of this area by otters including spraint, slides and well defined trails. There were no signs of otter activity during subsequent ecological surveys at this location from 2016.	Irish Red Data Book 'Near Threatened'. Habitats Directive Annex II and IV. Berne Convention Appendix III. Wildlife (Amendment) Act (2000).	Yes

Species	Indication of National Distribution	Records from desktop and ecological survey	Level of Protection	Ecological Receptor
		<p>An individual otter was observed commuting along the footprint of the abandoned railway at Mountain Stage in March 2017, within the bog woodland habitat (WN7). There was evidence of potential otter crossing the N70 at Mountain Stage, where runs and tracks were recorded on either side of the road. No holt was identified along this section of the route. Otter is likely to cross the footprint of the route when commuting between the sea and upland rivers.</p> <p>Known to be utilising habitats along the Valencia River Estuary and habitats at Mountain stage.</p> <p>Likely to be present in habitats in the River Behy and the River Ferta catchments.</p>		
<p>Pine marten <i>(Martes martes)</i></p>	<p>Throughout the country</p>	<p>Record 5.8km south east of the eastern section of the route [V7186 – Atlas of mammals in Ireland 2011 - 2015 (30/11/2012)].</p> <p>There is also a record of pine marten on Valencia Island (V 423, 760) recorded 16/04/2007 as part of a road kill survey.</p> <p>Possibly present within Behy Woodland. Not recorded during field surveys.</p>	<p>Irish Red Data Book: 'Least Concern'.</p> <p>Wildlife (Amendment) Act (2000).</p> <p>Habitats Directive Annex V</p>	<p>Yes</p>
<p>Red squirrel (<i>Sciurus vulgaris</i>)</p>	<p>Throughout the country</p>	<p>Record in the grid square V665906 in the Behy Woodland.</p> <p>Likely to be present within the Behy Woodland and other sections of forest/woodland along the route.</p> <p>Red squirrel was not observed during field surveys along the route.</p>	<p>Irish Red Data Book: 'Near Threatened'.</p> <p>Wildlife (Amendment) Act (2000).</p> <p>Berne Convention Appendix III.</p>	<p>Yes</p>
<p>Pygmy shrew (<i>Sorex minutus</i>)</p>	<p>Throughout the country</p>	<p>A pygmy shrew was recorded crossing a road into the Behy Woodland west of Glenbeigh (V 66346, 90442) during initial</p>	<p>Irish Red Data Book: 'Least Concern'.</p>	<p>Yes</p>

Species	Indication of National Distribution	Records from desktop and ecological survey	Level of Protection	Ecological Receptor
		habitat surveys. Likely to be present throughout the study area. This species was recorded near the Behy wood.	Wildlife (Amendment) Act (2000). Berne Convention Appendix III.	
Red deer <i>(Cervus elaphus)</i>	Scattered distribution throughout the country	2008 record in the 10km grid square V68 as part of Carden <i>et al.</i> (2011) [<i>Distribution and range expansion of deer in Ireland.</i>] Limited potential habitat within the greater area surrounding the route. A young stag was recorded in the woodland adjacent to the N70 north west of Glensk viaduct in March 2017. Possibly utilising some habitats along the route for foraging and/or commuting. Restricted distribution in South Kerry.	Irish Red Data Book: 'Least Concern'. Wildlife (Amendment) Act (2000).	Yes
Bat species	Lesser horseshoe bat is restricted to six western counties, Mayo, Galway, Clare, Limerick, Cork and Kerry. All other species found throughout the country.	Several records for 10km grid squares encompassing the route. All species were recorded commuting/foraging along the route during field surveys. A summer LHS bat roost was recorded adjacent to the route during field surveys. Known to utilise the habitats along the route. Tunnels do not constitute an established or traditional roost site for bats (Refer to Appendix 11.1, Volume 3). Tunnels are likely to be used for foraging only and on sporadic rather than a sustained basis. Night time lighting in the tunnels will not occur.	Irish Wildlife Act 1976/2000 EU Habitats Directive [92/43/EEC]. All bat species resident in Ireland are listed in Annex IV of the Directive. The Lesser horseshoe bat is also listed in Annex II of the Directive. Irish Conservation Status: Soprano and Common pipistrelle, Brown long-	Yes

Species	Indication of National Distribution	Records from desktop and ecological survey	Level of Protection	Ecological Receptor
			<p>earled, Daubenton's, Whiskered, Lesser horseshoe and Natterer's bats are of least concern.</p> <p>Leisler's bat is near threatened.</p>	
Salmonid spp.	Throughout the country	<p>Records retained by NBDC and NPWS for 10km grid squares encompassing the route.</p> <p>Atlantic salmon and Brown trout recorded during field surveys.</p> <p>Known to utilise watercourses along the route.</p>	<p>EU Habitats Directive [92/43/EEC] Annex II and Annex V</p> <p>Fisheries Acts 1959 to 2006</p> <p>Irish status: Vulnerable</p> <p>Global status: least concern</p>	Yes
European eel (<i>Anguilla Anguilla</i>)	Throughout the country	<p>No NBDC records for 10km grid squares V47, V48, V58, V68 or V69.</p> <p>Species was recorded during field surveys.</p> <p>Known to utilise watercourses along the route.</p>	<p>Fisheries Acts 1959 to 2006</p> <p>Irish status: Critically endangered</p> <p>Global status: critically endangered</p>	Yes
Sea lamprey (<i>Petromyzon marinus</i>)	Scattered distribution	<p>No NBDC or NPWS records for 10km grid squares V47, V48, V58, V68, V69.</p> <p>Not recorded during field surveys but suitable habitat found in the Ferta river.</p> <p>Possibly utilise watercourses along the route.</p>	<p>EU Habitats Directive [92/43/EEC] Annex II</p> <p>Fisheries Acts 1959 to 2006</p> <p>Irish status: Near threatened</p> <p>Global status: least concern</p>	Yes
River/Brook lamprey (<i>Lampetra fluviatilis/Lampetra planeri</i>)	Scattered distribution	<p>No NBDC or NPWS records for 10km grid squares V47, V48, V58, V68, V69.</p>	<p>EU Habitats Directive [92/43/EEC] Annex II</p> <p>Fisheries Acts</p>	Yes

Species	Indication of National Distribution	Records from desktop and ecological survey	Level of Protection	Ecological Receptor
		Not recorded during field surveys but suitable habitat found in the Ferta river. Possibly utilise watercourses along the route.	1959 to 2006 Irish status: Least concern Global status: least concern	
Freshwater pearl mussel (<i>Margaritifera margaritifera</i>)	Restricted and declining distribution	Records retained by NBDC and NPWS for 10km grid squares encompassing the route. Recorded during field surveys at one location (Behy River) outside the route. Known to occur in watercourses adjacent to the route.	EU Habitats [Directive 92/43/EEC] Annex II Fisheries Acts 1959 to 2006 Irish status: Critically endangered Global status: Critically endangered	Yes
Chough (<i>Pyrrhocorax pyrrhocorax</i>) Dunlin (<i>Calidris alpina</i>) Little egret (<i>Egretta garzetta</i>)	Chough is a Coastal species, predominantly found on the west coast of the country. Little egret are found on both the coast and at inland wetlands.	Records retained by NBDC and NPWS for 10km grid squares encompassing the route. Recorded during field surveys. Known to utilise habitats along the route.	EU Birds [Directive 2009/147/EC] Annex I	Yes
Curlew (<i>Numenius arquata</i>) Grey wagtail (<i>Motacilla cinerea</i>) Meadow pipit (<i>Anthus pratensis</i>)	Throughout the country	Records retained by NBDC and NPWS for 10km grid squares encompassing the route. Recorded during field surveys. Known to utilise habitats along the route.	Red Listed species	Yes
House martin (<i>Delichon urbicum</i>) House sparrow (<i>Passer domesticus</i>) Kestrel (<i>Falco tinnunculus</i>) Robin (<i>Erithacus rubecula</i>) Linnet (<i>Linaria cannabina</i>)	Throughout the country	Records retained by NBDC and NPWS for 10km grid squares encompassing the route. Recorded during field surveys. Known to utilise habitats along the route.	Amber listed	Yes

Species	Indication of National Distribution	Records from desktop and ecological survey	Level of Protection	Ecological Receptor
Sand martin (<i>Riparia riparia</i>) Skylark (<i>Alauda arvensis</i>) Snipe (<i>Gallinago gallinago</i>) Stonechat (<i>Saxicola torquata</i>) Swallow (<i>Hirundo rustica</i>)				
Common seal (<i>Phoca vitulina</i>)	Coastal	Records retained by NBDC and NPWS for 10km grid squares encompassing the route. Recorded in the Valentia River Estuary and hauled out on shoreline and islets. Known to utilise coastal waters adjacent the route.	Wildlife Act 1976/2000 EU Habitats [Directive 92/43] Annex V Bern Convention Appendix III	Yes
Grey seal (<i>Halichoerus grypus</i>)	Coastal	Records retained by NBDC and NPWS for 10km grid squares encompassing the route. Recorded in the Valentia River Estuary and hauled out on shoreline and islets. Known to utilise coastal waters adjacent the route.	Wildlife Act 1976/2000 EU Habitats [Directive 92/43] Annex V Bern Convention Appendix III	Yes
Viviparous lizard (<i>Zootoca vivipara</i>)	Throughout the country	Records retained by NBDC and NPWS for 10km grid squares encompassing the route. Likely to utilise suitable habitats along the route. Species not recorded during field surveys.	Wildlife Act 1976/2000	Yes
Smooth newt (<i>Lissotriton vulgaris</i>)	Throughout the country	No records retained by NBDC and NPWS for 10km grid squares encompassing the route. Likely to utilise suitable habitats along the route. Species not recorded during field surveys.	Wildlife Act 1976/2000	Yes

Species	Indication of National Distribution	Records from desktop and ecological survey	Level of Protection	Ecological Receptor
Common frog (<i>Rana temporaria</i>)	Throughout the country	Records retained by NBDC and NPWS for 10km grid squares encompassing the route. Recorded during field surveys. Known to utilise suitable habitats along the route.	Wildlife Act 1976/2000 EU Habitats [Directive 92/43] Annex V Bern Convention Appendix III	Yes
Kerry slug (<i>Geomalacus maculosus</i>)	Previously found only in West Cork and Kerry. Recently recorded in Co. Galway (2014).	Records retained by NBDC and NPWS for 10km grid squares V47, V57, V58 and V69. Species recorded on stone wall habitat at Drung Hill outside the route during 2014 presence/absence surveys, and wet heath habitat outside the route at Mount Foley during ROA surveys. NPWS licensed presence/absence surveys did not yield positive results. Known to utilise habitats along the route.	Irish Wildlife Act 1976/2000 EU Habitats Directive [92/43/EEC] Annex II and Annex IV	Yes

11.5 BRIEF PROJECT DESCRIPTION

11.5.1.1 Main elements of the project

The main elements of the project include:

- Removal/clearance of vegetation from the works area
- Excavation to a maximum depth of 300mm
- Drainage on either side of route corridor
- Pavement formation and buffers
- Pavement construction
- Permanent boundary construction
- Construction of 5 no. permanent carparks (2 existing, 3 new)

It is estimated that the entire project will likely be completed in 54 weeks. It is proposed to construct the Greenway in sections of 3000 metres, each section expected to take 3-4 weeks to complete. Full details of the proposed construction works are detailed in **Chapter 3 of this EIAR and in the Construction Methodology Report available in Appendix 2, Volume 3 of this EIAR.**

The construction works will not be complex, rather the complexity of the project arises from the many minor construction site locations and temporary works areas along the 32km linear route corridor. There will be three types of temporary construction areas required during the construction phase:

- Temporary construction compounds and direct access points to the construction locations
- Temporary crossing points
- Temporary works areas adjacent to the route corridor (within the CPO boundary) required to facilitate construction of the Greenway

There will be a total of nine direct access points to construction locations along the route where access to the construction areas will be directly from the public road network.

There will be 24 temporary site compounds required in total during the construction phase along the 32km linear route. Temporary site compounds will be placed sequentially at different construction locations. Access to works areas will be from the temporary compounds or via the direct access points only. Works will be undertaken approximately 1500m in each direction from the temporary compounds, and 500m each direction from the direct access points. Works areas will be delineated by an electric fence. The impacts of the temporary compounds on biodiversity are assessed in Section 11.6.3 below.

Temporary crossing points will be established at locations where permanent gated crossing points for agriculture are proposed. The temporary crossing points will be established to facilitate the safe passage from one side of the works area to the other by farm machinery and farm animals. No fences, hedgerows or other field boundaries will be removed or disturbed and there will be no additional crossings of land drains or construction of watercourses. During the works, when construction plant comes to an existing hedgerow, fence, land drain etc. in the temporary works area, the plant will divert back into the permanent corridor via the existing temporary access tracks, to move around the obstacle. In this way no fences will be removed or additional watercourse crossings required.

Car parks

A total of 5 no. permanent car parks will be constructed for the Greenway. Of the proposed car parks, three will be located within buildings and artificial surfaces habitat (BL3), one within wet improved agricultural grassland (GA1) and one within buildings and artificial surfaces/amenity grassland (BL3/GA2) habitat. None of these habitats are identified as key ecological receptors. The car park located at the Behy woodland entrance to the Greenway at Glenbeigh, will be located within habitats identified as key ecological receptors, namely mixed broadleaved woodland (WD1) and scrub (WS1). An assessment of the impact of the Greenway on these habitat types is discussed in Section 11.6.3 below.

Welfare amenities

It is proposed to provide temporary welfare facilities at points along the greenway. These will consist of portable cabins containing a toilet and sink. These will be provided and serviced under a Kerry County Council contract. The portable units will be placed on a flat hardstanding area at appropriate locations where they can be accessed for servicing– they will be located within the car parks at the Reenard Trail Head, Glenbeigh Trail Head, Kells Car Park and the Marina in Caherciveen. Waste water will be contained within a sealed adjacent tank which will form part of the construction. The tanks will be fitted with a high level call out alarm to notify the maintenance personnel that the tank has reached the predetermined level for the call out and needs to be emptied. The emptying of the tank will be arranged by Kerry County Council and the wastewater will be transported to one of the local waste water plants, Cahervieen or Killorglin, for disposal. Cleaning, removal of waste material as may arise and renewal of sanitary stocks will be undertaken by Kerry County Council.

Water quality is assessed in section 11.6.4.4 below.

11.6 POTENTIAL SIGNIFICANT IMPACTS

Assessments of the direct and indirect impacts on key ecological receptors (i.e. habitats, flora and fauna) that may occur as a result of the proposed Greenway development are assessed in the following sections.

11.6.1 Designated sites

Designated sites in the area include SAC’s, SPA’s, NHA’s, pNHA’s, Ramsar and Nature Reserves. Three of the pNHA sites, the Ramsar site and the three Nature Reserves identified in Section 11.4.3 above, overlap with SAC and SPA designations, having been designated to protect the same ecological feature/resource. For that reason, impacts to these sites area addressed in the NIS.

The NIS is presented in **Volume 5 of this EIAR**.

Impacts on the remaining four pNHA’s and one NHA outside Natura 2000 designation will be assessed in this section (Refer to Table 11-8). However, it is worth noting that impacts to the species and habitats protected by these designations are included in this biodiversity assessment.

The Valentia River Estuary pNHA is the only site located in immediate proximity to the project, occurring adjacent to the Reenard section of the route. There will be no direct impacts to this pNHA as there will be no spatial overlap between the route and this site. Potential impacts may arise indirectly through water quality impairment or disturbance. Direct impacts to the other four nationally designated sites will not occur owing to the intervening distance between these sites and the project. Indirect impacts to mobile species (birds) through water quality impairment and disturbance are considered **temporary imperceptible negative impacts** as there is an abundance of similar and higher quality habitat available in the greater area, most notably within the areas designated for these species.

Table 11-8: Designated sites (NHA, pNHA) within 10km not included within Natura 2000 sites

Name	Site Code	Distance from study area	Reason for proposed designation
Knockroe Bog NHA	000366	6.4km	– Peatland/bog
Valentia River Estuary pNHA	001383	Immediately adjacent to the Reenard section of the Greenway	– Mudflats – Estuarine channels – Saltmarsh – Grassland – Islands – Wintering wildfowl – Breeding seabirds
Doulus Head to Cooncrome Harbour pNHA	001350	2.9km	– Seabirds
Glanleam Wood pNHA	001353	2.3km	– Semi-natural woodland composed of sub-tropical species – Native bryophytes – Hybrid Kidney saxifrage – Hybrid St. Patricks cabbage
Valentia Island Cliffs pNHA	001382	2.9km	– Seabirds

11.6.2 Rare and protected flora

Chamomile

This species was recorded on the shoreline along the Reenard section of the Greenway, outside the route corridor and outside the development area and CPO boundary. There will be **no impact** to this species during the construction or operation of the Greenway.

St. Patrick's Cabbage

This species was recorded east of Mountain Stage outside Glenbeigh on garden walls and in shaded rocky areas adjacent to the route. This species is listed as 'Least Concern' in the Irish Red list (2016). It is likely to be directly impacted during the construction phase of the project. Removal of this plant, or suitable habitat, to facilitate the Greenway is likely to result in a **permanent, slight negative impact**. There will be **no impact** on this species during operation of the Greenway, as suitable habitat will not occur on the Greenway route, and adjacent suitable habitats will be separated from the Greenway by means of boundaries.

11.6.3 Habitats

11.6.3.1 Construction phase

Temporary habitat loss is expected to arise from the temporary construction compounds, direct access points and temporary works areas. This is considered a **temporary slight negative impact** to habitats. Once a works area has been completed, temporary structures will be removed and temporary works areas will be closed. It is expected that the habitats affected will re-establish naturally. Table 11-9 below shows the extent of the temporary habitat loss during the construction phase. The impacts arising from the main elements of the project are assessed in the following sections.

Table 11-9: Temporary habitat loss during the construction phase owing to temporary Structures

Habitat	Ecological Value	Location of temporary habitat loss	Total area of temporary habitat loss	Ecological receptor
Improved agricultural grassland (GA1)	Locally important (lower value)	Compound no.'s 2,4,7,9,20 and 21. Temporary access track (compound) no. 4, 5 and 20	0.58Ha	No
Buildings and artificial surfaces (BL3)	Locally important (lower value)	Compound no.'s 2, 11, 13 and 15. Temporary access track (compound) no. 2 and 6	0.42Ha	No
Buildings and artificial surfaces (BL3) and Amenity grassland (GA2)	Locally important (lower value)	Compound no. 3	0.06Ha	No
Improved agricultural grassland (GA1), grassy verge	Locally important (lower value)	Compound no. 2	0.01Ha	Yes

Habitat	Ecological Value	Location of temporary habitat loss	Total area of temporary habitat loss	Ecological receptor
(GS2) and Scrub (WS1)				
Scrub (WS1)	Locally important (higher value)	Compound no.'s 5, 18,19 and 22	0.22Ha	Yes
Recolonising bare ground (ED3) and Scrub (WS1)	Locally important (lower value)	Compound no. 12	0.06Ha	No
Immature woodland (WS2)	Locally important (lower value)	Compound no. 5	0.0007Ha	No
Dry-humid acid grassland (GS3) and wet grassland (GS4)	Locally important (higher value)	Compound no. 6 and temporary access track (compound) no. 6	0.18Ha	Yes
Wet heath (HH3) and Scrub (WS1)	Locally important (higher value)	Compound no. 8 and temporary access track (compound) no. 8	0.1Ha	Yes
Lowland blanket bog (PB3)	Locally important (higher value)	Compound no. 11 and 16	0.1Ha	Yes
Spoil and bare ground (ED2)	Locally important (lower value)	Temporary access track (compound) no. 16	0.07Ha	No
Wet heath (HH3), Lowland blanket bog (PB3), Scrub (WS1) and Conifer plantation (WD4)	Locally important (higher value)	Compound no. 14	0.06Ha	Yes

Construction of the Greenway and associated car parks will result in permanent habitat loss. However, the footprint of the development will predominantly be on the remnants of the existing dismantled railway line or the margins of adjacent habitats where development prevents construction on the railway line. The habitats selected as key ecological receptors along the route are common within the local area and have been modified. On-going reclamation and modification has been noted throughout the course of ecological surveys along the route. Habitats in the study area occur as mosaics, which is a reflection of their highly modified nature. Owing to the relatively small area of loss and the low species diversity within these habitats, they do not represent ecologically significant examples of these habitat types.

Table 11-10 over summarises the loss of each habitat selected as a key ecological receptor.

Table 11-10: Area of permanent habitat loss within habitats selected as key ecological Receptors

Habitat Type	Ecological value	Approximate loss of Habitat (Ha)
Hedgerows (WL1)	Locally important (higher value)	0.05
Treelines (WL2)	Locally important (higher value)	0.04
Earth banks (BL2)	Locally important (Lower value)	0.01
Earth banks (BL2) and Scrub (WS1)	Locally important (higher value)	0.009
Improved agricultural grassland (GA1), Wet grassland (GS4) and Scrub (WS1)	Locally important (higher value)	0.24
Neutral grassland (GS1) and Dry-humid acid grassland (GS3)	Locally important (higher value)	0.001
Neutral grassland (GS1), Wet grassland (GS4) and Scrub (WS1)	Locally important (higher value)	0.06
Neutral grassland (GS1) and Dry siliceous heath (HH1)	Locally important (higher value)	0.0002
Neutral grassland (GS1) and Scrub (WS1)	Locally important (higher value)	0.13
Grassy verge (GS2)	Locally important (higher value)	0.74
Grassy verge (GS2) and Scrub (WS1)	Locally important (higher value)	0.05
Grassy verge (GS2) Scrub (WS1) and Wet willow-alder-ash woodland (WN6)	Locally important (higher value)	0.18
Grassy verge (GS2) Wet Heath (HH3) and Scrub (WS1)	Locally important (higher value)	0.12
Dry-humid acid grassland (GS3)	Locally important (higher value)	0.32
Dry-humid acid grassland (GS3) and Wet grassland (GS4)	Locally important (higher value)	0.48
Dry-humid acid grassland (GS3) Wet grassland (GS4) and Wet heath (HH3)	Locally important (higher value)	0.07
Dry-humid acid grassland (GS3) Wet grassland (GS4) and Scrub (WS1)	Locally important (higher value)	0.26

Habitat Type	Ecological value	Approximate loss of Habitat (Ha)
Wet grassland (GS4)	Locally important (higher value)	0.85
Wet grassland (GS4) and Wet heath (HH3)	Locally important (higher value)	0.02
Wet grassland (GS4) Wet heath (HH3) and Scrub (WS1)	Locally important (higher value)	0.05
Wet grassland (GS4) and Scrub (WS1)	Locally important (higher value)	0.55
Dry siliceous heath (HH1)	Locally important (higher value)	0.23
Dry siliceous heath (HH1) and Dense bracken (HD1) grazed	Locally important (higher value) to International importance	0.01
Dry siliceous heath (HH1) and Wet heath (HH3)	Locally important (higher value) to International importance	0.01
Wet heath (HH3)	Locally important (higher value)	0.14
Wet heath (HH3) Exposed siliceous rock (ER1) and Scrub (WS1)	Locally important (higher value)	0.11
Wet heath (HH3) and Lowland blanket bog (PB3)	Locally important (higher value) to International importance	0.18
Wet heath (HH3) and Scrub (WS1)	Locally important (higher value)	0.30
Lowland blanket bog (PB3) degraded	Locally important (higher value)	0.08
Lowland blanket bog (PB3) and Wet grassland (GS4) degraded	Locally important (higher value)	0.02
(Mixed) broadleaved woodland (WD1)	Locally important (higher value)	0.01
(Mixed) broadleaved/conifer woodland (WD2)	Locally important (higher value) to County importance	0.34
Oak-birch-holly woodland (WN1)	Locally important (higher value)	0.14
Riparian woodland (WN5)	Locally important (higher value)	0.01

Habitat Type	Ecological value	Approximate loss of Habitat (Ha)
Wet willow-alder-ash woodland (WN6)	Locally important (higher value)	0.09
Bog woodland (WN7)	Locally important (higher value)	0.19
Conifer plantation (WD4)	Locally important (higher value)	0.11
Scrub (WS1) and Conifer plantation (WD4)	Locally important (higher value)	0.01
Scrub (WS1)	Locally important (higher value)	2.17

Overall, loss of semi-natural habitat types will range from 0.0002 Ha (Neutral grassland and Dry heath) to 0.85Ha (Wet grassland) which is considered a **permanent imperceptible to slight negative impact** to habitats. These habitat types are extensively grazed and managed for agriculture. Land reclamation and clearance (burning) was recorded along most of the Greenway route over the course of field surveys. The ecological value of these habitat types has been greatly reduced owing to on-going landuse activities. The largest loss of semi-natural habitat will be the loss of 2.17 Ha of scrub habitat, which is considered a **permanent slight to moderate negative impact**. There are a number of pockets of dense gorse and willow scrub, along the route where land management and/or grazing has not been as intense in recent years, or where development has resulted in areas becoming encroached by transitional and successional scrub habitats. It is likely that over time, agricultural improvement, grazing, and further development could lead to the removal of some or all of these pockets of scrub habitat, notwithstanding the proposed project.

Table 11-11 below summarises the potential impacts of the unmitigated construction phase of the development on habitats selected as key ecological receptors. Table 11-12 lists the valuable habitats adjacent to the Greenway, which may be impacted during the unmitigated construction phase. There will be no direct removal of the habitats listed in Table 11-12 below.

The habitat types *estuaries and upland/eroding rivers* will be crossed by means of existing structures or construction of new crossings (**Refer to Chapter 13 of this EIAR for details of water crossings, Appendix 2, Volume 3 – Construction Methodology Report**). Indirect impacts to these habitats may occur through water quality impairment owing to construction phase run-off. An outline CEMP has been prepared which details the best practice water quality protection measures that will be integrated into the project design. **The outline CEMP is available in Appendix 2, Volume 3 of this EIAR**. In light of the requirements for water quality protection detailed in the outline CEMP, potential impacts to aquatic habitats during the construction phase are therefore expected to be **temporary slight to moderate negative impacts**.

The habitat types *woodland, bog, heath, reed bed and large sedge swamps, saltmarsh, shingle, gravel and sheltered rocky shores* which occur adjacent to the route but will not be traversed by it are classified as having local (higher) importance to International importance owing to their occurrence within designated sites. The proposed Greenway will not impact these habitats directly, however, there is potential, during the construction phase, for indirect **temporary, slight to moderate, negative impacts** on these habitat types through trampling, water quality impairment or other un-controlled activities during the construction phase. This is summarised in Table 11-12. Clearance of vegetation and tree removal will be confined to the necessary parts of the route corridor only. Every effort will be made to keep felling to a minimum through cutting back of branches. Felling of mature trees will be avoided where possible. Woodland habitats are marginal where they interact with the route, for the most part, the route corridor is already established, and woodland habitats occur on either side of the abandoned railway line.

Table 11-11: Ecological impact on habitats identified as ecological receptors, during the construction phase (without mitigation)

Habitat Type	Ecological value	Construction phase Impact	Habitat loss (Ha)	Magnitude	Duration	Reversibility	Positive/ Negative
Hedgerows (WL1)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development, but this habitat type is common throughout the greater area.	0.05	Imperceptible to Slight	Permanent	Irreversible	Negative
Treelines (WL2)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development, but this habitat type is common throughout the greater area, predominantly associated with gardens.	0.04	Imperceptible to Slight	Permanent	Irreversible	Negative
Earth banks (BL2)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development, but this habitat type is common throughout the greater area.	0.01	Imperceptible to Slight	Permanent	Irreversible	Negative
Earth banks (BL2) and Scrub (WS1)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development, but this habitat type is common throughout the greater area.	0.009	Imperceptible	Permanent	Irreversible	Negative
Improved agricultural grassland (GA1), grassy verge (GS2) and Scrub (WS1)	Locally important (higher value)	There will be temporary loss of this habitat to facilitate the establishment of Temporary construction compound no. 2.	0.01	Imperceptible to Slight	Temporary	Reversible	Negative

Habitat Type	Ecological value	Construction phase Impact	Habitat loss (Ha)	Magnitude	Duration	Reversibility	Positive/ Negative
Improved agricultural grassland (GA1), Wet grassland (GS4) and Scrub (WS1)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development, but this habitat type is common throughout the greater area.	0.24	Slight	Permanent	Irreversible	Negative
Neutral grassland (GS1) and Dry-humid acid grassland (GS3)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development, but this habitat type is common throughout the greater area.	0.001	Imperceptible	Permanent	Irreversible	Negative
Neutral grassland (GS1), Wet grassland (GS4) and Scrub (WS1)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development, but this habitat type is common throughout the greater area.	0.06	Imperceptible to Slight	Permanent	Irreversible	Negative
Neutral grassland (GS1) and Dry siliceous heath (HH1)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development, but this habitat type is common throughout the greater area.	0.0002	Imperceptible	Permanent	Irreversible	Negative
Neutral grassland (GS1) and Scrub (WS1)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development, but this habitat type is common throughout the greater area.	0.13	Slight	Permanent	Irreversible	Negative

Habitat Type	Ecological value	Construction phase Impact	Habitat loss (Ha)	Magnitude	Duration	Reversibility	Positive/ Negative
Grassy verge (GS2)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development, but this habitat type is common throughout the greater area.	0.74	Slight	Permanent	Irreversible	Negative
Grassy verge (GS2) and Scrub (WS1)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development, but this habitat type is common throughout the greater area.	0.05	Imperceptible to Slight	Permanent	Irreversible	Negative
Grassy verge (GS2) Scrub (WS1) and Wet willow-alder-ash woodland (WN6)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development. This habitat is marginal where it occurs.	0.18	Slight	Permanent	Irreversible	Negative
Grassy verge (GS2) Wet Heath (HH3) and Scrub (WS1)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development, but this habitat type is common throughout the greater area.	0.12	Slight	Permanent	Irreversible	Negative
Dry-humid acid grassland (GS3)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development, but this habitat type is common throughout the greater area.	0.32	Slight	Permanent	Irreversible	Negative
Dry-humid acid grassland (GS3) and Wet grassland (GS4)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development, but this habitat type is common throughout the greater area.	0.48	Slight	Permanent	Irreversible	Negative

Habitat Type	Ecological value	Construction phase Impact	Habitat loss (Ha)	Magnitude	Duration	Reversibility	Positive/ Negative
Dry-humid acid grassland (GS3) Wet grassland (GS4) and Wet heath (HH3)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development, but this habitat type is common throughout the greater area.	0.07	Imperceptible to Slight	Permanent	Irreversible	Negative
Dry-humid acid grassland (GS3) Wet grassland (GS4) and Scrub (WS1)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development, but this habitat type is common throughout the greater area.	0.26	Slight	Permanent	Irreversible	Negative
Wet grassland (GS4)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development, but this habitat type is common throughout the greater area.	0.85	Slight	Permanent	Irreversible	Negative
Wet grassland (GS4) and Wet heath (HH3)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development, but this habitat type is common throughout the greater area.	0.02	Imperceptible to Slight	Permanent	Irreversible	Negative
Wet grassland (GS4) Wet heath (HH3) and Scrub (WS1)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development, but this habitat type is common throughout the greater area.	0.05	Imperceptible to Slight	Permanent	Irreversible	Negative
Wet grassland (GS4) and Scrub (WS1)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development, but this habitat type is common throughout the greater area.	0.55	Slight	Permanent	Irreversible	Negative

Habitat Type	Ecological value	Construction phase Impact	Habitat loss (Ha)	Magnitude	Duration	Reversibility	Positive/ Negative
		is common throughout the greater area.					
Dry siliceous heath (HH1)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development. This habitat is marginal and degraded where it occurs.	0.23	Slight	Permanent	Irreversible	Negative
Dry siliceous heath (HH1) and Dense bracken (HD1) grazed	Locally important (higher value)	There shall be minimal loss of this habitat where it occurs.	0.01	Imperceptible to Slight	Permanent	Irreversible	Negative
Dry siliceous heath (HH1), Wet heath (HH3) and Dense bracken (HD1) grazed	Locally important (higher value) to International importance	There shall be limited removal of this habitat type where it occurs.	0.0008	Imperceptible	Permanent	Irreversible	Negative
Dry siliceous heath (HH1) and Wet heath (HH3)	Locally important (higher value) to International importance	There shall be some loss of the habitat as a result of the proposed development. This habitat type is marginal where it occurs.	0.01	Imperceptible to Slight	Permanent	Irreversible	Negative
Wet heath (HH3)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development. This habitat type is marginal where it occurs.	0.14	Slight	Permanent	Irreversible	Negative
Wet heath (HH3), Lowland blanket bog (PB3), Scrub (WS1) and Conifer	Locally important (higher value)	There will be temporary loss of this habitat to facilitate the establishment of Temporary construction compound no. 14.	0.06	Imperceptible to Slight	Temporary	Reversible	Negative

Habitat Type	Ecological value	Construction phase Impact	Habitat loss (Ha)	Magnitude	Duration	Reversibility	Positive/ Negative
plantation (WD4)							
Wet heath (HH3) Exposed siliceous rock (ER1) and Scrub (WS1)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development, but this habitat type is common throughout the greater area.	0.11	Slight	Permanent	Irreversible	Negative
Wet heath (HH3) and Lowland blanket bog (PB3)	Locally important (higher value) to International importance	There shall be some loss of the habitat as a result of the proposed development.	0.18	Slight	Permanent	Irreversible	Negative
Wet heath (HH3) and Scrub (WS1)	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development, but this habitat type is common throughout the greater area.	0.30	Slight	Permanent	Irreversible	Negative
Lowland blanket bog (PB3) degraded	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development.	0.08	Imperceptible to Slight	Permanent	Irreversible	Negative
Lowland blanket bog (PB3) and Wet grassland (GS4) degraded	Locally important (higher value)	There shall be some loss of the habitat as a result of the proposed development.	0.02	Imperceptible to Slight	Permanent	Irreversible	Negative
(Mixed) broadleaved woodland (WD1)	Locally important (higher value)	Clearance will be confined to the necessary parts of the route corridor only to facilitate the construction of the greenway.	0.01	Imperceptible to Slight	Permanent	Irreversible	Negative

Habitat Type	Ecological value	Construction phase Impact	Habitat loss (Ha)	Magnitude	Duration	Reversibility	Positive/ Negative
(Mixed) broadleaved/connifer woodland (WD2)	Locally important (higher value) to County importance	Felling of mature trees will be avoided unless specifically required for the greenway construction – every effort will be to keep felling to a minimum though cutting back of branches etc. Clearance will be confined to the necessary parts of the route corridor only to facilitate the construction of the greenway. Felling of mature trees will be avoided unless specifically required for the greenway construction – every effort will be to keep felling to a minimum though cutting back of branches etc.	0.34	Slight	Permanent	Irreversible	Negative
Oak-birch-holly woodland (WN1)	Locally important (higher value)	Felling of mature trees will be avoided unless specifically required for the greenway construction – every effort will be to keep felling to a minimum though cutting back of branches etc.	0.14	Slight	Permanent	Irreversible	Negative

Habitat Type	Ecological value	Construction phase Impact	Habitat loss (Ha)	Magnitude	Duration	Reversibility	Positive/ Negative
Riparian woodland (WN5)	Locally important (higher value)	Small sections of riparian habitat will be removed at water crossings. This is a widespread habitat type bordering rivers and streams in the overall area.	0.01	Imperceptible to Slight	Permanent	Irreversible	Negative
Wet willow-alder-ash woodland (WN6)	Locally important (higher value)	Clearance will be confined to the necessary parts of the route corridor only to facilitate the construction of the greenway. Felling of mature trees will be avoided unless specifically required for the greenway construction – every effort will be to keep felling to a minimum though cutting back of branches etc.	0.09	Imperceptible to Slight	Permanent	Irreversible	Negative
Bog woodland (WN7)	Locally important (higher value)	Clearance will be confined to the necessary parts of the route corridor only to facilitate the construction of the greenway. Felling of mature trees will be avoided unless specifically required for the greenway construction – every effort will be to keep felling to a minimum though cutting back of branches etc.	0.19	Slight	Permanent	Irreversible	Negative
Conifer plantation (WD4)	Locally important (higher value)	Clearance will be confined to the necessary parts of the route corridor only to facilitate the	0.11	Slight	Permanent	Irreversible	Negative

Habitat Type	Ecological value	Construction phase Impact	Habitat loss (Ha)	Magnitude	Duration	Reversibility	Positive/ Negative
		<p>construction of the greenway.</p> <p>Felling of mature trees will be avoided unless specifically required for the greenway construction – every effort will be to keep felling to a minimum though cutting back of branches etc.</p>					
Scrub (WS1) and Conifer plantation (WD4)	Locally important (higher value)	There will be minimal removal of this habitat type where it occurs on the margins of the existing pathway in the Behy woodland.	0.01	Imperceptible to Slight	Permanent	Irreversible	Negative
Scrub (WS1)	Locally important (higher value)	There shall be some loss of this habitat. Overall scrub habitat is abundant in the area and is generally transitional/successional where it occurs along the less manages/grazed areas of the route.	2.17	Slight to Moderate	Permanent	Irreversible	Negative

Table 11-12: Valuable habitats adjacent to the route corridor with potential to be impacted during the construction phase in the absence of Mitigation

Habitat type	Ecological value	Construction phase impact	Magnitude	Duration	Reversibility	Positive/Negative
Eroding/upland rivers and streams (FW1)	Locally important (higher value) to National importance	There is the potential without mitigation that chemicals and sediment used/produced during the construction phase may enter rivers and streams within the catchment.	Slight to Moderate	Temporary	Reversible	Negative
Lowland blanket bog (PB3)	County importance to International importance	There will be no direct impact to this habitat type. Potential for indirect construction phase impacts owing to run-off, machinery, trampling etc.	Slight to Moderate	Temporary	Reversible	Negative
Dry siliceous heath (HH1)	County importance to International importance	There will be no direct impact to this habitat Potential for indirect construction phase impacts owing to run-off, machinery, trampling etc.	Slight to Moderate	Temporary	Reversible	Negative
Wet heath (HH3)	County importance to National importance	There will be no direct impact to this habitat Potential for indirect construction phase impacts owing to run-off, machinery, trampling etc.	Slight to Moderate	Temporary	Reversible	Negative
Reedbed and large sedge swap (FS1)	National importance	There will be no direct impact to this habitat Potential for indirect construction phase impacts owing to run-off, machinery etc.	Slight to Moderate	Temporary	Reversible	Negative
Upper saltmarsh (CM2)	National importance	There will be no direct impact to this habitat Potential for indirect construction phase impacts owing to run-off, machinery etc.	Slight to Moderate	Temporary	Reversible	Negative
Sheltered rocky shore (LR3)	National importance to International	There will be no direct impact to this habitat There is the potential without mitigation that chemicals and sediment used/produced during the construction phase may enter the pNHA/SAC.	Slight to Moderate	Temporary	Reversible	Negative

Habitat type	Ecological value	Construction phase impact	Magnitude	Duration	Reversibility	Positive/Negative
	importance	Potential for indirect construction phase impacts owing to run-off, machinery, trampling etc.				
Shingle and gravel shores (LS1)	National importance	There will be no direct impact to this habitat. There is the potential without mitigation that chemicals and sediment used/produced during the construction phase may enter the pNHA. Potential for indirect construction phase impacts owing to run-off, machinery, trampling etc.	Slight to Moderate	Temporary	Reversible	Negative
Estuaries (MW4)	National importance to International importance	There will be no direct impact to this habitat. There is the potential without mitigation that chemicals and sediment used/produced during the construction phase may enter rivers and streams draining to the Valentia River Estuary (pNHA and SAC).	Slight to Moderate	Temporary	Reversible	Negative

11.6.3.2 Operation phase

Additional impacts to the habitats listed above during the operation of the Greenway are not expected. The Greenway will be screened and separated from the surrounding habitats by means of stockproof boundary fencing and hedging designed to prevent access to adjacent lands by cyclists, pedestrians and dogs. Appropriate boundaries will prevent users deviating from the route and will prevent disturbance to the ecologically sensitive areas identified in Table 11-12. **Details of boundaries are available in Appendix 2, Volume 3 of this EIAR – Boundary Report.**

No additional water quality impacts are envisaged during the operation of the Greenway as all water crossings and drainage works will be complete thereby preventing ingress of potentially polluting materials to watercourses from the operational Greenway. Annual Environmental Reports (AERs) for both the Caherciveen and Killorglin WWTP's have been checked and it is confirmed that there is adequate capacity at both sites for treatment and disposal of wastewater from the welfare facilities located in the four car parks.

11.6.4 Fauna

The following sections assess the potential impacts, without mitigation, on fauna selected as ecological receptors. Disturbance to breeding, sheltering or foraging fauna, through increased human and construction activities is a potential impact during the construction phase. Work taking place during the summer months could cause disturbance to breeding species and could lead to temporary displacement of some species from immediate areas during construction.

The operational Greenway will be separated from adjacent habitats by means of boundaries which will comprise of existing formed boundaries such as fences, hedgerows and embankments, and new boundaries including timber post and wire fence, and panel fencing. The greenway will incorporate additional site-specific measures such as sub-surface pipes to facilitate fauna crossings if required at appropriate locations. The locations of such additional measures will be subject to pre-construction ecological surveys.

11.6.4.1 Mammals

Badger

Construction phase

Suitable habitats, including earth banks, dense scrub and woodland, were searched for evidence of badger activity and badger setts. There was limited evidence of badger activity within the study area during surveys and no badger setts were recorded. The desk top survey indicated that it is **likely** that badgers forage in and commute through the general area, therefore there is potential for foraging/commuting badgers to temporarily avoid the works area during the construction phase. This is considered a **temporary slight negative impact**. There is an abundance of suitable and higher quality foraging habitat in the wider area extending away from the Greenway. The construction works are unlikely to significantly disturb foraging or commuting badgers.

Operation phase

It is considered that once the construction phase of the proposed Greenway has been completed, badgers that may have been temporarily displaced owing to construction activity will utilise the habitats within and adjacent to the Greenway, within a short period of time. Access across the Greenway will be maintained for foraging and commuting badgers through the use of suitable boundaries and site-specific measures as appropriate, to allow movement of badgers across the Greenway. It is considered that badgers will habituate to the change of landuse, therefore any impacts on badgers during the operation of the Greenway are expected to be **long-term, neutral, imperceptible impacts**.

Bats

Construction phase

It is considered that the loss of trees and vegetation within the footprint of the route in the context of the wider landscape, will not significantly impede the ability of bats to navigate through the general area, and will not lead to any significant disconnection between the construction area and the surrounding landscape. It is considered that the relatively limited removal along the route corridor of these features to facilitate construction will not result in an overall significant loss in the abundance of prey item biomass available for bat species.

As construction activities will occur during daytime hours, commuting/foraging bats will not be directly impacted. Any impact to foraging/commuting bats is expected to be a **temporary slight negative impact**, during the construction phase as the field boundary system and woodlands that occur outside the footprint of the project will continue to provide sufficient prey for foraging bats and linear connections between and within the landscape for commuting bats.

The Greenway will circumnavigate the Lesser horseshoe bat (LHB) summer roost. A limited amount of rock breaking will be required to the rear of the LHB roost to facilitate construction of the Greenway (approximately 843m³). Rock breaking is expected to take over 3-4 days by a rock breaker mounted on an excavator. There will be no requirement for rock blasting. The increased noise and construction activity in this location, if carried out during the summer months, is expected to be a **temporary moderate to significant negative impact** on Lesser horseshoe bats in this roost. Potential impacts to the Killarney National Park SAC population of LHB during the construction phase, are assessed in detail in the NIS and specific mitigations are recommended (**the NIS is available in Volume 5 of this EIAR**).

Operation phase

The level of disturbance owing to the operational Greenway is not expected to be above that which currently exists owing to traffic and human activity. The Greenway is an amenity which will be utilised during the day, and so will not directly impact foraging or commuting bats. Surveys indicate that none of the three tunnels are established or traditional bat roost sites. The tunnels are likely to be utilised by foraging bats. Lighting along the Greenway will be restricted to the Drung Hill tunnels only, as a health and safety precaution with lighting being restricted to daylight hours only.

It is considered that LHB will habituate to the change of landuse owing to the Greenway. The location of the LHB roost adjacent to a busy national road indicates that the bats that utilise the roost are habituated to noise disturbance. Disturbance impacts to LHB during the operation of the Greenway are expected to be **long-term, imperceptible to slight negative impacts**.

Otter

Construction phase

The otter holt recorded on the shoreline adjacent to the Valentia River Estuary is outside of the route corridor and development area therefore will not be directly impacted by the construction works. While there was no otter activity recorded at this location during 2017 surveys, noise emissions during the construction phase may result in disturbance to otters potentially utilising the holt at the time of construction. Similarly, foraging/commuting otters may temporarily avoid the works area during the construction phase. Owing to the temporary and relatively limited nature of the construction works along the narrow route corridor, any disturbance impact to otter during the construction phase is expected to be a **temporary slight negative impact**.

The Greenway will cross two large rivers and a number of their tributaries, therefore there is potential for water quality impacts to indirectly impact prey availability for otter. Owing to the abundance of watercourses in the overall area, the controls detailed in the **Construction Methodology Report (Appendix 2 Volume 3)** and having regard to the nature of the works, potential impacts to foraging otter through impairment of water quality is considered to be a **temporary slight negative impact**.

Operation phase

There are a number of watercourses along the route potentially utilised by otter. It is considered that once the construction phase of the proposed Greenway has been completed, otters that may have been temporarily displaced owing to construction activity will utilise the habitats within and adjacent to the Greenway, within a short period of time. Boundary fencing (**Refer to Appendix 2, Volume 3 – Boundary Report** for details on fencing) will prevent direct access by users to the shoreline, thereby reducing the potential for disturbance impacts to breeding otters potentially utilising the otter holt. Access across the Greenway will be maintained for foraging and commuting otters through watercourses and through the use of suitable boundaries and site-specific measures as appropriate, to allow movement of otters. It is considered that otters will habituate to the change of landuse within a short period of time, therefore the impact of the operational Greenway on otters is expected to be a **long-term, neutral, imperceptible impact**.

Common and Grey Seals

Construction phase

Both common and grey seals were recorded hauled out on rocks along the northern shore of the Valentia River Estuary, as well as at a number of islets and headlands within the Valentia River Estuary (**Refer to Appendix 11.1, Volume 3 of this EIAR**). Breeding is **known** to occur at offshore islands. These locations are considered to be resting haul-out sites utilised by both species, which forage in the estuary. The Greenway crosses the Valentia River Estuary via the Caherciveen Railway Bridge. Potential water quality impacts will be limited owing to the dilution factor of the estuary and the controls detailed in the **Construction Methodology Report - Appendix 2, Volume 3**. The adjoining land is grazed predominantly by cattle and there is relatively little human presence at this location. The closest haul out site to the Greenway is currently well screened from the route by dense gorse scrub which dominates the railway embankment immediately north of the haul out site. Disturbance to resting seals owing to vegetation clearance works and construction works in the vicinity of the haul-out site, is considered a **temporary slight negative impact** on seals.

Operation phase

During operation of the Greenway, there will be an increased human presence in the area adjacent to the shoreline, relative to the current land-use. This increased human activity in the vicinity of the haul out site adjacent to the route may lead to **short-term slight negative disturbance impacts** to seals. There are a number of rocky headlands and islets within the estuary that are also utilised by resting seals which may be preferentially selected in the short term. In time, seals are expected to become accustomed to the increased human presence.

Pine marten, Irish Stoat and Red Squirrel

Construction phase

There will be limited loss of suitable habitat for pine marten, Irish stoat and red squirrel during the construction phase. Owing to the abundance of suitable habitat outside the construction area, this is not considered to be a significant impact. Disturbance during the construction phase owing to increased noise and human activity may lead to temporary avoidance of the works area. Disturbance during the construction phase is considered a temporary slight negative impact.

Operation phase

It is considered that once the construction phase of the proposed Greenway has been completed, pine marten, Irish stoat and/or Red squirrel that may have been temporarily displaced owing to construction activity will utilise the habitats within and adjacent to the Greenway, within a short period of time. Access across the Greenway will be maintained for foraging and commuting pine marten, Irish stoat and Red squirrel through the use of suitable boundaries and site-specific measures as appropriate, to allow movement, as well as the retention of wooded areas adjacent to the route. It is considered that these mammals will habituate to the change of landuse, therefore the impact of the operational Greenway on these species is expected to be a **long-term neutral imperceptible impacts**.

Hedgehog and Pygmy shrew

Construction phase

There will be loss of suitable habitat for small mammals such as hedgehog and pygmy shrew along the route. As there is an abundance of similar and higher value habitats in the overall area this is not considered to be a significant impact. Disturbance during the construction phase owing to increased noise and human activity may lead to temporary avoidance of the works area. Disturbance during the construction phase is considered a **temporary slight negative impact**.

There is potential for **temporary moderate negative impacts** to hibernating hedgehogs through direct mortality, should hedgehogs be present in an area of vegetation during clearance activities. Hedgehogs typically hibernate during the winter (October – March).

Operation phase

It is considered that once the construction phase of the proposed Greenway has been completed hedgehogs and pygmy shrews that may have been temporarily displaced owing to construction activity will utilise the habitats within and adjacent to the Greenway, within a short period of time. Access across the Greenway will be maintained for foraging and commuting hedgehogs and pygmy shrews through the use of suitable boundaries to allow movement.

It is considered that these mammals will habituate to the change of landuse, therefore the impact of the operational Greenway on these species is expected to be a **long-term neutral imperceptible impacts**.

Irish Mountain Hare

Construction phase

The loss of suitable habitat for Irish mountain hare will be limited along the route, and therefore is not considered significant as there is an abundance of similar and higher value habitats in the overall area. This species may temporarily avoid the works area during the construction phase owing to disturbance from increased human activity. Disturbance during the construction phase is considered a **temporary slight negative impact**.

Operation phase

It is considered that once the construction phase of the proposed Greenway has been completed that any hare that may have been temporarily displaced owing to construction activity will utilise the habitats within and adjacent to the Greenway, within a short period of time. Access across the Greenway will be maintained for foraging and commuting Irish mountain hare through the use of suitable boundaries to allow movement.

It is considered that hare will habituate to the change of landuse, therefore the impact of the operational Greenway on Irish mountain hare is expected to be a **long-term neutral imperceptible impact**.

Red deer

Construction phase

A red deer was observed in 2017 in the Gleensk woodland north west of the N70. It is considered that red deer may on occasion travel underneath the Gleensk viaduct along the river valley to access this area of woodland. However, red deer are not common so far west of Killarney National Park and are unlikely to be present in large numbers in proximity to the Greenway. Loss of habitat and disturbance associated with the construction phase of the Greenway are unlikely to significantly affect red deer populations and therefore the construction phase is expected to have a temporary imperceptible negative impact on red deer.

Operation phase

Owing to the fact that there is a lack of suitable habitat in the overall area for red deer, and noting that this species is not commonly recorded so far west of Killarney National Park, any red deer utilising the area in the vicinity of the Greenway would be rare. The proposed boundaries will not impede the free movement of red deer throughout the area as the boundaries will not include deer proof fencing. The Gleensk River valley will remain accessible for red deer as the Greenway will be positioned above the valley on the Gleensk viaduct. There will be no boundary fencing between the woodland to the north of the N70 and the habitats to the south of the N70 that will impede red deer. Therefore, the impact of the operational Greenway on red deer is expected to be a **long-term neutral imperceptible impact**.

11.6.4.2 Birds

Construction phase

There shall be a limited loss of mature trees to facilitate the greenway construction as most areas of woodland occur outside of the route corridor. The greatest loss of habitat arising from the construction of the Greenway will be a total loss of 2.17 Ha of scrub habitat. Scrub, predominantly stands of gorse and willows, has encroached onto the old railway embankment in the less well managed areas of the route. Other areas of scrub habitat are transitional where they occur adjacent to agricultural land that is frequently burned or cleared forming mosaics with more dominant habitats. Gorse and willow scrub habitat is considered to have a local value for breeding passerines in particular. Transitional scrub and sections of semi-natural woodland along and extending away from the route offer potential breeding habitat for red listed species such as grey wagtail and meadow pipit, as well as amber listed species such as greenfinch, robin and stonechat. Felling will be restricted and confined to the route corridor only. The loss of these potential breeding habitats may have a **permanent moderate negative impact** on birds of conservation concern if vegetation clearance is conducted within the bird nesting period. Greater impacts will be avoided as scrub is a common habitat in the study area and in the wider landscape.

Annex I species Cough, Dunlin and Little egret, Red listed species, Curlew and Meadow pipit, and a number of Amber listed species such as house martin, house sparrow, kestrel, sand martin and swallow were recorded foraging within the habitats adjacent to the corridor of the Greenway.

Removal of terrestrial foraging habitats during the construction phase is expected to have a **permanent slight negative impact on birds** as similar and higher value habitats are abundant in the overall area. There will be no loss of aquatic or shoreline foraging habitats.

Noise and anthropogenic disturbance during construction works will likely result in temporary avoidance of the works area by birds. Temporary avoidance of foraging habitats during the construction phase is expected to have a **temporary slight negative impact** on birds as there is an abundance of similar and higher value foraging habitat extending away from the Greenway to accommodate foraging birds potentially displaced during the construction phase.

Operation phase

It is considered that once the construction phase of the proposed Greenway has been completed birds that may have been temporarily displaced owing to construction activity will utilise the habitats adjacent to the Greenway, within a short period of time. It is considered that birds will habituate to the change of landuse. Therefore, the impact of the operational Greenway on birds is expected to be **long-term neutral imperceptible impacts**.

11.6.4.3 Other Fauna

Kerry Slug

Construction phase

Overall there is limited suitable habitat within the study area for Kerry slug as the habitats within the study area are frequently managed and modified. A number of suitable habitats were recorded during surveys, outside, adjacent to the route corridor. These included the Behy woodland, the woodland west of Gleensk viaduct and a limited number of fields containing exposed bedrock/boulders (**Refer to Appendix 2 of Appendix 11.1, Volume 3 of this EIAR**). These habitats, which occur outside the route corridor will not be removed to facilitate the Greenway.

Within the footprint of the project, one area of suitable habitat was identified that will be directly impacted during the construction phase. This area is confined to the section of bedrock associated with the Drung Hill Tunnels at Mountain Stage. The loss of 2100m² of suitable rock habitat at Drung Hill to facilitate the placement of rock gabions is expected to have a **permanent moderate to significant negative impact** on Kerry slug in the absence of mitigation. There is potential, during the construction phase for direct mortality to occur, which is considered a **temporary moderate to significant negative impact**. Potential impacts to the Killarney National Park SAC population of Kerry slug during the construction phase, are assessed in detail in the NIS and specific mitigations are recommended (**the NIS is available in Volume 5 of this EIAR**).

Operation phase

Kerry slug will continue to utilise suitable habitats in the area once the construction phase is complete. Overall the area of suitable habitat at Drung Hill will be increased by 560m² as a result of the Greenway through the placement of rock gabions. Other suitable habitats identified outside the route corridor will not be impacted by the operational Greenway. While the possibility that individual slugs may be present on the pavement during operation cannot be precluded it is concluded, in light of the survey data cited in McDonnell *et al.* (2011), the species' largely crepuscular activity and the level of footfall associated with the times of day when the species will be active, that the potential extent of fatalities is not likely to reduce the overall population of the species. Therefore, the impact during the operation of the Greenway on Kerry slugs is expected to be a **permanent slight negative impact**. Impacts on the Kerry slug are assessed in the NIS, available in **Volume 5 of this EIAR**.

Common Lizard Smooth newt and Common frog

Construction phase

There will be a limited loss of suitable habitat for lizards, newts and frogs along the route. As there is an abundance of similar and higher value habitats in the overall area this is not considered to be a significant impact. Disturbance during the construction phase owing to increased noise and human activity may lead to temporary avoidance of the works area. Disturbance during the construction phase is considered to result in a temporary slight negative impact.

There is potential for **temporary moderate negative impacts** to hibernating lizards, newts and frogs through direct mortality, should these species be present in a works area during construction.

Operation phase

It is considered that once the construction phase of the proposed Greenway has been completed lizards, newts and frogs that may have been temporarily displaced owing to construction activity will utilise the habitats adjacent to the Greenway, within a short period of time. It is considered that these species will habituate to the change of landuse, therefore the impacts of the operational Greenway on lizards, smooth newt and frogs is expected to be a **long-term neutral imperceptible impacts**.

11.6.4.4 Potential impacts on Water Quality

Construction phase

There is potential for earthworks associated with the construction phase to cause entrainment of suspended solids and nutrient release in surface watercourses (e.g. via surface water run-off). There is also the potential for the release of pollutants used during the construction phase (e.g. hydrocarbon fuels, hydraulic fluids, etc.) into surface waters. Potential impacts by siltation include the smothering of fish eggs, eutrophication from nutrients carried into water in silt, encouragement of macrophyte growth and direct damage to individual fish/aquatic species.

Potential impacts on hydrology and water quality have been assessed in detail in **Chapter 13 of this EIAR**. The Outline Construction and Environmental Management Plan (oCEMP) sets out water quality protection measures that will be employed during the construction phase to prevent the occurrence of potential significant impacts. The oCEMP is available in **Appendix 2, Volume 3 of this EIAR**. Therefore, potential impacts to water quality during the construction phase are considered to be **temporary slight to moderate negative impacts**.

Operation phase

As mentioned in Section 11.6.3.2 above, additional water quality impacts are not envisaged during the operation of the Greenway as all water crossings and drainage works will be complete thereby preventing ingress of potentially polluting materials to watercourses from the operational Greenway. Annual Environmental Reports (AERs) for both the Caherciveen and Killorglin WWTP's have been checked and it is confirmed that there is adequate capacity at both sites for treatment and disposal of wastewater from the welfare facilities located in the four car parks.

All water crossings and drainage will be in place from the construction phase.

11.6.4.5 Potential impacts on aquatic species (Fish, Freshwater pearl mussel)

Construction phase

There is potential for **temporary slight to moderate negative impacts** to water quality from the unmitigated construction phase, as discussed in section 11.5.2 above. In turn any impact to water quality can lead to **temporary slight to moderate impacts** on aquatic species such as salmonids, lamprey, and freshwater pearl mussel either directly through water quality impairment or indirectly through impairment of the habitats that support such species. Overall, the watercourses which will be crossed by the Greenway are not considered high value habitats for aquatic species. (**Refer to Appendix 11.1, Volume 3 of this EIAR – Aquatic Surveys Report**). Furthermore, the oCEMP will set out the water quality protection measures which will be employed during the construction phase to prevent the occurrence of potential significant impacts.

Operation phase

No additional impacts to water quality are expected during the operation phase of the project.

A summary of the significance of the expected impacts on fauna during the construction phase and the associated confidence levels is included in Table 11-13 below.

Table 11-13: Summary of ecological impacts on fauna (without mitigation)

Fauna	Description of Impact	Magnitude/ Extent	Duration	Reversibility	Frequency of occurrence	Positive/ Negative
Badger	Construction: There will be some disturbance to badger through noise and anthropogenic disturbance during the construction phase.	Slight	Temporary	Reversible	Likely to be present all year round	Negative
	Operation: Badgers are expected to utilise habitats in the area shortly after completion of the construction phase.	Imperceptible	Long-term	n/a	Likely to be present all year round	Neutral
Bats	Construction: There will be some disturbance to bats owing to limited loss of potential foraging/commuting habitat during construction phase.	Slight	Temporary	Reversible	Bats are most active during the summer (May-Sept).	Negative
	Construction: There is potential for disturbance impacts to LHB if works in the vicinity of the roost are carried out during the summer months (when the dwelling is occupied by LHB).	Moderate to Significant	Temporary	Irreversible	Bats are most active during the summer (May-Sept).	Negative
Otter	Construction: Potential for disturbance at the LHB roost.	Imperceptible to Slight	Long-term	Reversible	Likely to be present all year round.	Negative
	Construction: There will be some disturbance to otter through noise and anthropogenic disturbance during the construction phase.	Slight	Temporary	Reversible	Likely to be present all year round.	Negative
	Construction: There is limited potential for					

Fauna	Description of Impact	Magnitude/ Extent	Duration	Reversibility	Frequency of occurrence	Positive/ Negative
	reduction in prey availability owing to water quality impairment.	Slight				
	Operation: Otters are expected to utilise habitats in the area shortly after completion of the construction phase.	Imperceptible	Long-term	n/a	Likely to be present all year round	Neutral
Common seal and Grey seal	Construction: There will be some disturbance to seals through noise and anthropogenic disturbance during the construction phase.	Slight	Temporary	Reversible	Likely to be present all year round.	Negative
	Operation: There will be some disturbance to seals during the initial stages of the operational Greenway. Seals are expected to become habituated over time.	Slight	Short-term	n/a	Likely to be present all year round.	Negative
Pine marten Red squirrel and Irish stoat	Construction: There will be some disturbance to these species owing to noise and anthropogenic disturbance during the construction phase.	Slight	Temporary	Reversible	Likely to be present all year round	Negative
	Operation: These species are expected to utilise habitats in the area shortly after completion of the construction phase.	Imperceptible	Long-term	n/a	Likely to be present all year round	Neutral
Hedgehog and Pygmy shrew	Construction: There will be some disturbance to these species owing to noise and anthropogenic disturbance during the construction phase.	Slight	Temporary	Reversible	Likely to be present all year round	Negative
	Construction: There is potential for direct mortality of hibernating hedgehogs.	Moderate	Temporary	Irreversible		

Fauna	Description of Impact	Magnitude/ Extent	Duration	Reversibility	Frequency of occurrence	Positive/ Negative
Irish hare (mountain)	Operation: These species are expected to utilise habitats in the area shortly after completion of the construction phase.	Imperceptible	Long-term	n/a	Likely to be present all year round	Neutral
	Construction: There will be some disturbance to Irish mountain hares owing to noise and anthropogenic disturbance during the construction phase.	Slight	Temporary	Reversible	Likely to be present all year round	Negative
Red deer	Operation: Irish mountain hares are expected to utilise habitats in the area shortly after completion of the construction phase.	Imperceptible	Long-term	n/a	Likely to be present all year round	Neutral
	Construction: Red deer are rare in the overall area, some limited noise and anthropogenic disturbance during the construction phase.	Imperceptible	Temporary	Irreversible	Unlikely present to be present	Negative
Annex I Chough, Dunlin and Little egret	Operation: Any red deer potentially present are expected to utilise habitats in the area shortly after completion of the construction phase.	Imperceptible	Long-term	Reversible	Unlikely present to be present	Negative
	Construction: There will be some loss of terrestrial foraging habitat suitable for Chough and Little egret. Construction: There will be some disturbance to foraging Chough, Dunlin and Little egret owing to noise and anthropogenic disturbance during the construction phase.	Slight Slight	Permanent Temporary	Irreversible Reversible	Potentially present all year round.	Negative

Fauna	Description of Impact	Magnitude/ Extent	Duration	Reversibility	Frequency of occurrence	Positive/ Negative
	<p>Operation: Chough, Dunlin and Little egret are expected to utilise habitats in the area shortly after completion of the construction phase.</p>	Imperceptible	Long-term	n/a		Neutral
Red Listed species Grey wagtail, Meadow pipit, Curlew	<p>Construction: There will be some loss of potential breeding habitat for passerines.</p>	Moderate	Permanent	Irreversible	Present all year round	Negative
	<p>Construction: There will be some loss of foraging habitat.</p>	Slight	Permanent	Irreversible		
	<p>Construction: There will be some disturbance during the construction phase.</p>	Slight	Temporary	Reversible	Present all year round	Negative
	<p>Operation: Red listed breeding and foraging species are expected to utilise habitats in the area shortly after completion of the construction phase.</p>	Imperceptible	Long-term	n/a	Present all year round	Neutral
Amber listed species Greenfinch House marten House sparrow Kestrel Robin Sand martin Snipe	<p>Construction: There will be some loss of potential terrestrial breeding habitat.</p>	Moderate	Permanent	Irreversible	Present all year round	Negative
	<p>Construction: There will be some loss of foraging habitat</p>					
	<p>Construction: There will be some disturbance during the construction phase.</p>	Slight	Permanent	Irreversible		

Fauna	Description of Impact	Magnitude/ Extent	Duration	Reversibility	Frequency of occurrence	Positive/ Negative
Stonechat Swallow		Slight	Temporary	Reversible		
	Operation: Amber listed breeding and foraging species are expected to utilise habitats in the area shortly after completion of the construction phase.	Imperceptible	Long-term	n/a	Present all year round	Neutral
Kerry slug	Construction: There will be some loss of suitable habitat at Drung Hill.	Moderate to Significant	Permanent	Irreversible	Present all year round	Negative
	Construction: There is potential for direct mortality of Kerry slug during construction.	Moderate to Significant	Temporary	Irreversible	Present all year round	Negative
	Operation: There is limited potential for direct mortality of Kerry slug during operation.	Slight	Permanent	Irreversible	Present all year round	Negative
Common lizard, Smooth newt and Common frog	Construction: There will be some disturbance to lizards, newts and frogs owing to noise and anthropogenic disturbance during the construction phase.	Slight	Temporary	Reversible	Present all year round	Negative
	Construction: There is potential for direct mortality of hibernating lizards, newts and frogs.	Moderate		Irreversible		

Fauna	Description of Impact	Magnitude/ Extent	Duration	Reversibility	Frequency of occurrence	Positive/ Negative
	Operation: Lizards, newts and frogs are expected to utilise habitats in the area shortly after completion of the construction phase.	Imperceptible	Long-term	n/a	Present all year round	Neutral
Brown trout; Lamprey sp; Atlantic salmon; European eel;	Construction: There is potential for water quality impairment to impact aquatic species.	Slight to Moderate	Temporary	Reversible	Potential present all year round	Negative
Freshwater mussel pearl	Operation: There are no additional water quality impacts expected during the operation phase.	n/a	n/a	n/a	Potential present all year round	n/a

11.6.5 Potential spread of invasive species

A number of invasive plant species were identified in the study area (**Refer to Appendix 11.4, Volume 3 of this EIA/EIS**). The species recorded in the study area included:

- Japanese knotweed
- Giant rhubarb
- Rhododendron
- Cherry laurel
- Pampas grass
- Montbretia

There is potential for invasive species to spread, or to be introduced to the area as a result of the construction phase, particularly where vegetation clearance is required. A preliminary invasive species management plan has been prepared and is available in **Appendix 11.4, Volume 3 of this EIA/EIS**. Potential spread or introduction of invasive alien species during construction of the Greenway will therefore be controlled and managed and any impact owing to invasive species is considered a **short-term slight negative impact**.

11.6.6 Cumulative impacts

An assessment of relevant projects and plans was undertaken to determine the potential for significant in combination effects on biodiversity. A cumulative impact arises from incremental changes caused by other past, present or reasonably foreseeable actions together with the proposed Greenway development.

11.6.6.1 Plans

A review of the relevant plans that could potentially interact with the proposed project was undertaken. Plans that could interact synergistically with the project include:

- Kerry County Development Plan 2015 – 2021;
- NPWS Conservation Management Plans;
- Caherciveen, Waterville & Sneem Functional Areas Local Area Plan 2013-2019;
- Killorglin Functional Area Local Area Plan;
- South Western River Basin Management Plan, 2009 – 2015;
- Draft River Basin Management Plan for Ireland (2018-2021); and
- Fáilte Ireland South West Tourism Development Plan 2008-2011.

No significant cumulative impacts are predicted with the Plans listed above, as each has a range of environmental and natural heritage policy safeguards in place. These safeguards to protect the natural environment will also apply to the proposal described in this report.

11.6.6.2 Existing and Proposed Developments

A review of the planning permissions sought within the last five years, within 10km of the proposed Greenway that could potentially interact with the proposed project was undertaken. It indicated that most planning permissions relate to minor development works such as car parks and dwelling houses and their associated effluent treatment systems. A number of cycleway/walkways are also included which will be encompassed by this Greenway application, these are highlighted in bold text in the following table. Table 11-14, below lists those developments situated within 10km of the proposed Greenway.

Table 11-14: Local Planning Applications

Planning app. no.	Decision date	Location and habitat value	Applicant	Brief development description	Distance to greenway
17561	August 8, 2017	Rossbehy and Faha within BL3 and GA2 habitat (lower value)	Glenbeigh Community Council	Create walkways from Behy Bridge to Incherea Cross, from Retreat Lodges to Rossbeigh and parallel to the R564	1 km – No spatial overlap
161122	January 19, 2017	Tullig More. BL3 habitat (lower value)	Vodafone Ireland Ltd.	Retention for 17.4m telecommunications structure	10 km - No spatial overlap
1199702	October 29, 2015	Knightstown BL3 habitat (lower value)	Valentia Island Development Ltd	Change of use of St Derarca's Parish Hall for Community Enterprise Centre, internal works, additional external elevation modifications and ancillary site development and boundary treatment works	1 km - No spatial overlap
15736 (Complete)	October 20, 2015	Kilnabrack Lower BL3 habitat (lower value)	Glenbeigh Community Council	Construction of a replica Rossbeigh Tower / Beacon with associated site works on the parking / forecourt area of Glenbeigh GAA grounds	1 km - No spatial overlap
1513	April 28, 2015	Cromane Upper GA habitat (lower value)	Cromane Community Pre-School Group	Construction of a community childcare centre, provision of 26 car parking spaces, other associated works	6.5 km – No spatial overlap
14756	January 9, 2015	Garranebane and Garranearagh	ACARD	Construction of a cycle way (alteration to planning app. 13/532), including Natura Impact Statement	0 km
14738	March 5, 2015	Treanoughtragh GA1 (lower value)	Dooks Golf Club	Construction of 5 holiday homes, associated site access, and other site works	3 km – No spatial overlap
14712	April 19, 2015	Caherciveen BL3 (lower value) adjacent MW4 (higher value)	ACARD	Construction of a planetarium	> 1 km - No spatial overlap. Potential water quality impairment.
14490	December 3, 2014	Killurly West BL3 and WS1 (lower value)	John O'Connor	Retention and completion of car park to serve Cnoc na dTobar Walk	1 km - No spatial overlap
14352	November 25, 2014	Garranearagh and Reenard	ACARD	Construction of a cycle way and walkway with Natura Impact Statement	0 km

Planning app. no.	Decision date	Location and habitat value	Applicant	Brief development description	Distance to greenway
13532	April 14, 2014	Garranebane Caherciveen	ACARD	Construction of a cycleway with Natura Impact Statement	0 km
13478	January 28, 2014	Canburrin WD4 (higher value) GA (lower value)	Michael Clifford	Provide a clay pigeon shooting area with an open sided building	6 km – No spatial overlap
13356	August 27, 2013	Kells LR, WS (higher value) BL3, GA (lower value)	Mike Bowler	Installation of three camping pod accommodation units, on-site car parking, waste water treatment system & polishing filter	> 1 km – No spatial overlap. Potential water quality impairment
13123	October 28, 2013	Farranreagh BL3 and GA2 (lower value)	Valentia Island Development Company	Development of offices, cable station museum (protected structure), increase in car parking	> 1 km – No spatial overlap. Potential water quality impairment
12860	August 19, 2013	Farranreagh BL3 and GA2 (lower value)	John Shanahan	Construction of a caravan park with 39 pitches, camping area, play area, and associated site works	> 1 km – No spatial overlap. Potential water quality impairment
12666	January 3, 2013	Cromane Upper GA (lower value)	Cromane Community Field Development Group	Construction of a playground & community field	6.5 km – No spatial overlap

While there are a number of permitted and proposed developments in the greater area of the proposed South Kerry Greenway those developments yet to obtain planning will be subject to the planning process and conditions to planning, where relevant, which will prevent negative interactions with the natural environment and ecology of the area. Cumulative impacts on ecologically sensitive habitats are not expected owing to the low ecological value of the habitats associated with the above-listed planning applications and having regard to the fact that the route of the Greenway will follow marginal and modified habitats associated with the existing railway line embankment, agriculture and man-made land. Habitats identified as ecologically sensitive most notably qualifying interest habitats associated with designated sites will be avoided through design.

However, the potential does exist for **short-term slight to moderate negative cumulative water quality impacts** to arise between these developments and the Greenway project in the absence of appropriate mitigation particularly during the construction phase. This may lead, in the short term, to negative cumulative impact to water quality. However, these effects are unlikely as the volumes generated would need to be very large for any adverse impact to ensue and they are not likely to impact on physico-chemical parameters in the water column.

11.6.6.3 Ongoing Activities

Other activities which could interact synergistically with the proposed Greenway include waste water treatment, aquaculture and fisheries in Valencia Harbour and Castlemaine Harbour, agriculture, traffic on the adjacent N70 and any ongoing road works. Because the routes of the Kerry Way and the Wild Atlantic Way also traverse the Iveragh Peninsula; there is some potential for cumulative impacts between them and the proposed Greenway.

Sewage Treatment

Glenbeigh WWTP: Glenbeigh is served by 800 pe⁶ secondary treatment plant (Licence No. D0286-01). The EPA issued a Wastewater Discharge Licence for Glenbeigh WWTP in Jan 2015 with emission limits of 25mg/l BOD, 125mg/l COD, 35mg/l SS, 5mg/l Ammonia and 2mg/l Ortho-P. Its current WWTP Compliance Status is 'Pass'⁷. There is also a primary treatment plant (< 500 PE) at Rossbeigh (Reg. No. A0088-01) that discharges to the inner reaches of Rossbehy Creek near the landward end of the spit at a location approximately 1.0km to the west of Glenbeigh. Kerry County Council converted the original primary settlement tank to a pumping station which pumps untreated effluent to a new 350 pe design capacity integrated constructed wetland for treatment before being discharged.

Killorglin WWTP: Killorglin is serviced by a 5000 pe secondary treatment plant (Licence No. D0182-01). Estimated loading on the plant is approx 3900 pe. The plant consists of fine screen, grit removal, storm water settlement tank, carousel oxidation ditch and 2 secondary treatment tanks. The EPA issued a Wastewater Discharge licence for Killorglin in June 2015 with ELVs of 25mg/l BOD, 125mg/l COD, 35mg/l SS, 5mg/l Ammonia and 2mg/l Ortho-P. Its current WWTP Compliance Status is 'Pass'.

Milltown WWTP: A new 3500 pe secondary treatment plant (Licence No. D0331-01) to serve Milltown has been operational since May 2011. The EPA issued a Wastewater Discharge Licence to the plant in August 2015 with emission limit values of 25mg/l BOD, 125mg/l COD, 35mg/l SS and 5mg/l Ortho-P. Its current WWTP Compliance Status is 'Fail'.

There is a primary treatment sewage plant (< 500pe) at Portmagee (Reg. No. A0042-01) that discharges to Portmagee Channel near the bridge to Valencia Island at a location approximately 7.5km to the south west of Reenard Point and two secondary treatment plants (> 500pe) in the general vicinity of Caherciveen town. These are Caherciveen (Licence. No. D0181-01) - its current WWTP Compliance Status is 'Pass' and Knightstown (Licence. No. D0421-01); this plant's current WWTP Compliance Status is 'Fail'.

The pressures associated with these WWTP's are the discharges that may impact upon on physico-chemical parameters such as the levels of dissolved nutrients, suspended solids and some elemental components. It should be noted that the pressures resulting from the proposed Greenway are primarily associated with an increased risk of sediments and fuel or oils spills during the construction phase. However, these effects are unlikely as the volumes generated from the Greenway would need to be very large for any adverse impact to ensue and furthermore, these pressures are not likely to impact on physico-chemical parameters in the water column. Welfare facilities which will be placed in four of the five proposed car parks will be brought to with the Killorglin or the Caherciveen WWTP's for treatment and disposal as required. Annual Environmental Reports (AERs) for both the Caherciveen and Killorglin WWTP's have been checked and it is confirmed that there is adequate capacity at both sites for treatment and disposal of wastewater from the welfare facilities located in the four car parks.

It is considered that with adequate and appropriate mitigation that potential cumulative impacts to water quality will be **temporary slight negative impacts**.

Agriculture

Agriculture is extensive within the study area, grazing cattle, horses and sheep were noted within many sections of the proposed route. Sections of the route are actively grazed and are being used by farmers as access routes for vehicles and the movement of livestock between fields. Sections of the route have been reclaimed and reseeded for grazing and have been integrated into the larger network of improved agricultural grassland fields. The diversity of flora within the habitats along these sections of the route has been reduced dramatically by reseeding, fertilisation and intensive grazing by cattle and sheep.

⁶ Population Equivalent: The term most used to describe the size of sewage treatment plants and equates to the number of persons the plant is designed to serve.

⁷ <https://gis.epa.ie/EPAMaps/>

There will be minimal loss of higher value grassland habitats where the Greenway traverses the margins of these habitat mosaics. Agricultural practices in higher ecological value grassland habitats are not intensive and are restricted to sheep grazing for the most part. Stock proof fencing delineates agricultural land thereby restricting the area impacted by grazing animals. Significant cumulative habitat degradation is not expected as the Greenway will follow the existing railway embankment, agricultural land and man-made habitats. Intersections with higher ecological value grassland habitats will be imperceptible.

There is potential for the project to contribute to **temporary slight to moderate negative cumulative impacts** on the water quality with agriculture. This derives from the potential for sediments and fuels/oils entering the watercourses as a result of construction activities to act in combination with ongoing farming activities in the areas surrounding. Nutrient enrichment is unlikely to ensue from the proposed Greenway as discussed in the preceding sections.

Peat extraction

Peat extraction has been occurring in the region for many decades. The expected ecological impacts from this activity would be loss of and alteration of peatland habitat. The drainage and cutting associated with peat extraction has, in the past, resulted in loss of intact lowland blanket bog, which is likely to have dominated the area before human activities altered the habitat. The resultant activity has led to habitat alteration of lowland blanket bog to degraded lowland and cutover blanket bog. However, because of the subsequent drying out of the peat through drainage, and the alteration of the peatland habitat through cutting and burning, this has resulted in the formation of entirely different habitats such as wet and dry heath, wet grassland and degraded blanket bog.

There will be no intersection with actively harvested peatland habitats along the proposed route. The route traverses small sections of degraded lowland blanket bog, wet heath and dry heath where the existing railway line remains intact or has been reclaimed for agriculture or made land. Peatland habitats are marginal where they encroach onto the existing railway route. Therefore, the project is expected to have a **temporary imperceptible negative cumulative impact** with peat extraction in the area.

Other amenities

When completed, some sections of the Greenway will be located beside the National N70 Route that accommodates road traffic including that associated the Wild Atlantic Way coastal driving route⁸. It is expected that the noise generated by human activity along the Greenway will be subsumed into those emanating from traffic on the adjacent road. It is concluded that potential cumulative and or in-combination impacts between the Greenway and these amenities will **be temporary imperceptible neutral impacts**. Similarly, the route will intersect the Kerry Way which is routed primarily off road and comprises a network of unsurfaced paths and tracks. Cumulative trampling of high ecological value habitat, including qualifying interest habitats of designated sites is not envisaged as the Greenway will follow the existing railway embankment where it traverses managed and modified habitats. At the locations of intersection, the Kerry Way will merge with the Greenway, therefore reducing the area traversed by both amenities. It is concluded that potential cumulative and or in-combination disturbance impacts arising from increased usage in the area will **be temporary imperceptible neutral impacts**.

11.6.6.4 Conclusion

It is considered that due to the nature, scale and duration of the works that construction and operation of the Greenway will not constitute a significant additional loading on the ecological carrying capacity of area or the habitats and fauna selected as key ecological receptors. It is considered, bearing in mind the scope, scale, nature, size and location of the project and the sensitivities of the ecological receptors, that there is limited potential for synergistic interaction, between the Greenway and the projects, plans and activities considered in the preceding sections that would create significant cumulative or in-combination impacts. However, there is the potential, without an adequate programme of mitigation measures that cumulative water quality impacts could ensue between the proposed development and the other projects and plans identified.

⁸ <http://www.failteireland.ie/FailteIreland/media>

11.6.7 Decommissioning impacts

The Greenway is not anticipated to be decommissioned.

11.7 MITIGATION

11.7.1 Mitigation by design

Extensive ecological and environmental studies were undertaken during the route selection process to negate potential significant impacts to ecologically sensitive areas. An example of this is the boardwalk design, which will be located at a section of the route that traverses wet heath habitat at Coolnaharragill. This is proposed to mitigate any potential impact on the existing ground where the required finished height of the greenway exceeds local existing ground level. If an embankment was used the footprint of the embankment would encroach on the existing sensitive habitat. A boardwalk was designed to prevent the loss of 503m² ecologically valuable habitat through the standard design.

The building in which the Lesser Horseshoe bat roost was recorded was initially due to be demolished to facilitate the Greenway route. Through consultation with NPWS the alignment was revised, and the building was retained. It is proposed to enhance the roost for bats and to utilise this building as an educational tool to highlight this important ecological feature and to emphasise the biodiversity value of the area.

While it is proposed to provide lighting in the Drung Hill tunnels as a health and safety precaution, lighting along the remainder of the Greenway route will not occur in order to avoid potential impacts to foraging and roosting bat species in the area. It was also decided at the design stage to prohibit lighting in the tunnels at night time to avoid disturbance to foraging bats.

Full details of the project design and construction methodology **are available in Chapter 3 of this EIAR**. Best practice construction methods and guidelines will be followed. An outline Construction and Environmental Plan (oCEMP) has been prepared for the project - **Refer to Appendix 2, Volume 3 of this EIAR**. The oCEMP sets out the key environmental management issues associated with the construction and operation of the proposed Greenway, to ensure that during these phases of the development, the environment is protected, and any potential impacts are minimised.

11.7.2 Mitigation by management

1. A Project Ecologist with appropriate experience and expertise will supervise the construction phase of the project. The Project Ecologist will ensure that all mitigation measures are implemented. The Project Ecologist will undertake ecological walkovers of the construction area prior to vegetation clearance and advancement of excavations to ensure key ecological receptors are clear of the works area. The Project Ecologist will be awarded a level of authority to stop construction activity should potential for adverse ecological effects arise during any stage of the construction phase.
2. Exclusion zones will be established between the route corridor and the following ecologically sensitive habitats identified adjacent to the route corridor:

Habitat	Ecological value	Location
(Mixed) broadleaved/conifer woodland (WD2)	Locally important (higher value) to County importance	Behy woodland
(Mixed) broadleaved woodland (WD1)	Locally important (higher value)	Margins of N70; adjacent Gleensk viaduct; small pockets adjacent route corridor.
Oak-birch-holly woodland	Locally important	Immediately west of Gleensk viaduct

Habitat	Ecological value	Location
(WN1)	(higher value)	
Bog woodland (WN7)	Locally important (higher value)	Adjacent LHB roost, east of Mountain Stage
Eroding/upland rivers and streams (FW1)	Locally important (higher value) to National importance	Throughout and downstream
Lowland blanket bog (PB3)	County importance to International importance	Large area extends away from the development area east of the Gleensk viaduct. Lowland blanket bog occurs within the Iveragh Peninsula SPA at Mount Foley.
Reedbed and large sedge swap (FS1)	National importance	Reenard section, adjacent to the development area, within Valentia River Estuary pNHA
Upper saltmarsh (CM2)	National importance	Reenard section, adjacent to the development area within Valentia River Estuary pNHA
Sheltered rocky shore (LR3)	National importance to International importance	Reenard section, adjacent to the development area, within Valentia River Estuary pNHA/Valentia Harbour / Portmagee Channel SAC
Shingle and gravel shores (LS1)	National importance	Reenard section, adjacent to the development area, within Valentia River Estuary pNHA
Estuaries (MW4)	National importance to International importance	Reenard section, within Valentia River Estuary pNHA/Valentia Harbour / Portmagee Channel SAC

- Fencing will be established and clearly marked as an exclusion zone for all construction activity and personnel,
 - There will be no removal of trees or clearance of vegetation from exclusion zones,
 - Access to construction areas will be via the route corridor only, from temporary compounds and direct access points established in previous sections.
3. Where temporary works areas are required within peatland habitats (particularly at temporary compound No.'s 8 and 16), in order to afford the best opportunity for vegetation restoration post construction, it is recommended that the surface vegetation will be protected as follows:
- a. The top vegetated sod (i.e. living layer of the habitat) will be excavated to a depth of at least 50 cms, thus allowing for full protection of the roots. This layer should be kept viable by irrigation if necessary. The longer the period of storage (i.e. time between excavation and reinstatement), the higher the likelihood of damage and less successful reinstatement.
 - b. The turves (vegetated sod-peat) will be stored separately from the amorphous humified peat and in a single layer.
 - c. There will be provision for the continual monitoring of turve storage during construction. This can be carried out by the project ecologist.
 - d. These turves will be irrigated as necessary to prevent drying and to reduce the likelihood of shrinkage.

- e. There will be minimal delay between construction and reinstatement of the peatland sections.
- f. The replacement of turves (vegetated sod-peat) is the final stage of construction. They will be packed firmly over a regulation layer of peat on the working area. Any gaps will be as small as possible and filled with loose peat as the process is being done – otherwise permanent gaps will be left which have implications for the future, leading to erosion and the potential to harm grazing livestock when temporary fencing is removed.
- g. Low ground pressure vehicles will be used in peat habitats to reduce compaction.

or,

where temporary works are of short duration, then the surface vegetation will be protected using timber bogmats.

- 4. Excavation areas will be clearly defined for personnel prior to commencement of construction. Excavations will only be permitted within demarcated areas. Storage of excavated material will be permitted within designated areas only within the demarcated areas. Re-use of soil is recommended on-site. Excess soil/unsuitable soil will be removed from the development area to an appropriately licensed facility.
- 5. Vegetation clearance will take place outside the bird nesting season (1st March – 31st August). Vegetation clearance and felling will be undertaken in accordance with the Forest Service Best Practice Guideline 'Forest harvesting and Environment Guidelines (2000a) and 'Forestry and Water Quality Guidelines (2000b). Where possible mature trees, particularly native species shall be retained. Soft felling of mature trees will be permitted where necessary.
- 6. Clearance of scrub will be minimised by demarcating clearance areas prior to commencement of clearance activity. Areas of scrub outside and adjacent to the route corridor will be retained where access to the works area will not be impeded.
- 7. Reseeding, fertilisers and planting of non-native species will not be permitted. Exposed areas slow to re-vegetate will be hydroseeded with natural species to control erosion. It is recommended to store top-sod separately for any reinstatement works.
- 8. Surveys for St. Patrick's cabbage will be undertaken prior to commencement of development. Where St. Patrick's cabbage is present within the development area, it will be removed from the area by an experienced ecologist/botanist prior to the construction phase and translocated to suitable locations outside of the development area.
- 9. Pre-construction badger surveys will be undertaken to ensure that newly established setts do not occur within the development area. Should a badger sett be identified, additional surveys/enabling works will only be permitted under the appropriate NPWS licence. These surveys will inform the appropriate location(s) for crossing measures (e.g. sub-surface pipes) where/if required.
- 10. Pre-construction otter surveys will be undertaken to ensure that newly established holts do not occur within the development area. Should a new holt be identified, surveys/enabling works will only be undertaken under the appropriate NPWS licence. These surveys will inform the appropriate location(s) for crossing measures (e.g. sub-surface pipes) where/if required. In the event that activity is recorded at the holt identified on the Reenard shoreline, construction will be delayed until after the breeding season.
- 11. Bats (Refer to NIS for Lesser Horseshoe bat mitigation)
 - a. Pre-construction bat roost surveys will be undertaken to identify any use of trees or structures along the route by bats, in the event that individual bats utilise structures as temporary roosts, or in the event that bats have begun to roost in previously surveyed features. Any maintenance or upgrading works including grouting or re-pointing of culverts/bridges will only proceed after an inspection of the structure for potential bat roosts. If individual bats need to be removed from a structure to allow works to continue, this will be carried out by an appropriately qualified person under a Wildlife Licence from National Parks and Wildlife Service (NPWS). If a maternity or hibernation roost is found to be present, advice will be sought from the NPWS and Bat Conservation Ireland before works will be allowed to advance and additional surveys/enabling works will only be undertaken under the appropriate NPWS licence.

- b. Soft felling of trees will be carried out, where tree limbs are cut and left grounded overnight to allow any bats to make their way out of cracks, crevices or dense ivy.
- c. Construction works in the vicinity of the identified LHB roost, including rock breaking, will only be permitted during the optimum time period for carrying out works at a Maternity site – 1st September to 1st May (Kelleher *et al.*, 2006). Prior to works commencing, an emergence survey will be undertaken and the roost will be inspected with the appropriate NPWS Wildlife Licence, to confirm that the roost is unoccupied. Rock breaking will ensure the use of modern rock breaking units with integrated sound suppression. Rock blasting will not be permitted. Use of artificial lighting in proximity to the roost during operation will not be permitted.
- d. The type of lighting to be used in the Drung Hill tunnels will be in compliance with BCI guidelines (2011)⁹. The light will be as low as guidelines permit, lighting at night will not be permitted.

12. Kerry slug (refer to NIS for Kerry slug mitigation and identified exclusion zone areas):

- a. For all aspects of construction that relate to the Kerry slug, a contractor's method statement will be approved by a competent malacologist and the work supervised by the Project Ecologist with a full understanding of the malacological requirements.
- b. Exclusion zones to prevent any incursion or damage to identified areas of suitable habitat will be established. The extent of the habitat will be delineated using appropriate fencing, or equivalent. Personnel or machinery will not be permitted within the established exclusion zones. Regular inspection of these exclusion zones will be undertaken.
- c. Pre-construction surveys will be undertaken at Drung Hill. The gabion wall will be constructed in a sequential manner commencing from the east and working westwards towards the tunnels. This will result in a works area of approximately 75m in length at any one time with the eastern side reaching design height first, and moving sequentially. Construction will be from road level from the southern verge of the N70 upwards. Pre-construction surveys will investigate the presence/absence of Kerry slugs in each 75m section in advance of the works and will comprise a 6 week programme of metric trapping followed by hand searching. The construction works will not progress without the express permission of the Project Ecologist and will not advance along the footprint into unsurveyed areas under any circumstances.
- d. Any Kerry slugs found during the surveys described will be translocated under a 'Section 23 and 34 – licence to capture or humanely kill a protected wild animal for education or scientific purposes'. As the newly created mitigatory habitat for the Kerry slug will take time to develop, any Kerry slugs found will need to be translocated to an area where a population had been identified previously. Any Kerry slugs captured during the surveys will be translocated to the area where, in 2014, Kerry slugs were previously recorded. This area has been identified as the most suitable area and the closest to the survey corridor. As this location is within the CPO but outside the works footprint and is in relatively close proximity to the area that will be the subject of the surveys it will minimise the level of disturbance to any specimens found. As per Reich *et al.*, (2012) any Kerry slugs captured will be temporarily stored in a plastic container filled with moss and fed on a diet of carrots until translocation takes place on the same day.
- e. The gabions at Drung Hill will be constructed using sandstone blocks which will provide good gaps for the species and will be painted with yoghurt (containing live bacterial cultures) to encourage early colonisation with moss and lichen.

13. Seals have the potential to be present within the Valentia River Estuary all year round. The shoreline between the nearest haul-out site and the route corridor provides a natural buffer to visual and noise disturbance. Disturbance impacts owing to human disturbance become apparent within an average of 200m of a seal population¹⁰.

⁹ http://www.batconservationireland.org/wp-content/uploads/2013/09/BCIrelandGuidelines_Lighting.pdf

¹⁰ <https://www.pinnipeds.org/attachments/article/199/Disturbance%20for%20SCS%20-%20text.pdf>

To further minimise potential disturbance to seals during the construction phase the following measures will be applied:

- a. Insofar as is practical, works occurring within 200m of the closest identified haul-out site will be carried out at high tide, to prevent disturbance to hauled-out seals.
 - b. Vegetation clearance will be carried out manually where practical within 200m of the haul-out site.
 - c. An environmental screen will be established around the works area within 200m of the haul-out site to attenuate noise and visual disturbance.
 - d. Treelines and areas of scrub adjacent to the shoreline (up to 200m either side of the haul-out site) will be retained.
 - e. Visual screening will be enhanced along the shoreline by planting in native trees.
 - f. The operational Greenway is considered a passive amenity in terms of potential disturbance. It is recommended to encourage users, through appropriate signage, to minimise noise disturbance and to keep dogs on a lead at all times.
14. Section 40 of the Wildlife Act 1976, as amended by Section 46 of the Wildlife (Amendment) Act 2000, restricts the cutting, grubbing, burning, or destruction by other means, of vegetation growing on uncultivated land or in hedges or ditches during the nesting and breeding season for birds and wildlife, from 1 March to 31 August. Unless the site qualifies for an exemption under the Acts, and such is agreed with the NPWS, removal of hedgerows and trees should be done outside of the restricted period to prevent the destruction of active bird's nests.
15. Water quality:
- a. Raw or uncured waste concrete / cementitious material will be disposed of by removal from the development area;
 - b. Excavated soil will be temporarily stored locally at each construction area in permitted areas only. Suitable soil will be re-used as backfill and landscaping.
 - c. Fuelling and lubrication of equipment will be carried out under controlled conditions in bunded areas within site compounds and away from watercourses or drains;
 - d. Any spillage of fuels, lubricants or hydraulic oils will be immediately contained, and the contaminated soil removed from the site and properly disposed of;
 - e. Sufficient oil booms and oil soakage pads will be kept on site to deal with any accidental spillage;
 - f. Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling;
 - g. Prior to any work it will be ensured that all construction equipment is mechanically sound to avoid leaks of oil, fuel, hydraulic fluids and grease; and
 - h. Overnight parking of plant machinery and site vehicles will only take place in the designated site compound area away from watercourses and aquatic zones.
 - i. Works which may impact on aquatic habitats will be undertaken only during the months May – September.
 - j. Control measures will be implemented to prevent runoff flowing across exposed ground within the working areas and become polluted by sediments;
 - k. Regular inspections and maintenance of surface water and sediment controls will be carried out. Inspection and maintenance is especially important after prolonged or intense rainfall;
 - l. Additional protection by silt trapping apparatus such as a geotextile silt fence to prevent contaminated runoff will be established as necessary;
 - m. Temporary silt fences should be erected to trap sediment particles when work is taking place during a prolonged wet weather period or intense rainfall event;

- n. Swales or grassed surface water channels will be used for drainage of the operational Greenway in order to attenuate surface water flow and remove potential pollutants.
 - o. Washout of concrete trucks will not occur at any location along the route corridor;
 - p. A designated trained operator experienced in working with concrete will be employed during any concrete pouring;
 - q. Any volumes of concrete water will be pumped into a skip to settle out. Settled solids' will be appropriately disposed of off-site. The total volume will be reduced by only permitting concrete chutes to be washed off site at the supplier's yard;
 - r. Any small volumes of incidental wash generated from cleaning hand tools, cement mixers or other plant, as required, will be trapped on-site to allow sediment to settle out and reach neutral pH before clarified water is released to the surface water drains or allowed to percolate into the ground. Settled solids will need to be appropriately disposed of off-site. The total volume will be reduced by only permitting concrete chutes to be washed on site.
16. Construction of the coastal revetment will be restricted to the area above the mean high-water mark located between chainage 2700 and 2905m (total length of revetment 205m). The extent of the revetment wall shall remain within the footprint of the previous coastal defence and the eroded embankment only. The works area will be clearly demarcated prior to commencement of construction of the coastal revetment. Exclusion zones as detailed in 2 above will remain *in situ*. Access to the works area via the shoreline will not be permitted. Access will only be permitted via the route corridor.
17. A surface water management plan (SWMP) will be prepared in advance of any works taking place. The SWMP will detail method statements for protecting water quality in the watercourses affected. The SWMP will set out measures to avoid siltation, erosion, surface water run-off and accidental pollution events which all have the potential to adversely affect water quality within the site during the construction phase. Any new development at water course crossings will have to consider fish passage. Consideration should be given to existing migration barriers and any in-stream improvement works will be carried out with reference to O' Grady (2006)¹¹
18. The final CEMP will be implemented by the appointed contractor and will manage the environmental commitments of the project. The implementation of mitigation measures as well as the monitoring and supervision of these measures will be managed through the CEMP. Mitigation measures to prevent significant negative impacts to the qualifying features of Natura 2000 sites will also be incorporated into the project through the CEMP. The final CEMP will include the following:
- a. Construction method statements will be prepared prior to commencement of construction and incorporated into the CEMP.
 - b. Construction methods will be reviewed by the Project Ecologist and any statutory bodies/experts as detailed above.
 - c. A fuel management plan will be prepared prior to commencement of construction and incorporated into the CEMP.
 - d. Dedicated construction phase site compounds as detailed in planning drawings will be established prior to commencement of works at each section/phase of development.
 - e. All site offices and welfare facilities will be located within this compound and all necessary equipment for management and control of waste, and the storage of material such as fuels and oils will be put in place prior to delivery of any supplies required.
 - f. Each compound will function as the main secure designated storage area for all materials. Secure bunding for fuels and oils will be constructed at this location and sufficient car parking will be made available to ensure that secure overnight parking of site vehicles and mobile equipment is available.
 - g. All mitigation measures as described will be incorporated into the CEMP.

¹¹ O'Grady, M. (2006). *Channels and Challenges. The enhancement of salmonid rivers'* Irish Fisheries Ecology and Management Series: Number 4. Central Fisheries Board, Dublin.).

11.7.3 Biodiversity Enhancement

The project has the potential to enhance the biodiversity value of the area through the suitable management and maintenance of the surrounding habitats. Overall, the project has the capacity to provide a biodiversity gain, and therefore have a positive impact on biodiversity in the area through the application of appropriate and coordinated measures.

An Ecological Restoration and Management Plan (ERMP) shall be developed to provide a framework for the conservation and enhancement of ecological features along the route. It is recommended that the ERMP should be implemented over a two year period from when the site becomes operational. The ERMP should also look at Long Term Management of the site beyond the five year period. The site will be primarily managed as a natural amenity; however, the site will also be managed for nature conservation. The ERMP should be carried out by the Project Ecologist. Enhancement measures will be incorporated into the ERMP and the finalised CEMP. Enhancement measures should be monitored for effectiveness over the first five years and, based on the results, alterations and/or further enhancements should be undertaken.

The following enhancement measures are recommended to increase the overall biodiversity of the area:

1. Semi-natural grassland, riparian woodland and scrub will be allowed to establish along the riparian corridors and route verges, cleared to facilitate construction. Maintenance of route verges will be restricted to the appropriate times of the year and will only be required where health and safety requirements deem it necessary. Flailing of verges will not be permitted.
2. Where vegetation is slow to regenerate, planting of native species will be undertaken. The project ecologist will advise on the appropriate species and planting requirements to mimic the existing nature of the habitats in the area.
3. Natural establishment of semi-natural grassland and scrub habitats will be facilitated as above within the CPO boundary of the project that is outside the route corridor.
4. Nest boxes will be set up at appropriate bridges as advised by the Project Ecologist to encourage dipper nesting.
5. Native plant species (including hawthorn, blackthorn, hazel and oak) will increase the value of the Greenway as foraging habitat for bats. Native species offer higher quality habitat for invertebrates. The main prey item for bats.
6. All planting and scrub/hedgerow creation and management will be carried out following the guidelines and recommended methodology referenced in Natural England (2006), Knowles (1995) and JNCC (2001).
7. Bat boxes will be erected at suitable locations along the route advised by the Project Ecologist.
8. The existing dwelling where the LHB roost was identified during surveys will be enhanced to provide more suitable roosting habitat and to encourage the prolonged use of this building by roosting Lesser Horseshoe bats. The building will be enhanced by providing suitable partitioned void space and unobstructed entrances and fly space within the building. Enhancement works will only occur during the optimal time period (1st September to 1st May) in accordance with the most recent NPWS and BCI guidance available¹² ¹³. Consultation with NPWS will be undertaken prior to commencement of enhancement works and throughout as necessary.

11.7.4 Education/information

Visual display boards promoting wildlife conservation will be mounted at various locations along the route as an educational and environmental awareness tool. A CCTV monitor will be displayed at the Lesser Horseshoe bat roost and signage will be installed to add an educational aspect to this important ecological feature. The Project Ecologist will advise on the placement of these display boards and will advise on the information to be included. NPWS will be consulted in relation to the CCTV and the signage at the Lesser Horseshoe Bat roost.

¹² <https://www.npws.ie/sites/default/files/publications/pdf/IWM25.pdf>

¹³ http://jncc.defra.gov.uk/pdf/batwork_manualpt4.pdf

11.8 RESIDUAL IMPACTS

Residual impacts are impacts that remain, once mitigation has been implemented or, impacts that cannot be mitigated. Table 11.16 below provides a summary of the residual impacts to the habitats identified as key ecological receptors. Table 11.17 provides a summary of the residual impacts to fauna, and water quality at the site. Section 11.5 above concluded that impacts to designated sites outside Natura 2000 designations will be **imperceptible** owing to the nature of the nature of the project and the distance between the designated sites and the Greenway route.

Provided all mitigation measures are implemented in full and remain effective throughout the construction phase, impacts from the proposed Greenway on the nearby Valentia River Estuary pNHA or on the local ecology are expected to be **permanent imperceptible neutral impacts**.

Table 11-15: Residual impacts of the habitats that are classified as key ecological receptors

Habitat	Evaluation	Significance of construction phase impact without mitigation	Mitigation	Residual Impact
Hedgerows (WL1)	Locally important (higher value)	Imperceptible to Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Imperceptible to Slight
Treelines (WL2)	Locally important (higher value)	Imperceptible to Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Imperceptible to Slight
Earth banks (BL2)	Locally important (higher value)	Imperceptible to Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Imperceptible to Slight
Earth banks (BL2) and Scrub (WS1)	Locally important (higher value)	Imperceptible	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Imperceptible
Improved agricultural grassland (GA1), grassy verge (GS2) and Scrub (WS1)	Locally important (higher value)	Imperceptible to Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Imperceptible to Slight

Habitat	Evaluation	Significance of construction phase impact without mitigation	Mitigation	Residual Impact
Improved agricultural grassland (GA1), Wet grassland (GS4) and Scrub (WS1)	Locally important (higher value)	Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Slight
Neutral grassland (GS1) and Dry-humid acid grassland (GS3)	Locally important (higher value)	Imperceptible	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Imperceptible
Neutral grassland (GS1), Wet grassland (GS4) and Scrub (WS1)	Locally important (higher value)	Imperceptible to Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Imperceptible to Slight
Neutral grassland (GS1) and Dry siliceous heath (HH1)	Locally important (higher value)	Imperceptible	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Imperceptible
Neutral grassland (GS1) and Scrub (WS1)	Locally important (higher value)	Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Slight

Habitat	Evaluation	Significance of construction phase impact without mitigation	Mitigation	Residual Impact
Grassy verge (GS2)	Locally important (higher value)	Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Slight
Grassy verge (GS2) and Scrub (WS1)	Locally important (higher value)	Imperceptible to Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Imperceptible to Slight
Grassy verge (GS2) Scrub (WS1) and Wet willow-alder-ash woodland (WN6)	Locally important (higher value)	Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Slight
Grassy verge (GS2) Wet Heath (HH3) and Scrub (WS1)	Locally important (higher value)	Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Slight
Dry-humid acid grassland (GS3)	Locally important (higher value)	Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Slight
Dry-humid acid grassland (GS3) and Wet grassland	Locally important	Slight	Project ecologist	Slight

Habitat	Evaluation	Significance of construction phase impact without mitigation	Mitigation	Residual Impact
(GS4)	(higher value)		Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	
Dry-humid acid grassland (GS3) Wet grassland (GS4) and Wet heath (HH3)	Locally important (higher value)	Imperceptible to Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Imperceptible to Slight
Dry-humid acid grassland (GS3) Wet grassland (GS4) and Scrub (WS1)	Locally important (higher value)	Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Slight
Wet grassland (GS4)	Locally important (higher value)	Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Slight
Wet grassland (GS4) and Wet heath (HH3)	Locally important (higher value)	Imperceptible to Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Imperceptible to Slight
Wet grassland (GS4) Wet heath (HH3) and Scrub (WS1)	Locally important (higher value)	Imperceptible to Slight	Project ecologist Best practice construction methods as per CEMP	Imperceptible to Slight

Habitat	Evaluation	Significance of construction phase impact without mitigation	Mitigation	Residual Impact
			Habitat restoration and enhancement as per ERMP	
Wet grassland (GS4) and Scrub (WS1)	Locally important (higher value)	Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Slight
Dry siliceous heath (HH1) degraded	Locally important (higher value)	Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Slight
Dry siliceous heath (HH1) and Dense bracken (HD1) grazed	Locally important (higher value)	Imperceptible to Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Imperceptible to Slight
Dry siliceous heath (HH1) and Wet heath (HH3)	Locally important (higher value)	Imperceptible to Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Imperceptible to Slight
Dry siliceous heath (HH1), Wet heath (HH3) and Dense bracken (HD1) grazed	Locally important (higher value) to International importance	Imperceptible	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Slight

Habitat	Evaluation	Significance of construction phase impact without mitigation	Mitigation	Residual Impact
Wet heath (HH3) degraded	Locally important (higher value)	Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Slight
Wet heath (HH3), Lowland blanket bog (PB3), Scrub (WS1) and Conifer plantation (WD4)	Locally important (higher value)	Imperceptible to Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Imperceptible to Slight
Wet heath (HH3) Exposed siliceous rock (ER1) and Scrub (WS1)	Locally important (higher value)	Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Slight
Wet heath (HH3) and Lowland blanket bog (PB3)	Locally important (higher value) to International importance	Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Slight
Wet heath (HH3) and Scrub (WS1)	Locally important (higher value)	Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Slight

Habitat	Evaluation	Significance of construction phase impact without mitigation	Mitigation	Residual Impact
Lowland blanket bog (PB3) degraded	Locally important (higher value)	Imperceptible to Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Imperceptible to Slight
Lowland blanket bog (PB3) and Wet grassland (GS4) degraded	Locally important (higher value)	Imperceptible to Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Imperceptible to Slight
(Mixed) broadleaved woodland (WD1)	Locally important (higher value)	Imperceptible to Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Imperceptible to Slight
(Mixed) broadleaved/conifer woodland (WD2)	Locally important (higher value) to County importance	Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Slight
Oak-birch-holly woodland (WN1)	Locally important (higher value)	Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Slight

Habitat	Evaluation	Significance of construction phase impact without mitigation	Mitigation	Residual Impact
Riparian woodland (WN5)	Locally important (higher value)	Imperceptible to Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Slight
Wet willow-alder-ash woodland (WN6)	Locally important (higher value)	Imperceptible to Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Imperceptible to Slight
Bog woodland (WN7)	Locally important (higher value)	Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Slight
Conifer plantation (WD4)	Locally important (higher value)	Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Slight
Scrub (WS1) and Conifer plantation (WD4)	Locally important (higher value)	Imperceptible to Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Imperceptible to Slight

Habitat	Evaluation	Significance of construction phase impact without mitigation	Mitigation	Residual Impact
Scrub (WS1)	Locally important (higher value)	Slight to Moderate	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Slight
Valuable habitats adjacent to the route				
Upland/eroding rivers (FW1)	Locally important (higher value) to National Importance	Slight to Moderate	Project ecologist Best practice construction methods as per CEMP Exclusion zones Habitat restoration and enhancement as per ERMP	No impact
Lowland blanket bog (PB3)	County importance to International importance	Slight to Moderate	Project ecologist Best practice construction methods as per CEMP Exclusion zones Habitat restoration and enhancement as per ERMP	No impact
Dry heath (HH1)	County importance to International importance	Slight to Moderate	Project ecologist Best practice construction methods as per CEMP Exclusion zones Habitat restoration and enhancement as per ERMP	No impact
Wet heath (HH3)	County importance to National importance	Slight to Moderate	Project ecologist Best practice construction methods as per CEMP Exclusion zones Habitat restoration and enhancement as per ERMP	No impact

Habitat	Evaluation	Significance of construction phase impact without mitigation	Mitigation	Residual Impact
			methods as per CEMP Exclusion zones Habitat restoration and enhancement as per ERMP	
Reed bed and large sedge swamp (FS1)	National importance	Slight to Moderate	Project ecologist Best practice construction methods as per CEMP Exclusion zones Habitat restoration and enhancement as per ERMP	No impact
Upper saltmarsh (CM2)	National importance	Slight to Moderate	Project ecologist Best practice construction methods as per CEMP Exclusion zones Habitat restoration and enhancement as per ERMP	No impact
Sheltered rocky shore (LR3)	National importance to International importance	Slight to Moderate	Project ecologist Best practice construction methods as per CEMP Exclusion zones Habitat restoration and enhancement as per ERMP	No impact
Shingle and gravel shores (LS1)	National Importance	Slight to Moderate	Project ecologist Best practice construction methods as per CEMP Exclusion zones	No impact

Habitat	Evaluation	Significance of construction phase impact without mitigation	Mitigation	Residual Impact
Estuaries (MW4)	National importance to International importance	Slight to Moderate	Habitat restoration and enhancement as per ERMP Project ecologist Best practice construction methods as per CEMP Exclusion zones Habitat restoration and enhancement as per ERMP	No impact

Table 11-16: Residual impacts on fauna and water quality

Species	Evaluation	Significance of impact without Mitigation	Mitigation	Residual impact
Badger	National importance	Construction: Slight Operation: Imperceptible	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Construction: Imperceptible Operation: Imperceptible
Bats	National to International importance	Construction: Slight (foraging) to Significant (LHB) Operation: Imperceptible to Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP Bat specific mitigations	Construction: Imperceptible Operation: Imperceptible

Species	Evaluation	Significance of impact without Mitigation	Mitigation	Residual impact
Otter	National to International importance	Construction: Slight Operation: Imperceptible	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Construction: Imperceptible Operation: Imperceptible
Common seal and Grey seal	National to International importance	Construction: Slight Operation: Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP Seal specific mitigation	Construction: Imperceptible Operation: Imperceptible
Pine marten Red squirrel and Irish stoat	National importance	Construction: Slight Operation: Imperceptible	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Construction: Imperceptible Operation: Imperceptible
Hedgehog and Pygmy shrew	National importance	Construction: Slight to Moderate (hibernation) Operation: Imperceptible	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Construction: Imperceptible Operation: Imperceptible

Species	Evaluation	Significance of impact without Mitigation	Mitigation	Residual impact
Irish (mountain) hare	National importance	Construction: Slight Operation: Imperceptible	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Construction: Imperceptible Operation: Imperceptible
Red deer	National importance	Construction: Imperceptible Operation: Imperceptible	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Construction: Imperceptible Operation: Imperceptible
Annex I Chough, Dunlin and Little egret	International importance	Construction: Slight Operation: Imperceptible	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Construction: Imperceptible Operation: Imperceptible
Red Listed species -Curlew, Grey wagtail, Meadow pipit	National to International importance	Construction: Slight to Moderate Operation: Imperceptible	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Construction: Imperceptible Operation: Imperceptible
Amber listed species - Greenfinch House marten House sparrow Kestrel Robin	National to International importance	Construction: Slight to Moderate Operation: Imperceptible	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Construction: Imperceptible Operation: Imperceptible

Species	Evaluation	Significance of impact without Mitigation	Mitigation	Residual impact
Sand martin Snipe Stonechat Swallow				
Kerry slug	National to International importance	Construction: Moderate to Significant Operation: Slight	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP Kerry slug mitigation	Construction: Slight Operation: Imperceptible
Common lizard, Smooth newt and Common frog	National importance	Construction: Slight to Moderate (hibernation) Operation: Imperceptible	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Construction: Imperceptible Operation: Imperceptible
Brown trout; Lamprey sp; Atlantic salmon European eel and Freshwater pearl mussel	National to International importance	Construction: Slight to Moderate Operation: n/a	Project ecologist Best practice construction methods as per CEMP Habitat restoration and enhancement as per ERMP	Construction: Imperceptible Operation: Imperceptible

11.9 CONCLUSION

Residual impacts on biodiversity arising from the project, including impacts to habitats, flora, fauna and water quality, are considered ***imperceptible to slight*** provided the recommended mitigations and best practice methodologies are employed during the construction and operation phases of the development. The assessment concluded that significant residual ecological impacts either alone or in combination with other plans or projects will not arise from the project. Biodiversity enhancement measures will be designed with suitably qualified ecological professionals to increase the net biodiversity value of the area. This is expected to have a positive impact on biodiversity in the overall area.

11.10 REFERENCES

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