# Appendix D. Environmental Constraints Report

ATKINS

Member of the SNC-Lavalin Group

# N25 Waterford to Glenmore

## Environmental Constraints Report

Kilkenny County Council

October 2020

# Notice

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## Document history

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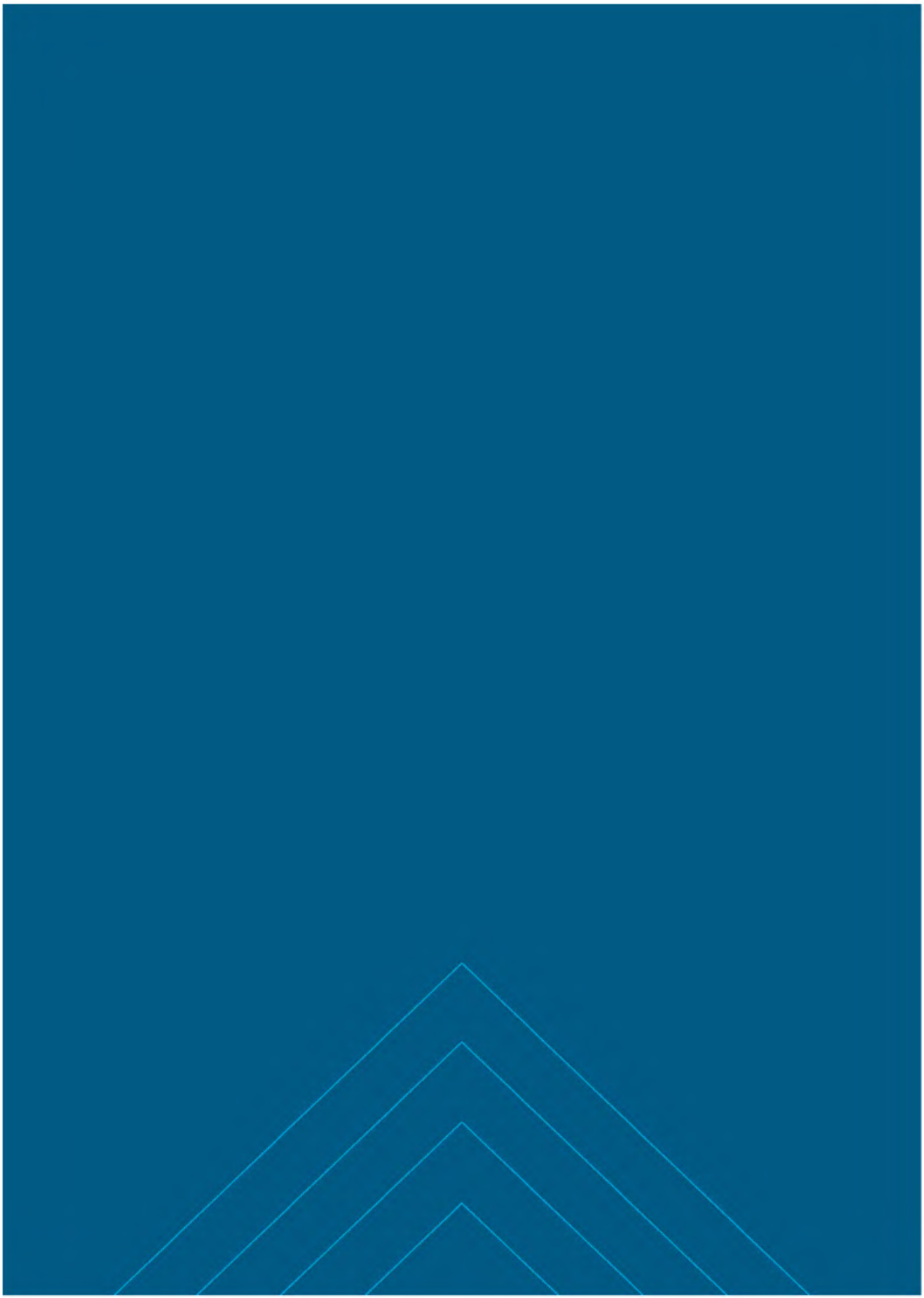
## Client signoff

| | |
|---|---|
| Client | Kilkenny County Council Kilkenny County Council |
| Project | N25 Waterford to Glenmore |
| Job number | 5190130 |
| Client signature/date | *Seamus Foley* October 2020 |

# Contents



# 1. Introduction

## 1.1. Objectives

This report aims to highlight environmental constraints associated with the N25 Waterford to Glenmore project. A study area was defined for the purpose of undertaking an appraisal of the lands in proximity to the existing N25 and within which possible route options could be considered. The constraints study area has been selected to reflect the topography and existing physical barriers in the vicinity of the N25.

The environmental constraints study relates to the sections generally discussed within an Environmental Impact Assessment. This includes the following listed below:

- Plans and Policies
- Socio-Economic and Community (Population)
- Agronomy
- Geology, Soils and Contaminated Land
- The Water Environment
- Biodiversity
- Landscape and Visual
- Air Quality and Climate
- Noise and Vibration
- Human Health
- Cultural Heritage
- Material Assets

## 1.2. Study Area

The N25 study area is entirely located within County Kilkenny and lies to the south east of the county. The study area is approximately 0.44km west of County Wexford and 3.4km north of County Waterford (at their closest points). The study area is shown in Figure 1-1 (OSI mapping) and Figure 1-2 (aerial photo).

The N25 Waterford to Glenmore project is positioned between two major bypass schemes around Waterford City and the town of New Ross. The northern boundary of the constraints study area is adjacent to the southern extent of the 'N25 Ross Bypass' and the southern boundaries of the constraints study area are in proximity to the N29, which is linked to the existing N25 route.

The N25 is a vital link in the national road network in the south east. The N25 connects Cork at one end to the port of Rosslare at the other end, with a link to Waterford City from the N25 between these locations. It provides access to 4 of the country's major ports, Cork, Waterford, New Ross and Rosslare. It also provides access to 2 airports, Cork and Waterford.

This section of the national road network is rural in nature and is situated in county Kilkenny between the townland of Luffany in the south and Jamestown in the north. The village of Glenmore is adjacent to the existing N25 towards the northern end of the project's extents. The project will interface with the N25 New Ross Bypass and the N25 Waterford City Bypass.

## 1.3. Purpose of Identifying Constraints

The purpose of identifying the constraints within the proposed project study area is to ensure the integration of environmental considerations into the selection and development of potential route options. The environmental desktop constraints assessment of the study area includes the following:

- A scope of the environmental disciplines to be assessed;
- Methodology including information sources; and
- Description of the receiving environment and Identification of the constraints within the study area.

A constraints analysis for each of the environmental disciplines addressed is presented in the following section.

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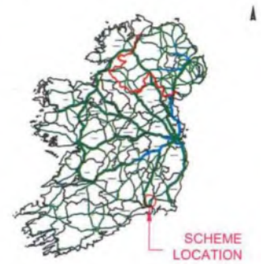
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE
2. ONLY WRITTEN DIMENSIONS SHALL BE USED. NO DIMSNEIONS SHALL BE SCALED FROM THE DRAWINGS
3. ALL LEVELS ARE IN METRES AND ARE TO MALIN HEAD DATUM
4. ALL COORDINATES ARE IN METRES AND ARE TO IRISH TRANSVERSE MERCATOR
5. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE SPECIFICATION

KEY PLAN




Study Area



| Rev | Description | By | Date | Chk'd | Auth |
|---|---|---|---|---|---|

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Client: KILKENNY COUNTY COUNCIL

Project: N25 WATERFORD TO GLENMORE SCHEME

Purpose: Environmental Constraints Report

Title: Figure 1-1 OSI Study Area Map

| Original Scale | Des/Drawn | Checked | Authorised |
|---|---|---|---|
| N/A | CA Date 04/06/2020 | DMcL Date 04/06/2020 | MMcL Date 04/06/2020 |

| Status | Drawing Number | Rev |
|---|---|---|
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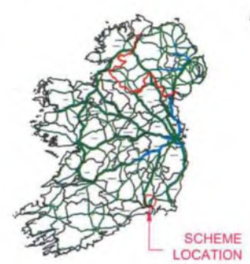


Study Area



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Transport Infrastructure Ireland

NDP
PLEAN FORBARTHA NÁISIÚNTA

| Rev | Description | By | Date | Chk'd | Auth |
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Client: KILKENNY COUNTY COUNCIL

Project: N25 WATERFORD TO GLENMORE SCHEME

Purpose: Environmental Constraints Report

Title: Figure 1-2 Aerial Study Area Map

| Original Scale | Des/Drawn | Checked | Authorised |
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| N/A | CA Date 04/06/2020 | DMcL Date 04/06/2020 | MMcL Date 04/06/2020 |

| Status | Drawing Number | Rev |
|---|---|---|
| F | 5190130-ATK-XX-XX-DR-EC-0011 | 0 |

# 2. Environmental Constraints

## 2.1. Plans and Policies

### 2.1.1. Introduction

This section of the report identifies and outlines any major planning and development related constraints within the study area, based on a review of all relevant planning policy. In addition, planning applications lodged within the study area are also examined to assess their potential to constrain the proposed development of the N25 Waterford to Glenmore Scheme

### 2.1.2. Methodology

This section of the environmental constraints report outlines the major planning and development constraints of the study area, including a review of the following planning documents;

- Kilkenny County Development Plan 2014-2020
- Ferrybank Belview Local Area Plan 2017
- Slieverue Local Area Plan 2006-2012

In addition, a detailed review of planning applications lodged within the defined study area has been carried out. This included new planning applications, as well as those granted within the past five years, having regard to the five-year validity of planning applications.

### 2.1.3. Identified Constraints

#### 2.1.3.1. Planning Policy Constraints

The subject site is located within County Kilkenny and is therefore subject to the policies and objectives contained within the Kilkenny County Development Plan 2014-2020. Furthermore, minor sections of the identified study area are located within the settlement boundaries of Slieverue and Belview, and therefore, the proposed development should have regard to constraints posed by the Ferrybank Belview Local Area Plan (2017) and the Slieverue Local Area Plan (2006).

##### 2.1.3.1.1. Kilkenny County Development Plan 2014-2020

The Kilkenny County Development Plan is the current Development Plan for County Kilkenny. Of particular significance to the proposed development is section 11.7.6 of the Plan, where it is stated that Kilkenny County Council, with the support of the NRA is progressing/developing a number of road schemes within County Kilkenny, and the N25 Waterford-Glenmore is specifically mentioned.

It is noted that there are development objectives outlined in the plan which would specifically constrain the proposed development.

Other development related issues such as biodiversity constraints, landscape/visual constraints and heritage constraints are outlined in the Environmental Constraints Report, Section 2.6, 2.7 and 2.11 respectively.

##### 2.1.3.1.2. Ferrybank Belview Local Area Plan 2017

The Ferrybank Belview Local Area Plan was adopted by Kilkenny County Council in 2017 and came into effect on 15th January 2018. It is noted that the study area encroaches slightly on the defined settlement boundary of Ferrybank/Belview. Part of the study area is zoned “Passive Open Space” as outlined in Figure 2.3 of the LAP.

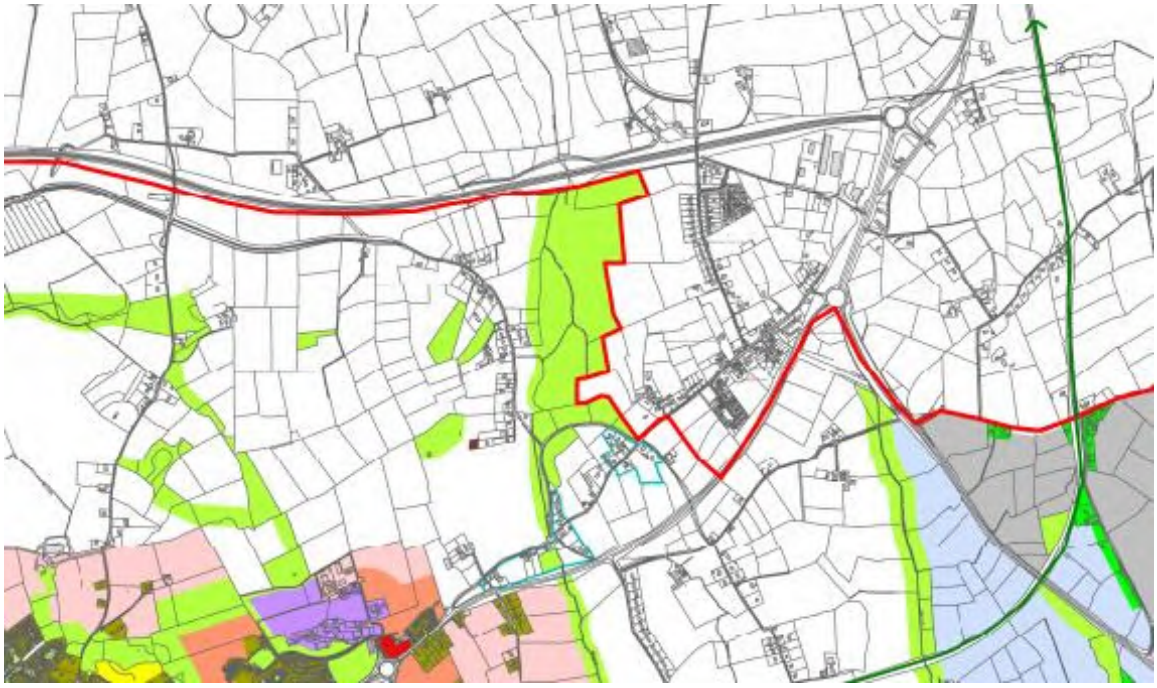

**Figure 2-1 - Extract from Figure 2.3 of the Ferrybank Belview LAP 2017[1]**

The zoning objective for passive open space areas is outlined in Appendix 1 of the LAP as follows;

- *To allow for passive opens pace/green links/biodiversity conservation.*

It is further noted as per Figure 7.2 of the LAP, there is also a significant tree stand within the study area.

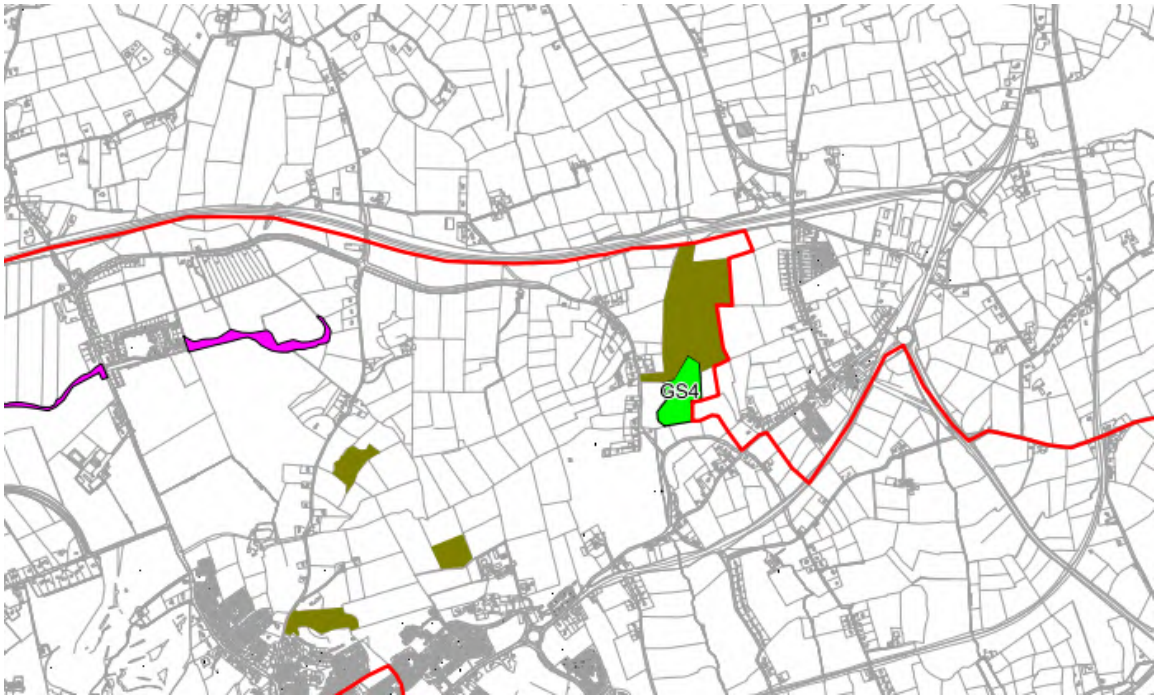


**Figure 2-2 - Extract from Figure 7.2 of the Ferrybank Belview LAP 2017[2]**

[1] https://www.kilkennycoco.ie/eng/Services/Planning/Development-Plans/Local%20Area%20Plans/Adopted_Local_Area_Plans/Ferrybank_Local_Area_Plan/Figure-2-3-Zoning-map.pdf
[2] https://www.kilkennycoco.ie/eng/Services/Planning/Development-Plans/Local%20Area%20Plans/Adopted_Local_Area_Plans/Ferrybank_Local_Area_Plan/Ferrybank-LAP-2017.pdf

#### 2.1.3.1.3. Slieverue Local Area Plan 2006

The Slieverue Local Area Plan expired in 2012, but the plan does contain a significant amount of information on the natural and built heritage and other planning issues. The expired Plan will be used as a supplementary guidance document. The study area encroaches slightly on the defined settlement boundary of Slieverue.

The sections of the study area that is located within the settlement boundary of Slieverue are zoned for Residential and Light Industrial.

The zoning objectives for the LAP are outlined in Section 3 of the Plan. The objective for residentially zoned land is “to protect and improve residential amenities and to provide new residential development appropriate to the scale and character of Slieverue. It is noted that public service installations are a permitted use under this zoning. The objective for industrial zoned lands is “To provide for industrial and related uses”. It is noted that public service installations are a use that is permitted in principle under this zoning.

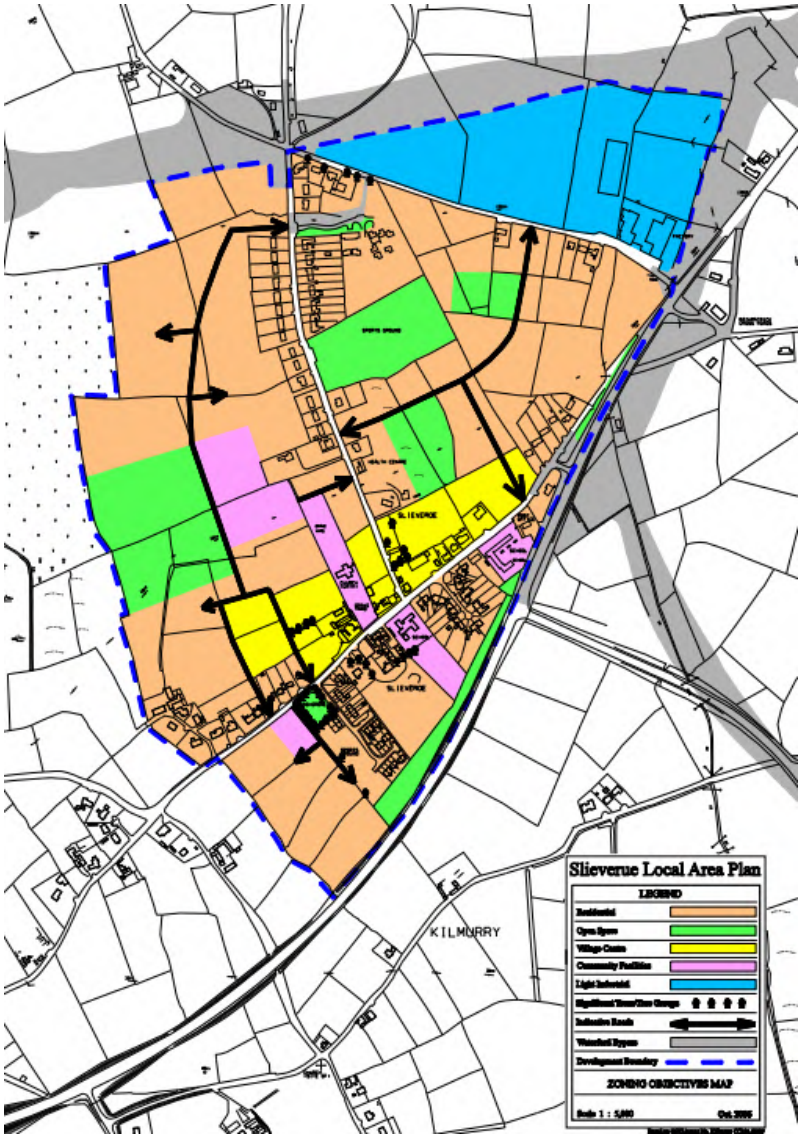


**Figure 2-3 - Extract from Slieverue LAP 2006[3]**

#### 2.1.3.1.4. Planning Application Constraints

A detailed planning search was carried out within the identified study area, in order to identify all development applications within the study area which could possibly constrain the development of the proposed road scheme.

[3] https://www.kilkennycoco.ie/resources/eng/Services/Planning/LocalAreaPlans/Slieverue/slieverue%20zoning%20obj.pdf

It is noted that a significant number of the planning applications received within the study area since the last iteration of this scheme related to permission for individual dwellings with associated wastewater treatment facilities.

However, there have also been several more significant applications granted recently which could potentially constrain the proposed road scheme. These schemes are outlined briefly below;

**Application Register Reference 18573**: Planning permission was granted on 8th march 2019 for Development will consist of upgrade of GRT ISL-KK 100kv overhead line including: re-stringing conductor with higher capacity conductor, replacement of large proportion of existing structures, breaking out & reconstruction of concrete foundation & shear blocks of metal masts, painting of mast structures, replacement of insulators, crossarms, stays and/or fittings on existing structures &fitting/replacement of bird flight diverters. It is noted that the 46.4km of the overhead line in located within Kilkenny.

**Application Register Reference 1851**: Extension of Duration permission was granted on 23rd March 2018 to extend the life of an application granted under for the following: The development consists of the retention and continued use of the existing quarry development (c. 12.1 ha). Processing of material takes place by crushing and screening using mobile crushing and screening plants (2 no. mobile crushing plants and 3 no. mobile screening plants for which retention is also sought). Permission is sought for the retention of the existing wheel wash. Retention permission is also sought for the existing compound which is used in conjunction with the quarry development. The application is now valid until 18th March 2023.

**An Bord Pleanála Reference PL10.246963 / Application Register Reference 15366:** Planning permission was granted on by An Bord Pleanála for development within part of an existing quarry for a C&D recycling facility for the recycling of construction and demolition waste and for the importation and recovery of non-hazardous soils, subsoil and other similar material. Material will be crushed and screened using existing mobile quarry plant and machinery and non-hazardous soils will be used in the existing rehabilitation scheme for the quarry.

**An Bord Pleanála Reference PL10 .242559 / Application Register Reference 13353:** Planning permission was granted by An Bord Pleanála on 26th May 2014 for the erection of 1. no.500 kw wind turbine (hub height 65.00m), and the construction of a 25.00 sq. m electrical sub-station, site access road, and all ancillary works.

It is noted that the study area is now available to view on the Kilkenny Planning Search Online Application. A system has been put in place whereby all application for development within the study area are issued to the design team for comment during the statutory public consultation time-period. Any future applications within the study area will be examined by the design team, in order to determine the likely impact on any new development in the selection of proposed routes.

This allows the planning and development information to be updated and the opportunity to identify proposed developments with the potential to impact on the route selection process.

# 2.2. Socio-Economic and Community (Population)

## 2.2.1. Introduction

Population and socio-economic factors comprise an important element of the 'environment', and any potential constraints associated with the proposed scheme should therefore be identified at this preliminary stage. A review of the potential constraints within the identified study area, with respect to these factors, has been prepared through the completion of a desk-based review of all available information, including available Ordnance Survey mapping and aerial photography.

## 2.2.2. Methodology

The following datasets have been examined as part of this study:

- Central Statistics Office: Electoral Division Boundaries;
- EPA Maps.

## 2.2.3. Identified Constraints

### 2.2.3.1. Population

Recent demographic trends are examined at State, County and local level. The constraints study area is located within the following Electoral Divisions:

- Kilbride;
- Kilmakevoge;
- Ballincrea;
- Kilcolumb;
- Rathpatrick; and
- Dunkitt.

Figures published in the 2016 Census indicate that the population of Ireland grew by 3.8% since the 2011 Census[4]. The population level in County Kilkenny has also increased in recent years by approximately 4%, to 99,232, recorded during the 2016 Census.

The population in the immediate vicinity of the constraints study area showed an overall decrease since the 2011 census of approximately 2.6%. The latest recorded population changes for the combination of the six EDs which cover the constraints study area are presented in Table 2-1 below.

**Table 2-1 – Population Changes**

| Area | Total Population | | % Change |
|---|---|---|---|
| | 2011 | 2016 | |
| State | 4,588,252 | 4,761,865 | +3.8 |
| Co. Kilkenny | 95,419 | 99,232 | +4.0 |
| Kilbride ED | 427 | 400 | -6.3 |
| Kilmakevoge ED | 430 | 433 | +1.0 |
| Ballincrea ED | 310 | 313 | +1.0 |
| Kilcolumb ED | 579 | 585 | +1.0 |
| Rathpatrick ED | 1,140 | 1,095 | -3.9 |
| Dunkitt ED | 1,058 | 1,015 | -4.1 |

### 2.2.3.2. Employment and Economic Setting

Employment rates across Ireland increased in 2016 by 9% for women and 12.8% for men when compared to 2011 levels (CSO, 2017). An overall unemployment rate in Ireland in 2016 of 12.9% was reported, with the

[4] https://www.cso.ie/en/media/csoie/releasespublications/documents/population/2017/Chapter_1_Population_change_and_historical_perspective.pdf

following sectors reported to have experienced the greatest increase in employment levels over the preceding five years; Health and Social Work, Computer and Related Activities and Construction (CSO, 2017).

The Economic and Social Research Institute (ESRI) have recently published a review of the overall outlook for the Irish economy, in a local and international context (ESRI, Summer 2017). The general outlook with respect to the Irish economy is positive for 2017; albeit the ESRI do note the need for caution in the current market, particularly in relation to the issue of Brexit. Some of the main findings of the analysis are as follows:

- Continued growth in employment levels noted, particularly in the Construction sector;
- Gross Domestic Product (GDP) was predicted to increase by 3.8% for 2017. This increasing trend was predicted to continue for 2018, with a 3.5% predicted increase in GDP;
- Household consumption continued to grow throughout 2016, following a robust performance in 2015, due to the following drivers; continued improvement in labour market conditions, and continued improvement in household balance sheets;
- A slowdown in revenue growth was reported, and further possible complications for the public finances due to Brexit and the recent decision on funding water provisions were also noted. In addition, the underlying vulnerability of the domestic economy to external factors was highlighted; and
- Given the expected strong performance of both the housing and labour market over the short to medium term, further significant contribution to growth from consumption was predicted.

It should be noted that subsequent trends may be impacted by the Covid-19 pandemic which began in March 2020.

#### 2.2.3.3. Land-use and Community

The constraints study area covers the existing N25 route and lands extending approximately 3km either side of this national road. Within the northern region of the constraints study area lies the small village of Glenmore. The southern boundary of the constraints study area intersects the existing N25 Waterford bypass. The western and eastern portion of the constraints study area comprise agricultural land dominated by primarily third class roads, with the River Barrow running parallel to the eastern boundary of the study area.

Land-use within the constraints study area is primarily agricultural with residential and commercial properties scattered sparsely throughout the study area and within the village of Glenmore.

The existing environment of the study area is predominately rural in nature. The land use is predominately a mixture of agricultural lands, residential properties and a small degree of commercial and industrial premises. Residential properties are typically in ribbon style development along the existing N25 with properties, churches and schools within small villages and clusters along the route (Luffany, Curraghmore, Ballyrahan, Gaulstown, Ballymona, Kilmakevoge, Glenmore and Graiguenakill).

#### 2.2.3.4. Tourism and Commerce

Tourism is a significant component of the Irish economy, it is estimated to employ approximately 220,000 people overall, and in 2016 was responsible for overseas earnings of €4.577 billion (DTTAS, 2017).

Tourism is a particularly important industry for Kilkenny, a fact which has recently been highlighted by Kilkenny County Council through the preparation of a Tourism Statement of Strategy and Work Programme (2017-2022). This document clearly sets out the significance of this region in the context of national and international tourism:

*"Kilkenny's history, heritage, and landscape have provided a valuable tourism asset, which has the potential to sustain a significant element of our local economy. Tourism is currently a major revenue generator for County Kilkenny, estimated by Fáilte Ireland, at approximately €76m, in 2015. Kilkenny is marketed as a heritage destination and has a large number of visitor attractions associated with heritage, both built and natural. There is also potential to build on the contribution of the County's natural and built heritage to the economic development of Kilkenny"*[5].

There is very limited commercial, tourism and retail businesses located within the constraints study area.

Kilkenny County Council have given a commitment within the County Development Plan 2014-2020 to facilitate and support the development of Kilkenny as a premier location for tourism as it is now recognised as an international destination with the drive to grow international visitor numbers and income.

A Greenway connecting the town of New Ross in the north to Waterford City in the south via a disused railway is expected to be completed in 2021. The railway, which closed in 2010 due to low passenger numbers, intersects the eastern section of the study area and runs in a predominantly north/south direction along lower

[5] https://www.kilkennycoco.ie/eng/Your_Council/Council_Meetings/Kilkenny_County_Council_Ordinary_Meetings/2017-Council-Meetings/Tourism-Strategy.pdf

lying topography. Work on the 24km South-east (Kilkenny section) Greenway has started and is anticipated to benefit tourism in New Ross and Waterford City.

## 2.3. Agronomy

### 2.3.1. Introduction

This section identifies the key agricultural constraints within the study area. Agricultural constraints are the key farm enterprises sensitive to the construction of a new road scheme. The Agricultural constraints identified within the study area are presented in the Agricultural constraints drawing.

### 2.3.2. Methodology

The assessment of Agricultural constraints was undertaken in line with Transport Infrastructure Ireland's (TII) document entitled "Project Manager's Manual for National Roads" (2019) and the Environmental Protection Agency "Guidelines on the information to be contained in Environmental Impact Assessment Reports" Draft 2017.

The assessment included an assessment of key agricultural constraints. Key agricultural constraints are farm enterprises considered most sensitive to a new road development such as intensive dairy, equine farms or farms which are important in terms of type or scale. In general dairy and equine farms are more sensitive to the construction of a new road. Intensive horticulture, pig or poultry units would also be considered key enterprises.

The agricultural assessment of the constraints within the study area comprised of a combination of a desktop examination of available information, local knowledge and consultation with several sources on current land uses and a roadside survey which was undertaken in September 2019, to identify any potential agricultural constraints for consideration in this report.

#### 2.3.2.1. Sources of information

The following information sources were used to collate and interpret data relevant to the study area.

- 2010 Census of Agriculture;
- Soils and Subsoils digital data from Environmental Protection Agency and Teagasc;
- Orthophotography 2016, 2017;
- The Directory of the Turf; and
- EPA IE/IPC Licence Information.

### 2.3.3. Identified Constraints

The study area as delineated in the Agricultural Constraints Drawing. The study area is predominately rural in nature. The principal land use is agriculture.

The study area is generally flat to undulating topography with acid brown earth soils. The soils are predominately well drained. Farming in the area is intensive in nature due the fertile soils with dairy, beef, mixed livestock and tillage enterprises found throughout the study area.

The natural constraints identified consist of agricultural land and the quality and intensity of use from an agricultural perspective. Artificial constraints consist of permanent agricultural structures such as farm buildings, animal handling facilities and farm roadways.

The study area can be considered to be an area of agricultural production consisting of lands of wide range use capable of most agricultural uses. The main farming enterprises located within the study area are predominately grass based including dairy, beef, sheep and some equine enterprises. There are also some intensive tillage enterprises located within the study area. Agriculture is intensive in nature throughout the study area.

Good quality agricultural land is found throughout the study area and therefore land is a natural constraint that is unavoidable. Artificial constraints such as those outlined above were found throughout the study area. Farmyards and farm buildings should be avoided to minimise the impact where possible. Removal of farm buildings or severance of land from farm buildings can impact on the management and day to day operation of farm enterprises.

The key agricultural constraints within the study area were identified by a combination of a desktop study and a roadside survey. This resulted in identifying key sensitive farms which were mainly those involved in dairying or equine farms. Please refer to the Agricultural constraints drawing (Figure 2.4).

#### 2.3.3.1. Dairy Enterprises

Dairy farms are known to be particularly sensitive to the location of a major road. A dairy farm is one of the most intensive land-based farming enterprises and is entirely dependent on the land parcel or grazing paddocks adjacent to the farmyard. In addition to the land take involved, the location of a major road may cause severance of the land parcel into smaller areas or severance of the access from the yard to the grazing paddocks. This may impact on the future viability of the farm or its continuation in dairying. Where possible dairy farms especially those where the grazing platform is affected i.e. the land that is in close proximity to the farm buildings and that is used for daily grazing by the dairy herd should be avoided.

The dairy constraints are found throughout the study area with a predominance of key dairy farms located to the west of the existing N25 at Ballinclare, and Grogan.

##### 2.3.3.1.1. Equine Enterprises

There is a rich tradition of breeding and racing horses in County Kilkenny. The equine sector in County Kilkenny is recognised for breeding and training of both flat and national hunt horses. Key equestrian enterprises include equestrian centres. A key equestrian training enterprise “Beacon Hill Stables” was identified within the study area. In addition, a number of other equine enterprises were identified within the study area some of these appear to be equine farms where horses are kept on the farm in conjunction with other with other farm enterprises.

Equine farms also have the potential to be severely impacted, as equine stock are of a more nervous disposition than other stock types and are prone to stress caused by irregular noise and moving vehicles. Such stress may render individual land parcels unsuitable for grazing equine stock or for certain types of equine activities.

##### 2.3.3.1.2. Tillage Enterprises

From the assessment it is evident that specialist tillage farming is operated within the study area. There are some very intensive cereal and potato growers located throughout the study area. A road scheme will have a lower impact on a tillage farm or enterprise than on a livestock farm. Land take and severance may also occur on a tillage farm although the impact will largely consist of access problems for machinery to the severed areas.

#### 2.3.3.2. Livestock Enterprises

Livestock enterprises such as beef and sheep are generally less affected than dairy farms. Beef production is the predominant farm enterprise within the study area. Other farm enterprises such as sheep and mixed livestock are also carried out within the study area.

Like dairy farms, livestock farms are also affected by land take and severance due to the location of a road. Severance of lands will impact on overall farm management and access to farmyard facilities from severed areas. These farms are generally less affected than dairy farms as stock on these farms are not moved from field to field as frequently as on a dairy farm. Large farmyards were identified during the roadside inspection which indicated intensive livestock farming is carried out within the study area.

#### 2.3.3.3. Pigs/Poultry

A review of EPA licences required for intensive pig and poultry enterprises concluded there were no intensive pig or poultry farms within the study area.

#### 2.3.3.4. Horticulture

No horticulture enterprises were identified within the study area.

#### 2.3.3.5. Agri- Businesses

Agri-businesses could be affected by the location of a road. The location of a new road near such businesses will impact on the accessibility of the business to the agricultural and wider community. Glanbia Cooperative, and Roche Agri machinery ltd are located within the study area.

These businesses would provide a number of services to the farmers in the study area including supplying of inputs such as seeds, feeds and fertilisers along with supplying and servicing agricultural machinery. Frequent access with agricultural machinery would often be required for these businesses. Farmers would be using the co-operative on a weekly basis.

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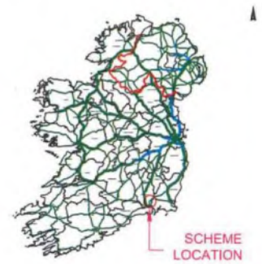


Equine

Dairy Farm

Study Area

This drawing has been produced by Philip Farrelly & Co in relation to the N25 Waterford to Glenmore Scheme. Philip Farrelly & Co are a sub-consultant to Atkins



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Purpose: Environmental Constraints Report

Title: Figure 2-4 Agronomy Constraints Map

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# 2.4. Geology, Soils and Contaminated Land

## 2.4.1. Introduction

This section provides a description of the topography, soils and geology in the general region of the proposed scheme and also identifies potential associated constraints.

## 2.4.2. Methodology

The desk-based study involved reviewing information from the following sources:

- Geological Survey of Ireland Online mapping (GSI Spatial Resource);
- Teagasc Subsoils maps (gis.epa.ie/Envision);
- Ordnance Survey Ireland (OSI) Online mapping (OSI, 2020); and
- Integrated Pollution Control (IPC and Industrial Emissions (IE) Licenses, Environmental Protection Agency.

This review has been undertaken in accordance with relevant best practice guidance from the Institute of Geologists of Ireland (IGI), 'Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements' (IGI, 2013) and EPA (2015) Revised Guidelines on the information to be contained in Environmental Impact Statements (2015).

## 2.4.3. Identified Constraints/Receiving Environment

### 2.4.3.1. Topography

The study area includes a range of topographical features and as a result elevation is noted to vary from over 185m at spot heights towards the west of the study area to below 10m towards the north of the study area where Unnamed/Oaklands_010 surface water tributaries of the River Barrow intersects. The existing N25 intersects a more gentle gradient profile through the study area, flanked to the east and west by elongated (north / south) sections of increased elevation. Spot heights include a 185m highpoint between Coolnaleen and Ballinclare, just west of the existing N25 and elevation is generally lowest towards the east of the study area, approaching the River Barrow and intersecting tributaries. An extended ridgeline of approximately 2.5km is identified running north south just west of the existing N25. A second shorter (c. 1km) ridgeline is also identified running from north west to south east and is situated towards the north east of the study area and south east of the existing N25.

A search of Historic mapping (Historic Map 25-inch (1888-1913) OSI, 2019) indicates that a railway was in operation through the study area. This railway, now disused, intersects the eastern section of the study area and runs in a predominantly north/south direction along lower lying topography and may present a risk with respect to contaminated land.

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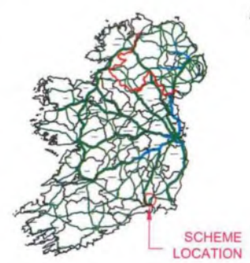


955 ft
899 ft
843 ft
787 ft
735 ft
682 ft
627 ft
577 ft
525 ft
476 ft
427 ft
377 ft
331 ft
285 ft
243 ft
200 ft
161 ft
121 ft
85 ft
52 ft
23 ft
0 ft

Study Area



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Purpose: Environmental Constraints Report

Title: Figure 2-5 Topographical Map

| Original Scale | Des/Drawn | Checked | Authorised |
|---|---|---|---|
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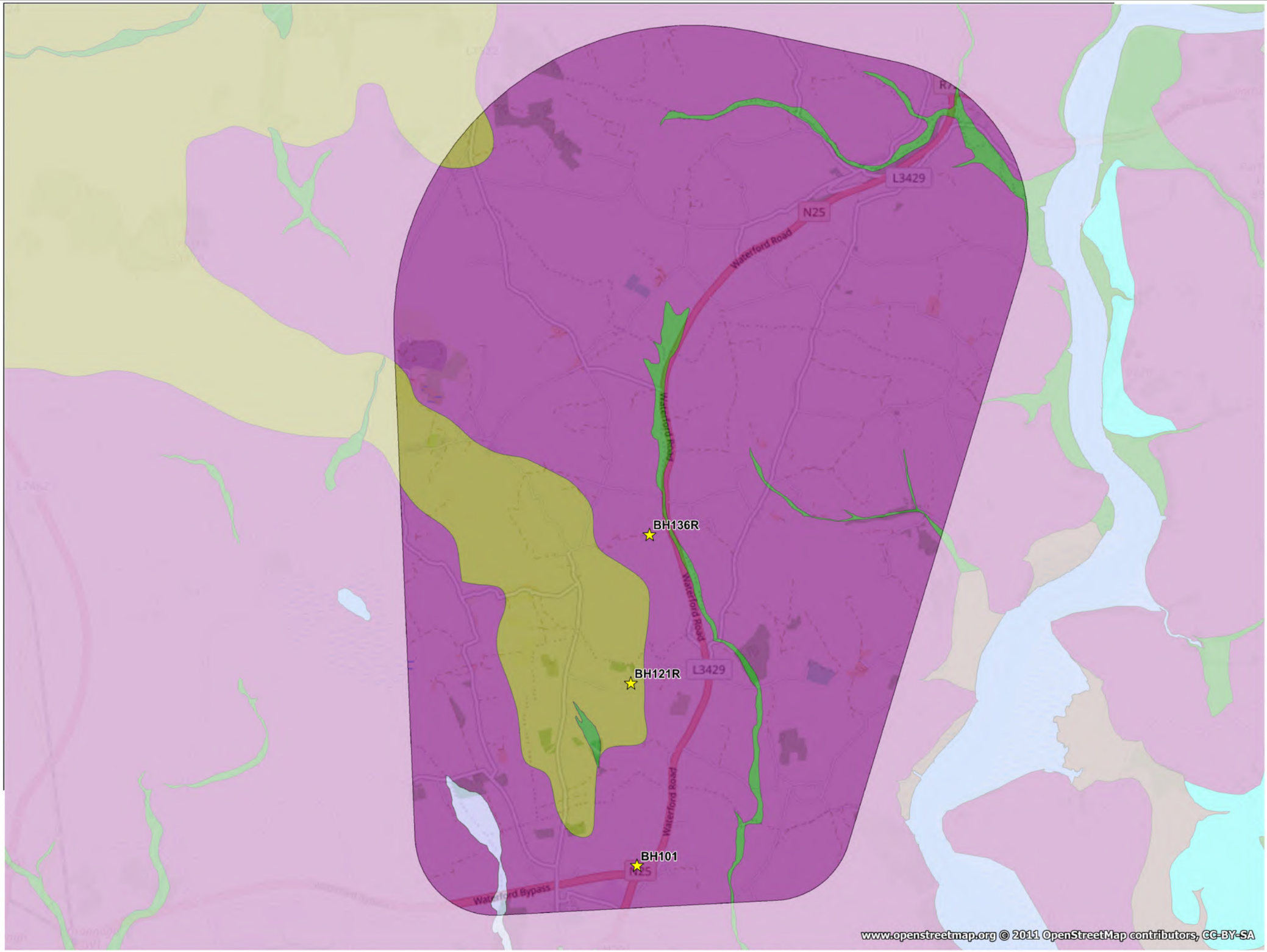
#### 2.4.3.2. Soils and Subsoils

The constraints study area is predominantly underlain by Deep marine, Slate, schist and minor greywacke bedrock of Palaeozoic, Lower – Middle Ordovician age. Towards the south west an area of continental redbed facies; sandstone, conglomerate and siltstone of the Palaeozoic, Upper Devonian – Carboniferous age intersects the study area. Quaternary sediments; Till derived from Lower Palaeozoic shales persist throughout the study area interspersed by Bedrock outcrop / subcrops. A small area of till derived from Devonian sandstones is located towards the south west of the study area and slivers of alluvium trace along intersecting waterbodies within the study area.

According to a 2012 geotechnical investigation completed by Glover Site Investigations, the general thickness of overburden encountered in the area ranges from 0.1m below ground level (bgl) (BH121R) TO 5.5m bgl (BH101) with an exception of 18.94m bgl in BH136R. This investigation was carried out on the preferred emerging route identified in 2012. A localised area of lacustrine deposits is within the southwest of the study area, which may be characterised by weak sediment with low permeability.

The ‘teagasc soils’ map records the study area soil composition as predominantly ‘Clonroche (1100a). This is described as fine loamy drift with siliceous stones. A smaller area of ‘Clashmore’ (1100c) is also identified within the study area and is described as coarse loamy drift with siliceous stones. Finally, in areas of intersecting waterbodies ‘River alluvium’ (5RIV) is noted.

According to the Teagasc ‘Ireland Peatland Map’ no areas of peatland (including raised bogy, blanket bog or fen) have been recorded within the study area however, a localised area identified as ‘cut over raised peak’ is noted as being within the southwest of the study area which may contain variable depths of peat deposits (GSI, 2020).

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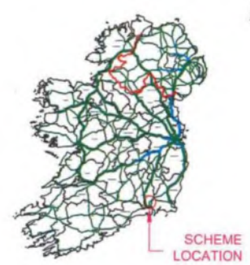


Soil Association
- 05LAK
- 05RIV
- 1100a
- 1100c
- Salt marsh
- Tidal marsh
- Urban
- Water body
- Boreholes
- Study Area



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Title: Figure 2-6 Soil Association Map

| Original Scale | Des/Drawn | Checked | Authorised |
|---|---|---|---|
| N/A | CG Date 10/02/2020 | MMcL Date 10/02/2020 | MMcL Date 10/02/2020 |

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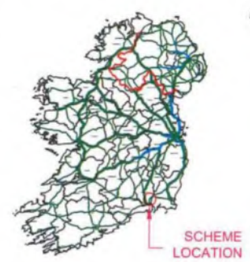


Quaternary Sediments

- Alluvium
- Bedrock outcrop or subcrop
- Cut over raised peat
- Esturine silts and clays
- Gravels derived from Lower Palaeozoic shales
- Lacustrine sediments
- Till derived from cherts
- Till derived from Devonian sandstones
- Till derived from Lower Palaeozoic shales
- Water
- Study Area



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Purpose: Environmental Constraints Report

Title: Figure 2-7 Quaternary Geology Map

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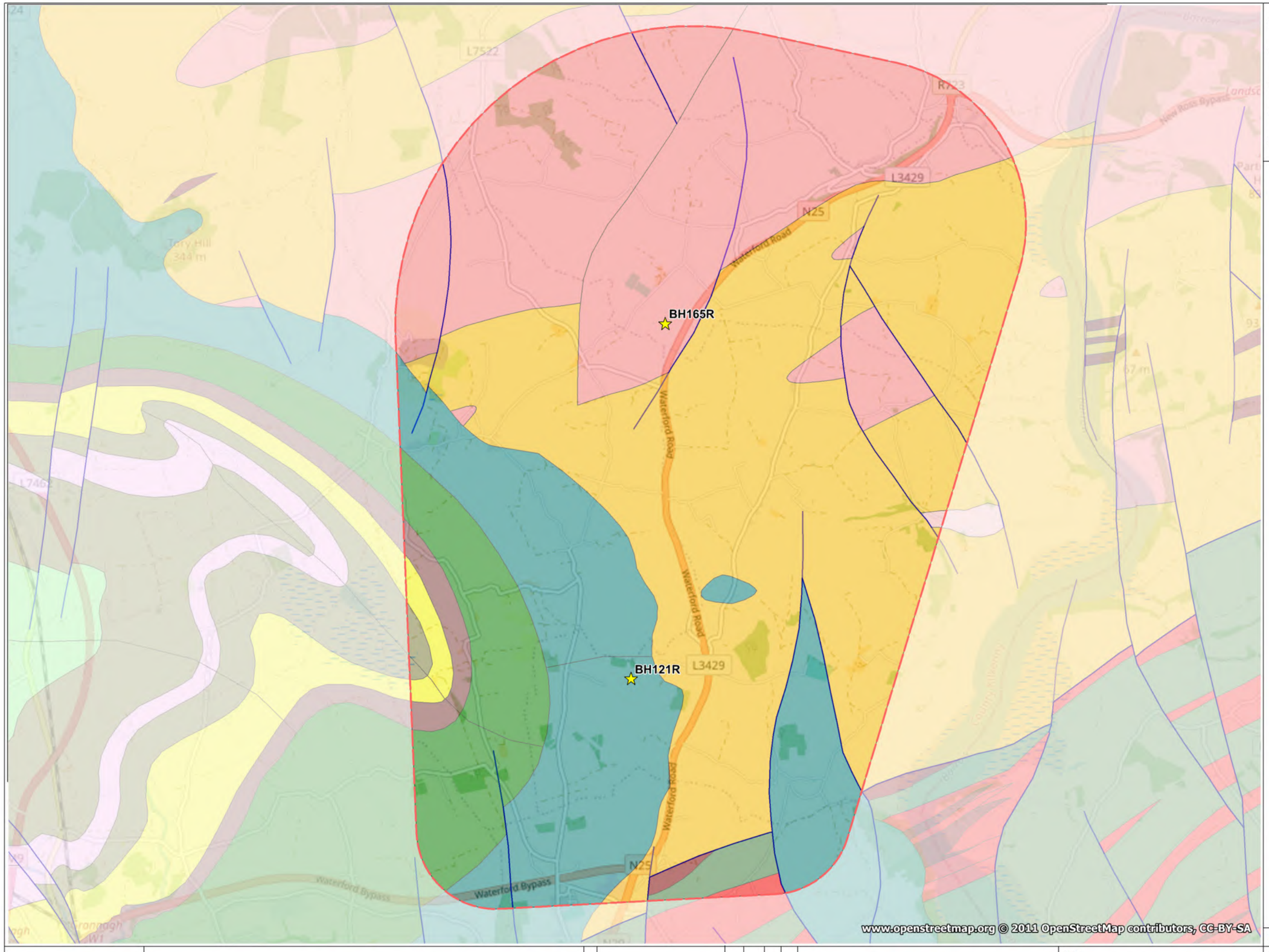
#### 2.4.3.3. Bedrock Geology

The study area is underlain by 5 major formations. In the west, southwestern section, the study area is underlain by yellow and red sandstone, and green mudstone of Kiltorcan Formation. The northern section is underlain by green, red-purple, buff slate, siltstone, greywacke and shale of the Oaklands Formation. The eastern and central section is predominantly underlain by green and grey slate with thin siltstone from the Ballylane Formation. The southern, southeast and central west sections are underlain by the Carrigmaclea Formation comprising red, brown conglomerate and sandstone with pockets of Green and grey slate with think siltstone of the Ballylane Formation; and Dolerite and Rhyolitic volcanics, grey and brown slates of Campile formation, as shown in Figure 2-8. According to existing geotechnical investigations and boreholes in the area, bedrock was encountered between 0.1m bgl (BH121R) and 11.5m bgl (BH165R) (Preliminary Ground Investigation, Glover, 2012).

There are approximately 15 no. faults running in a generally north south direction as well as a north east to south west direction as evidenced on the GSI Spatial Resource.

No karst features are reported on the GSI Spatial Resource to be present within the boundary of the study area. The nearest karst features are located approximately 5km to the south west of the study area and is described as a limestone, unbedded Spring (2311SEK001), situated within the stratigraphy ‘Waulsortian’.

Karstification is a process whereby some of the pre-existing fissures and fractures in the limestone rock are slowly enlarged as groundwater passing through them dissolved away limestone. The main topographic features of karst areas are enclosed depressions, sinking streams, sparse or intermittent streams, bare rock exposures, collapse features, dry valleys, deep water tables in high topographic areas, caves and springs (GSI, 1993). Such features are present in the region west of the study area. In karst regions, the interval between the topsoil and the mostly unaltered bedrock is known as ‘epikarst’; this layer is typically characterised by extreme fracturing and weathering.

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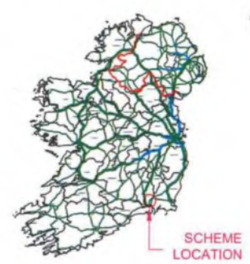


Bedrock Geology

- Ballylane Formation
- Ballymartin Formation
- Ballysteen Formation
- Campile Formation
- Carrigmaclea Formation
- Dolerite
- Granite (undifferentiated)
- in Campile Formation
- Kiltorcan Formation
- Oaklands Formation
- Porters Gate Formation
- Boreholes
- Study Area



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Title: Figure 2-8 Bedrock Geology Map

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#### 2.4.3.4. Geological Heritage Areas

As noted on the GSI Spatial Resource, there are no designated Geological Heritage Sites within the study area. The nearest features are recorded approximately 270m east (the River Barrow, Lower and River Suir' – Site Code: Unassigned & IGH 14 ranking) and 2km south east (Granny Quarry – Site Code: KK011 & IGH 8 ranking). These are both designated under the National Heritage Plan, 2002.


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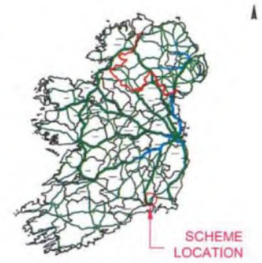


Pits and Quarries

Historic Pits and Quarries

Geological Heritage sites

Study Area



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Purpose: Environmental Constraints Report

Title: Figure 2-9 Geological Heritage Map

| Original Scale | Des/Drawn | Checked | Authorised |
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#### 2.4.3.5. Economic Geology

According to the GSI the closest active quarry is Oaklands Quarry situated over 3km east of the study area, near Slieve Coiltia Commons. It is however evident from aerial imagery that 'Kent Quarries' is situated within the study area. This is situated towards the westmost section of the study area, along the Ballincrea / Knockbrack Road and has a footprint of approximately 0.9km$^2$. Kent Quarries is identified on the GSI Aggregate Potential Mapping (APM) resource as an historic quarry. A further unnamed historic quarry is also identified towards the centre northern aspect of the study area (5,033.00). Two historic pits are situated towards the north east of the study area, adjacent the River barrow and just south of Ballyverneen. Finally, Aggregate Potential Mapping (AMP) identifies four other 'Pits and Quarries Areas', dated from the Mid-Late 19$^{th}$ Century to the Early-Mid 20$^{th}$ Century. These each occupy small isolated footprints within the study area.

Three 'Mineral Localities' are reported on the GSI Spatial Resource as being within or in immediate proximity to the study area, as follows:

- Slate, situated towards the centre of the study area (5,033.00);
- Clay, brick; situated towards the north east of the study area (1,763.00); and
- Clay, situated towards the north east of the study area (5,029.00).

#### 2.4.3.6. Landslides

There is only 1 no. reported landslide situated within approximately 2km of the study area (GSI Spatial Resource). This was identified south west of New Ross and East of Glenmore (Forestalstown). While the landslide trigger is recorded as 'unknown' the landslide mechanisms is noted as 'Fall'. The susceptibility to landslides within the vicinity of the study area is generally 'Low' with scattered pockets of 'Moderate Low', 'Moderate High' and 'High' throughout the study area.

#### 2.4.3.7. Licenced Facilities (including Landfills)

Based on a review of available National Waste Collection Permit Office (NWPCO) records, there are 34 waste facility permitted sites located within Co. Kilkenny, however none of these are situated within the study area. The nearest facility 'Tom Kenny Skip Hire (NWCPO-11-02105-06), is situated approximately 1.5km south at Nicholastown Slieverue.

A review of the EPA 'Focus on Landfilling' (2010) report suggests there are no known illegal, MSW, Inert, Mono or IPPC Landfill sites within the study area.

The closest licensed Urban Wastewater Treatment Plant (Reg Code: D0022) is located circa. 3.2km to the south of the study area (EPA, 2020). The closest IPPC facility is located circa. 1.7km south east of the study area.

In summary, the following specific constraints have been highlighted:

- Prevalence of faulting and bedrock outcrops / sub crops suggest difficult / changeable ground conditions may persist along a preferred route, and a requirement for breaking out of bedrock in these areas, depending on proposed road elevations, may be required. A geotechnical ground investigation will be required to accurately verify ground conditions once a preferred route has been selected and in advance of the detailed design stage.
- While the majority of the study area comprises agricultural land, there is potential for Made Ground to be encountered beneath any lands which have already been developed, and beneath the existing N25 and local third-class roads. Given the inherent heterogeneity associated with Made Ground, construction on such materials can bring potential contaminated land and ground stability issues. These considerations can be further addressed during the geotechnical ground investigation.
- Although no karst features are reported within the constraints study area, such features are reported by the IGI to be present in the surrounding area, notably south west of the study area. Taking account of the local geology, the potential presence of karst features beneath the study area cannot be ruled out at this stage.
- A number of historic and current land uses, including the disused railway, quarries and pits, may have the potential to have introduced contamination within the study area (e.g. through spillages and infilling/landfilling activities). A Contaminated Land Preliminary Risk Assessment is recommended to further understand risk of contamination against any preferred route option.

# 2.5. The Water Environment

## 2.5.1. Introduction

This section provides a description of the hydrological (i.e. surface water) and hydrogeological (i.e. groundwater) setting in the general region of the proposed scheme and also identifies potential associated constraints.

## 2.5.2. Methodology

The desk-based study involved reviewing information from the following sources:

- Geological Survey of Ireland Online mapping (GSI, Spatial Resource);
- Environmental Protection Agency Online mapping (EPA); and
- OPW Flood Hazard Online Mapping & National Catchment Flood Risk Assessment and Management Online Mapping (OPW).

An initial Stage 1 Flood Risk Identification exercise has also been undertaken to identify whether there may be any flooding or surface water management issues related to a plan area or proposed development site that may warrant further investigation. This is based on the methodology included within “The Planning System and Flood Risk Management – Guidelines for Planning authorities” (DEHLG 2009).

This review has been undertaken in accordance with relevant best practice guidance from the Institute of Geologists of Ireland (IGI), ‘Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements’ (IGI, 2013).

## 2.5.3. Identified Constraints

### 2.5.3.1. Flood Risk Identification

The key findings from the initial Flood Risk Identification Stage are as follows:

- There are a number of rivers and streams within the study area, including the Luffany Stream and the Nicholastown 16 Stream which both discharge ultimately into the River Suir south of the study area and a network of minor unnamed tributaries of the River Barrow which intersect the north of the study area);
- Only a small localised point within the study area has been identified to be at potential risk of flooding within the Kilkenny County Development Plan (2014 – 2020). The flood risk (via. fluvial sources) is identified at Slieverue, near the Rathpatrick Industrial Estate, just south of the south of the N25;
- A small area to the north west of the study area and towards the north east of the study area have been identified as ‘liable to flood’;
- The Office of Public Works (OPW) national flood hazard mapping was consulted (OPW, 2020) and although there have been several historic flooding events reported in the area surrounding the study area there are none within it or in immediate proximity to it (refer to Figure 2-10). The closest instances of flooding are associated with the River Suir, south of the study area. Flood risk mapping is available for the general vicinity of the study area from the Flood Maps maintained by the Office of Public Works. Available Preliminary Flood Risk maps for the constraints study area are presented in Figure 2-11 - Flood Risk Map and identify adjacent flood risk associated with the River Barrow, east of the study area;
- The interactive mapper ‘GeoHive’ identifies areas ‘liable to floods’, and these are also presented in Figure 2-11 - Flood Risk Map.

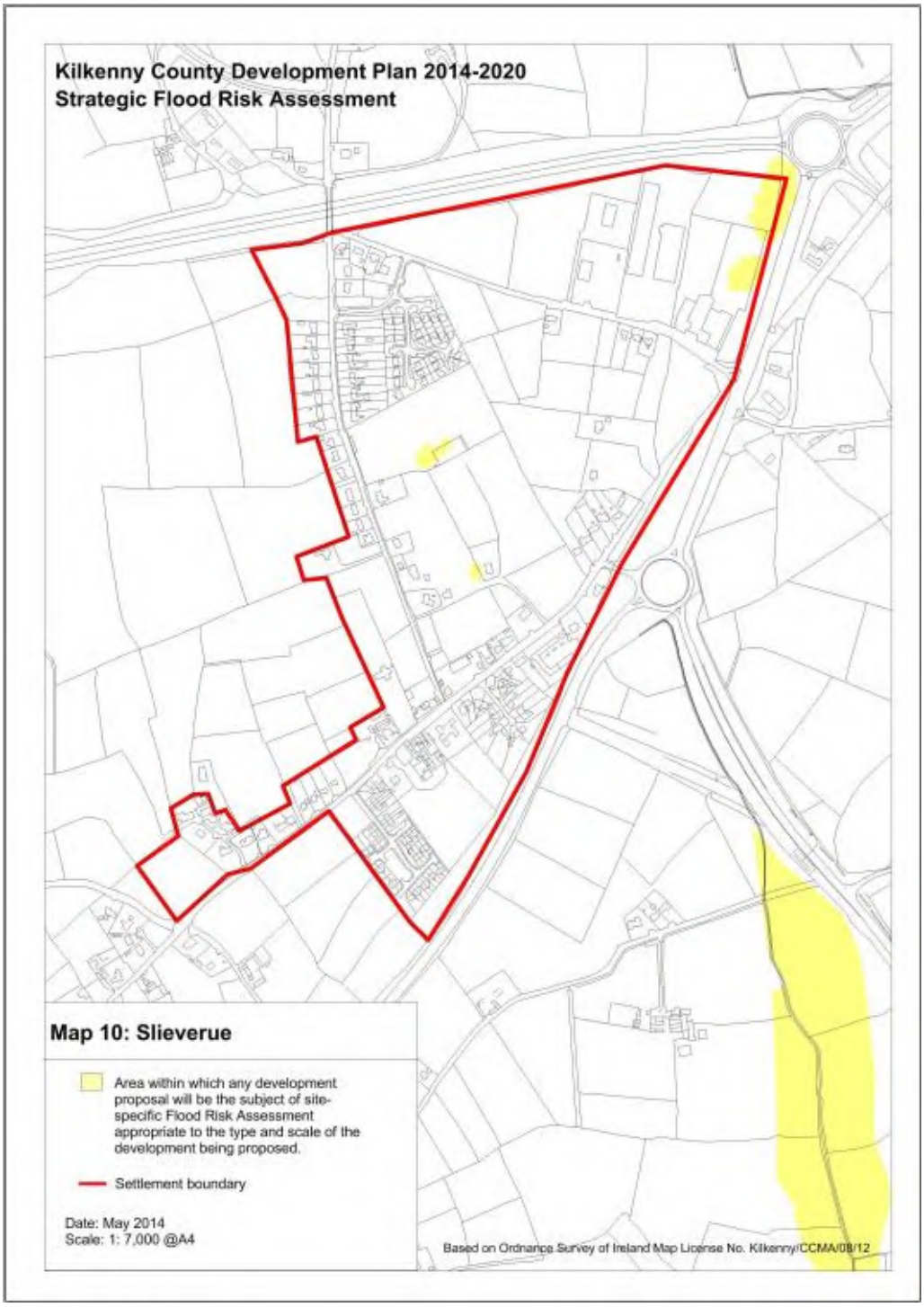
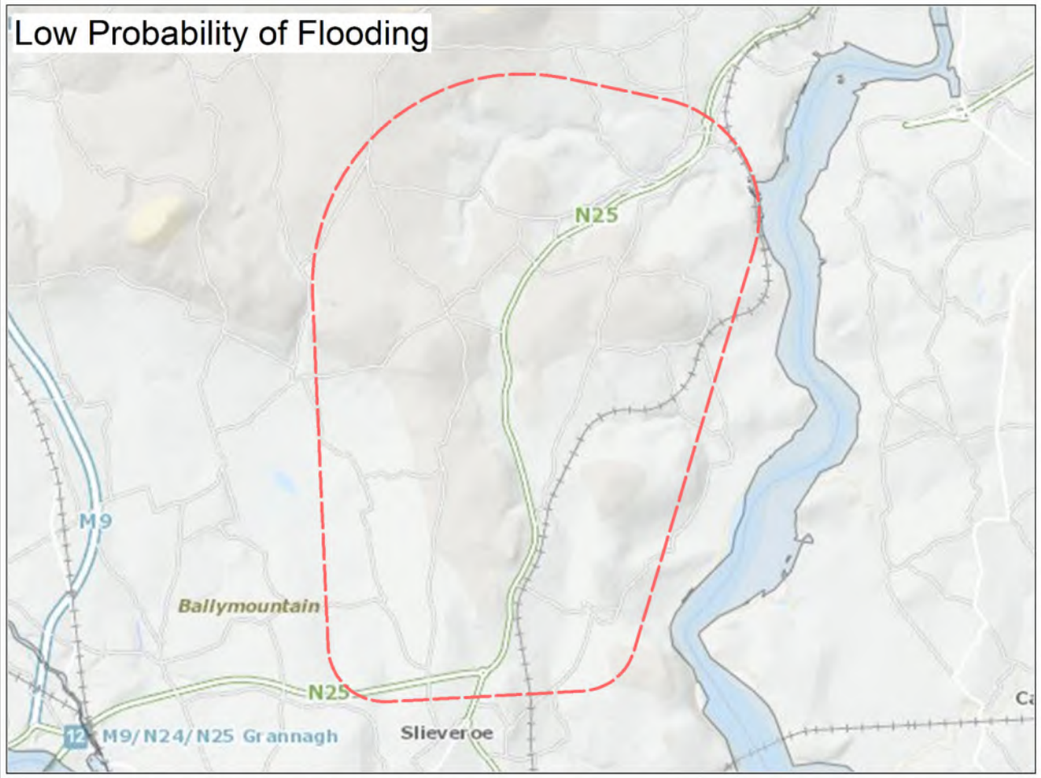
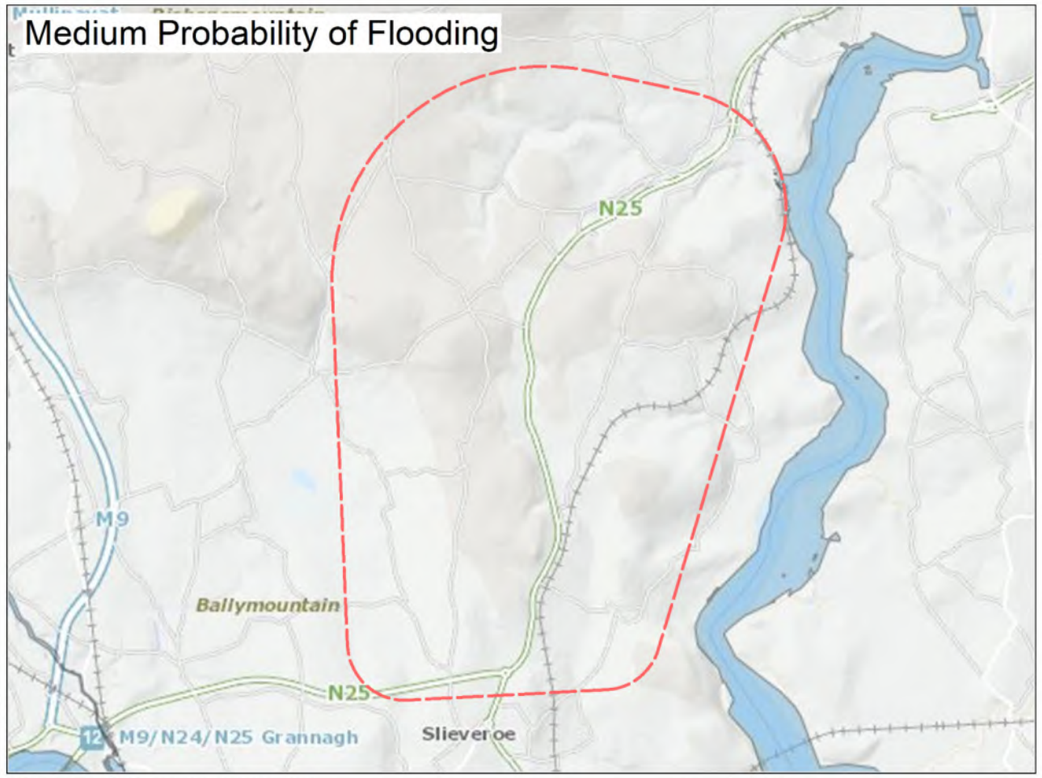
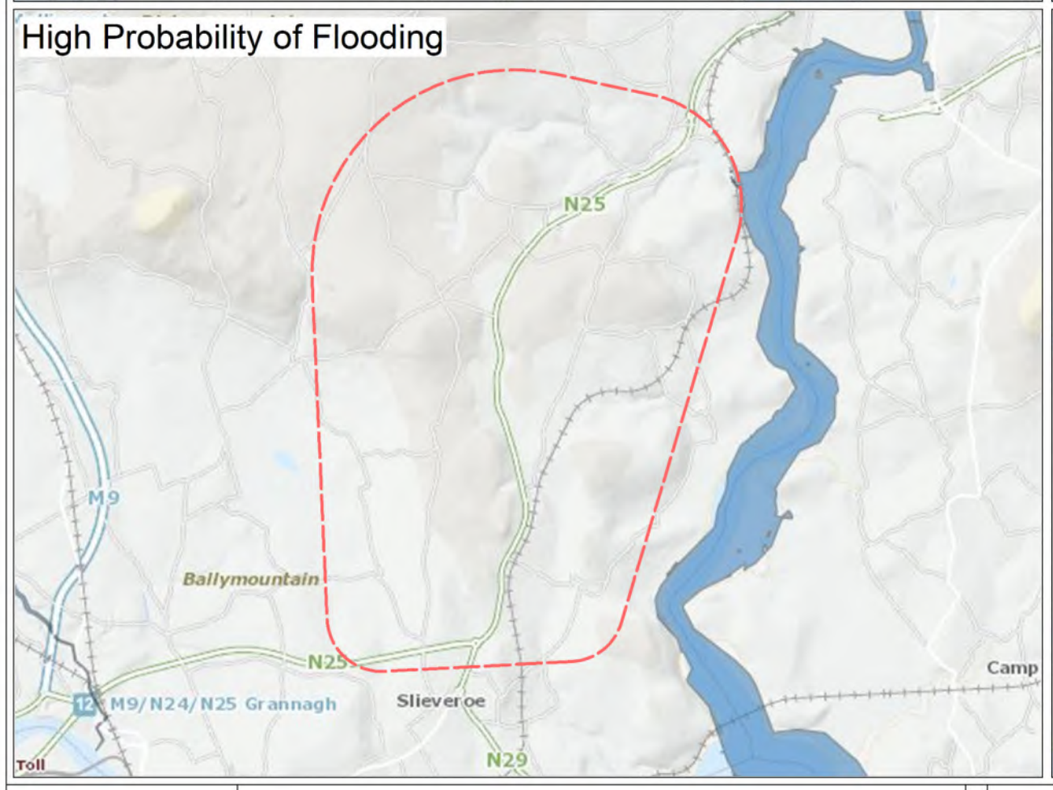


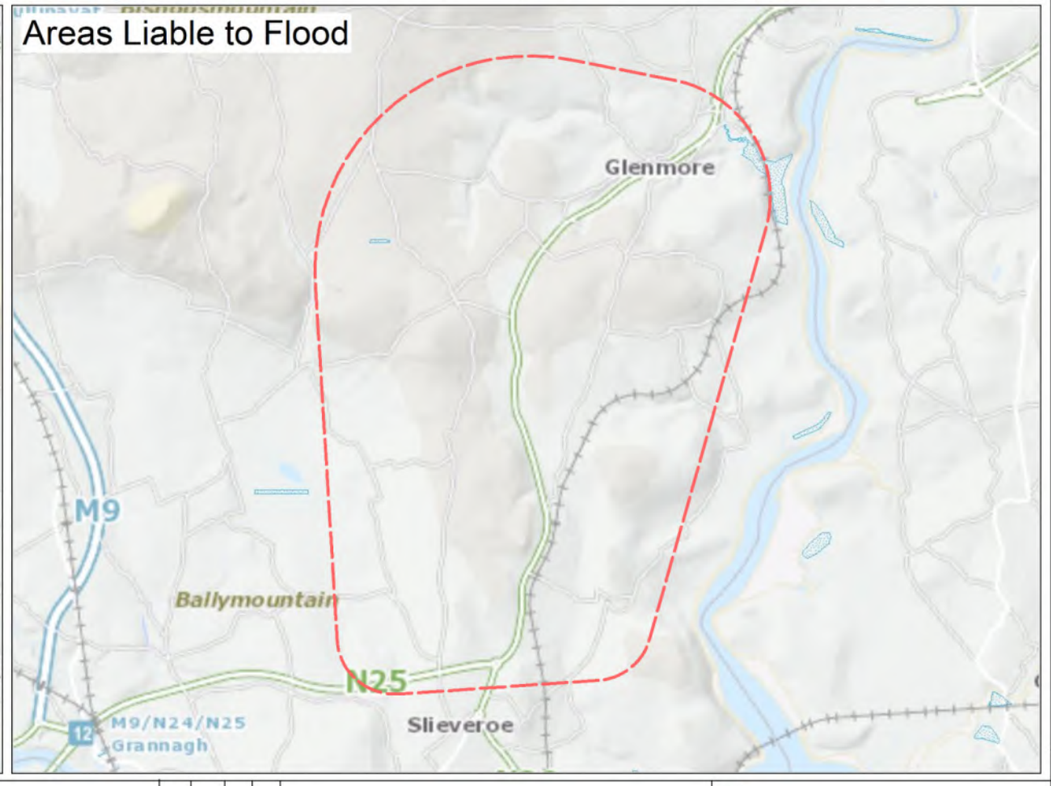

**Figure 2-10 - Strategic Flood Risk Assessment**

Based on a preliminary evaluation of the information presented above flooding is not considered to pose significant risk within the study area. It should however be acknowledged that the predominantly rural study area has not been subject to extensive or more detailed flood risk assessment and that further investigation may demonstrate an increased flood risk.

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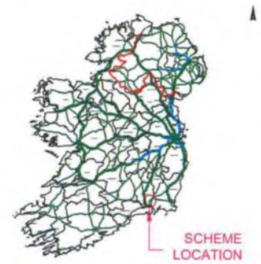


- Low Probability of Flooding
- Medium Probability of Flooding
- High Probability of Flooding
- Areas Liable to Flood

No past flood events were recorded within the study area. The closest was recorded as a reoccuring flood event over 3km south east.

Study Area



Bonneagar Iompair Éireann
Transport Infrastructure Ireland

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Client: KILKENNY COUNTY COUNCIL

Project: N25 WATERFORD TO GLENMORE SCHEME

Purpose: Environmental Constraints Report

Title: Figure 2-11 Flood Risk Map

| Original Scale | Des/Drawn | Checked | Authorised |
|---|---|---|---|
| N/A | CA Date 05/06/2020 | DMcL Date 05/06/2020 | MMcL Date 05/06/2020 |

| Status | Drawing Number | Rev |
|---|---|---|
| F | 5190130-ATK-XX-XX-DR-EC-0013 | 0 |

#### 2.5.3.2. Hydrology

The EPA Catchment explorer online identifies two primary catchments as falling within the study area, as follows:

**Nore Catchment**: This catchment includes the area drained by the River Nore and all streams entering tidal water between its confluence with the River Barrow at Ringwood, and the Barrow railway bridge at Drumdowney, Co. Kilkenny, draining a total area of 2,595km$^2$. The largest urban centre in the catchment is Kilkenny. The Slieve Bloom uplands at the northern tip of the catchment are underlain by old red sandstone. South of this limestones of varying purity underly the flat lowland areas of the catchment while shales and coal measures underly the Castlecomer Pleataux and Slieve Argdagh Hills. The southern part of the catchment is underlain by metamorphic rocks.

**Barrow Catchment**: This catchment includes the area drained by the River Barrow upstream of the River Nore confluence and all streams entering tidal water between the Barrow railway bridge at Great Island and Ringwood, Co. Kilkenny, draining a total area of 3,025km$^2$. The largest urban centre in this catchment is Carlow. The Barrow catchment is underlain in its flat northern area by limestones of varying purity which continue down the western side of the catchment and sustain good groundwater resources in places. On the eastern side of the catchment, granites dominate, culminating in the summits of the Blackstairs Mountains.

The following surface water features are identified within the study area (EPA Catchments, 2020) and are presented in Figure 2-12 below: -

- Luffany Stream (intersecting the mid to south east of study area);
- Nicholastown 16 Stream (intersecting the south west of study area); and
- Unnamed/Oaklands_010 surface water tributaries of the River Barrow (intersecting the north of study area).

The Luffany stream emanates from the centre of the study area, flowing in a southernly direction before discharging into the River Suir. This stream also carries the surface run-off from the surrounding hills area. To the immediate east of the study area, the River Barrow flows in a southernly direction before discharging to Barrow, Suir Nore Estuary ca. 7km downstream of the study area.

The Nicholastown stream to the south western section of the study area flowing in a north westerly direction before discharging into Lough Cullin.

The Oaklands_010 which emanates in the northern section of the study area and joins the River Barrow. Due to the nature of the topography, all the surface run-off flows towards the low-lying valleys which give rise to this stream. Refer to Figure 2-12 for further details.


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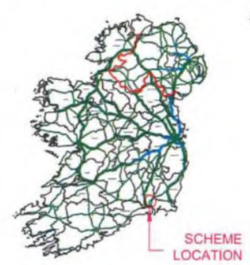
KEY PLAN




Mudflats and sandflats not covered by seawater at low tide

Atlantic salt meadows

Lakes

Rivers

Study Area



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Project: N25 WATERFORD TO GLENMORE SCHEME

Purpose: Environmental Constraints Report

Title: Figure 2-12 Main Hydrological Features Map

| Original Scale | Des/Drawn | Checked | Authorised |
|---|---|---|---|
| N/A | CG Date 10/02/2020 | MMcL Date 10/02/2020 | MMcL Date 10/02/2020 |

| Status | Drawing Number | Rev |
|---|---|---|
| F | 5190130-ATK-XX-XX-DR-EC-0005 | 0 |

With respect to designated waterbodies, the River Barrow and supporting riverside habitat is designated as 'The River Barrow And River Nore Special Area of Conservation (SAC)' (002162) and falls partially within the north of the study area. This designated site is described as consisting of mostly freshwater stretches of the Barrow/Nore River catchments. The Barrow is tidal as far upriver as Graiguenamanagh while the Nore is tidal as far upriver as Inistioge. The site also includes the extreme lower reaches of the River Suir and all of the estuarine component of the Waterford Harbour extending to Creadan Head. The site is noted for supporting many Annexed habitats including the priority habitats of alluvial woodland and petrifying springs. Quality of habitat is described as generally good and the site also supports a number of Annex II animal species, Annex I Bird species and a range of rare plants and invertebrates (NPWS Natura 2000 Form). Of note, the site was initially designated as an individual 'proposed Natural Heritage Area (pNHA).

While Lough Cullin (000406) falls outside the study area, the pNHA designated area associated with it falls partially within the south west of the study area. Lough Cullin is noted as the only natural lake in south Kilkenny and occupies a low-lying depression 6km north of Waterford. Streams enter the basin from the NW, NE and SE and are noted to cause considerable flooding in most winters. The outflow is described as sluggish towards Dunkitt and the Suir, though work has been undertaken to deepen the channel.

Other features of interest include Mudflats and sandflats not covered by seawater at low tide and Atlantic salt meadows (Glauco-Puccinellietalia maritimae).

#### 2.5.3.3. Surface Water Quality

The Water Framework Directive Ireland (WFDI) interactive mapper notes the River Waterbody intersecting the north east of the study area (Oaklands/IE_SE_14_6) received an overall status of 'Good' during the 2009-2015 WFD period. This is inferred to be part of the wider tributary network directly connected to the SAC designated River Barrow at a distance of approximately 1km. The River Barrow (New Ross Port) is classified as a Transitional Waterbody (IE_SE_100_0200) and received a 'Moderate' classification for the WFD 2009-2015 period.

The WFDI does not identify the Nicholastown 16 waterbody however does identify a small subsection (Smartscale (Tributary of Suir) / IE_SE_16_1085) intersects the south west of the study area immediately adjacent Lough Cullin. This watercourse receives a classification of 'Good' during the WFD 2009-2015 period. Of note, the Lower Suir Estuary is the transitional receiving waterbody (IE_SE_100_0500) of the River Smartscale and is situated approximately 3km south of the study area. The estuary received a status of 'Good' during the 2009-2015 period.

The Luffany has not been assigned a WFD status according to WFDI, though its receiving surface waterbody (the Lower Suir Estuary/IE_SE_100_0500) is noted to receive a classification of 'Good'.

#### 2.5.3.4. Hydrogeology

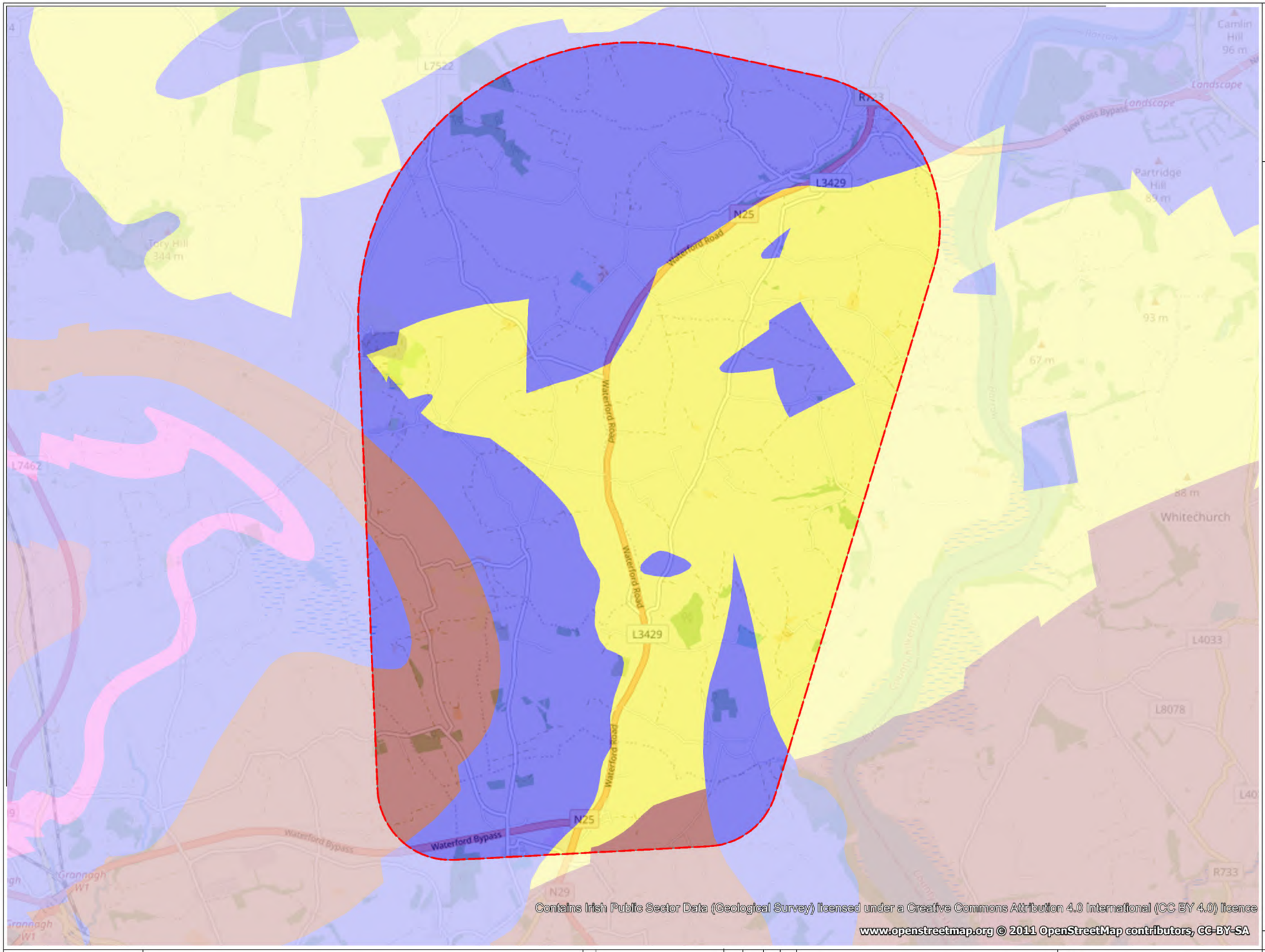
The GSI provides a methodology for aquifer classification based on resource value (regionally important, locally important and poor). Resource value refers to the scale and production potential of the aquifer.

The bedrock aquifer within the study area is mostly classified as 'LI', a locally important bedrock aquifer and 'Pl', a poor aquifer (GSI, 2020), but there are also small sections which are classified as 'Rf', a regionally important aquifer – fissured bedrock, as presented in Figure 2-13.

LI bedrock aquifers are described by the GSI as aquifers with a limited and relatively poorly connected network of fractures, fissures and joints, giving a low fissure permeability which tends to decrease further with depth. A shallow zone of higher permeability may exist within the top few metres of more fractured/weathered rock, and higher permeability may also occur along fault zones. These zones may be able to provide larger 'locally important' supplies of water. Due to the low permeability and poor storage capacity, the aquifer has a low 'recharge acceptance'.

PI bedrock aquifer, similar to Locally Important Bedrock Aquifer and Moderately Productive only in Local Zones (LI) but with fewer and more poorly-connected fractures, fissures and joints, and with less permeable and/or more limited zones of higher permeability. Overall permeability, storage capacity, recharge acceptance, length of flow path and baseflow are likely to be less than in LI aquifers.

Rf or Regionally Important Fissured Bedrock Aquifers are described as aquifers in which the network of fractures, fissures and joints, through which groundwater flows, is well connected and widely dispersed, resulting in a relatively even distribution of highly permeable zones. There is good aquifer storage and groundwater flow paths can be up to several kilometres in length. There is likely to be substantial groundwater discharge to surface waters (baseflow) and large (>2,000m3/d), dependable springs maybe associated with these aquifers.

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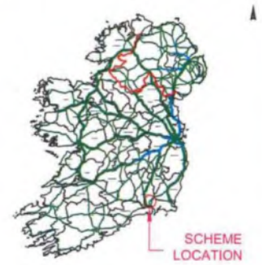
KEY PLAN




Aquifer Bedrock Classification

| | | | |
|---|---|---|---|
| Lake | | Pu | |
| Lk | | Rf | |
| Ll | | Rk | |
| Lm | | Rkc | |
| Pl | | Rkd | |

Study Area



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Purpose: Environmental Constraints Report

Title: Figure 2-13 Aquifer Classification Map

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| Status | Drawing Number | Rev |
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**Table 2-2 - Table showing Vulnerability Mapping Guidelines (DoELG, EPA, GSI)**

| Depth to Rock | Hydrogeological Requirements for Vulnerability Categories | | | | |
|---|---|---|---|---|---|
| | Diffuse recharge | | | Point Recharge | Unsaturated Zone |
| | **high permeability** *(sand/gravel)* | **Moderate permeability** *(sandy subsoil)* | **Low permeability** *(clayey subsoil, clay, peat)* | *(swallow holes, losing streams)* | *(sand & gravel aquifers only)* |
| **0-3m** | Extreme | Extreme | Extreme | Extreme (30m radius) | Extreme |
| **3-5m** | High | High | High | N/A | High |
| **5-10m** | High | High | Moderate | N/A | High |
| **>10m** | High | Moderate | Low | N/A | High |

i. N/A = not applicable.
ii. Release point of contaminants is assumed to be 1-2m below ground surface.
iii. Permeability classifications relate to the engineering behaviour described by BS 5930.
iv. Outcrop and shallow subsoil (i.e. generally ,1.0m) areas are shown as a sub-category of extreme vulnerability.

*(amended from Deakin and Daly (1999) and DELG/EPA/GSI (1999))*

The GSI provides a methodology for the vulnerability classification (extreme, high, moderate or low) of an aquifer. Vulnerability refers to the ease with which groundwater may be contaminated by human activities. Vulnerability classification is primarily based on the permeability and thickness of subsoils. Vulnerability mapping guidelines are presented in Table 2-2 (DoELG, EPA, GSI, 1999 (amended)).

The groundwater vulnerability rating within the majority of the site is classified as ‘High’ and ‘Extreme’ with isolated pockets of Moderate and Low (GSI, 2020). Refer to Figure 2-14.

With respect to groundwater recharge, according to the Geological Survey Ireland Spatial Resource, average recharge is noted as between 100-200mm/yr across the centre and eastern segments of the study area. A smaller area towards the south west of the study area is recorded as 50mm/yr however, there are also pockets in this area which reach towards the south of the study area where recharge is recorded as up to 523mm/yr.

Groundwater beneath the general vicinity of the study area predominately forms part of both the Mullinavat Groundwater Body (GWB) and Inistioge GWB. It is also partly within the Carrick-on-Suir GWB and Waterford GWB.

The Mullinavat GWB is described as a regional-scale aquifer and while the effective thickness is not expected to be large the bedrock may be permeable to depths of around 25m in some areas. The thickness of subsoil over this groundwater body varies greatly. In Kilkenny the thickness is very low and there are large areas of rock close to surface. In North Waterford there is a mixture of subsoils: in the east there is till derived from sandstone, which thins out to the east where there is a large area of rock close to surface. South of Carrick-on-Suir there are deposits of shale till to the east and sandstone till to the west. The groundwater flow paths in this area are considered to be short because the bedrock is not considered to constitute a major aquifer.

The Inistioge GWB lies at the southern end of the Nore Valley where the Nore meets the Barrow. The topography of these areas is an upland hilly surface and contains the catchment divides between the Nore, Suir and Barrow. From the southern tip to Glenmore all drainage is east towards the Barrow Valley. Effective thickness is thought to be relatively shallow concentrating in the top 10m to 30m of the rock profile with deeper flow in areas of higher structural deformation and faulting. Of note there is little subsoil with significant thickness to consider a classification of lithology.

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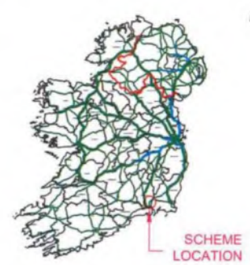
KEY PLAN




Groundwater Vulnerability

- Extreme
- High
- Low
- Moderate
- Rock at or near Surface or Karst
- Water

Study Area





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Purpose: Environmental Constraints Map

Title: Figure 2-14 Groundwater Vulnerability Map

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| | Date 10/02/2020 | Date 10/02/2020 | Date 10/02/2020 |

| Status | Drawing Number | Rev |
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| F | 5190130-ATK-XX-XX-DR-EC-0006 | 0 |

#### 2.5.3.5. Groundwater Use

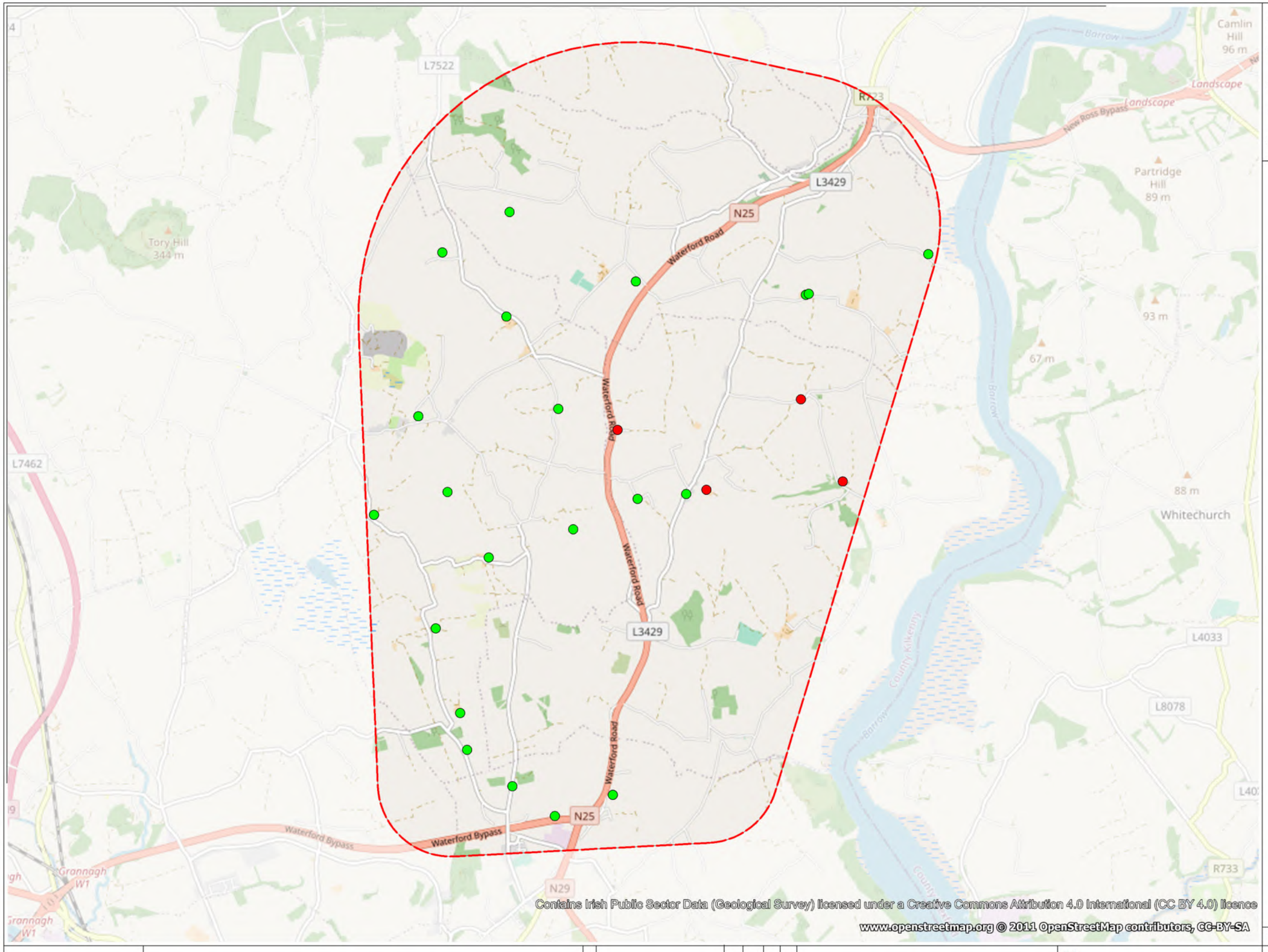
A search of the GSI groundwater well database was conducted to identify registered wells within the general area of the study area. There are 25no. registered wells within the area, as presented in Figure 2-15, with the following reported uses: -

- Agricultural and domestic use – 4 no.; and
- Unknown / other use – 21 no.

The highest yielding well (approximately 109 cubic metres per day) present within the study area is documented as a borehole of 29.9m depth commissioned in 1960. The well is situated towards the south west of the study area at Trenarea and while its source use is listed as 'Unknown', it appears to be associated with agricultural farm buildings.

Properties along the existing N25 route are anticipated to be connected to public water mains, however properties off this route may be served by the numerous private wells recorded by the GSI throughout the study area. It should be noted that the GSI database does not identify if these wells are currently operational. A door to door well survey may be required as this project evolves in order to avoid any potential groundwater impacts which could arise from the scheme.

The Glenmore source protection area has been identified as being 352m north of the study area.

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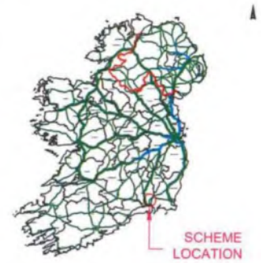


Groundwater Wells
- Agri & domestic use
- Unknown

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Project: N25 WATERFORD TO GLENMORE SCHEME

Purpose: Environmental Constraints Report

Title: Figure 2-15 Groundwater Wells Map

| Original Scale | Des/Drawn | Checked | Authorised |
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| Status | Drawing Number | Rev |
|---|---|---|
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#### 2.5.3.6. Groundwater Quality

The European Communities Environmental Objectives (Groundwater) Regulations, (S.I. 9 of 2010) came into effect on 27th January 2010. The aim of the Regulations is to achieve the environmental objectives established for groundwater by Article 4 (1) (b) of the Water Framework Directive (2000/60/EC). An amendment to these came in 2016 (S.I. 366).

The 2010 Regulations set down groundwater quality standards for nitrate (37.5mg/L) and active substances in pesticides in Schedule 4 and also established threshold values for pollutants or indicators of pollutants in Schedule 5. Under these regulations the EPA shall also assign a status of 'Good' or 'Poor' to those bodies of groundwater where available data and knowledge allows.

The groundwater quality within the general vicinity of the study area (Inistioge), is of 'Good Status' for the 2013 to 2018 period. A key component of the groundwater classification is the assessment of the impact of pollution on the groundwater body. The groundwater status classification process accounts for the ecological needs of the relevant rivers, lakes and terrestrial ecosystems that depend on contributions from groundwater.

#### 2.5.3.7. Potential Constraints

The following specific constraints have been highlighted in relation to flood risk, hydrology and hydrogeology: -

- Only provisional information exists regarding the potential flood risk across the study area. Once a preferred route has been identified a Stage 2 Initial Flood Risk Assessment should be undertaken. Depending on the outcome a Stage 3 Detailed Flood Risk Assessment may also be warranted.
- The following surface water features are identified within the constraints study area; Luffany stream; Nicholastown 16 stream/Smartscastle; and unnamed/Oakland tributaries of the River Barrow. The River Barrow and Lough Cullin are also noted to be within approximately 1km of the study area. Further consideration of all surface water features is warranted as the project progresses, both from a surface water quality and base-flow perspective. This is particularly important given that environmental protections afforded to the hydrologically connected River Barrow, Lough Cullin as well as the ecological habitats and wetland in the wider area.
- Shallow bedrock is present across the study area. Groundwater beneath these areas would therefore be extremely vulnerable to potential contamination.
- There are a number of private wells across the study area. A door to door well survey may be required. Potential impacts to local groundwater resources will need to be considered as the project progresses.

# 2.6. Biodiversity

## 2.6.1. Introduction

The objective of the natural environment section of the Constraints Study (CS) is to identify the international, national, county and local issues that must be taken into account when planning and designing roads, which includes the main ecological constraints that should be avoided or that could affect the design of the scheme, delay progress or influence costs.

## 2.6.2. Methodology

The ecology section of the Constraints Study is primarily a desk exercise that involves a review of all available resources and information in order to establish the baseline of the existing environment and identify key habitats and species, in particular those protected by European and national legislation, such as Special Areas of Conservation, Special Protection Areas and Natural Heritage areas.

Examples of online databases include National Parks and Wildlife Service mapviewer, National Biodiversity Data Centre Biodiversity Maps, Environmental Protection Agency mapviewer and Botanical Society of the British Isles online data etc. Ecologically sensitive areas can be digitally mapped, and a Geographical Information System (GIS) prepared. The use of GIS and production of maps is continued throughout all phases of the project during the design and planning stage.

The ecological appraisal within the study area of the proposed scheme followed methodologies outlined in the following guidelines: -

- National Roads Authority (2010). 2010 Project Management Guidelines;
- Transport Infrastructure Ireland (2019). Project Management Guidelines PE-PMG-02041;
- National Roads Authority (2009). Guidelines for Assessment of Ecological Impacts of National Roads Scheme;
- Environmental Protection Agency (EPA) (2017). Guidelines on the Information to be contained in Environmental Impact Assessment Reports. (Draft, August 2017);
- CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine. (Version 1.1 - Updated September 2019);
- CIEEM (2017). Guidelines for Preliminary Ecological Appraisal. 2nd Edition.

### 2.6.2.1. Ecological Study Area

The *zone of influence* is the area over which ecological features may be subject to significant effects as a result of the proposed road scheme and associated activities. This is likely to extend beyond the footprint of the various route corridors. The zone of influence can vary for different ecological features depending on their sensitivity to environmental change (CIEEM, 2018). Ecological resources or features of conservation value within the zone of influence of a route may be subject to impacts as a result of their direct or indirect connectivity to the road project. Direct connectivity refers to ecological features found within or partly within the study area. These features may be directly impacted by the proposed road scheme, e.g. though habitat loss. Indirect connectivity refers to sites outside of the study area but connected through features such as linear habitats (i.e. wildlife corridors) or surface water pathways. Indirect impacts may include deterioration of water quality and severing linear corridors used by wildlife to move between sites.

For the purposes of this study, direct impacts such as loss of habitat and direct mortalities of species were confined to ecological resources contained within the study area boundary. For the consideration of indirect impacts, such as impacts to water quality or disturbance of species, the zone of influence was extended to 15km to incorporate the presence of European and nationally designated sites, as the zone of influence will vary for different ecological features depending on their sensitivity to environmental change (CIEEM, 2018).

### 2.6.2.2. Desk Study

A desk study was carried out to collate available existing information on habitats and species of ecological value within and surrounding the southern section of the study area. A 2011 Ecology report containing ecological information, data and assessments provided by Natura Environmental Consultants (Natura, 2011) for a historic route selection study on the N25 road scheme from Waterford to Glenmore was also reviewed as part of the desktop exercise. This ecological information was reviewed with the aim to provide a comprehensive evaluation of baseline ecological conditions found within the entire study area and was used to undertake a comparative evaluation of the likely impacts each route will have on the biodiversity found within the study area.

Sites designated for nature conservation were examined within 15km of the study area. Sites reviewed in context with the scheme included both internationally (Natura 2000 sites, Ramsar sites) and nationally designated conservation areas (National Heritage Areas, proposed National Heritage Areas, Nature Reserves).

The Natura 2000 network is comprised of both Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) for birds; these sites are designated for the protection of biodiversity across the European Union. SACs are designated under the EU Habitats Directive (92/43/EEC), as transcribed into Irish law by the European Communities (Birds and Natural Habitats) Regulations, 2011, while SPAs are designated under the EU Birds Directive (79/4089/EEC; and as amended 2009/147/EC). SACs are sites of international importance due to the presence of Annex I habitats and/or Annex II species listed under the EU Habitats Directive (92/43/EEC). SPAs are designated for the protection of bird species listed on Annex I of the Bird Directive (2009/147/EC), regularly occurring populations of migratory species and areas of international importance for migratory birds. Ramsar sites are wetland sites designated to be of international importance under the Ramsar Convention an intergovernmental environmental treaty established by UNESCO.

A Natural Heritage Area (NHA) is the basic designation for wildlife under the Wildlife Amendment Act (2000). Natural Heritage Area sites are selected by having special scientific significance for one or more species, communities, habitats, landforms or geological features, or for a variety of natural attributes. A Nature Reserve is an area of importance to wildlife, which is protected under Ministerial order and sites are established under section 15 of the Wildlife Act, 1976.

The inland surface waters (e.g. rivers, streams and lakes) that are intersected by the route corridors were reviewed and, where information was available, were assessed in relation to their fisheries value, biological status, water quality and designation status. Relevant waterbodies within the study area were identified through the EPA online Map Viewer facility as well as the Wetlands Survey Ireland webpage[6]. Available records of protected aquatic species, designation status and water quality for these water features were reviewed.

The desk-based study also reviewed available information on any known or potentially important sites for rare or protected flora or fauna known to occur within the study area. Available information on any other sites of ecological value, that are not nationally or internationally designated, found within the study area were also reviewed.

Sources of data used to collate and compile information of ecological features of interest and importance for the southern section of the study include:

- National Parks and Wildlife Service (NPWS): -
  - Information on sites designated for nature conservation, including spatial data;
  - Habitats and species data;
  - Wildfowl Sanctuaries;
  - Data Request.
- National Biodiversity Data Centre (NBDC): -
  - Protected species records;
  - Invasive species records.
- Environmental Protection Agency: -
  - Watercourses and lake spatial files;
  - Water quality data;
  - Corine land cover data.
- Geological Survey of Ireland: -
  - Underlying geology, soils and hydrogeology.
- Ordnance Survey Ireland: -
  - OSi 1:50,000 Discovery series mapping;
  - OSi 1:5,000 / 1:2,500 vector mapping;
  - Orthophotos;
  - Historic mapping.
- Birdwatch Ireland: -
  - Bird count data from the Irish Wetland Bird Survey (IWeBS).
- Wetland Survey Ireland: -

[6] http://www.wetlandsurveysireland.com/wetlands/map-of-irish-wetlands--/index.html

  - Information on identified wetland habitats within the study area.
- Kilkenny County Development Plan, 2014 – 2020: -
  - SEA Environmental Report;
  - Natura Impact Report;
  - Tree preservation orders.
- Ramsar sites information[7]

Sources of data used to collate and compile information on the areas, habitats and species of ecological importance for the northern section of the study area are derived from the following reports: -

- New Ross Bypass Environmental Impact Statement Volumes 1 (ERM, 2007);
- N25 New Ross Bypass Presented to a meeting of the Cork Region of Engineers Ireland (Murphy et al, 2018);
- N25 Waterford to Glenmore Route Selection Report (Natura, 2011);
- Slieverue Location Area Plan Flora and Fauna Survey (White Young Green, 2005);
- Waterford to New Ross Greenway Ecological Impact Assessment (ROD, 2016).

## 2.6.3. Identified Constraints

### 2.6.3.1. Sites Designated for Nature Conservation

There is one Natura 2000 site located within the study area; the River Barrow and River Nore SAC (002162). There are no SPAs within the study area. There are 3 no. SACs located within 15km of the study area (Table 2-3) and 7 no. SPA's (Table 2-4) within 30km of the study area. The study area is hydrologically connected to both the River Barrow and River Nore SAC and the Lower River Suir SAC (002137). (Natura 2000 sites are illustrated on Figure 2-16/ Figure 2-17 for SACs and Figure 2-18 for SPAs).

There are 2 no. sites which are of national importance within the study area; with an additional 4 no. pNHA's located within 5km, but outside the study area (refer to Figure 2-19). These designated sites are outlined in greater detail in the following sections of this report.

#### 2.6.3.1.1. International Importance - Natura 2000 Sites

As noted above the River Barrow and River Nore SAC is the only Natura 2000 site within study area there are in total 3 no. SAC's sites within 15km of this study area and 7no. SPA's within 30km of the study area (refer to Table 2-3 and Table 2-4).

#### 2.6.3.1.2. Special Areas of Conservation

The River Barrow and River Nore SAC and the Lower River Suir SAC are connected hydrologically through a number of watercourses within the study area (see Figure 2-20): -

- Along the western boundary of the study area the Smartscastle Stream flows north to south through Lough Cullin pNHA – joining the Blackwater at Granny and shortly thereafter the River Suir. Where it joins the main channel of the Suir the river is designated as the Lower River Suir SAC (002137).
- The Nicholastown River rises near Slieverue and flows north to Lough Cullin before joining the Smartscastle Stream. The southwestern corner of the study area therefore drains to the River Suir and hence to the Lower River Suir SAC (002137).
- The Luffany River rises near Ballyrahan and flows from centre of study area in a southerly direction to discharge to the River Barrow in the townland of Dromdowney just west of Cheekpoint (south of and outside the study area).
- 1 no. unnamed river and 5 no. tributaries (named here as the Glenmore River and also referred to elsewhere as Oaklands 10) flow from the northern portion of the study area in a generally easterly direction to discharge to the Barrow River in the townland of Carrigcloney – entering the River Barrow and River Nore SAC.

All of these rivers / streams therefore discharge to either the River Barrow or the River Suir. Watercourses within the study area therefore have connectivity with either the River Barrow and River Nore SAC or the Lower River Suir SAC. Other SACs outside the zone of influence are detailed in Table 2-3.

[7] https://www.ramsar.org/wetland/ireland

**Table 2-3 - Natura 2000 Sites within 15km of the Study Area**

| Site Name & Code | Location / Distance | Features of Interest | Connectivity |
|---|---|---|---|
| River Barrow and River Nore SAC (002162) | Located within the northern portion of the Study Area (SA) – north of Glenmore and along the River Barrow to the east of the Study Area. | Estuaries [1130]<br>Mudflats and sandflats not covered by seawater at low tide [1140]<br>Reefs [1170]<br>Salicornia and other annuals colonising mud and sand [1310]<br>Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]<br>Mediterranean salt meadows (Juncetalia maritimi) [1410]<br>Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260]<br>European dry heaths [4030]<br>Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]<br>Petrifying springs with tufa formation (Cratoneurion) [7220]<br>Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]<br>Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0]<br>*Vertigo moulinsiana* (Desmoulin's Whorl Snail) [1016]<br>*Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029]<br>*Austropotamobius pallipes* (White-clawed Crayfish) [1092]<br>*Petromyzon marinus* (Sea Lamprey) [1095]<br>*Lampetra planeri* (Brook Lamprey) [1096]<br>*Lampetra fluviatilis* (River Lamprey) [1099]<br>*Alosa fallax* (Twaite Shad) [1103]<br>*Salmo salar* (Salmon) [1106]<br>*Lutra lutra* (Otter) [1355]<br>*Trichomanes speciosum* (Killarney Fern) [1421]<br>*Margaritifera durrovensis* (Nore Pearl Mussel) [1990] | Yes – within the Study Area. Therefore land, air and surface water pathways exist. |
| Lower River Suir SAC (002137) | 3km south of the Study Area. | Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]<br>Mediterranean salt meadows (Juncetalia maritimi) [1410] | Yes – located downstream of the Study Area. Therefore, surface water pathways exist |

| Site Name & Code | Location / Distance | Features of Interest | Connectivity |
|---|---|---|---|
| | | Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260]<br>Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]<br>Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]<br>Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0]<br>*Taxus baccata* woods of the British Isles [91J0]<br>*Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029]<br>*Austropotamobius pallipes* (White-clawed Crayfish) [1092]<br>*Petromyzon marinus* (Sea Lamprey) [1095]<br>*Lampetra planeri* (Brook Lamprey) [1096]<br>*Lampetra fluviatilis* (River Lamprey) [1099]<br>*Alosa fallax fallax* (Twaite Shad) [1103]<br>*Salmo salar* (Salmon) [1106]<br>*Lutra lutra* (Otter) [1355] | via the Smartscastle River and Luffany Stream. |
| Hugginstown Fen SAC (000404) | 12.8km north west of the Study Area. | Alkaline fens [7230] | No – located upstream of the Study Area |
| Tramore Dunes and Backstrand SAC (000671) | 13km south of the Study Area. | Mudflats and sandflats not covered by seawater at low tide [1140]<br>Annual vegetation of drift lines [1210]<br>Perennial vegetation of stony banks [1220]<br>Salicornia and other annuals colonising mud and sand [1310]<br>Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]<br>Mediterranean salt meadows (Juncetalia maritimi) [1410]<br>Embryonic shifting dunes [2110]<br>Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120]<br>Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] | No - located on opposite side of the River Suir, south of Waterford City. |

**Table 2-4 - Special Protection Areas for birds**

| Site Code | Site Name | Distance to boundary of study area[8] | Interest Interests[9] | Connectivity |
|---|---|---|---|---|
| 004233 | River Nore SPA | 10.6km | [A229] Kingfisher (*Alcedo atthis*) | No – Located Upstream of the Study Area |
| 004027 | Tramore Back Strand SPA | 12.88km | **Birds**<br>A142 Lapwing (*Vanellus vanellus*)<br>A160 Curlew (*Numenius arquata*)<br>A141 Grey Plover (*Pluvialis squatarola*)<br>A149 Dunlin (*Calidris alpina*)<br>A157 Bar-tailed Godwit (*Limosa lapponica*)<br>A156 Black-tailed Godwit (*Limosa limosa*)<br>A046 Light-bellied Brent Goose (*Branta bernicla hrota*)<br>A140 Golden Plover (*Pluvialis apricaria*)<br>**Habitats**<br>Wetlands | No – located within a separate WFD catchment to study area no hydrological connection |
| 004033 | Bannow Bay SPA | 14.65km | **Birds**<br>A156 Black-tailed Godwit (*Limosa limosa*)<br>A157 Bar-tailed Godwit (*Limosa lapponica*)<br>A149 Dunlin (*Calidris alpina*)<br>A054 Pintail (*Anas acuta*)<br>A140 Golden Plover (*Pluvialis apricaria*)<br>A143 Knot (*Calidris canutus*)<br>A160 Curlew (*Numenius arquata*)<br>A046 Light-bellied Brent Goose (*Branta bernicla hrota*)<br>A048 Shelduck (*Tadorna tadorna*)<br>A130 Oystercatcher (*Haematopus ostralegus*)<br>A142 Lapwing (*Vanellus vanellus*) | No – located within a separate WFD catchment to study area no hydrological connection |

[8] Distance measured in a straight line from closest point.

[9] Site documentation sourced from https://www.npws.ie/protected-sites

| Site Code | Site Name | Distance to boundary of study area[8] | Interest Interests[9] | Connectivity |
|---|---|---|---|---|
| | | | A162 Redshank (*Tringa totanus*)<br>A141 Grey Plover (*Pluvialis squatarola*)<br>**Habitats**<br>Wetlands | |
| 004193 | Mid-Waterford Coast SPA | 17.04km | **Birds**<br>A017 Cormorant (*Phalacrocorax carbo*)<br>A346 Chough (*Pyrrhocorax pyrrhocorax*)<br>A184 Herring Gull (*Larus argentatus*)<br>A103 Peregrine (*Falco peregrinus*) | No – located within a separate WFD catchment to study area no hydrological connection |
| 004118 | Keeragh Islands SPA | 25.7km | **Birds**<br>A017 Cormorant (*Phalacrocorax carbo*) | No – located within a separate WFD catchment to study area no hydrological connection |
| 004020 | Ballyteige Burrow SPA | 21.1km | **Birds**<br>A157 Bar-tailed Godwit (*Limosa lapponica*)<br>A142 Lapwing (*Vanellus vanellus*)<br>A046 Light-bellied Brent Goose (*Branta bernicla hrota*)<br>A048 Shelduck (*Tadorna tadorna*)<br>A141 Grey Plover (*Pluvialis squatarola*)<br>A140 Golden Plover (*Pluvialis apricaria*)<br>A156 Black-tailed Godwit (*Limosa limosa*)<br>**Habitats**<br>Wetlands | No – located within a separate WFD catchment to study area no hydrological connection |
| 004076 | Wexford Harbour and Slobs SPA | 29.7km | **Birds**<br>A037 Bewick's Swan (*Cygnus columbianus bewickii*)<br>A395 Greenland White-fronted Goose (*Anser albifrons flavirostris*)<br>A160 Curlew (*Numenius arquata*)<br>A156 Black-tailed Godwit (*Limosa limosa*)<br>A125 Coot (*Fulica atra*) | No – located within a separate WFD catchment to study area no hydrological connection |

| Site Code | Site Name | Distance to boundary of study area[8] | Interest Interests[9] | Connectivity |
|---|---|---|---|---|
| | | | A162 Redshank (*Tringa totanus*)<br>A050 Wigeon (*Anas penelope*)<br>A183 Lesser Black-backed Gull (*Larus fuscus*)<br>A052 Teal (*Anas crecca*)<br>A004 Little Grebe (*Tachybaptus ruficollis*)<br>A048 Shelduck (*Tadorna tadorna*)<br>A130 Oystercatcher (*Haematopus ostralegus*)<br>A195 Little Tern (*Sterna albifrons*)<br>A028 Grey Heron (*Ardea cinerea*)<br>A017 Cormorant (*Phalacrocorax carbo*)<br>A179 Black-headed Gull (*Chroicocephalus ridibundus*)<br>A069 Red-breasted Merganser (*Mergus serrator*)<br>A062 Scaup (*Aythya marila*)<br>A046 Light-bellied Brent Goose (*Branta bernicla hrota*)<br>A038 Whooper Swan (*Cygnus cygnus*)<br>A143 Knot (*Calidris canutus*)<br>A140 Golden Plover (*Pluvialis apricaria*)<br>A157 Bar-tailed Godwit (*Limosa lapponica*)<br>A005 Great Crested Grebe (*Podiceps cristatus*)<br>A067 Goldeneye (*Bucephala clangula*)<br>A054 Pintail (*Anas acuta*)<br>A149 Dunlin (*Calidris alpina*)<br>A053 Mallard (*Anas platyrhynchos*)<br>A141 Grey Plover (*Pluvialis squatarola*)<br>A082 Hen Harrier (*Circus cyaneus*)<br>A144 Sanderling (*Calidris alba*)<br>A142 Lapwing (*Vanellus vanellus*)<br>**Habitats**<br>[A999] Wetland and Waterbirds | |

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE
2. ONLY WRITTEN DIMENSIONS SHALL BE USED. NO DIMSNEIONS SHALL BE SCALED FROM THE DRAWINGS
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4. ALL COORDINATES ARE IN METRES AND ARE TO IRISH TRANSVERSE MERCATOR
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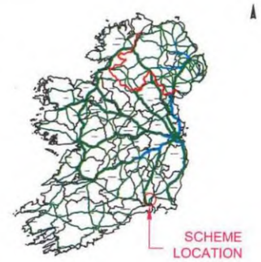
KEY PLAN




Special Areas of Conservation

- Lower River Suir SAC
- River Barrow And River Nore SAC
- Study Area



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| Rev | Description | By | Date | Chk'd | Auth |
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Project: N25 WATERFORD TO GLENMORE SCHEME

Purpose: Environmental Constraints Report

Title: Figure 2-16 Special Areas of Conservation

| Original Scale | Des/Drawn | Checked | Authorised |
|---|---|---|---|
| N/A | CA | DMcL | MMcL |
| | Date 14/06/2020 | Date 14/06/2020 | Date 14/06/2020 |

| Status | Drawing Number | Rev |
|---|---|---|
| F | 5190130-ATK-XX-XX-DR-EC-0016 | 0 |

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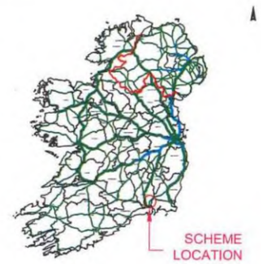
KEY PLAN




Special Areas of Conservation

- Ballyteige Burrow SAC (000696)
- Bannow Bay SAC (000697)
- Blackstairs Mountains SAC (000770)
- Hook Head SAC (000764)
- Lower River Suir SAC (002137)
- River Barrow And River Nore SAC (002162)
- Saltee Islands SAC (000707)
- Slaney River Valley SAC (000781)
- Tramore Dunes and Backstrand SAC (000671)
- Study Area
- Study Area 15km Buffer



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Purpose: Environmental Constraints Report

Title: Figure 2-17 Special Areas of Conservation within 15km

| Original Scale | Des/Drawn | Checked | Authorised |
|---|---|---|---|
| N/A | CA | DMcL | MMcL |
| | Date 14/06/2020 | Date 14/06/2020 | Date 14/06/2020 |

| Status | Drawing Number | Rev |
|---|---|---|
| F | 5190130-ATK-XX-XX-DR-EC-0017 | 0 |

River Nore SPA
004233

Bannow Bay SPA
004033

Ballyteigue Burrow SPA
004020

Keeragh Islands SPA
004118

Tramore Back Strand SPA
004027

Mid-Waterford Coast SPA
004193

Saltee Islands SPA
004002

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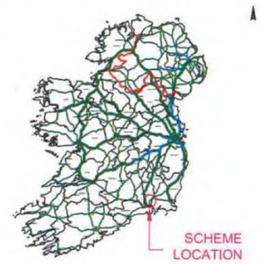
KEY PLAN




Special Protection Areas

Study Area

Study Area 15km Buffer



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Project: N25 WATERFORD TO GLENMORE SCHEME

Purpose: Environmental Constraints Report

Title: Figure 2-18 Special Protection Areas within 15km

| Original Scale | Des/Drawn | Checked | Authorised |
|---|---|---|---|
| N/A | CA Date 11/08/2020 | DMcL Date 11/08/2020 | MMcL Date 11/08/2020 |

| Status | Drawing Number | Rev |
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| F | 5190130-ATK-XX-XX-DR-EC-0021 | 0 |

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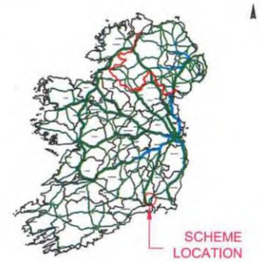
KEY PLAN




proposed National Heritage Areas

- Ballykelly Marsh (000744)
- Barrow River Estuary (000698)
- Grannyferry (000833)
- King's Channel (001702)
- Lough Cullin (000406)
- Oaklands Wood (000774)

Study Area



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Purpose: Environmental Constraints Report

Title: Figure 2-19 proposed National Heritage Areas

| Original Scale | Des/Drawn | Checked | Authorised |
|---|---|---|---|
| N/A | CA | DMcL | MMcL |
| | Date 1/06/2020 | Date 1/06/2020 | Date 1/06/2020 |

| Status | Drawing Number | Rev |
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| F | 5190130-ATK-XX-XX-DR-EC-0018 | 0 |

### Special Protection Areas for Birds

No SPA's are located within the study area. There are 7 no Special Protection Area within 30km of proposed study area (see Table 2-4, above). The closest SPA to the proposed study area is the River Nore SPA (004233) at 10.6km to the north followed by Tramore Back Strand SPA (004027) (12.9km, south) and Bannow Bay SPA (004033) (14.12km, south east); (refer to Figure 2-18). The remaining SPA's are located at 20km from the proposed development. None of these SPAs shares hydrological connectivity with the study area (see Table 2-4, above).

### Ramsar Sites

A Ramsar Site is a wetland site designated to be of international importance under the Ramsar Convention, an intergovernmental environmental treaty established in 1971 by UNESCO[10]. It provides for national action and international cooperation regarding the conservation of wetlands, and wise sustainable use of their resources. There is no Ramsar site within the study area. No hydrological connectivity exists with these Ramsar Sites and the study area.

The nearest Ramsar sites are: -

- 835 Tramore Back Strand SPA9; and
- 840 Bannow Bay SPA10

#### 2.6.3.1.3. Sites of National Importance

There are no Natural Heritage Areas within study area or within 5km of it.

There are two pNHAs located within the study area Lough Cullin pNHA (000406) and the Barrow River Estuary pNHA (000698). Six no. pNHA's are located within 5km, but outside the study area; see Table 2-5, below (The location of pNHA is illustrated on Figure 2-19).

**Table 2-5 - Site synopses extracts of pNHAs within 15km of Study Area**

| Site Name | Birds/suitable habitat within site | Connectivity |
|---|---|---|
| Ballykelly Marsh pNHA (000744) | This site combines an arable field with a high-quality wetland site. The arable field contains a rare arable weed community including the protected flora species Sharp-leaved Fluellen (*Kickxia elatine*). Adjacent to this field is a small species-rich lake and fen area. Such small wetlands are characteristic of the south-east of Ireland but are decreasing rapidly due to drainage and land reclamation | 2.95km east of the study area. |
| King's Channel pNHA (001720) | See site synopsis for Lower River Suir SAC | 3.56km south of the study area. |
| Grannyferry pNHA (000833) | The Blackwater is a small tributary of the River Suir in south Kilkenny joining the main river upstream of Waterford. Its lower reaches (5km or so) are tidal and although the river embankments are still generally intact, various sluices and valves do not always operate successfully so that there is some flooding in the valley bottoms, especially on spring tides<br>This site contains reed-swamp, marshes and wet fields with a salt influence which declines from south to north. Small numbers of Mallard and Water Rail occur within the area and in summer there are, most probably, Sedge Warbler and Reed Bunting nesting. | 3km south west of the study area. |

[10] Refer to http://irishwetlands.ie/irish-sites/ for Irish Ramsar sites.

| Site Name | Birds/suitable habitat within site | Connectivity |
|---|---|---|
| Oaklands Wood pNHA (000774) | This site is a mixed coniferous and deciduous wood. The site is of interest as it is a representative area of broadleaved woodland and its associated flora. | Located 3.76km north west of the study area. |
| Lough Cullin pNHA (000406) | Lough Cullin is the only natural lake in south Kilkenny and occupies a low-lying depression 6km north of Waterford. Streams enter the basin from the north-west, north-east and south-east and cause considerable flooding in most winter.<br>Most of the fields within the site are grazed though some are cut for silage and, rarely, tilled for cereals despite the winter flooding. The only area of semi-natural vegetation occurs east of the lake and within the lake itself. The fens here include much Tall Fescue as well as Purple-loosestrife (*Lythrum salicaria*), Yellow Pimpernel (*Lysimachia nemorum*), Meadowsweet and Wild Angelica (*Angelica sylvestris*).<br>Bottle Sedge (*Carex rostrata*) and Common Reed (*Phragmites australis*) grow near drains and around the lakeshore where they are joined by Lesser Bulrush (*Typha angustifolia*) in its only Kilkenny station, by bur-reeds (*Sparganium erectum, S. minimum*) and by Nodding Bur-marigold (*Bidens cernua*).<br>The main interest of the site lies in its flowering plants some of which are rare in the Kilkenny and Waterford region.<br>There is a high population of Snipe in winter as well as smaller numbers of Curlew, Lapwing and Mallard. In summer Sedge Warbler and Reed Bunting breed. | Located within the south western portion of the Study Area. |
| Barrow River Estuary pNHA (000698) | See site synopsis for River Barrow and River Nore SPA. | Located within the northern portion of the Study Area and to the east of the Study Area. |

### Areas of Scientific Interest

Prior to the proposal to designate Natural Heritage Areas under the Wildlife Act (1972-2000), Areas of Scientific Interest were identified by An Foras Forbartha (for Kilkenny see Young, 1972).

Young (1972) identified the following site: - 406. Lough Cullin & Surrounding Area (identified as being regionally important). The evaluation noted the following – "*With the exception of three very small lakes near Johnstown, and the Castlecomer lakes (see p. 38), Lough Cullin is the only area of permanent still water in County Kilkenny. In view of this and the ecological diversity and floristic richness of the surrounding wetlands and fields, the area must be considered as being of regional importance*".

Areas of Scientific Interest in Co. Kilkenny, Index (Anon, 1992[11]) referred to the following sites: -

- 406. Lough Cullin (S61 18); regionally important.
- 822. Ballinlaw Ferry (S670167); not rated.
- 828. Carrickcloney (S68 22); not rated.
- 848. Rochestown Marshes (S69 19); not rated.

[11] Downloaded from NPWS webpage - https://www.npws.ie/content/publications/areas-scientific-interest-co-kilkenny-index.

While Lough Cullin is noted as having Ornithological interest the other three sites are noted as being of botanical interest. Both Carrickcloney and Rochestown Marshes were noted to support Meadow barley (*Hordeum secalinum*); while Ballinlaw Ferry was of note for Divided Sedge (*Carex divisa*).

### Nature Reserves

There are no Nature Reserves[12] or National Parks within 15km of the study area. The nearest such site is Ballyteigue Burrow Nature Reserve in Co. Wexford.

#### 2.6.3.1.4. Other Sites

### Wildlife Sanctuaries

Lough Cullin (Holy Lake) Wildlife Sanctuary (WS Code: WFS-32) is located to the west of the study area; with hydrological links to this site via the Nicholastown Stream / Smartscastle River. The next nearest Wildlife Sanctuary is Coolfinn Marshes Wildlife Sanctuary (WS Code: WFS-50) on the River Suir located to the northwest of Waterford City. The lake has been counted as part of the Irish Wetland Bird Survey.

### Wetland Habitats

Wetland Surveys Ireland host a webpage illustrating the location of wetland sites in Ireland. The following sites are located within the study area (see Table 2-6): -

- River Barrow & River Nore SAC (Wexford);
- Lough Cullin pNHA;
- Ballyrowragh;
- Tinnavaucoosh / Nicholastown Wetland;
- Jamestown; and
- Catsrock Quarry Pond.

**Table 2-6 - Wetland Sites identified on the Wetland Surveys Ireland webpage**

| Name | Site Code | Rating | Main Wetland Type | Description |
|---|---|---|---|---|
| River Barrow & River Nore SAC (Wexford) | WMI_WX1 | A<br>International | River, Reed swamp, Marsh, Calcareous spring, Tall Herb Swamp | This site consists of the freshwater stretches of the Barrow / Nore River catchments as far upstream as the Slieve Bloom Mountains and it also includes the tidal elements and estuary as far downstream as Creadan Head in Waterford.<br>[Data Source: NPWS] |
| Lough Cullin pNHA | WMI_KK15 | B Rating<br>Nationally Important | River, Alkaline fen, Wet grassland, Marsh, Reed swamp, Eutrophic lake, Scrub | Lough Cullin is the only natural lake in south Kilkenny. Generally, the area consists of wet grassland, with fen on eastern side of lake.<br>[Data Source: Irish Peatland Conservation Council 2012[13]] |
| Ballyrowragh | WMI_KK178 | F Rating<br>Unknown value - survey required | *Data Pending*<br>River, Marsh & Scrub | [Included within ESA 16 - Ballyrowragh: -<br>Described in 2011 report as follows: - Large site which includes disused railway line in cut with steep embankment up to 15m high with mature scrub (WS1). Ash woodland on steep bank west of railway. |

[12] https://www.npws.ie/places-visit/places-visit-nature-reserves

[13] For further information see - Report: Ireland's Peatland Conservation Plan 2020. IPCC, 2009.

| Name | Site Code | Rating | Main Wetland Type | Description |
|---|---|---|---|---|
| | | | | Further west small conifer plantation (WD4). The main body of the site is wetland on a slope with young alder plantation (WS2), wet grassland (GS4) and scrub (WS1). Western side is bounded by a river (FW1) with associated band of wet willow woodland (WN6)]<br>[Data Source: Natura, 2011] |
| Tinnavaucoosh / Nicholastown Wetland | WMI_KK36 | F Rating<br>Unknown value - survey required | *Data Pending*<br>Scrub, River, Marsh, Wet grassland & Fen | 1. Description Pending<br>[Data Source: Wetland Surveys Ireland]<br>[Included within ESA 18 - Ballynamona: -<br>Described in 2011 report as follows: - Wetland site in a valley with stream (FW1) through small glen with mature scrub (WS1). Mosaic of wet grassland (GS4), scrub (WS1) and wet woodland (WN6). Conifer plantation (WD4)]<br>[Data Source: Natura, 2011] |
| Jamestown | WMI_KK185 | F Rating<br>Unknown value - survey required | *Data Pending*<br>River, Marsh, Wet grassland, Scrub | [Included within ESA 2 - Ballyverneen: -<br>Complex of riparian woodland (WN5), mixed broadleaved woodland (WD1) and planted conifers (WD4) along the banks of an unnamed tributary (FW1) of the River Barrow adjacent to the SAC.<br>*Appears to be within the footprint of the N25 New Ross Bypass*.<br>[Data Source: Natura, 2011] |
| Catsrock Quarry Pond | WMI_KK188 | F Rating<br>Unknown value - survey required | Artificial pond in quarry setting. | Artificial pond in quarry setting.<br>[Data Source: Wetland Surveys Ireland (online data)] |

#### 2.6.3.1.5. Watercourses

Spatial data and water quality analysis were examined and accessed through the EPA datasets. On review of EPA Lake and River data sets; six watercourses were found to be situated within the study area; no lakes were noted. Lough Cullin (EPA Code: 16_296) is located just outside the western side of the study area on. Watercourses are illustrated on Figure 2-20. As the underlying geology of the area is primarily derived from sandstone, slate and siltstone material the watercourses in the area would be expected to have a typically acidic hydrochemistry.

All of these rivers / streams discharge to either the River Barrow or the River Suir. Watercourses with the study area therefore have connectivity with either the River Barrow and River Nore SAC or the Lower River Suir SAC. Watercourses can be summarized as follows:

- Along the western boundary of the study area the Smartscastle Stream flows north to south through Lough Cullin pNHA – joining the Blackwater at Granny and shortly thereafter the River Suir. Where it joins the main channel of the Suir the river is designated as the Lower River Suir SAC (002137).

- The Nicholastown River rises near Slieverue and flows north to Lough Cullin before joining the Smartscastle Stream. The southwestern corner of the study area therefore drains to the River Suir and hence to the Lower River Suir SAC (002137).
- The Luffany River rises near Ballyrahan and flows from centre of study area in a southerly direction to discharge to the River Barrow in the townland of Dromdowney just west of Cheekpoint (south of and outside the study area).
- 1 no. unnamed river and 5 no. tributaries (named here as the Glenmore River) flow from the northern portion of the study area in a generally easterly direction to discharge to the Barrow River in the townland of Carrigcloney – entering the River Barrow and River Nore SAC.

Under EPA Water Framework Directive (WFD) monitoring the 'Smartscastle Stream_020' waterbody was given a status of 'Moderate' during the 2013-2018 monitoring cycle. This Smartscastle Stream_020 waterbody includes; Smartscastle (Stream); Nicholastown 16; Fahy 16; Moanroe 16 and the field drains draining lands around Lough Cullin. This is the only waterbody assigned a WFD status within the study area. Q-value assessments (EPA Biological quality sampling) scored Q3-4 at two location on the Smartscastle Stream.

The Smartscastle Stream_020 was found to be 'At Risk' of not achieving 'Good Status' under WFD monitoring. Luffany_010 and the Oaklands_010 (Including the Glenmore River) are both under review. The Smartscastle Stream_020 and Oaklands_020 waterbodies (to the north of Glenmore; just outside the study area) have been identified as river under significant agriculture pressures. It is probable that the Nicholastown Stream and Luffany Stream share similar characteristics.

Outside of the study area both the River Barrow and River Suir Estuaries are assessed as part of 2013- 2018 WFD monitoring. The Middle Suir Estuary and Lower Suir Estuary (Little Island - Cheekpoint) have been assigned Poor and Good status respectively. Within the Barrow New Ross Port has been assigned a status of 'Moderate' and downstream past the confluence of the Suir the Barrow Suir Nore Estuary body is also 'Moderate'.

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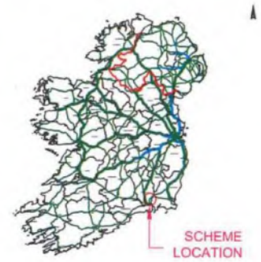
KEY PLAN




Watercourse

Lake

Study Area



Bonneagar Iompair Éireann
Transport Infrastructure Ireland

NDP
PLEAN FORBARTHA NÁISIÚNTA

| Rev | Description | By | Date | Chk'd | Auth |
|---|---|---|---|---|---|

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Client: KILKENNY COUNTY COUNCIL

Project: N25 WATERFORD TO GLENMORE SCHEME

Purpose: Environmental Constraints Report

Title: Figure 2-20 Watercourses

| Original Scale | Des/Drawn | Checked | Authorised |
|---|---|---|---|
| N/A | CA | DMcL | MMcL |
| | Date 1/09/2020 | Date 1/09/2020 | Date 1/09/2020 |

| Status | Drawing Number | Rev |
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| F | 5190130-ATK-XX-XX-DR-EC-0019 | 0 |

### 2.6.3.2. Habitats

#### 2.6.3.2.1. Ecologically Sensitive Areas

When the current scheme was previously considered a number of sites were identified as Ecologically Sensitive Areas (ESAs) by Natura Environmental Scientists (Natura, 2011); prepared during a series of site visits in 2009 and 2009. Table 2-7 reproduces *Appendix II – List of Ecological Receptors* included in the Ecology Route Selection Report (Natura, 2011). Aerial photographs of these sites were also reviewed.

The location of these sites is illustrated in Figure 2-21; re-digitised from Figure 2 – Ecological Sites and Route Options included in Natura (2011).

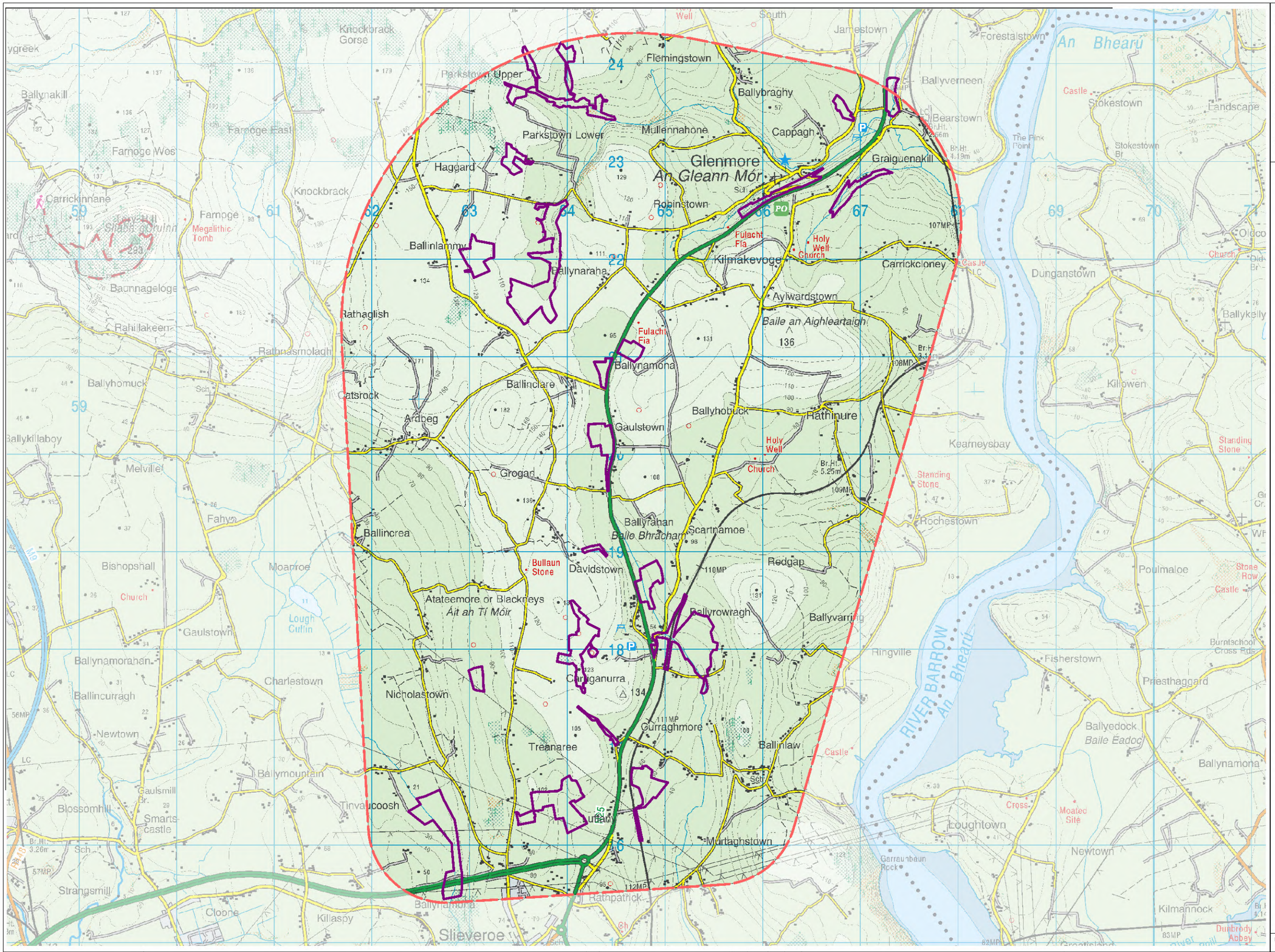
**Note: -** The site identified as ESA-2 - Ballyverneen has already been affected by the construction of the roundabout linking to the N25 New Ross Bypass (just opened).

**Table 2-7 - Description and evaluation of ecological receptors (including designated conservation areas, ecological site and watercourses) within the Study Area (Natura, 2011)**

| Site No. | Site Name | Site Description/Habitats | Receptor Importance |
|---|---|---|---|
| 002162 | River Barrow and River Nore SAC | The existing N25 crosses over the River Barrow and River Nore SAC and the Glenmore river which is a swift flowing watercourse 2m-3m wide (**FW2**). The river bank west of the N25 culvert has a narrow band of riparian vegetation (**WN5**). Habitats associated with the river and which have links with Annex I habitats include 'Alluvial forests (91E0) and Floating river vegetation (3266). Other habitats associated with the existing road embankment within the SAC boundary include scrub (**WS1**), broadleaved woodland (**WD1**), recolonising bare ground (**ED3**) and artificial surfaces (**BL3**). | International |
| 1 | Ballybraghy | Area of wet willow woodland (**WN6**) along a small stream (**FW1**) valley. Species poor, wet agricultural grassland (**GA1/GS4**) extends along the valley to the north-west. | County |
| 2 | Ballyverneen | Area of wet willow woodland (**WN6**) along a small stream (**FW1**) valley, Species poor, wet agricultural grassland (**GA1/GS4**) extends along the valley to the north-west. | Local importance (lower value) |
| 3 | Craiguenakill/ Ballyverneen | Steep-sided valley west of the River Barrow and River Nore SAC, with mature hawthorn, and gorse scrub (**WS1**) and stream (**FW1**) that flows into the River Barrow estuary, (part of the SAC). Good bat potential. | Local importance (higher value) |
| 4 | Parkstown upper | Several valleys with stream (**FW1**) converging to form a small river with nice riparian woodland (**WN5**) dominated by hazel and ash. Occasional oak. Alder localised. Good at and mammal potential. | Local importance (higher value) |
| 5 | Parkstown Lower | Several valleys with stream (**FW1**) converging in from a small river with nice riparian woodland (**WN5**) dominated by hazel and ash. Occasional oak. Alder localised. Good bat and mammal potential. | Local importance (higher value) |
| 6 | Ballinlammy | Small area seepage spring flush, (**FP2**) with skeletal peaty soils, and some of the plant species associated with this habitat. Surrounded by improved agricultural and semi-improved wet grassland field (**GA1/GS4**). | Local importance (higher value) |
| 7 | Ballynaraha | The southern end of the site is on elevated ground with a mosaic of wetland habitats including complex of rush-dominated wet acid grassland (**GS4**) (including devils bit scabious and marsh cinquefoil). | Local importance (higher value) |

| Site No. | Site Name | Site Description/Habitats | Receptor Importance |
|---|---|---|---|
| | | Also scrub (**WS1**) with willow and gorse. Likely groundwater seepage. A watercourse (**FW1**) arising from the wetland flows into a valley. Hazel woodland (**WN2**) with occasional mature oaks along the valley side in the north of the site. The eastern valley predominantly with gorse scrub and bracken (**WS1/HD1**). | |
| 8 | Craiguenakill | Section of conifer woodland/planted conifers (**WD3/WD4**) including Scots pine and larch in the southern part of the site with an area of mixed broadleaved woodland (**WD1**) extending along the valley to the north. Northern end of site adjacent to the River Barrow and River Nore SAC. | Local importance (higher value) |
| 9 | Ballynamona | Species poor, rush dominated wet grassland (**GS4**) fields. A small stream (**FW1**) which is overgrown with scrub (**WS1**) flows through the site. | Local importance (lower value) |
| 10 | Ballinclaire | Tall tussock sedge swamp (**FS1**) at base of small valley grading to rush dominated wet grassland (**GS4**) towards the north of the site. Occasional willow. Small stream (**FW1**) and 1-2m deep drainage ditches around the boundary of the site. Substrate: organic peaty layer (20cm) over a grey marl. Site appears to be drying out. | Local importance (lower value) |
| 11 | Gaulstown | Inaccessible section of willow scrub/woodland (**WS1/WD1**) in the centre of the site. Some standing water visible – potential for wet willow woodland (**WN6**). Surrounding fields are improved agricultural grassland (**GA1**) and species poor, rush dominated wet grassland (**GS4**). | Local importance (higher value) |
| 12 | Davidstown | Area of gorse scrub (**WS1**) in the centre of the site and an area of mixed broadleaved woodland (**WD1**) in the west of the site. | Local importance (lower value) |
| 13 | Ballyrahan/Davidstown | Wetland site in small valley with stream (**FW1**) at base. Includes wet grassland fields (**GS4**), willow scrub (**WS1**) with patches of wet woodland (**WN6**). Good mammal + bat feeding habitat potential. | Local importance (higher value) |
| 14 | Nicholastown | Improved agricultural field (**GA1**) and species poor, rush dominated wet grassland field (**GS4**). | Local importance (lower value) |
| 15 | Carriganuara | Wet grassland field (**GS4**) on sloping ground currently being drained. Network ditches (**FW4**) includes 2 raths with mature mixed scrub. Good mammal potential. At southern end gorse scrub (**WS1**) and exposed conglomerate rock (**ER1**) on elevated ground. Conifer plantation (**WD4**). | Local importance (lower value) |
| 16 | Ballyrowagh<br><br>Curraghmore | Large site which includes disused railway line in cut with steep embankment up to 15m high with mature scrub (**WS1**). Ash woodland on steep bank west of railway. Good mammal potential. Further west small conifer plantation (**WD4**). The main body of is wetland on a slope with young alder planation (**WS2**), wet grassland (**GS4**) and scrub (**WS1**). Western side of site bounded by river (**FW1**) with associated band of wet willow woodland (**WL2**) and riparian woodland | Local importance (higher value) |

| Site No. | Site Name | Site Description/Habitats | Receptor Importance |
|---|---|---|---|
| | | (WN5) along river channel. Species poor, rush dominated wet grassland (**GS4**) along the margins of the surrounding fields. | |
| 17 | Treanaree | Meandering fast flowing stream (**FW1**) through small glen with mature scrub on side of glen. | Local importance (higher value) |
| 18 | Ballynamona | Wetland site in a valley with stream (**FW1**) going through. Mosaic of wet grassland (**GS4**), scrub (**WS1**) and wet woodland (**WN6**). Conifer plantation (**WD4**) at southern end. Good bat potential. | Local importance (higher value) |
| 19 | Luffany | Area of willow and alder woodland (**WN6**). Potential for wet woodland within site (**WN6**). Surrounded by species poor, rush dominated wet grassland field (**GS4**) and patches of gorse scrub (**WS1**) and bracken (**HD1**). | Local importance (higher value) |
| 20 | Luffany | Site Includes mixed broadleaved woodland (**WD1**) around farm buildings at southern end of site, and species poor, rush dominated wet grassland (**GS4**) field. | Local importance (lower value) |
| 21 | Luffany | Former railway line overgrown with scrub (**WS1**), Occasional mature tree along the site margins. | Local importance (lower value) |
| | Watercourses | There are a number of un-named watercourses inside the study area of the N25. They are divided into two main catchments: At the northern end of the scheme watercourse flow south-eastwards and are tributaries of the River Suir. The watercourses vary in size from ca. <1m to 3-4m wide with flow regime from slow to swift and that may or may not include riffle and glide. They generally have a substrate that includes gravel and cobble and river bank vegetation is variable including overhanging woodland, scrub or grassland with tall herbs. Based on limited information available at Route Selection Stage, it is assumed that the watercourses are potentially suitable for salmonids (ref. SRFB) throughout the site. | Local importance (higher value) |

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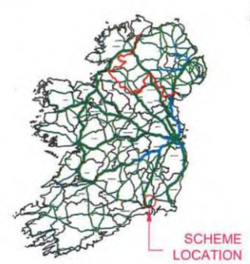


Environmentally Sensitive Areas

Study Area



Bonneagar Iompair Éireann
Transport Infrastructure Ireland

NDP
PLEAN FORBARTHA NÁISIÚNTA

| Rev | Description | By | Date | Chk'd | Auth |
|---|---|---|---|---|---|

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Client: KILKENNY COUNTY COUNCIL

Project: N25 WATERFORD TO GLENMORE SCHEME

Purpose: Environmental Constraints Report

Title: Figure 2-21 Environmentally Sensitive Areas

| Original Scale | Des/Drawn | Checked | Authorised |
|---|---|---|---|
| N/A | CA | DMcL | MMcL |
| | Date 11/05/2020 | Date 11/05/2020 | Date 11/05/2020 |

| Status | Drawing Number | Rev |
|---|---|---|
| F | 5190130-ATK-XX-XX-DR-EC-0020 | 0 |

#### 2.6.3.2.2. Other Habitat Information

##### Article 17 / Annex I Habitats

Habitats outside of Natura 2000 Sites, but which are protected under Annex I of the Habitats Directive were examined using the Article 17[14] reports and spatial data accessed through the National Parks and Wildlife Service.

Coastal habitats such as estuaries (1130), Mudflats and sandflats not covered by sea water at low tide (1140), salt meadows (1330 / 1410) or Salicornia and other annuals colonizing mud and sand (1310) do occur along the River Barrow, but these are all located outside the study area.

With respect to woodland, Alluvial woodland* (91E0), has been recorded in the Glenmore valley within the SAC (see below). Areas of wet woodland have also been recorded within a number of the Ecologically Sensitive Areas; their potential correspondence with Alluvial woodland* (91E0) will therefore need to be considered. There are no records of Yew woodland* (91J0) or old oak woodland (91A0) within the study area.

Floating river vegetation (3260) has been recorded on the Glenmore River within the SAC.

There are no further published records of Annex I habitats from within the study area.

##### Woodland Habitats

The National Survey of Native Woodlands (NSNW)[15], NPWS and NBDC datasets identify several areas of woodland in the vicinity of study area; however, neither database includes records of woodland from within the study area.

On a review of NBDC habitat information and orthophotos numerous areas of woodland were located within the study area. The structure and colouring of these woods would indicate these are mostly conifer plantations, this was cross checked used Google Street View. Of note are the broad-leaved woodlands bounding the watercourses draining the northern section of the study area. The Glenmore River was identified in the Natura Report (2011) as hosting riparian woodland with links to Annex I Alluvial Woodland: -

> "*The river bank of the Glenmore River and the un-named tributary of the Glenmore river east of the existing N25 culvert have a line of trees (WL2) which expands to a narrow band of woodland 2-5m wide dominated by alder (Alnus glutinosa) with occasional birch (Betula pubescens) and willow (Salix cinerea). The ground flora on the steep or elevated banks is sparse and is mainly dominated by bramble (Rubus fruitcosus agg.) with occasional ivy (Hedera helix), fern (Polystichum setiferum) and soft rush (Juncus effusus) and the moss (Atrichum undulatum). At the confluence of the two watercourses, the river bank is lower with signs of alluvial deposits. The woody species there are mainly willow (Salix cinerea), dominated, and the ground flora includes species that are indicative of the Annex I priority habitat*."

Three of these sections of woodland are designated as Alluvial forests (EU Code 91E0) and are a priority habitat for the River Barrow and River Nore SAC.

##### Treelines and Hedgerows

The dominant habitat found within the study area is improved agricultural grassland. The hedgerows and treelines which act as field boundaries around the field systems serve as wildlife habitats and corridors connecting many of the sites of ecological interest within the wider area.

As part of the Environmental Report which accompanied the Strategic Environmental Assessment (SEA) for Kilkenny County Development Plan, 2014-2020, surveys of hedgerows were undertaken in a number of areas / settlements around the county (as part of Habitat and Green Infrastructure Assessment) (see Tubridy, 2010a & Tubridy, 2010b). This found that: -

> "*Hedgerows contribute significantly to the biodiversity and landscape character of County Kilkenny. They have an important farming function, they are wildlife habitats, and wildlife corridors between habitats, and they also have historical significance as townland and field boundaries*."

Hedges within the study area were not surveyed. In other areas, Hawthorn was the most common species recorded, followed by blackthorn with other native species such as holly, hazel and grey willow also common. Where trees were recorded within the hedges, ash was most common on dry ground, with grey willow most common on wetter ground.

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[14] Under Article 17 of the Habitats Directive each member state is obliged to report to the EC every 6 years on the status of the natural habitats and species in the Annexes and on the implementation of the measures taken under the Directive (NPWS, 2019a-c).

[15] National Survey of Native woodlands 2003-2008 (Perrin *et al*. 2008).

### Tree Preservation Orders

There are no Tree Preservation Order in the study area; the nearest is located at Ferrybank, Co. Kilkenny. There are no records of trees from the Tree Register of Ireland within the study area.

#### 2.6.3.3. Species

##### 2.6.3.3.1. Rare or Protected Species Records

Table 2-8 presents a summary of protected and rare plant and animal records from the environs of the study area (data derived from NBDC online information).

**Table 2-8 - Protected and rare plant records**

| Taxon Common Name | Taxon Latin Name | Sample Location | Sample Date | Sample 10 km Square | Sample Spatial Reference | Survey Name | Sample Year | Within SAC | Location within the study area |
|---|---|---|---|---|---|---|---|---|---|
| Meadow Barley | *Hordeum secalinum* | River Barrow Pink Rock | 1943 | S62 | S6822 | *Hordeum secalinum* | 1943 | Yes | Located ca. on north east boundary possible |
| Meadow Barley | *Hordeum secalinum* | River Barrow Bearstown bridge | 1971 | S62 | S6822 | *Hordeum secalinum* | 1971 | Yes | Located ca. on north east boundary possible |
| Meadow Barley | *Hordeum secalinum* | River Barrow Carrickcloney | 1984 | S62 | S6822 | *Hordeum secalinum* | 1984 | Yes | Located ca. on north east boundary possible |
| Meadow Barley | *Hordeum secalinum* | Fisherstown | 25/06/1990 | S61 | S6817 | *Hordeum secalinum* | 1990 | Yes | Located to the south east on eastern bank of the barrow |
| Meadow Barley | *Hordeum secalinum* | River Barrow Pink Rock | 05/07/1990 | S62 | S6822 | *Hordeum secalinum* | 1990 | Yes | Located ca. on north east boundary possible |
| Meadow Barley | *Hordeum secalinum* | River Barrow Ballinlaw ferry | 12/08/1992 | S61 | S671169 | *Hordeum secalinum* | 1992 | Yes | Located to the south east on eastern bank of the barrow |
| Meadow Barley | *Hordeum secalinum* | River Barrow Bearstown bridge | 26/07/1995 | S62 | S6822 | *Hordeum secalinum* | 1995 | Yes | Located ca. on north east boundary possible |
| Meadow Barley | *Hordeum secalinum* | River Barrow Pink Rock | 26/07/1995 | S62 | S6822 | *Hordeum secalinum* | 1995 | Yes | Located ca. on north east boundary possible |
| Meadow Barley | *Hordeum secalinum* | River Barrow Bearstown bridge | 20/07/1990 | S62 | S6822 | *Hordeum secalinum* | 1990 | Yes | Located ca. on north east boundary possible |
| Meadow Barley | *Hordeum secalinum* | River Barrow, Bearstown Bridge; Marsh W of railway | 1971 | S62 | S6822 | NPWS Rare/Threatened Plants Database | 1971 | Yes | Located ca. on north east boundary possible |

| Taxon Common Name | Taxon Latin Name | Sample Location | Sample Date | Sample 10 km Square | Sample Spatial Reference | Survey Name | Sample Year | Within SAC | Location within the study area |
|---|---|---|---|---|---|---|---|---|---|
| Meadow Barley | *Hordeum secalinum* | River Barrow, Bearstown Bridge; Marsh W of railway | 1995 | S62 | S6822 | NPWS Rare/Threatened Plants Database | 1995 | Yes | Located ca. on north east boundary possible |
| Meadow Barley | *Hordeum secalinum* | River Barrow; E of Carrickcloney | 1984 | S62 | S6822 | NPWS Rare/Threatened Plants Database | 1984 | Yes | Located ca. on north east boundary possible |
| Meadow Barley | *Hordeum secalinum* | River Barrow; E of Carrickcloney | 1990 | S62 | S6822 | NPWS Rare/Threatened Plants Database | 1990 | Yes | Located ca. on north east boundary possible |
| Meadow Barley | *Hordeum secalinum* | River Barrow; S of Pink Rock | 1943 | S62 | S6822 | NPWS Rare/Threatened Plants Database | 1943 | Yes | Located ca. on north east boundary possible |
| Meadow Barley | *Hordeum secalinum* | River Barrow; S of Pink Rock | 1995 | S62 | S6822 | NPWS Rare/Threatened Plants Database | 1995 | Yes | Located ca. on north east boundary possible |
| Meadow Barley | *Hordeum secalinum* | Carrickcloney; R. Barrow, embankment of unimproved grazing marsh | 15/06/1990 | S62 | S6822 | Herbarium and Literature Database 19/02/2013 | 1990 | Yes | Located ca. on north east boundary possible |
| Meadow Barley | *Hordeum secalinum* | Bearstown | July 2000 - August 2000 | S62 | S676229 | Miscellaneous Plant Records (2015) | 2000 | Yes | Located inside the study area to the north east |
| Meadow Barley | *Hordeum secalinum* | Bearstown | July 2000 - August 2000 | S62 | S677229 | Miscellaneous Plant Records (2015) | 2000 | Yes | Located inside the study area to the north east |
| Meadow Barley | *Hordeum secalinum* | Bearstown | July 2000 - August 2000 | S62 | S677230 | Miscellaneous Plant Records (2015) | 2000 | Yes | Located inside the study area to the north east |

| Taxon Common Name | Taxon Latin Name | Sample Location | Sample Date | Sample 10 km Square | Sample Spatial Reference | Survey Name | Sample Year | Within SAC | Location within the study area |
|---|---|---|---|---|---|---|---|---|---|
| Meadow Barley | *Hordeum secalinum* | Pink Rock, Co. Waterford | July 2000 - August 2000 | S62 | S681226 | Miscellaneous Plant Records (2015) | 2000 | Yes | Located on the north eastern boundary of the study area |
| Divided Sedge | *Carex divisa* | Fishertown causeway | 1892 | S61 | S61 | *Carex divisa* | 1892 | Intersecting | Intersecting study area to south east |
| Divided Sedge | *Carex divisa* | Fishertown causeway | 1893 | S61 | S61 | *Carex divisa* | 1893 | Intersecting | Intersecting study area to south east |
| Divided Sedge | *Carex divisa* | Dunganstown | 1892 | S62 | S62 | *Carex divisa* | 1892 | Intersecting | Intersecting study area to north east |
| Divided Sedge | *Carex divisa* | Dunganstown | 1921 | S62 | S62 | *Carex divisa* | 1921 | Intersecting | Intersecting study area to north east |
| Divided Sedge | *Carex divisa* | Fisherstown; By the Causeway | 1892 | S61 | S61 | NPWS Rare/Threatened Plants Database | 1892 | Intersecting | Intersecting study area to south east |
| Divided Sedge | *Carex divisa* | Fisherstown; By the Causeway | 1893 | S61 | S61 | NPWS Rare/Threatened Plants Database | 1893 | Intersecting | Intersecting study area to south east |
| Divided Sedge | *Carex divisa* | Dunganstown; marshes near Killowen House | 1892 | S62 | S62 | NPWS Rare/Threatened Plants Database | 1892 | Intersecting | Intersecting study area to north east |
| Divided Sedge | *Carex divisa* | Dunganstown; marshes near Killowen House | 1921 | S62 | S62 | NPWS Rare/Threatened Plants Database | 1921 | Intersecting | Intersecting study area to north east |
| Divided Sedge | *Carex divisa* | Piltown, grown in garden | 1921 | S61 | S61 | Herbarium and Literature Database 19/02/2013 | 1921 | Intersecting | Intersecting study area to south east |
| Divided Sedge | *Carex divisa* | Piltown, saltmarsh | September 1922 | S61 | S61 | Herbarium and Literature | 1922 | Intersecting | Intersecting study area to south east |

| Taxon Common Name | Taxon Latin Name | Sample Location | Sample Date | Sample 10 km Square | Sample Spatial Reference | Survey Name | Sample Year | Within SAC | Location within the study area |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Database 19/02/2013 | | | |
| Opposite-Leaved Pondweed | *Groenlandia densa* | Gauls Mills, Co. Kilkenny | 1866 | S61 | S61 | *Groenlandia densa* | 1866 | Intersecting | Intersecting study area to south east |
| Opposite-leaved Pondweed | *Groenlandia densa* | Gauls Mills, Co. Kilkenny | 1856 | S61 | S61 | NPWS Rare/Threatened Plants Database | 1856 | Intersecting | Intersecting study area to north east |
| Opposite-leaved Pondweed | *Groenlandia densa* | Gauls Mills, Co. Kilkenny | 1866 | S61 | S61 | NPWS Rare/Threatened Plants Database | 1866 | Intersecting | Intersecting study area to south east |
| Opposite-leaved Pondweed | *Groenlandia densa* | Gauls Mills, Co. Kilkenny | 1856 | S61 | S61 | Herbarium and Literature Database 19/02/2013 | 1856 | Intersecting | Intersecting study area to south east |
| Grey Seal | *Halichoerus grypus* | Kearney Bay, Co. Kilkenny | 23/04/1983 | S62 | S62 | Animal Survey IBRC Species Records | 1983 | Intersecting | Intersecting study area to north east |
| Grey Seal | *Halichoerus grypus* | Aylwardstown, Co. Kilkenny | 30/04/1983 | S62 | S62 | Animal Survey IBRC Species Records | 1983 | Intersecting | Intersecting study area to north east |
| Grey Seal | *Halichoerus grypus* | Near Rochestown Marsh, Co. Kilkenny | 12/02/1983 | S61 | S61 | Animal Survey IBRC Species Records | 1983 | Intersecting | Intersecting study area to south east |
| Meadow Barley | *Hordeum secalinum* | Ballinlaw Ferry; by River Barrow | 11/08/1899 | S61 | S61 | Herbarium and Literature Database 19/02/2013 | 1899 | Intersecting | Intersecting study area to south east |
| Henbane | *Hyoscyamus niger* | Glenmore, Co. Kilkenny (beetcrop) | 1978 | S62 | S62 | *Hyoscyamus niger* | 1978 | Intersecting | Intersecting study area to north east |

| Taxon Common Name | Taxon Latin Name | Sample Location | Sample Date | Sample 10 km Square | Sample Spatial Reference | Survey Name | Sample Year | Within SAC | Location within the study area |
|---|---|---|---|---|---|---|---|---|---|
| Henbane | *Hyoscyamus niger* | Glenmore (beetcrop) | 1978 | S62 | S62 | NPWS Rare/Threatened Plants Database | 1978 | Intersecting | Intersecting study area to north east |
| Henbane | *Hyoscyamus niger* | Glenmore (beetcrop) | 27/10/1978 | S62 | S62 | Herbarium and Literature Database 19/02/2013 | 1978 | Intersecting | Intersecting study area to north east |
| Sharp-leaved Fluellen | *Kickxia elatine* | Alderton, Co. Wexford; in cornfields | 1889 | S61 | S61 | *Kickxia elatine* | 1889 | Intersecting | Intersecting study area to south east |
| Sharp-leaved Fluellen | *Kickxia elatine* | Alderton; in cornfields | 1889 | S61 | S61 | NPWS Rare/Threatened and Scarce (Final) Plant Database | 1889 | Intersecting | Intersecting study area to north east |
| Greater Broomrape | *Orobanche rapum-genistae* | Between town and Kilmanock, S. of New Ross | 1889 | S62 | S62 | *Orobanche rapum-genistae* | 1889 | Intersecting | Intersecting study area to north east |
| Greater Broomrape | *Orobanche rapum-genistae* | Between town and Kilmanock, S. of New Ross | 1889 | S62 | S62 | NPWS Rare/Threatened Plants Database | 1889 | Intersecting | Intersecting study area to north east |
| Borrer's Saltmarsh-grass | *Puccinellia fasciculata* | Ringville, Co. Kilkenny | 1997 | S61 | S61 | Miscellaneous Rare Plant Records Sept 2013 | 1997 | Intersecting | Intersecting study area to south east |
| Betony | *Stachys officinalis* | | 1856 | S61 | S61 | *Stachys officinalis* | 1856 | Intersecting | Intersecting study area to south east |
| Betony | *Stachys officinalis* | Rochshire Hill | 1906 | S61 | S61 | *Stachys officinalis* | 1906 | Intersecting | Intersecting study area to south east |

| Taxon Common Name | Taxon Latin Name | Sample Location | Sample Date | Sample 10 km Square | Sample Spatial Reference | Survey Name | Sample Year | Within SAC | Location within the study area |
|---|---|---|---|---|---|---|---|---|---|
| Betony | *Stachys officinalis* | Waterford, near | 1856 | S61 | S61 | NPWS Rare/Threatened Plants Database | 1856 | Intersecting | Intersecting study area to south east |
| Betony | *Stachys officinalis* | Rochshire Hill | 1906 | S61 | S61 | NPWS Rare/Threatened Plants Database | 1906 | Intersecting | Intersecting study area to south east |
| Betony | *Stachys officinalis* | Waterford, near | 1856 | S61 | S61 | Herbarium and Literature Database 19/02/2013 | 1856 | Intersecting | Intersecting study area to south east |
| Betony | *Stachys officinalis* | Rockshire Hill | June 1906 | S61 | S61 | Herbarium and Literature Database 19/02/2013 | 1906 | Intersecting | Intersecting study area to south east |

#### 2.6.3.3.2. Bats

Dr. Caroline Shiel was contracted by Atkins Ireland to conduct a preliminary bat survey along within the study area (Shiel, 2020).

##### Previous Site Data

Previous ecological surveys were carried out on behalf of Kilkenny County Council by Natural Environmental Consultants who prepared a Route Selection Report in January 2011. The purpose of this report was to evaluate the impacts of the 9 proposed route options on flora, fauna and fisheries. Desk studies and field visits were conducted to evaluate the ecological importance of the 21 ecological sites. which were identified in the Constraints Report. An evaluation of the habitat available for bats on each of the route options was undertaken by Natura in the field. Natura reported that "*In general, watercourses, woodland, hedgerows, treelines and other semi natural wetland habitats are important foraging areas and commuting routes for bats. Mature trees can also be important roosting sites for bat species. Consultation with Bat Conservation Ireland undertaken in the course of the Constraints Report for the N25 New Ross By-pass Scheme (Ewbank et al., 2001) highlighted the presence of three bat species within the study area – Leisler's bat, Common pipistrelle and Soprano pipistrelle, with additional records for unidentified bats Pipistrellus spp. and Myotis bats*".

##### Bat Conservation Ireland Database

Glenmore Village (S663 229) was taken as the northern point and a point north of Slieveroe village (S633 160) as the southern point of the scheme for the purposes of desktop research. In order to get a sense of bat species currently within the study area, these were also the two points at which remote Songmeter4 bat detectors were deployed overnight on 16th/17th September 2019.

Glenmore Village (S663 229) – a search of bat roost records within 1km of this point returned no records. When the search was extended to 10km 10 bat roosts were returned, as shown in Table 2-9 (exact grid references are not provided here, but can be provided on request).

**Table 2-9 - Bat roost data within 10km of Glenmore Village**

| Roost Name | Date | Details of bats recorded |
|---|---|---|
| Annagh's Castle Roost | 2005 | *Myotis* spp. (large pile droppings), Soprano pipistrelle (1), Brown long-eared (1) |
| Courtyard Annagh's Castle | 2005 | Daubenton's (3), Natterer's (8), Leisler's (2), Common pipistrelle (18), Soprano pipistrelle (4) |
| Bearstown Bridge | 2010 | Brown long-eared (1) |
| Cottage, Tullogher, Listerlin | 2013 | Soprano pipistrelle (1), Brown long-eared (1) |
| Grannagh Castle | 2013 | Leisler's (15), Common pipistrelle (20) |
| Great Island Power Plant | 2011 | Common pipistrelle (1) |
| Kilkenny County Council Offices | 1999 | Unidentified bats (10) |
| Mature Beech Tree, New Ross | 2010 | Leisler's (1) |
| Springfield House | 2007 | Leisler's (1), Soprano pipistrelle (4) |
| Strokestown Cottage | 2014 | Soprano pipistrelle (6) |

None of these 10 bat roosts are located within the study area for the N25 Glenmore to Waterford road.

Annagh's Castle is located c. 3km north-east of the proposed study area boundary. Grannagh Castle is located c 4.5 km south west of the proposed study area boundary. Springfield House is situated c. 3 km south of proposed study area. Strokestown Cottage is situated c. 3km east of proposed study boundary, on east side of River Barrow.

Slieveroe Village (S633 160) -– a search of bat roost records within 1km of this point returned no records. When the search was extended to 10km 12 bat roosts were returned, as shown in Table 2-10 (exact grid references are not provided here, but can be provided on request).

Seven of these roosts are the same as for Glenmore Village (Annagh's Castle Roost, Courtyard Annagh's Castle, Grannagh Castle, Great Island Power Plant, Kilkenny Co. Co. Offices, Springfield House and Strokestown Cottage. The additional five roosts were located as follows:

**Table 2-10 - Bat roost data within 10km of Slieveroe Village**

| Roost Name | Date | Details of bats recorded |
|---|---|---|
| Viewmount Park, Waterford | 1999/2011 | Leisler's (75) in 1999, 0 in 2011 |
| Marsuci Country House | 1999 | Common pipistrelle (10) |
| Whitfield Court Beech Tree Roost | 2003 | Unidentified bat (1) |
| Whitfield Court House | 2003 | Whiskered (25), Leisler's (3), Common pipistrelle (25), Brown long-eared (30) |
| Whitfield Court Old Farm Buildings | 2003 | Natterer's (25), Pipistrelle spp. (no count) |

None of these 5 roost sites are located within the proposed study area. Viewmount Park roost is 5-6 km south of the study boundary in Waterford city and south of the River Suir, as is Marsuci House. Whitfield Court House contains very important bat roosts but is located almost 10km to the south west of the site boundary.

#### Preliminary Bat Survey Records

A total of 5 species of bat were recorded at Glenmore Bridge overnight on 16th/17th September 2019. The vast majority of calls were of Soprano pipistrelle. It is likely that there is a roost of Soprano pipistrelles in Glenmore village. 27 Brown long-eared bat calls were recorded. Brown long-eared bats are generally difficult to detect due to their low intensity. It is most likely that there is a roost of Brown long-eared bats close-by.

Songmeter 2 was deployed overnight on a small tree-lined road approximately 1km north of Slieveroe (grid reference S633 160) and within the proposed study area of this road scheme.

Only 3 species of bats were recorded at this site in Slieveroe – Common pipistrelle, Soprano pipistrelle and Leisler's bat. Almost equal numbers of Common and Soprano pipistrelles were recorded.

A number of drive transects were also undertaken. **Transect 1** commenced in Glenmore village at 20:00, then onto existing N25 and drove south to Slieveroe roundabout, then north again on local road to west of N25 through Ardbog and Haggard townlands and ended back in Glenmore at 21;17 (refer to Shiel, 2020). Almost equal numbers of Soprano and Common pipistrelles were detected on this driven transect. Only a single Leisler's bat was recorded.

**Transect 2** commenced at Glenmore, crossed to the east of the N25 and ran south through Aylwardstown, Rathinure and Scartnamoe townlands and back onto the southern section of the N25 within the proposed study area (at 22.25 on 16/09/19 and ran until 00.03 on 17/09/19). The vast majority of calls were from a single species – Soprano pipistrelle. Surprisingly no Common pipistrelles were recorded during this transect. A single Nathusius's pipistrelle was recorded on this transect. Nathusius's pipistrelle has been recorded previously in this area during the Car-based Bat Monitoring Scheme run by Bat Conservation Ireland. In July 2013, a total of 5 Nathusius's pipstrelle calls were detected.

### 2.6.3.3.3. Birds

A desktop assessment of the study area was undertaken to determine if the study area could support birds species of conservation concern (after Colhoun and Cummins, 2013; *Birds of Conservation Concern in Ireland*). Sources of data considered included: -

- A review of the qualifying interests of neighbouring Special Protection Areas for birds to determine the potential for such species to occur within the study area. This included consideration of the potential occurrence of species listed on Annex I of the EU Birds Directive;
- Usage of SACs by birds was also considered – by reviewing accompanying Natura 2000 forms and site synopses;
- A review of pNHA site synopses for records of birds or habitats which might support rare or protected bird species (notably Lough Cullin pNHA site synopsis);
- Review of ASI (Young,1972) site descriptions;

- Review of other sites as described above and consideration of the type and distribution of semi-natural habitats by reviewing aerial photographs;
- Review of records in the Ecology Route Selection Report for the N25 Waterford to Glenmore prepared by Natura Environmental Scientists (Natura, 2011);
- Review of records in the N25 New Ross Bypass which is located at the eastern terminus of the N25 Waterford to Glenmore scheme ERM, 2007;
- Bird Records
    - Irish Wetland Bird Survey data for Lough Cullin pNHA
    - Data included on the online bird recording webpage Irishbirding.com. This included a significant number of recent records from the environs of the study area, especially along the River Barrow to the east. Sites for which data were presented included: - Aylwardstown Callows (Marsh); Kearney Bay / Kearney Bay Wood; Rochestown Marsh; Carrigcloney Marsh; Redgap; and Davidstown / Carriganurra
    - Bird records hosted on NBDC (National Biodiversity Data Centre);
- Published sources such as Balmer *et al*., 2013, Boland and Crowe, 2008 (re. Greylag Geese on the River Barrow), Lewis *et al*. 2019; and
- Review of the occurrence of key nesting habitat; e.g. quarries.

Based upon this research targeted field survey work was undertaken on 8th and 10th January 2020 focusing on Lough Cullin pNHA to the west; and the Barrow Estuary to the east. A particular focus of the survey was to search for any evidence of the wintering Greylag flock that was reported from this section of the Barrow Estuary in 2008 (Boland and Crowe, 2009). This flock was reported using fields on both sides of the estuary and roosting on the estuary in the bay on the eastern side of the estuary.

On 8th January 2019, fields and saltmarsh along the Kilkenny side of the Barrow Estuary adjacent to the study area, and Lough Cullin (Holy Lake) and adjacent low-lying fields were surveyed. Roads within the study area were also driven to check for any other areas of potential waterbird habitat; in particular this survey effort focused on searching for evidence of field feeding geese or waders. On 10th January 2019 all the accessible areas of saltmarsh and low-lying fields along both sides of the Barrow Estuary between New Ross and its confluence with the Suir were surveyed. In addition, a low tide count, and a dusk roost watch, of the bay on the eastern side of the Barrow at Fisherstown was undertaken to better understand the bird community using this area. Full records are not included, but can be provided on request (Gittings, 2020a).

Greylag were not recorded feeding on fields next to the Barrow during the day or roosting on the estuary at dusk. However, a local resident reported seeing flocks of unspecified geese on a few occasions in recent winters in the fields behind the bay at Fisherstown (approximately corresponding to the eastern feeding position reported in 2008). The historical Greylag records from the Barrow Estuary are within the potential core foraging range (15-20 km; SNH, 2016) of the wintering Greylag population at Coolfinn Marshes on the River Suir. Therefore, the Barrow Estuary may be a peripheral site that is occasionally used by this population.

Lough Cullin is a small lake surrounded by a large area of low-lying grassland. The lake is surrounded by a narrow fringe of reeds, with extensive forestry planting on three sides of the lake. The grassland is mainly improved/semi-improved, but is dissected by a number of deep drains. The lake held a relatively rich assemblage of waterbirds given its small size (Table 2-11); it is largely located outside the study area, but is fed by the Nicholastown Stream, which is within the study area. The Curlew and many of the Wigeon were feeding on the grassland adjacent to the northern end of the lake (outside the study area).

**Table 2-11 - Waterbirds recorded at Lough Cullin on 8th January 2020**

| Species | Count | Species | Count |
|---|---|---|---|
| Mute Swan | 3 | Little Grebe | 1 |
| Wigeon | 89 | Moorhen | 1 |
| Teal | 9 | Coot | 6 |
| Mallard | 24 | Curlew | 29 |
| Tufted Duck | 35 | Snipe | 7 |

Waterbirds, or significant areas of potential waterbird habitat, were not recorded elsewhere within the study area. However, the presence of large Golden Plover and Lapwing roosting flocks on the adjacent section of the Barrow Estuary suggests that flocks of these species may use fields within the study area. To investigate this a further round of targeted survey work was undertaken.

The most notable were Peregrine and Great Spotted Woodpecker. The Peregrine was recorded flying east over Rathinure, while the Great Spotted Woodpecker was recorded in a roadside treeline at Ringville.

The study area was resurveyed on the 25th February 2020, the main objective being to investigate potential linkages between the Golden Plover and Lapwing roosting flocks previously recorded on the Barrow Estuary at Fisherstown Bay and fields within the study area. No Lapwing were recorded during this survey; however, as wintering Lapwing depart from southern Ireland in late February / early March, it is possible that the wintering Lapwing in this area had already departed (this will be examined with respect to the emerging preferred route in the winter of 2020/21). On arrival at 09:15, a flock of around 300 Golden Plover were recorded circling around and over the Fisherstown Bay, Barrow Estuary (east of the study area). The study area was subsequently driven to look of Golden Plover field feeding (from suitable public vantage points); no evidence of field feeding Golden Plover was noted. On returning to Fisherstown Bay at 13:35, there was now a flock of around 2000 Golden Plover roosting on the mudflats (Gittings, 2020b); the site was watched for the remainder of the day.

Overall, the results of this survey do not provide any evidence indicating the use of fields within the study area by significant numbers of Golden Plover. As the tide flooded movements of birds suggest predominantly northerly / easterly patterns of movement. As the moon phase was close to a new moon, nocturnal feeding would be less likely to occur; therefore, the movement of birds from Fisherstown Bay north at dusk suggest the presence of a roosting area upstream of the study area, possibly in a flooded area along the Barrow.

Greylag Geese were not recorded during the February 2019 surveys.

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