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OPW Oifig na nOibreacha Poiblí Office of Public Works

Comhairle Chontae na Gaillimhe Galway County Council

BALLINASLOE FLOOD RELIEF SCHEME,

CO. GALWAY

ENVIRONMENTAL CONSTRAINTS STUDY REPORT

April 2021

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EXECUTIVE SUMMARY

This report sets out the key environmental issues relating to the Study Area for the Ballinasloe Flood Relief Scheme which may be impacted upon by potential flood risk management measures and/or which may impose constraints on the viability and/or design of these measures. Information has been gathered on engineering, socio-economic, environmental, heritage and geotechnical constraints.

Environmental constraints have been investigated under the following headings:

- Human Beings
- Ecology
- Water
- Soils & Geology
- Archaeology & Cultural Heritage
- Landscape
- Air & Climate
- Material Assets

Under each heading, the assessment methodology is first outlined followed by a description of the defined Study Area or 'receiving environment'. Finally, a summary of the key constraints and implications for the proposed scheme is considered in each section.

In addition to the assessments carried out, a public consultation day was held to present the Study Area to the public and invite feedback regarding the measures proposed in the Shannon CFRAM Study Area for Ballinasloe, which are to be reviewed and developed through the Ballinasloe Flood Relief Scheme. Information gathered during this public consultation has been included in this report.

This report is the first stage in the environmental assessment process, which will be ongoing throughout the planning and design of the project. Information gathered or alternatives suggested arising from public consultation days, meetings with stakeholders and written representations will be considered on the grounds of engineering feasibility, environmental viability, existing constraints and economics. A summary of the key constraints identified for each of the above headings is described in the following section of this Executive Summary.

Human Beings
In designing the proposed scheme, the value (both cultural and economic) of any buildings (Residential, Retail, etc) likely to be adversely affected by the scheme should be taken into account. In addition, adverse impacts on buildings or structures of conservation interest should be minimised or avoided where possible.
The design of the scheme should ensure that the public amenity value of the study area is not diminished. Impacts on the public amenity areas adjacent to the rivers such as riverside walks and in particular fishing access areas should be considered and minimised or mitigated.
Properties and businesses currently where flood alleviation measures are to be installed will need to have access maintained/re-established if proposed works are implemented.
The design of the scheme will need to take into consideration the proximity of proposed works to the main road routes for Ballinasloe area. Construction works and activities may have a negative effect on the use of Ballinasloe as a main transit point for people and goods. Ballinasloe being on several routes and having high traffic volumes should be taken into consideration and mitigated against.
Any design proposal should ensure that Ballinasloe Bridge is maintained so that temporary disruption on local transport links and access to homes and businesses in the study area are minimised.

Impacts on especially sensitive receptors e.g. schools, hospitals, crèches, nursing homes should be considered in the flood risk assessment.
The proposed scheme should take into consideration the proposed zoning objectives set out in the Galway County Development Plan 2015-2021 and Ballinasloe Local Area Plan 2015-2021.

Ecology
The River Suck and the surrounding banks and wetlands form part of the River Suck Callows SPA. There will most likely be effects on the function of the watercourses due to an effect on water flow and may cause wetlands to dry. These will need to be addressed to ensure that the negative effects are minimised and mitigated.
The areas in and around the Suck and Deerpark River (EPA channel name: Derrymullan Stream) waterbodies provide suitable habitats for breeding or resting locations for otter. When the details of the works option is decided upon, the areas to be affected require additional survey to determine the level of otter activity and if any breeding or resting places are present within and adjacent to the footprint of the works. Works could result in the damage or destruction of resting places and appropriate mitigation will be required to ensure no long-term adverse impacts on local otter populations. Appropriate licences may also be required from NPWS in relation to any works on or around otter breeding or resting places.
The River Suck through Ballinasloe has a WFD status of "Moderate". The aim for the WFD is to achieve "Good" status for all waterbodies and to ensure no deterioration of status in any waterbody. In-channel works, or permanent modification of channel banks or bed, could have an adverse impact on aquatic populations and water quality. This could arise directly through damage to in-channel habitats or indirectly through impacting upon water quality. Timing constraints will apply to any in-channel working to avoid the salmonid spawning season (usually between November and March). Appropriate measures shall also be required to prevent pollution incidents and silt mobilisation.
The scheme design should take into consideration the potential impacts from loss of riparian habitat which provides food, cover and shade and helps to stabilise riverbanks. Significant impacts on fish populations and macroinvertebrates populations could occur due to such loss of habitat.
The mobilisation of high levels of silt as a result of construction within rivers can impact spawning habitats. Excessive siltation can cause eggs and fry to be smothered. Spawning salmonids and lamprey are likely to avoid traditional spawning areas due to excessive silt deposits.
The riverine corridor and vegetated fringe of the study area watercourses provides suitable habitat for nesting birds and also within the river walls in Ballinasloe town which provide a number of cracks and crevices suitable for nesting birds. If possible, vegetation clearance associated with the works and any works to existing walls, should be conducted outside of the breeding bird season (March to September inclusive) to protect any nests that may be present. If this is not possible, working areas should first be searched by a suitably qualified ecologist for the presence of any nests. If found, the nests should not be disturbed until the chicks have fledged and the nest is deemed inactive.
Trees along the study area watercourses, river walls and old buildings in Ballinasloe town and the Ballinasloe Bridge provide potential roosting opportunities for bats, with the surrounding habitat

providing good foraging and commuting routes. Options that require the removal of mature trees or works to riverine built structures with the potential to support roosting bats shall be assessed for bat potential. The optimum time to carry out bat surveys is May-August inclusive. If bats are found to be present the surveys will determine the species, numbers, access points and type of roost. If a hibernation roost or maternity roost is found, they shall not be disturbed during the hibernation or maternity periods.

There is potential for fragmentation and degradation of existing habitats as a result of the proposed flood relief scheme infrastructure. Potential loss of habitats and connectivity between habitats may include loss or damage to hedgerows and tree lines which are important wildlife corridors for numerous species particularly bats and badger. It will be necessary to ensure that movement of species between ecological sites are not impaired by the Flood Relief Scheme. Any loss of corridors should be mitigated through the reinstatement and planting of additional corridors after construction.

In the design of the proposed scheme, consultation with NPWS will be necessary, together with an appropriate amount of survey work to establish baseline conditions in the study area watercourses. Constraints may be placed on the times of year that works in the proximity of the SPA may be carried out depending on the results of the various surveys and the requirements of NPWS. Constraints may also be placed on the time of year/weather conditions that the surveys may be undertaken.

It must be ensured that there are no significant impacts on European Sites (SACs/SPAs). The River Suck Callows Special Protection Area (SPA) Site Code: 004097 is directly adjacent to the proposed flood relief scheme. There is potential to negatively affect the status of these designated sites.

The EC (Birds and Natural Habitats) Regulations 2011 (S.I. 477/2011) prohibit the introduction and dispersal of plant species such as Japanese Knotweed, Himalayan balsam, Giant Hogweed, etc. Therefore, the works associated with the flood relief scheme in areas where invasive species are identified must use appropriate measures to ensure their containment. Appropriate measures should be taken to ensure that the spread of these invasive species is not initiated or extended by any proposed works. An Invasive Species Management Plan may be required for the treatment of these invasive species in a safe and environmentally acceptable manner.

Water

The design of the proposed flood relief scheme should take into account the main objectives of the Water Framework Directive River Basin District Management Plan (RBDMP) by ensuring that any works proposed do not result in the deterioration of water quality and where possible contribute to the achievement of "good" status within the study area.

The construction phase of the scheme has the potential to impact on the water quality of the study area watercourses through:

- Release or run-off of suspended solids from site preparation or development of construction
- Accidental release of cement or contaminated materials from the site to the study area watercourses
- Unintentional discharge of oil/diesel from the site to the study area watercourses

A Construction Environmental Management Plan will be required before commencement of any construction works. This should be approved in advance by the NPWS.
The Flood Relief Scheme has the potential to impact on the hydrology and morphology of the study area watercourses. It is recommended that the hydrological regime of all waterbodies which might be affected by the scheme are fully considered to ensure that the WFD hydro-morphological status is not affected by the scheme.
The scheme should take into consideration the presence of protected water resources and water dependant terrestrial ecosystems.
The hydrology of the River Suck should be assessed to determine any changes likely to occur such as an increase in freshwater flows to the river associated with the scheme. Any change in the hydrology could result in wetland habitat changes to the River Suck Callows SPA. Conservation objectives for the SPA include "to maintain or restore the favourable conservation condition of the wetland habitat at River Suck Callows SPA as a resource for the regularly-occurring migratory waterbirds that utilise it".
The removal and disposal of any river/estuarine sediment should follow the guidelines for handling waste under the Waste Management Acts as amended. A strict chain of custody must accompany all excavated materials taken off site for disposal.

Soils and Geology
It is recommended that a preliminary geotechnical investigation be carried out once viable flood risk management measures are developed in order to identify geology and ground conditions.
Permanent or temporary removal of soils/excavation of bedrock may be necessary during the construction of the Flood Relief Scheme which could potentially impact bedrock and alter drainage patterns. Ground conditions within the study area will be identified through geotechnical investigation during the next stage of scheme development
Consideration needs to be given to the permeability of the bedrock geology within the study area while developing the design of the viable flood risk management measures.
There is potential risk of contamination of groundwater through spills or leaks from hazardous substances used on site during construction. Best site practice should be implemented on site and appropriate mitigation measures should be implemented where works are hydrologically connected to groundwater bodies

Archaeology & Cultural Heritage
Given the provisions of the National Monuments Acts, no disturbance to, or interference with, any known archaeological sites can take place without prior Notification, assessment and consultation with the National Monuments Service of the Department of Housing, Local Government & Heritage (DoHLGH).This may be conducted through the environmental consultant's archaeologist and the established consultation process via the Development Applications Unit (DAU) as part of planning.

Appendices E1 – E3 provide details on archaeological sites/monuments within the study area. Each site/monument is assigned a Zone of Archaeological Potential (ZAP) within which no works should be undertaken without consent of the Minister of Culture, Heritage & the Gaeltacht. These Zones are indicated in pink in the relevant figures.
The riverine environment of the River Suck at East Bridge has high archaeological potential given the proximity to the site of an important medieval castle and associated bawn. This point has also been a fording point on the River Suck for millennia and historically marked a border between the provinces of Connaught, Munster & Leinster. The existing East Bridge contains medieval fabric and is a designated National Monument.
The riverine environment of the River Suck within the study area has both terrestrial & underwater archaeological potential.
An Archaeological Impact Assessment should be carried out for the proposed scheme. This may include a programme of advance archaeological testing and/or monitoring of Site Investigations as required.
An Architectural Heritage Impact Assessment should be carried out for the proposed scheme.
All impacts on identified heritage – including areas to which local lore is connected – and their immediate environs, should be avoided where possible in the design of the proposed flood relief scheme. Where avoidance by design is not possible then archaeological investigations may be required for identified areas of archaeological potential which would be directly impacted by the proposed scheme. This will be determined in consultation with the National Monuments Service of the DoHLGH.
Advance archaeological investigations should be undertaken at an early stage of project development to facilitate mitigation design and allow adequate time to evaluate and record any archaeological features or deposits that may be encountered.
Any ground disturbance works associated with the proposed scheme, including advance site investigations, should be further assessed for archaeological potential. Appropriate mitigation should be determined during the design phase in consultation with the National Monuments Service (DoHLGH).
Galway County Council Heritage and Conservation offices should be consulted at an early stage of project development.
The National Monument Service of the Department of Housing, Local Government & Heritage should be consulted at an early stage of the scheme development. This should include specific consultation with the Underwater Archaeology Unit (UAU) within NMS as there is high potential for encountering underwater archaeology during the project development.

Landscape
Views from residential and commercial properties and recreational views from riverside footpaths throughout Ballinasloe Town and their riverbanks should be retained in areas where flood protection measures are proposed.
Consideration should be given to protecting and retaining the amenity areas of the study area

Air and Climate
Prior to the selection of a preferred flood relief scheme as part of the Engineering Study, it is recommended that the short-listed flood alleviation measure be assessed in relation to the impact of noise and vibration during the construction phase of the project.
It is recommended that mitigation measures be put in place to reduce the impacts on air quality and the noise environment during the construction phase of any proposed flood relief scheme.
It is recommended that the effects of vibration during the construction phase be considered in the selection process for a potential flood alleviation scheme.
The scheme design should take into consideration any noise/vibration sensitive receptors such as residence, schools and retirement homes located in proximity to the flood relief scheme
Meteorological and climatological data should be consulted in the engineering design process.
The potential impacts of Climate change should be assessed with regard to the prediction of flood risk and should be taken into account in the design of a proposed flood relief scheme.

Material Assets
It is recommended that the existing and proposed location of watermains and underground services in the vicinity of any proposed flood relief scheme be ascertained as part of the Engineering Study. It is recommended that Galway County Council and other utility providers with services in the area be consulted regarding the location and priority of existing and proposed services. It is further recommended that the services be protected as part of any proposed flood relief scheme.
It is recommended that Galway County Council and Transport Infrastructure Ireland (TII) be consulted in relation to any effects on traffic management on the existing and proposed roads infrastructure in the study area from a proposed flood relief scheme.

SUMMARY OF KEY CONSTRAINTS

Works that may materially affect cultural, economic and ecological receptors and/or functions thereof under the headings detailed in this report will require mitigation measures throughout the scheme options and design stages.

Additionally, Public Consultation to date has highlighted particular concerns of the Local Community in relation to the progression of this Flood Relief Scheme, including water quality, land devaluation and efficacy of the scheme.

1. INTRODUCTION

The following provides an overview of the proposed flood relief scheme, study area and the process stages being advanced for the provision of both engineering and environmental services.

1.1 Background and Overview of The Scheme

As part of the implementation of the EU Floods Directive, the OPW undertook the Shannon Catchment Flood Risk Assessment and Management (CFRAM) Study; specifically the Flood Risk Management Plan for the Shannon Upper & Lower River Basin (UOM25-26). This study included Ballinasloe as an Area for Further Assessment (AFA) and concluded that a flood relief scheme would be viable and effective for the community.

Following the flood of 2009, a flood relief scheme for the Derrymullen area was advanced by Galway County Council. The Derrymullen Flood works were initiated in 2010 following major flooding in the 2009 flood event and constructed from 2010 to 2011. Construction of the scheme was completed in 2011 and involved 1.19km of flood defence structures consisting primarily of walls and embankments. The works comprise the construction of a flood relief wall around Derrymullen, installation of penstock and flood gates and provides protection against a 1% AEP (100 year) fluvial event from the Deerpark River for 135 properties. The existing Derrymullen scheme is proposed to be incorporated into the proposed Ballinasloe Flood Relief scheme, which will facilitate the ongoing management and maintenance of a single overall scheme for the town.

OPW in partnership with Galway County Council appointed Arup in conjunction with Hydro-Environmental Ltd. to assess, develop and design a viable, cost-effective and environmentally sustainable flood relief scheme for Ballinasloe. Ryan Hanley Ltd. were appointed by Galway County Council (GCC) and the Office of Public Works (OPW) in January 2020 to undertake the provision of Environmental Consultancy Services to facilitate the advancement of a Flood Relief Design to alleviate flooding in Ballinasloe town and environs.

1.2 Study Area

The outline scheme area for the project is the town of Ballinasloe as identified in the CFRAM study and is referred to as the Ballinasloe Area for Further Assessment (AFA). The scheme area is the area within which physical works are proposed to be constructed, accessed and maintained as part of any feasible scheme. This area is intended to benefit from and be protected by the scheme. A map of the study area is provided in Appendix B.

The Study Area for the proposed flood relief scheme covers approximately 18.95km^2 and lies within the Upper Shannon River Catchment, and as illustrated in Figure 1.1, is centred on Ballinasloe town in east Co. Galway. The boundary of the Study Area is based on the Ballinasloe Urban Electoral Division. It starts at the north just below the convergence of the Bunowen River with the River Suck, along the eastern side it follows the border between Galway and Roscommon and terminates just south of the M6 motorway. It contains a mix of agricultural, residential and commercial lands. The study area includes the main channel of the River Suck which runs through the town, as well as tributaries including the Deerpark River and Pollboy26 (Stream). The River Suck flows into the River Shannon c.12kms downstream of Ballinasloe near Shannonbridge. The River Suck Callows Special Protection Area (SPA) runs through the Study Area, following the course of the river and includes areas of agricultural land, wetland and woodland. There are 3 no. bridges over the River Suck within the study area. One railway bridge on the Galway to Dublin line; a second within the town itself and which takes the majority of the local traffic; and a third over the M6 Galway to Dublin motorway.

The Constraints Study is the first stage in the Environmental Impact Assessment (EIA) process for the Ballinasloe Flood Relief Scheme and is being advanced in parallel with the Engineering Study for the scheme. The project will be delivered in the following stages:

Table 1-1 Stages in Assessment & Planning for the Flood Relief Scheme

Stages	Environmental Impact Assessment	Engineering Study
Stage I	Part 1 - Baseline surveys & **Constraints Study** (*this stage*) Part 2 - Environmental Assessment of Scheme Options & Public Consultation Part 3 - Screening for Appropriate Assessment and NIS (if required), Environmental Impact Assessment scoping and main report, Derogation licences, CEMP	**Identification and Development of a Preferred Scheme:** Data Collection Surveys Hydrological Analysis Hydraulic Analysis and Modelling Scheme Analysis and Development Public and Stakeholder Engagement Set up Project Website Review of CFRAM Study
Stage II	Public Exhibition and Exhibition Report	Public Exhibition/Planning Process
Stage III	AA Screening Determination, Addendums to EIAR and NIS (if required)	Detailed Construction Design, Compilation of Work Packages and the Preparation of Tenders for Contracts and of Confirmation Documents
Stage IV		Construction Supervision and Project Management Services
Stage V		Handover of Works

1.3 Scope of Assessment

Information has been gathered under the relevant headings prescribed in the Environmental Protection Agency (EPA) guidelines "*Information to be contained in Environmental Impact Assessment Reports, Draft, August 2017*" and "*Advice Notes on Current Practice in the Preparation of Environmental Impact Statements, 2003*".

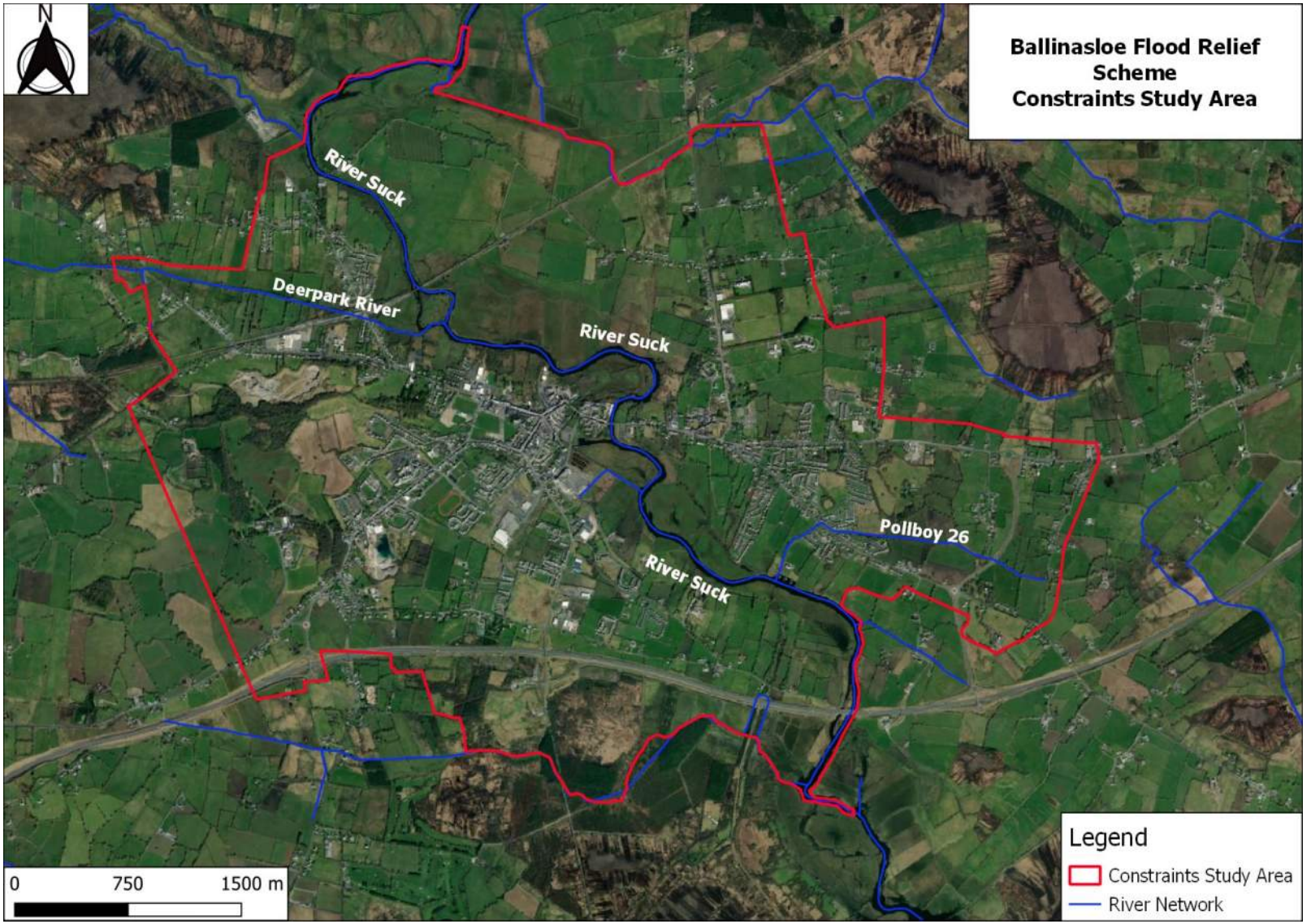


Figure 1.1: *Overview of the Ballinasloe Flood Relief Scheme Study Area*

1.4 Consultation

Consultation has taken place with statutory and non-statutory Consultees, shown in Table 1-2 and Table 1-3, as part of the initial scoping process. Comments and information gathered from the Public Consultation and subsequent submissions received are being considered from the following list of Consultees:

Table 1-2 Statutory Consultees

Statutory EIA Consultees	
1	An Bord Pleanála
2	An Comhairle Ealaion (The Arts Council)
3	An Taisce - The National Trust for Ireland
4	Commission for Regulation of Utilities
5	Department of Agriculture, Food & the Marine
6	Department of Enterprise, Trade & Employment
7	Department of Environment, Climate & Communications
8	Department of Housing, Local Government & Heritage
9	Department of Justice
10	Department of Tourism, Transport and Sport
11	Environmental Protection Agency
12	Fáilte Ireland
13	Health and Safety Authority
14	Inland Fisheries Ireland
15	Galway County Council
16	Office of Public Works (OPW)
17	The Heritage Council
18	Transport Infrastructure Ireland

Table 1-3 Other Consultees

Other Consultees	
1	Angling Council of Ireland
2	Angling in Ireland – The Irish Federation of Pike Angling Clubs
3	Ballinasloe & District Anglers
4	Ballinasloe Fair and Festival Office
5	Bat Conservation Ireland
6	Bird Watch Ireland

Other Consultees	
7	Boating Club and Associations
8	Board Gáis
9	Coillte
10	Flood Alleviation Ballinasloe (FAB)
11	Galway County Council Area Engineer
12	Galway County Council Architectural Conservation Officer
13	Galway County Council Heritage Officer
14	Geographical Society of Ireland
15	Geological Survey of Ireland
16	Inland Waterways Association of Ireland
17	Institute of Geologists of Ireland
18	Irish Creamery Milk Suppliers Association (ICMSA)
19	Irish Heritage Trust
20	Irish Peatland Conservation Council
21	Irish Planning Institute
22	Irish Small and Medium Enterprises Association (ISME)
23	Irish Wildlife Trust
24	National Association of Regional Games Councils
25	National Building Agency
26	National Monuments Service
27	National Parks and Wildlife Service
28	Teagasc
29	The Irish Environmental Network
30	Tourism Ireland
31	Voice of Irish Concern for the Environment
32	Waterways Ireland

A copy of the newsletter issued to Consultees is provided in Appendix A.

2. SCHEME CONTEXT AND BACKGROUND

2.1 History of Flooding

Ballinasloe has a long history of flooding from the River Suck, Deerpark River and associated local tributaries. Significant fluvial flooding occurred in November 2009 and again, more recently in the winter of 2015/2016.

A wet summer in 2009 led into a prolonged unsettled and heavy rainfall period in mid-October which continued into November 2009. The river catchments draining to the River Suck were saturated resulting in high water levels, high water tables and full flood plains. In November 2009, many low-lying properties were flooded. The finished floor levels of over 94 houses were below the flood level and flooded as a result.

During the winter of 2015/2016 Ireland experienced exceptional and widespread flooding. All Met Éireann stations reported rainfall amounts well above the Long-Term Average for December of 2015.

The OPW's Shannon Catchment Flood Risk Assessment and Management (CFRAM) Study identified Ballinasloe as an AFA and concluded that a flood relief scheme would be viable and effective for the community. The Flood Risk Management Plan for the Shannon Upper & Lower River Basin (UOM25-26) identified potentially viable flood relief works for Ballinasloe that may be implemented after project-level assessment and planning or Exhibition and confirmation might include;

- Construction of 530m of new flood defence walls, 5,050m of flood defence embankments and a demountable flood gate;
- Construction of two new 6m wide flood alleviation arch culverts at Ballinasloe East Bridge. The invert level of these culverts is 35.3m;
- Regarding of the riverbank 130m upstream and downstream of the bridge to 35.3m to maximize efficiency of the flood alleviation culverts;
- Construction of two Lock Gates across the Canal and a sluice gate across the channel flowing into the marina from the canal;
- Upgrade existing culvert to a 2.0m dia. Culvert;
- Upgrade the existing Kilclooney Road Bridge on the River Deerpark;
- Regarding of the riverbed upstream and downstream of Kilclooney Road Bridge to maximize efficiency of the upgraded structure;
- Public Awareness, Flood Forecasting will also be required as part of this measure;
- Maintain all existing defences;
- The West and East Atlas channels need to be maintained to ensure their full capacity can be utilised in a flood event.

2.2 Current and Future Changes

The risk of flooding may increase with the passage of time. Future changes, which have the potential to affect the risk of flooding, include:

- Climate Change is expected to in more extreme and intense weather events, including higher rainfall levels resulting in cumulatively greater flooding cycles at catchment level with also more intense rainfall events that cause pluvial flooding.

- Geomorphological processes, such as (i) Sedimentation transport which affects the area of conveyance of the river channel and (ii) Erosion.
- Development within the catchment which, dependent on the type of development, may have the potential to adversely affect the response of the catchment to rainfall;
- Changes in land use and associated hydrology, including afforestation, peat harvesting, agricultural improvement and land drainage;
- Development of leisure boating, navigable waterways, 'blue ways' and facilities such as berthing and marinas.
- The Galway to Dublin Cycleway includes the Galway to Athlone Cycleway Project which enters the Ballinasloe via Garbally Demense and exits the town by following a towpath on a decommissioned section of the old Grand Canal.
- Improved access via the M6 and the opportunity this presents for social and economic growth.
- Residential and commercial building development pushing outwards of the town towards the river in greenfield sites.

2.3 Potential Flood Risk Management

An Engineering Study is being advanced in parallel with the Environmental Assessment of the proposed flood relief scheme. The Constraints identified in this report will inform the selection of flood risk management measures as part of the Engineering Study.

The range of engineering measures typically considered for flood relief schemes include, but are not limited to the following:

a) Do Nothing (i.e., implement no new flood alleviation measures);

b) Non-Structural Measures (e.g. flood warning system or individual property protection);

c) Relocation of Properties and/or infrastructure;

d) Reconstruction of Properties and/or infrastructure to a higher level;

e) Flow Diversion (e.g. stream diversion or flood flow bypass channel);

f) Flow Reduction (e.g. upstream catchment management or flood storage);

g) Flood Containment through Construction of Flood Defences;

h) Increase Conveyance of Channel (upstream and/or through and/or downstream of the town);

i) Sediment Deposition and Possible Sediment Traps;

j) Pump storm waters from behind flood defences;

k) Measures Specific to the Study Location.

It is not possible, at this stage, to define the number of scheme options that will require study, although a typical Engineering Study of this nature will identify between three and five viable options including the 'do-nothing' and the 'do-minimum' scenarios.

2.4 Topography & Mapping

The Study Area, based on the Ballinasloe Urban Electoral Division, includes Ballinasloe town, suburbs and the rural outskirts of the town located in East Co. Galway. It contains a mix of agricultural, residential and commercial land. The study area includes the main body of the River Suck which runs through the

town and also parts of the tributaries of Deerpark River (EPA channel: Derrymullan stream) and Pollboy26.

The River Suck is a river within the Shannon River Basin. It is 133km in length and is the main tributary of the River Shannon. The River Suck starts just west of Lough O'Flynn at the border between County Mayo andCounty Roscommon and 5km east of Ballyhaunis. It then travels in a predominantly southern direction flowing through a nu,mber of towns and villages, including Castlerea and Athleague, before flowing through Ballinasloe and meeting the River Shannon at Shannonbridge approximately 12km downstream of the Study Area. The study area begins at the convergence of the Bunowen River with the Suck. The Bunowen River (labelled as Ahascragh River on some maps) starts 2.3km upstream and south east of Ballymacward. From here it flows in a predominately easterly direction towards Ahascragh before flowing south towards Ballinasloe and the River Suck. The Deerpark River drains the area west of Ballinasloe and rises approximately 13km west of the Study Area. The network consists mainly of the of the Deerpark River and the Lenafin stream, which flows from Callow Lough. The Bunowen and Deerpark watercourse networks drain the Suck_SC_080 subcatchment. The Pollboy 26 is a small tributary of only 2km which rises just east of the R357 and enters the River Suck on the eastern side adjacent to the Moycarn Lodge & Marina.

The following mapping was consulted and used in the preparation of this Constraints Study:

- Ordnance Survey (OS) Discovery Series Mapping at 1:50,000 scale
- Google Maps
- Bing Maps
- OS Historic 6" Mapping
- OS Historic 25" Mapping

3. ENVIRONMENTAL CONSTRAINTS

3.1 Introduction

The purpose of this section of the report is to describe the key environmental elements relating to the Ballinasloe Flood Relief Scheme, which may be impacted upon by potentially viable Flood Risk Management measures and / or which may impose constraints on the viability and / or design of these measures.

3.2 Methodology and Guidelines

This Constraints Study is the first stage in the Environmental Impact Assessment for the Ballinasloe FRS and is being carried out in accordance with the EPA "*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*" (Draft; August 2017).

Information has been gathered under relevant headings prescribed in the EPA Guidelines.

The following sections outline the findings of the Constraints Study under these headings and identify potential environmental constraints associated with the proposed scheme.

3.3 Population & Human Health

This section sets out the socio-economic features of the Study Area that may impact on the selection of flood alleviation measures for the proposed FRS.

3.3.1 Settlements and Planning Policy

The following sources of information were utilised in the preparation of this section:

- Galway County Development Plan 2015-2021 (http://www.galway.ie/en/services/planning/planspolicy/gcdp2021/)
- Ballinasloe Local Area Plan 2015-2021 http://www.galway.ie/en/services/planning/planspolicy/lap/bsloe/
- Galway County Local Economic & Community Plan 2016-2022 https://www.galwaycountyppn.ie/wp-content/uploads/2018/01/Galway-County-Local-Economic-and-Community-Plan-2016-2022.pdf
- Census of Ireland 2016: www.cso.ie
- Galway County Council Website: http://www.galway.ie/en/
- River Basin Management Plan for Ireland 2018-2021 https://www.gov.ie/en/publication/429a79-river-basin-management-plan-2018-2021/

Planning policies outlined in the Ballinasloe Local Area Plan (LAP) take due consideration of the National Flood Risk Management Guidelines 2009. Further detail on the objectives and policies can be found in the Ballinasloe LAP 2015-2021.

3.3.2 Population and Housing

The Study Area for the proposed Ballinasloe flood relief scheme is located within the Ballinasloe Urban Electoral Division.

The Ballinasloe Urban Electoral Division in the period of 2011 – 2016 increased from 6,449 to 6,660 individuals, a 3.3% increase. From 1996 to 2002 there was an increase in population of 6.2%. Since then, there has been a steady increase of around 1.1%.

The study area was identified as a County Town within the Galway County Development Plan 2015 – 2021. The Galway County Development Plan indicates that:

"Ballinasloe as a County town is one of the largest towns in Galway and preforms an important role, in particular, as a commercial/industrial centre for the eastern area of the County. The town has important transport connections and provides ease of access to other major regional centres including Dublin, Galway and Athlone."

"This Settlement Hierarchy recognises that there are different categories of settlements throughout Galway all with a complementary role to play in the future prosperity of the County. In this regard it has identified over 100 settlements in the County ranging from small crossroad settlements to larger villages and main town such as Ballinasloe and Tuam. It also recognises that the rural area must be catered for within the Settlement Hierarchy as it plays an essential role in the overall settlement structure by developing sustainable rural communities."

3.3.3 Industry and Business

The Ballinasloe Local Area Plan 2015 – 2021 Objective LU 4 promotes the sustainable development of industrial and industrial related uses. Objective LU 5 identifies the need to promote sustainable development of high value business and technology uses to reinforce Ballinasloe's potential as a growth centre for medium – large innovative companies including science and technology-based companies.

3.3.3.1 Integrated Pollution Prevention Control (IPPC) Licensed Facilities

The EPA licenses large-scale industrial and agricultural activities under the Integrated Pollution Prevention Control Directive. The nearest facility to the Study Area is listed on the EPA website as licenced.

Facilities downstream of the Study Area were also considered and no large scale industrial and agricultural activities were identified downstream of the Study Area. Details of IPPC licensed facilities are provided in Table 3-1

Table 3-1 IPPC Licensed facilities in the vicinity of the Ballinasloe Flood Relief Scheme Study Area

Facility	Address	Activity Category
Electricity Supply Board	Shannonbridge, Offaly, N37 C840	Industry
Mr John English	Clonbrock, Ahascragh, Ballinasloe, Galway (north east of Study Area)	Industry

3.3.4 Tourism

Tourism is one of the major contributors to the national economy and is a significant source of full time and seasonal employment.

During 2018 (the latest period for which Fáilte Ireland figures are available), total tourism revenue generated in Ireland was recorded as €5.6 billion. The number of overseas tourists grew by 6.5% to 9.6 million. Records show that 55% of overseas tourists came to Ireland on holidays in 2018. 11.2 million people visited Ireland in 2018 and this was the busiest year for tourism on record and represented a 6% increase from 2017. In total, tourists spent €6.1 billion in Ireland in 2018.

Ireland is divided into seven tourism regions. The West Region, in which the Study Area is located; comprises Counties Galway, Mayo and Roscommon. During 2018, the West Region benefited from 5.7 million visitors.

Table 3-2 provides Fáilte Ireland figures showing the types of activities that overseas tourists engaged in and a breakdown of the number of participants that undertook each activity. From these figures, it can be seen that Hiking/cross-country walking visits form the majority of activities enjoyed by tourists in Ireland.

Table 3-2 Activities undertaken by overseas visitors whilst visiting Ireland.

Holiday – Activities Engaged in (Overseas Participants (000s))	2018	2017	2016	2015
Hiking/cross country walking	2,679	2,352	2,077	1,674
Cycling	504	416	399	355
Golf	221	257	193	198
Angling	146	135	131	163
Equestrian	126	142	98	75

Fáilte Ireland data relating to the times of year that overseas tourists visit Ireland indicates that the peak season is October to December with the least activity in the months of April and September.

3.3.4.1.1 Local Tourism

An initiative "Exploring Ballinasloe" was set up by Ballinasloe Fit Town Team in partnership with Ballinasloe's Engineering Department, Galway County Council and Galway Sports Partnership to promote and develop Ballinasloe as an active town. Local attractions include walking, running, cycling, water activities, golfing and horse riding. Further information can be seen at the websites below:

- https://www.ballinasloe.ie/exploringballinasloe.html
- https://www.ballinasloe.ie/tourism.html

3.3.4.1.2 Local Tourist Attractions

Ballinasloe is known as the "Gateway to the West" and Ballinasloe town is considered an excellent base to enjoy many national and internationally renowned attractions such as Ballinasloe Famine Park, Ballinasloe Pitch and Putt, Ballinasloe Suck Walkway, Athlone Castle and Birr Castle to name a few.

Ballinasloe is also popular for horse riding and offers a choice of horse and pony riding facilities, stables and regular show jumping events. Equine husbandry and breeding features prominently in the grasslands of the River Suck floodplain and is deeply rooted in the history of the town as a market centre for horses and ponies. The annual Ballinasloe Horse Fair is Europe's oldest and largest horse fair, dating back to the 18th century. Coarse angling is very popular with local fishermen along the River Suck.

Ballinasloe also has established leisure boating facilities and the River Suck forms a part of the Shannon Navigation connecting to the Shannon Erne Waterway, the most extensive network for inland leisure boating on the island of Ireland, which was developed and is managed by Waterways Ireland. There

are two secure, serviced marina facilities on the River Suck at Ballinasloe; accessible by way of a locks system at Pollboy.

3.3.5 Community Facilities

The following identifies community facilities under the headings of Education, Sport & Recreation.

3.3.5.1 Education

There are three primary schools located in Ballinasloe. Scoil Uí Cheithearnaigh is a mixed Gaelscoil that caters for 217 students, Ballinasloe National School (mixed) which caters for 281 students and Creagh National School (mixed) which caters for 428 students. There are two secondary schools in Ballinasloe. Garbally College is an all-boys secondary school and caters for 525 students. Ardscoil Mhuire is an all-girls secondary school which caters 471 students.

The total number of students in the Ballinasloe area currently stands at 1922.

3.3.5.2 Sports and Recreation

Ballinasloe have a GAA club, Coral Leisure Club, Krav Maga Centre, Ballinasloe AFC Soccer Club, Ballinasloe Boxing Club and Ballinasloe Karate Club.

3.3.6 Key Constraints

- In designing the proposed scheme, the value (both cultural and economic) of any buildings (Residential, Retail, etc.) likely to be adversely affected by the scheme should be taken into account.

  In addition, adverse impacts on buildings or structures of architectural/historical/conservation interest should be minimised or avoided where possible (See also Section 3.7).
- The design of the scheme should ensure that the public, heritage and tourism amenity value of the Study Area is not diminished. Impacts on amenity areas such as parks and the river for boating and fishing should be considered, with replacement mitigation proposed if necessary.
- Properties and businesses located where flood alleviation measures may be required will need to have access maintained/re-established, if works in these areas are proposed.
- Impacts on especially sensitive receptors e.g. schools, crèches, nursing homes should be considered in the flood risk assessment.
- The proposed scheme should take consideration of the proposed zoning policies and objectives as set out in the Galway County Development Plan 2015-2021 and Ballinasloe Local Area Plan (LAP) 2015-2021.
- The proposed routing of a relief road for the town centre is indicated in the LAP at Townparks and may coincide/interact with the scheme embankment as outlined in the options proposed in CFRAM. This may present as a constraint to the FRS development, unless plans change or there is an approach which can marry and coordinate the respective plans. An overview of possible route options as available at time of writing (April 2021) is provided in Appendix G1.
- The proposed route of a greenway and cycleway through the Ballinasloe area for the Galway to Athlone section of the Dublin to Galway Greenway may coincide/interact with the scheme alignment or location of flood defences at locations which are as yet unknown. This may present as a constraint to the FRS development unless there is ultimately no overlap between the schemes or an accommodation for parallel development is achieved and coordinated. Further information is available from: https://www.galwaytoathlonecycleway.com/pages/publications.php

An overview of the proposed Athlone to Galway Cycleway route options and consultation areas as available at time of writing (April 2021) is provided in Appendix G2.

3.4 Ecology

This ecological constraint assessment has been carried out to provide decision makers with clear and concise information on the international, national, regional and local issues that must be taken into account when planning and designing the Ballinasloe Flood Relief Scheme.

This section will provide the main ecological issues and constraints that could significantly affect the design of the scheme, delay progress or influence the costs.

The findings of this section will feed into further sections of the proposed scheme such as the Environmental Impact Assessment.

3.4.1 Methodology

The methodology followed in completing this section of the report consisted of desktop research and consultation with a number of governmental and non-governmental bodies (See Section 1.5 of this report).

The following sources were also used in the compilation of this section of the constraints report:

- 1:50,000 scale Discovery series mapping
- 1:10,560 OS Maps of the Study Area
- Aerial photography of the Study Area
- NPWS site synopses and database of information on designated sites and records of protected species. See https://www.npws.ie/protected-sites/spa/004097
- *New Atlas of the British & Irish Flora* (Preston *et al.*, 2002)
- *The Atlas of Breeding Birds in Britain and Ireland*' (Sharrock, 1976), '*The New Atlas of Breeding Birds in Britain and Ireland*: 1988-1991' (Gibbons et al., 1993) and '*The Atlas of Wintering Birds in Britain and Ireland*' (Lack, 1986)
- Biodiversity Ireland Database www.biodiveristyireland.ie
- The EPA website http://www.epa.ie/rivermap/data
- The Water Framework Directive website www.WFD.ie

3.4.2 Desk Study

The following section provides details of the results of a desk-based study of the ecological constraints specific to the Ballinasloe Flood Relief Scheme study area.

3.4.2.1 Designated Areas

With the introduction of the EU Habitats Directive (92/43/EEC), which was transposed into Irish law as the Natural Habitats Regulations, 1997, the European Union formally recognised the significance of protecting rare and endangered species of flora and fauna, and also, more importantly, their habitats. Member states were directed to provide lists of sites for designation.

Natural Heritage Areas

Natural Heritage Areas (NHAs) are heritage sites that were designated for the protection of flora, fauna, habitats and geological sites of **national** importance. Management of NHAs is guided by planning

policy and the Wildlife (Amendment) Act 2000. It was from these NHAs that the most important sites were selected for international designation as SACs and SPAs.

Special Areas of Conservation and Special Protection Areas

There are two types of EU site designation, the Special Area of Conservation (SAC) and the Special Protection Area (SPA). SACs are designated for the conservation of flora, fauna and habitats of European importance and SPAs for the conservation of bird species and habitats of European importance. These sites form part of *"Natura 2000"* a network of protected areas throughout the European Union.

Annex I of the Habitats Directive lists certain habitats that must be given protection. Certain habitats are deemed 'priority' and have greater protection. Irish habitats include raised bogs, active blanket bogs, turloughs, heaths, lakes and rivers. Annex II of the Directive lists species whose habitats must be protected and includes Lesser Horseshoe Bat, Otter, Salmon and White-clawed Crayfish.

3.4.2.2 Designated Sites in the Vicinity of the Study Area

The National Parks and Wildlife Service publish synopses of the information regarding areas designated for conservation.

European (Natura 2000) sites

The nearest European sites (SAC's or SPA's) are outlined in Table 3-3 below.

Table 3-3 Special Area of Conservation (SACs) and Special Protected Area (SPAs) surrounding Study Area

SPA/SAC	Distance from Study Area
River Suck Callows SPA (Site Code: 004097)	Within the works area
Middle Shannon Callows SPA (Site Code: 004096)	9.1km east
Glenloughaun Esker SAC (Site Code: 002213)	2.8km south west
Castlesampon Esker SAC (Site Code: 001625)	7.8km north east
Killeglan Grassland SAC (Site Code: 002214)	8.6km north
River Shannon Callows SAC (Site Code: 000216)	9km east

These designated areas are less than 10km away from the works area. The River Suck flows through the Study Area and is also included as part of the River Suck Callows SPA.

Other European Sites in the area that are located a significant distance away and are unlikely to be affected are outlined in Table 3-4 below.

Table 3-4 Special Areas of Conservation located a significant distance from proposed works

Special Areas of Conservation	Distance from Study Area
Ballynamona Bog and Corkip Lough SAC (Site Code: 002339)	11.2km north east
Pilgrim's Road Esker SAC (Site Code: 001776)	13.1km east
Mongan Bog SAC (Site Code: 000580)	13.1km east
Fin Lough (Offaly) SAC (Site Code: 000576)	14km east
Ardgrraigue Bog SAC (Site Code: 002356)	14.6km south

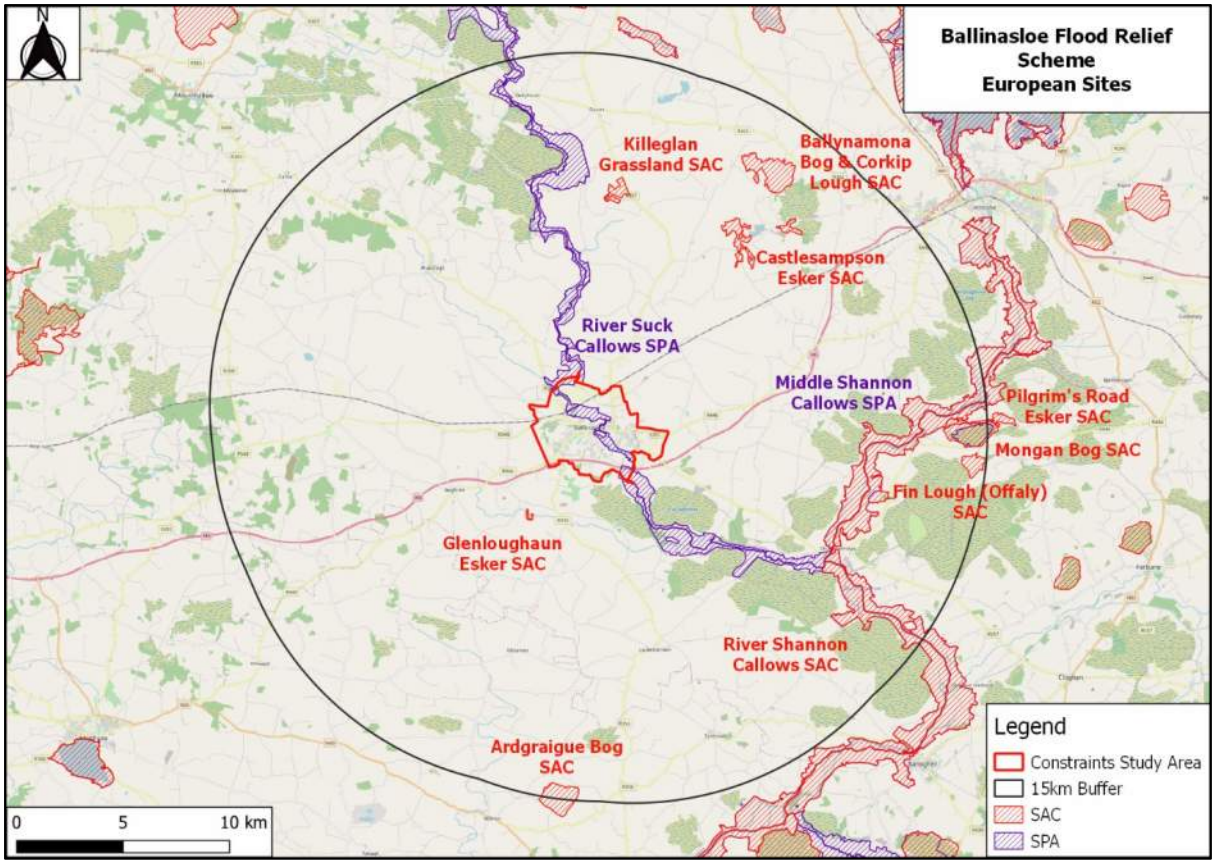


Figure 3.1: *European Sites within 15km radius of Study Area*

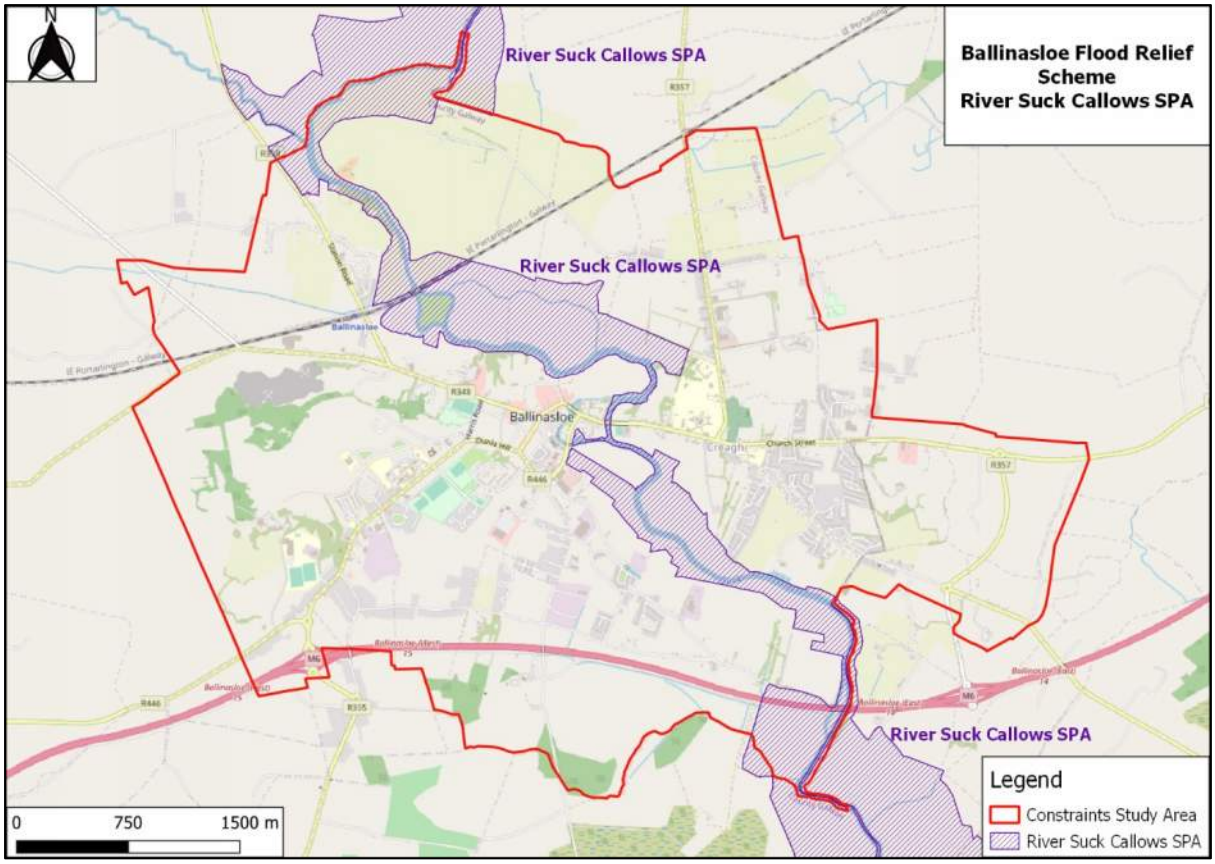


Figure 3.2: *River Suck Callows SPA within Study Area*

River Suck Callows SPA

The River Suck Callows SPA lies within the study area. This site is designated for Whooper Swan (*Cygnus cygnus*), Wigeon (*Anas penelope*), Golden Plover (*Pluvialis apricaria*), Lapwing (*Vanellus vanellus*), Greenland White-fronted Goose (*Anser albifrons flavirostris*) and Wetland and Waterbirds.

Other Designated Sites

One Proposed Natural Heritage Area (pNHA) is located within the Study Area:

- Ballinasloe Esker pNHA (Site Code: 001779)

Ballinasloe Esker pNHA

This proposed natural heritage area is around 6km long and run in a westerly direction from Ballinasloe. The main habitats in this pNHA are mixed woodland and dry broadleaved woodland and semi-natural woodland. Cattle graze parts of the esker and cause damage due to trampling. The esker size has been reduced due to quarrying and improvement of grassland by fertilising and reseeding. Quarrying and tree felling of mature trees are a threat to the Ballinasloe esker.

One Natural Heritage Area (NHA) is located within the Study Area:

- Suck River Callows NHA (Site Code: 000222)

Suck River Callows NHA

The Suck River Callows NHA supports a good diversity of raised bog microhabitats including hummocks and pools. The main habitat of the Callows is flood meadows of wet grassland and the associated aquatic and semi-aquatic habitats of drainage ditches. This site is of major ornithological importance. Species of particular note include the Greenland White fronted Goose which congregate mainly in the middle of the river. Other species of note are Whooper Swan, Wigeon and Lapwing which have populations of national importance. This site also supports Mute Swan, Teal, Pintail, Curlew and Golden Plover at times along with Otter, Irish Hare and Brown Trout.

The site is used for agriculture, peat cutting, forestry and conservation. Damaging activities associated with these land uses include habitat loss and drainage throughout the site and burning of the bog. This has resulted in the loss of habitat and damage to the hydrological status of the raised bog.

Figure 3.3 and Figure 3.4 outline the numerous pNHAs and NHAs around the Study Area.

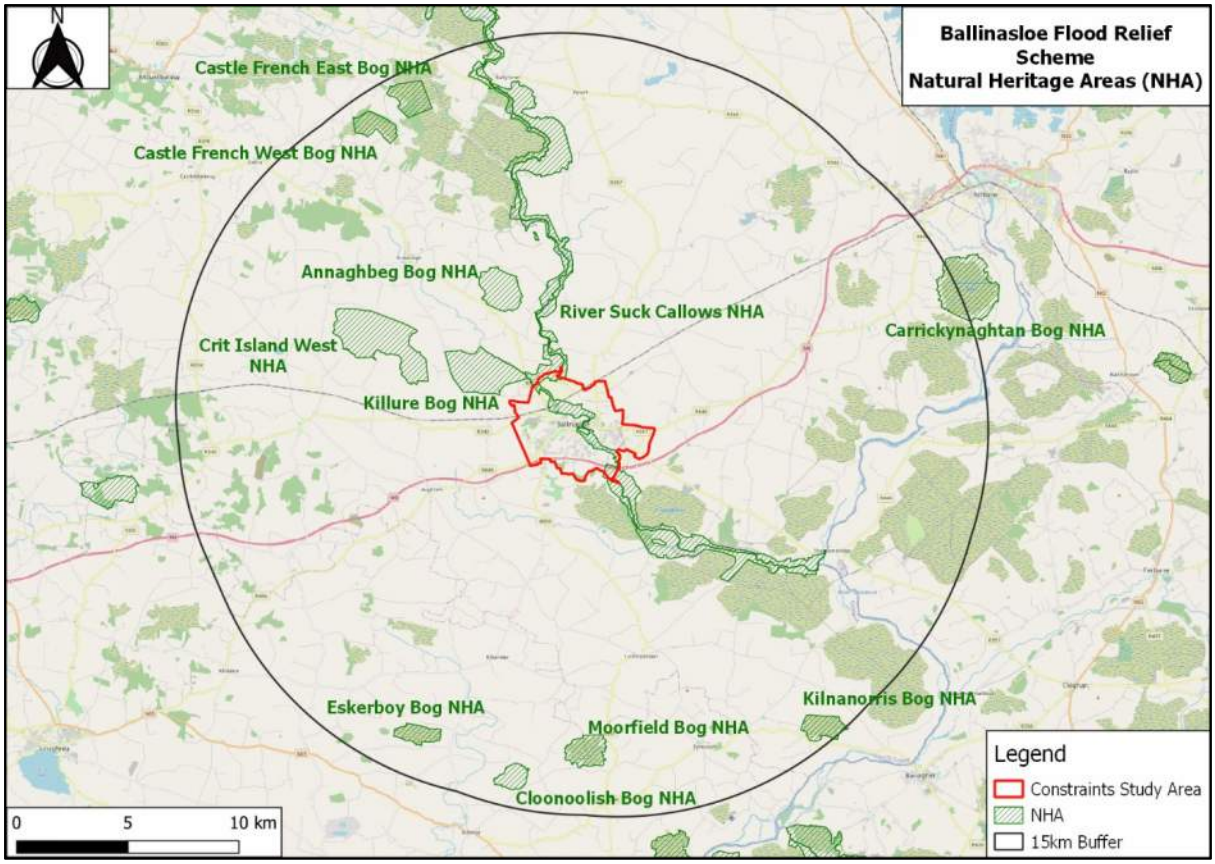


Figure 3.3: *Natural Heritage Areas (NHA) in vicinity of Study Area*

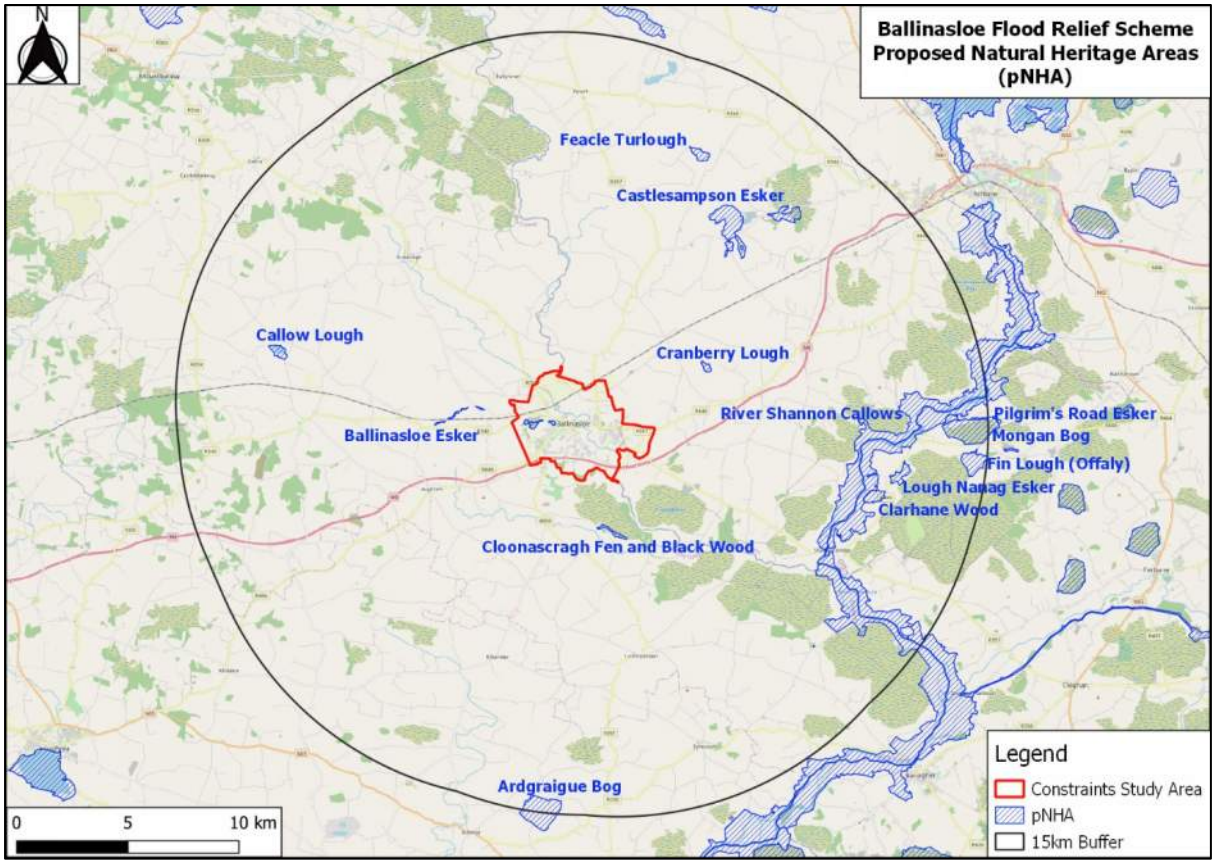


Figure 3.4: *Proposed Natural Heritage Areas (pNHAs) in vicinity of Study Area*

3.4.2.3 Non-Designated Features of Ecological Interest

The study area comprises buildings and artificial surfaces, improved agricultural grassland, dry calcareous and neutral grassland, amenity grassland (improved), hedgerows and trees, wet woodland, plantation forestry, semi-natural lowland wet grassland, aquatic and semi-aquatic habitats, drainage ditches and watercourses. The M6 motorway also runs through the Study Area.

3.4.2.4 Flora Protection Order

National Biodiversity Data was checked for records of species listed under the Flora (Protection) Order, 2015 to find which rare or unusual plant species had been recorded in the 10 km squares in which the Study Area is situated (M82 and M83).

No species protected under the Flora Protection Order were recorded in these squares.

3.4.2.5 Bird Atlases

'*The Atlas of Breeding Birds in Britain and Ireland*' *(Sharrock, 1976)*, '*The New Atlas of Breeding Birds in Britain and Ireland: 1988-1991' (Gibbons et al., 1993)*, '*The Atlas of Wintering Birds in Britain and Ireland*' *(Lack, 1986) and Bird Atlas 2007-2011 (Balmer et al.,2013)*' were consulted for information regarding the distribution of birds in Ireland. However, it should be remembered that, for some species at least, more recent work has been carried out.

These atlases show data for breeding and wintering birds respectively in individual 10 km by 10 km squares. Table 3-5 shows those species found in the relevant 10 km squares, M82 and M83, that are recorded in the Breeding Birds Atlases and are also protected under the EU Birds Directive or mentioned on the Birds of Conservation Concern in Ireland (BoCCI) red list (Colhoun and Cummins, 2013). Birds listed under Annex I are offered special protection by the EU Birds Directive. Those listed on the BoCCI 3 Red List meet one or more of the following criteria:

- Their breeding population or range has declined by more than 50% in the last 25 years.
- Their breeding population has undergone significant decline since 1900.
- They are of global conservation concern.

Table 3-5 Breeding Bird Atlas Data (M82 & M83)

Species	Latin	Annex I Species	BOCCI 3
Barn Owl	*Tyto alba*		Red List
Barn Swallow	*Hirundo rustica*		Amber List
Black headed Gull	*Larus ridibundus*		Red List
Common Grasshopper Warbler	*Locustella naevia*		Amber List
Common Kestrel	*Falco tinnunculus*		Amber List
Common Kingfisher	*Alcedo atthis*	X	Amber List
Common Linnet	*Carduelis cannabina*		Amber List
Common Redshank	*Tringa tetanus*		Red List
Common Sandpiper	*Actitis hypoleucos*		Amber List
Common Snipe	*Gallinago gallinago*		Amber List
Common Starling	*Sturnus vulgaris*		Amber List
Common Swift	*Apus apus*		Amber List
Corn Crake	*Crex crex*	X	Red List

Species	Latin	Annex I Species	BOCCI 3
Dunlin	*Calidris alpina*	X	Red List
Eurasian Curlew	*Numenius arquata*		Red List
Eurasian Teal	*Anas crecca*		Amber List
Eurasian Wigeon	*Anas penelope*		Amber List
Eurasian Woodcock	*Scolopaz rusticola*		Amber List
European Golden Plover	*Pluvialis apricaria*	X	Red List
European Turtle Dove	*Strepotopelia turtur*		Amber List
Great Cormorant	*Phalacrocorax carbo*		Amber List
Greater White-fronted Goose	*Anser albifrons*	X	Amber List
Grey Partridge	*Perdix perdix*		Red List
Hen Harrier	*Circus cyaneus*	X	Amber List
Herring Gull	*Larus argentatus*		Red List
House Martin	*Delichon urbicum*		Amber List
House Sparrow	*Passer domesticus*		Amber List
Lesser Black-backed Gull	*Larus fuscus*		Amber List
Little Egret	*Egretta garzetta*	X	
Little Grebe	*Tachybaptus ruficollis*		Amber List
Mute Swan	*Cygnus olor*		Amber List
Merlin	*Falco columbarius*	X	Amber List
Northern Lapwing	*Vanellus vanellus*		Red List
Northern Shoveler	*Anas clypeata*		Red List
Red Grouse	*Lagopus lagopus*		Red List
Sand Martin	*Riparia riparia*		Amber List
Sky Lark	*Alauda arvensis*		Amber List
Spotted Flycatcher	*Muscicapa striata*		Amber List
Stock Pigeon	*Columba oenas*		Amber List
Tufted Duck	*Aythya fuligula*		Amber List
Whooper Swan	*Cygnus cygnus*	X	Amber List
Yellowhammer	*Emberiza citrinella*		Red List

Nine species listed in Annex I of the EU Birds Directive have been recorded within the relevant 10km squares in the Atlases of Breeding Birds and are listed in Table 3-5 above.

The Common Kingfisher requires relatively shallow and slow-moving freshwater with thriving populations of small fish (stickleback, minnow) and vertical banks with soft materials where they can excavate their burrows.

Corncrakes breed in Ireland from Mid-May to early August and nest on the ground in tall vegetation. Most nests are found in hay fields.

A limited number of Dunlin breed in sandy/grassy locations along the Irish coastline, on blanket bog pool systems and some inland wetland sites

The European Golden Plover breed in heather moors, blanket bogs and acidic grasslands. In the winter, Golden Plover are found in a variety of habitats; including short wet grasslands in flood plains.

Greenland White-fronted Goose may be found in blanket bogs, wetlands, and short sward grasslands.

Hen Harrier has a preference for undulating moorland with lush coverings of heather, as well as young plantation forestry.

Little Egret use a variety of wetland habitats including shallow lakes, riverbanks, lagoons, coastal estuaries and rocky shoreline.

The Merlin breeds on open moorland and in conifer plantation adjacent to moorland.

In terms of wintering birds, Table 3-6 shows those species found in the 10 km squares; M82 and M83 that are recorded in the Atlas of Wintering Birds in Britain and Ireland 2007-2011 and are also protected under the EU Birds Directive or mentioned on the Birds of Conservation Concern in Ireland (BoCCI) red list.

Table 3-6 Wintering Bird Atlas Data (M82 &M83)

Common Name	Scientific Name	Annex I	BOCCI3 *red list*
Herring Gull	*Laurs argentatus*	No	Yes
Northern Lapwing	*Vanellus vanellus*	No	Yes
Whooper Swan	*Cygnus cygnus*	Yes	No
Yellowhammer	*Emberiza citrinella*	No	Yes

One bird species recorded as wintering in the relevant 10 km squares is protected under Annex I of the EU Habitats Directive: The Whooper Swan. The Whooper Swan is a winter visitor to wetlands during the months of October to April. They feed on aquatic vegetation and are commonly found grazing on agricultural grassland and fields. They winter on open farmland and inland wetlands, are regularly seen feeding on grassland and stubble and may be found within the Study Area.

A further three birds that are listed on the BoCCI Red list were recorded in the atlas as wintering in the area. These were Northern Lapwing, Yellowhammer and Herring Gull. Lapwing winter on farmland and flat coastal areas. Yellowhammer winter on agricultural land with adjacent scrub. Herring Gull winters on lakes, estuaries and open fields. All the above species are potentially found within the scheme area.

3.4.2.6 NPWS Records of Protected Species

The NPWS records of protected species in the area of the proposed development were obtained for the relevant 10 km squares, M82 and M83. The relevant records from the NPWS website are provided in Table 3-7 below.

Table 3-7 Protected species in the proposed Study Area

Common Name	Scientific Name	Year last recorded	Species Type
Pine Marten	*Martes martes*	2012	Terrestrial mammal
Lesser Noctule/Leisler's Bat	*Nyctalus leisleri*	2008	Terrestrial mammal
Pipistrelle	*Pipistrellus pipistrellus sensu lato*	2009	Terrestrial mammal
Soprano Pipistrelle	*Pipistrellus pygmaeus*	2008	Terrestrial mammal

Common Name	Scientific Name	Year last recorded	Species Type
Brown long eared bat	*Plecotus auratus*	2008	Terrestrial mammal
Daubenton's Bat	*Myotis daubentonii*	2005	Terrestrial mammal
West European Hedgehog	*Erinaceus europaeus*	2018	Terrestrial mammal
Eurasian Badger	*Meles meles*	2016	Terrestrial mammal
Eurasian Red Squirrel	*Sciurus vulgaris*	2017	Terrestrial mammal
Eurasian Pygmy Shrew	*Sorex minutus*	2017	Terrestrial mammal
European Otter	*Lutra lutra*	2012	Terrestrial mammal
Fallow Deer	*Dama dama*	2011	Terrestrial mammal
Common Frog	*Rana temporaria*	2003	Amphibian
Common Lizard	*Zootoca vivipara*	1960	Reptile
Freshwater White clawed Crayfish	*Austropotamobius pallipes*	2008	Crustacean
Greyer's Whorl Snail	*Vertigo (vertigo) geyeri*	1970	Mollusc
Marsh Fritillary	*Euphydryas aurinia*	2018	Insect - butterfly

Fauna

The River Suck is an important site for wintering waterfowl. The good quality riverine and grassland habitats are also home to populations of Otter (*Lutra lutra*) and Irish Hare (*Lepus timidus hibernicus*).

There are records of Otter in M83 (NPWS data) and from M83 in Ballinasloe and M82 elsewhere. Evidence of Otters has also been attained during recent walkover surveys (2021) within the scheme area on the River Suck and Deerpark River, within both 10km grid squares.

The Eurasian otter is classified as 'near threatened' by the IUCN (2006) and is listed as a strictly protected species in Appendix II of the Bern convention (Council of Europe, 1979). In Ireland, Otter was afforded legal protection under the Wildlife Act 1976, strengthened by the Wildlife Amendment Act (2000) making it entirely illegal to hunt, disturb, or intentionally kill otters and it is listed as internationally important in the Irish Red Data book (Whilde, 1993). The otter is listed on Annex II and Annex IV of the EU Habitats Directive (92/43/EEC) and accordingly is strictly protected under the provisions of Regulation 23 of the Habitats Regulations 1997.

There is suitable habitat for Otters, including for breeding purposes, along all watercourses within the study area. Otters may travel along minor or culverted watercourses and use features set back from the river such as banks and thickets as resting places or to create breeding holts. The confirmed occurrence of Otters along rivers and suitability of habitats within the study area give rise to a potential constraint to scheme proposals. Detailed survey of Otter occurrence, habitats use and breeding status relative to the study area is required to evaluate further. The design of the Ballinasloe FRS will need to take account of potential impacts on Otters in terms of habitat loss or damage, noise, disturbance and disruption, prey availability, potential impacts on resting areas/holts and potential impacts on movement of otter along watercourses.

The Irish hare has been legally protected since 1930 in the Republic of Ireland, initially under the Game Preservation Act (1930), more recently by the Wildlife Act (1976) and Wildlife (Amendment) Act (2000). It is listed on Appendix III of the Berne Convention (Anon, 1979), Annex V(a) of the EC Habitats Directive (92/43/EEC) and is listed as an internationally important species in the Irish Red Data Book (Whilde, 1993). The EC Habitats Directive requires member states to "maintain or restore [mountain hares] to favourable conservation status", necessitating "surveillance" of the population and encouraging scientific research.

Invasive Species

Biodiversity Ireland Maps contain information on selected areas around Ireland in the form of Grid Squares. The Gird Squares were obtained for the relevant 10km squares; M82 and M83.

The records for these Grid Squares are provided in Table 3-8 below.

Table 3-8 Invasive species found in 10km Grid Squares in Study Area (M82 & M83)

Invasive Species	Latin Name	Impact
Canadian Waterweed	*Elodea canadensis*	High Impact
Cherry Laurel	*Prunus laurocerasus*	High Impact
Japanese Knotweed	*Fallopia japonica*	High Impact
Rhododendron	*Rhododendron ponticum*	High Impact

3.4.2.7 Aquatic Ecology

Water quality

The EPA website (https://gis.epa.ie/EPAMaps/) contains information regarding water quality in selected Irish rivers based on surveys carried out by the EPA.

Information is provided in the form of Q values. Q Values are used to express biological water quality and are based on changes in the macro invertebrate communities of riffle areas brought about by organic pollution. Q1 indicates a seriously polluted water body and Q5 indicates unpolluted water of high quality. A value of Q 3 indicates moderately polluted water.

The EPA report concluded that water quality in the Suck river at Ballinasloe Bridge was "Poor" with a recorded Q value of 3.

Fisheries

A consultation email was sent to Inland Fisheries Ireland (IFI) on the 7th May 2020 with regard to the proposed flood relief scheme. At time of writing (15th July 2020) no response had yet been received.

Nine species of fish have been recorded along the River Suck. These species are listed in Table 3-9 below.

Table 3-9 Species of fish found in River Suck from IFI data river reports.

Species	Latin Name
Roach	*Rutilus rutilus*
Perch	*Perca fluviatilis*
Gudgeon	*Gobio gobio*
Minnow	*Phoxinus phoxinus*
Pike	*Esox lucius*
Stone loach	*Barbatula barbatula*
Eel	*Anguilla anguilla*
Brown trout	*Salmo trutta*
Bream	*Abramis brama*

According to the *Sampling Fish for the Water Framework Directive – Rivers 2008* (The Central and Regional Fisheries Boards, 2008), recorded Roach length ranged from 5.0cm to 21.5cm with a mean length of 12.6cm. Ages ranged from 1+ to 6+ years with the dominant age being 2+ years which accounted for 43% of the population. Perch ranged in length from 9.3cm to 25.6cm with a mean length of 14.8cm. Ages ranged from 1+ to 5+ years. One fish was found to be aged 8+ years. Gudgeon ranged in length from 6.5cm to 13.3cm with a mean of 10.2cm.

3.4.3 Summary of Key Constraints and Implications for the Proposed Scheme

- The River Suck is an important site for wintering migratory wetland birds and waterfowl and many different species of mammals. These watercourses and flood plains and other associated habitats support a range of species listed on Annex II of the EU Habitats Directive and Annex I of the Birds Directive. There may be significant constraints to developing flood defences at certain locations or seasonally (Autumn through Winter), due to the possibility of displacing over wintering birds or impacting their habitats.
- The breeding sites of EU listed and protected species including Otter and Kingfisher, as well as other threatened birds like Grey Wagtail or breeding Curlew and Lapwing, Snipe or waterfowl species, must be determined and taken into account, whereby proximity to the scheme locations may give rise to constraints, such as timing of works or the possibility of disturbance or habitat impacts.
- Many fish species have been found throughout the River Suck as can be seen in Table 3-9. Timing constraints to avoid spawning season should be put in place. White-clawed Crayfish are recorded from the area and potential impacts may constitute a constraint to the scheme, particularly in view of biosecurity requirements to avoid spread of crayfish plague. A further fisheries study may be required.
- Invasive species as seen in Table 3-8 were recorded in grid squares M82 and M83 within the Study Area. A site walkover of the Study Area is required.
- The sensitivity of the watercourses within the Study Area needs to be considered; whereby works that may materially affect the function of these watercourses under normal flow conditions such as water depth, velocity and changes to the shape of the bed should be minimised so that the existing

function of the river can be maintained. Impacts to areas upstream and downstream of the Study Area should also be considered as part of the assessment.

- The scheme construction will involve working in close proximity to the River Suck where there is potential for short term environmental impact.
- Suspended solid release during construction works have the potential for significant adverse impacts on species of fish present in the river and a knock-on effect on otter as their food supply may dwindle.
- In design of the proposed scheme, consultation with both the IFI and NPWS is necessary, together with adequate survey work to establish baseline conditions in the Study Area watercourses. Constraints may be placed on the times of year that in-stream works may be carried out depending on the results of the various surveys and the requirements of the IFI and NPWS. Constraints may also be placed on the time of year/weather conditions that the surveys may be undertaken, as well as in respect of COVID19 public health restrictions and measures
- It must be ensured that there are no significant impacts on European sites (SAC/SPA). Part of the proposed scheme is located within the River Suck Callows SPA. There is potential to negatively affect the status of this designated site.
- An Appropriate Assessment (AA) Screening and NIS will be required to assess the impacts of the works on the European Site and a Natura Impact Statement will be required to inform the AA. The outcome of this assessment may place constraints on scheme design and development.
- Appropriate measures should be taken to ensure that the spread of Japanese Knotweed and other invasive species is not accelerated by any proposed works.
- The River Suck Callows SPA is of considerable ornithological importance, in particular for the presence of nationally important populations of five species as detailed above. Works must not interfere with protected habitats for endangered and migratory species.
- Kingfisher surveys should be carried out during the summer nesting period (April-September) if necessary, where works are proposed.
- Otter surveys can be undertaken at any time of the year but are dependent on water levels.
- Bat surveys may be required to confirm presence/absence of roosting bats.

Note: Other bird surveys may be required further to consultation with NPWS and BWI given the potential habitat for Corncrake, breeding wader species such as Curlew, Dunlin, Lapwing or Snipe. In this regard, guidance from NPWS received by email on 28 September, states:

"One season of breeding bird surveys should be sufficient to provide baseline ecological information provided the conditions reflect average conditions. If extreme weather conditions result in poor coverage and data then further surveys the following year will be required. Surveys should include areas close to the River Suck in proximity of the flood defence works and other locations where suitable habitat is likely to be affected which should include all suitable habitats for ground nesting birds. Where ex-situ impacts are possible survey work may be required outside of the development sites. Focus should be on all ground-nesting birds not just Curlew with standard survey methodology. Locations identified for survey should be with respect to known historical records and existing records. More specific records for Curlew (within 1km) are available on request. This data should be requested back via NPWS (Jochen Roller).

Results for species need to be referenced back to the overall populations and their dynamics as, in some cases even a small risk to a population of a species could be considered significant. The baseline data must provide a reliable reference against which effects of the project can be measured. Methodology must be clearly set out so that it is replicable for future monitoring."

3.5 Water

This section of the Constraints Study describes the existing hydrological environment of the Study Area and the immediate surrounding area; in addition to the potential for impacts arising as a result of the Ballinasloe Flood Relief Scheme.

3.5.1 Methodology

The identification of potential hydrological constraints within the Study Area involved a review of desktop information including:

- EPA water quality database and maps
- Well card data compiled by the Geological Survey of Ireland (GSI)
- OPW Database of Hydrometric Stations
- River Basin District Management Plan (2018 - 2021)

3.5.2 Receiving Environment

The following section describes the receiving hydrological environment in terms of water supply and hydrogeology.

3.5.2.1 Water Supply – Existing River Abstractions

The Suck River rises northwest of Ballinlough and flows through Lough O'Flynn before it is joined from the northeast by the Francis River. The Suck then continues southeast and is joined by the Island River at Ballymoe. It moves towards Dunamon, past Athleague and Ballygar, Ballyforna and on towards Ballinasloe. It is joined by the Bunowen River, then the Deerpark River in Ballinasloe and then flows into the Shannon 1km downstream of Shannonbridge. The Upper Shannon (Suck) catchment comprises 11 sub-catchments with 58 waterbodies, one lake and eight groundwater bodies.

3.5.2.2 Water Supply – Existing Groundwater Abstractions

Well card data produced by the Geological Survey of Ireland (GSI) indicates that there are 2 no. boreholes within the Study Area. These boreholes are used for agriculture and domestic use. These borehole locations are indicated Appendix C.

3.5.2.3 Hydrometric Stations

There are two hydrometric stations within the Study Area for the Ballinasloe Flood Relief Scheme. These are:

1. Ballinasloe Town which records water level and flow,
2. Ballinasloe Old Channel which records water level only.

Both stations remain active.

3.5.2.4 Surface Water Features

The main hydrological feature within the Study Area is the River Suck. The River Suck rises to the north west of the Ballinasloe Study Area. The river flows south of Ballinasloe and meets the Shannon c.1km south of the village of Shannonbridge, Co. Offaly.

The EPA website (https://gis.epa.ie/EPAMaps/) contains information regarding water quality in selected Irish rivers based on surveys carried out by the EPA. Biological information is provided in the form of Q values. Q Values are used to express biological water quality and are based on changes in the macro invertebrate communities of riffle areas brought about by organic pollution. Q1 indicates a seriously polluted water body and Q5 indicates unpolluted water of high quality. A value of Q3 indicates moderately polluted water. These Q value ratings are shown in Table 3-10.

Table 3-10 Q Value Classifications

Quality Ratings	Quality Class	Pollution Status	Condition (re beneficial uses)
Q5, Q4-5, Q4	Class A	Unpolluted	Satisfactory
Q3-4	Class B	Slightly Polluted	Unsatisfactory
Q3, Q2-3	Class C	Moderately Polluted	Unsatisfactory
Q2, Q1-2, Q1	Class D	Seriously Polluted	Unsatisfactory

Four national monitoring stations were identified within the Study Area. Biological data for these monitoring points within the study area are shown in Table 3-11.

Table 3-11 Biological water quality in the Ballinasloe Study Area based on EPA data

	Biological Quality Ratings (Q Values)			
Station Name	**Station ID.**	**River Waterbody Name**	**Q Value Status**	**2017**
1st Bridge u/s Suck confl.	RS26D070700	Deerpark River (EPA channel: Derrymullan Stream)	Moderate	3-4
Bridge u/s Suck River confl.	RS26C170400	Cuilleen Stream_010	Moderate	3-4
Suck Ballinasloe Bridge	RS26S071300	Suck_140	Poor	3
3km d/s Ballinasloe (Pollboy)	RS26S071400	Suck_140	Moderate	3-4

Table 3-12 shows the surface water quality standards applied across a range of relevant legislation.

Table 3-12 Mandatory levels for physiochemical parameters for specific legislation

Parameter	Units	European Communities (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regulations, 1989 (S.I. No. 294/1989)[1]	European Communities Environmental Objectives (Surface Water) Regulations (S.I. No. 272 of 2009)	European Communities Drinking Water Regulations S.I. 106 of 2007	Salmonid Water Regulations (Mandatory Level) (S.I. No. 293 of 1988)
BOD	mg/l	5 –A1 & A2 7 – A3	High status ≤1.3 (mean) or ≤2.2 (95%ile) Good status ≤1.5 (mean) or ≤2.6 (95%ile)	N/A	≤ 5
Suspended Solids	mg/l	50	N/A	N/A	≤ 25
pH	-	5.5-8.5 – A1 5.5-9.0 – A2 & A3	4.5-9.5 (Soft Water) 6.0-9.0 (Hard Water)	≥ 6.5 & ≤ 9.5	≥ 6 & ≤ 9
Conductivity	µS/cm	1,000	N/A	2,500	N/A
Phosphates	mg/l P_2O_5	0.5 – A1 & A2 0.7 A3	N/A	N/A	N/A
Molybdate Reactive Phosphorus (MRP)	mg/l P	N/A	High status ≤0.025 (mean) or ≤0.045 (95%ile) Good status ≤0.035 (mean) or ≤0.075 (95%ile)	N/A	N/A
Chloride	mg/l Cl	250	N/A	250	N/A
Ammonium	mg/l NH_4	0.2 – A1 1.5 – A2 4 – A3	N/A	N/A	≤ 1.0
Total Ammonia	mg/l N	N/A	High status ≤0.040 (mean) or ≤0.090 (95%ile) Good status ≤0.065 (mean) or ≤0.140 (95%ile)	N/A	N/A
Nitrate	mg/l NO_3	50	N/A	50	N/A
Nitrite	mg/l NO_2	N/A	N/A	0.5	≤ 0.05
Dissolved Oxygen	-	>60% - A1 >50% - A2 >30% - A3	Lower limit: 95%ile>80% saturation Upper limit: 95%ile<120 %saturation	N/A	50% ≥ 9 mg/l

[1] S.I. No. 294/1989 is superseded by S.I. No. 272 of 2009. If a particular parameter is not found in SI 272 of 2009 then the 1989 value applies.

Parameter	Units	European Communities (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regulations, 1989 (S.I. No. 294/1989)[1]	European Communities Environmental Objectives (Surface Water) Regulations (S.I. No. 272 of 2009)	European Communities Drinking Water Regulations S.I. 106 of 2007	Salmonid Water Regulations (Mandatory Level) (S.I. No. 293 of 1988)
Total Hardness	mg/l $CaCO_3$	N/A	N/A	N/A	N/A
Copper	mg/l Cu	0.05 –A1 0.1– A2 1.0 – A3	5 - water hardness ≤100mg/l $CaCO_3$ 30 – water hardness >100mg/l $CaCO_3$	2.0	≤ 0.005 [1, 6] ≤ 0.022 [2, 6] ≤ 0.04 [3, 6] ≤ 0.112 [4, 6]
Zinc	mg/l Zn	3–A1 5- A2 & A3	0.008 - water hardness ≤10mg/l $CaCO_3$ 0.05 - water hardness>10 ≤100mg/l $CaCO_3$ 0.1- water hardness >100mg/l $CaCO_3$	N/A	≤ 0.03 [1, 6] ≤ 0.2 [2, 6] ≤ 0.3 [3, 6] ≤ 0.5 [5, 6]
Total coliforms	No/100ml	5,000 – A1 25, 000 – A2 100,000 – A3	N/A	N/A	N/A
Faecal coliforms	No/100ml	1,000 – A1 5,000 – A2 40,000 – A3	N/A	0	N/A

[1] At water hardness 10 mg/l CaCO3; [2] At water hardness 50 mg/l CaCO3.; [3] At water hardness 100 mg/l CaCO3; [4] At water hardness 300 mg/l CaCO3; [5] At water hardness 500 mg/l CaCO3; [6] To be conformed with by 95% of samples over a period of 12 months where sampling is carried out at least once a month; where sampling is less frequent, to be conformed with by all samples.

Water Framework Directive

The Study Area is located within the Water Framework Directive (WFD Upper Shannon (Suck) Catchment and the management plan for Shannon RBMP was consulted: https://www.catchments.ie/download/shannon-river-basin-district-river-basin-management-plan-2009-2015/

The main objectives of this management plan were to prevent deterioration, restore good status, reduce chemical pollution in surface waters and to achieve water-related protected areas objectives. The programme of measures designed to achieve these objectives is outlined in this document and includes the following:

- Control of urban wastewater discharges.
- Control of unsewered wastewater discharges.
- Control of agricultural sources of pollution.

- Water pricing policy.
- Sub-basin management plans and programmes of measures for the purpose of achieving environmental water quality objectives for European sites designated for the protection of Freshwater Pearl Mussel populations.
- Pollution reduction programmes for the purpose of achieving water quality standards for designated shellfish waters.
- Control of environmental impacts from forestry.

Information on status, objectives and measures in the Shannon River Basin Management Plan has been compiled for smaller, more manageable geographical areas than river basin districts; termed water management unit action plans. These units represent smaller river and lake basins where management of the pressures, investigations and measures will be focussed and refined during implementation of this plan.

The Study Area is within the Suck Water Management Unit (WMU).

There are 67 river water bodies in this WMU; 29 with "Good Status", 14 "Moderate", 22 "Poor" and 2 "Bad". In addition, there are 2 lake water bodies; Coolcam Lough and O'Flynn Lough, both of moderate status.

The status of the various waterbodies in this area is calculated using the EPA data described above.

The identified pressures/risks in this WMU include the following:

- Wastewater Treatment Plants (WWTP) and Industrial Discharges.
- Quarries, Mines and Landfills: There are 22 quarries and 3 landfills. 3 waterbodies are at risk from quarries and 1 water body is at risk from landfills.
- Agriculture: 27 water bodies within the WMU are at risk from agriculture.
- On-site systems: There are 12,955 septic tanks within this WMU, 9,896 are located in areas of very high or extreme risk.
- Morphology: 12 water bodies are at risk from Morphology within the Suck WMU.

3.5.2.5 Hydrogeology

The Geological Survey of Ireland (GSI) online database (https://www.gsi.ie/) shows the Study Area as being underlain by Dinantian Upper Impure Limestones, Dinantian Pure Bedded Limestones and Dinantian Pure Unbedded Limestones.

The Study Area falls within the Suck South Groundwater Body (GWB). The Geological Survey of Ireland (GSI) online database shows the Study Area as being underlain by regionally important karstified aquifer dominated by conduit flow. The GWB is composed of Dinantian Pure Bedded Limestones. Maps illustrating aquifers, wells and boreholes within the study area can be found in Appendix C.

3.5.3 Summary of Key Constraints and Implications for the Proposed Scheme

The design of the proposed flood relief scheme should take into account the main objectives of the Water Framework Directive River Basin District Management Plan (RBDMP) by ensuring that any works proposed do not result in the deterioration of water quality and where possible contribute to the achievement of "good" status within the Study Area.

Reduced seasonal flooding or changes in the size and area of the flood plain, which is natural feature of wetlands in the SPA, may result from the proposed FRS and cause a change in habitat for invertebrates, amphibians, birds, otter, bats, etc.

3.6 Soils and Geology

This section describes the soils and geology underlying the Study Area for the Ballinasloe Flood Relief Scheme.

3.6.1 Methodology

The section describes the bedrock geology, superficial deposits, economic geology and geological heritage of the Constraints Study Area identified from desktop information sources only. An inventory of the geological constraints identified by this desktop study is detailed below.

Soils and Geology constraints have been assessed with reference to the following:

- The Geological Survey of Ireland (GSI) online database (https://www.gsi.ie/).
- County Galway Development Plan (2015-2021).
- Concrete Products Directory (Irish Concrete Federation).
- Aerial Photographs.
- ENVision Mines Site, the EPA's online Historic Mines Inventory.

3.6.2 Receiving Environment

The following describes the receiving geological environment in terms of bedrock geology, soils, geological heritage and the economic potential of same.

3.6.2.1 Bedrock Geology & Soils

The Geological Survey of Ireland (GSI) Online Database indicates that the underlying geology of the Study Area is undifferentiated limestone, massive unbedded lime mudstone, dark limestone and shale. The lands within the area are generally flat and low lying. A map displaying the underlying bedrock geology in the study area can be found in Appendix D1.

The GSI Online Database shows that the dominant subsoil type within the Study Area is Limestone Till. A soil map of the study area can be found in Appendix D2.

3.6.2.2 Economic Geology

The term 'economic geology' refers to commercial activities involving soil and bedrock. The activities involved principally comprise aggregate extraction (sand and gravel pits and quarries) and mining. The sources outlined above were examined for information on such commercial activities within the Study Area.

A review of the abovementioned sources revealed that there is no mining activity in or in the vicinity of the Study Area.

3.6.2.3 Geological Heritage

To date, sites of geological interest have not been comprehensively covered by existing nature conservation designations. This is currently being addressed by the Department of Environment, Climate

& Communications and the Geological Survey of Ireland who are drawing up a list of sites of geological interest which will be proposed as Natural Heritage Areas in the future.

3.6.3 Summary of Key Constraints and Implications for the Proposed Scheme

- It is recommended that a preliminary geotechnical investigation be carried out once the potentially viable flood risk management measures are developed in order to identify local geology and ground conditions.

3.7 Archaeology, Built and Cultural Heritage

This section summarises the known archaeological and built heritage constraints within the Study Area for the Ballinasloe Flood Relief Scheme as identified through a desk-top study.

3.7.1 Methodology

As part of this constraints report, a study of the archaeological, built and cultural heritage resources within the Study Area was undertaken. This information provides an insight into the development of the Study Area and an evaluation of both recorded archaeology and built heritage as well as the potential for impacting on previously unrecorded archaeology.

The principal sources reviewed for the archaeological resource were the Sites and Monuments Record (SMR) and the Record of Monuments and Places (RMP). The Record of Protected Structures (RPS), as published by Galway County Council was reviewed in order to identify relevant architectural heritage in the Study Area. The following sources were also consulted:

- Cartographic & Aerial Photographic Archive of the Ordnance Survey of Ireland – www.osi.ie
- National Inventory of Architectural Heritage – Survey of the Architectural Heritage of County Galway (NIAH) – www.buildingsofireland.ie
- National Museum of Ireland Finds Database https://heritagemaps.ie/
- Annual Archaeological Excavations Bulletin – www.excavations.ie
- Galway County Development Plan 2015 – 2021.
- The Dúchas Project (DoCHG).
- The National Folklore Collection (UCD).

A list and associated maps of all protected archaeological, architectural and cultural heritage sites within the Study Area are included in APPENDIX E 1 To APPENDIX E 5 and recorded archaeological sites are indicated in Figure 3.5.

Intangible cultural heritage and folklore was also considered in the preparation of this section.

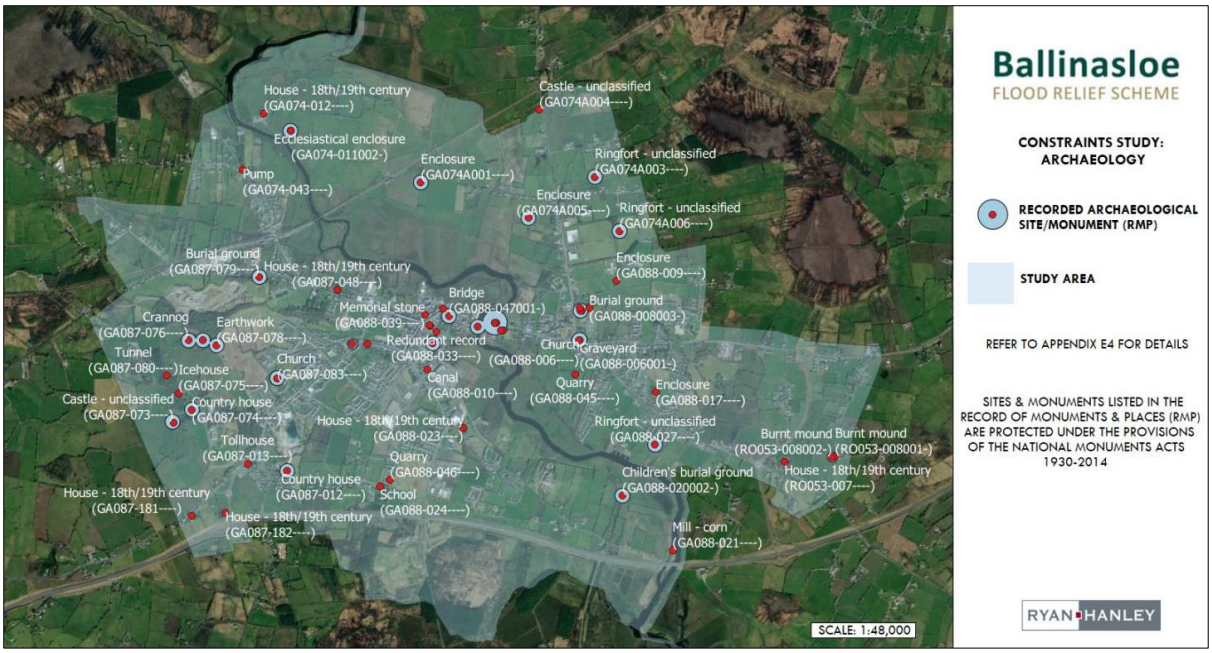


Figure 3.5: *Recorded Archaeological Sites/Monuments with the Study Area (See Appendix E1 & E4)*

3.7.2 Receiving Environment

The tables presented in APPENDIX E 4 & APPENDIX E 5 provide lists of the protected archaeological and architectural heritage sites within the Study Area. The key constraints that are protected by legislation comprise protected structures and recorded archaeological monuments/sites. There may be some overlap between these two categories as built structures can occasionally be listed in both the RMP and RPS.

Where possible, the scheme should be designed to avoid any impacts on the archaeological & built heritage as illustrated in APPENDIX E 1, APPENDIX E 2 & APPENDIX E 3.

Given the provisions of the National Monuments Acts, no disturbance or interference to any archaeological sites/monuments listed in the RMP can take place without prior consultation with the Dept. of Housing, Local Government & Heritage through the Development Applications Unit (DAU). Notification (under Section 12(3) of the National Monuments (Amendment) Act 1994), impact assessment and consultation with the National Monuments Service will be required to progress this scheme.

In the event that flood risk management measures are required – including the possibility for increased flooding – in the vicinity of recorded archaeological sites/monuments; appropriate mitigation measures must be designed in consultation with the National Monuments Service and Local Authority Heritage Office.

There is also the potential for the presence of unrecorded archaeological sites and artefacts within the Study Area. Any lands that may be impacted by ground disturbance works required by the proposed scheme (e.g. hard defences, topsoil stripping, access tracks, compounds, site clearance works, trial-pits, etc.) may require archaeological investigations such as advance test trenching or archaeological monitoring of works. The appropriate mitigation measures will be determined during the design phase in consultation with the National Monuments Service.

All Record of Protected Structures sites have statutory protection and avoidance of these features is recommended. In the event that works are required that may have a negative impact on protected structures, prior consultation with Galway County Council will be required.

Where works are proposed in the vicinity of recorded archaeological monuments and protected structures, the formulation of site-specific mitigation strategies is required. This will be carried out in consultation with the National Monuments Service and Galway County Council. This should take place well in advance of designed construction works in order to allocate adequate time and resources to implement agreed mitigation measures.

Depending on the nature and extent of the works, mitigation measures may take the form of avoidance by design, design stage/pre-works assessment (including test trenching) and/or archaeological monitoring of construction works carried out during the scheme.

Where possible, areas that are the subject of local folklore should be avoided in order to preserve the cultural heritage of the region.

Consideration should also be given to the potential for visual impacts on protected archaeological and architectural areas as part of the design of the proposed scheme.

3.7.3 Summary of Key Constraints and Implication for the Proposed Scheme

- Given the provisions of the National Monuments Acts, no disturbance to, or interference with, any known archaeological sites can take place without prior Notification, assessment and consultation with the National Monuments Service of the Department of Housing, Local Government & Heritage (DoHLG). This should be conducted through the established consultation process via the Development Applications Unit (DAU) as part of planning.
- There are a total of 66 recorded archaeological sites/monuments within the study area. These include the site of the Anglo-Norman masonry castle on the east bank of the River Suck (GA088-040----) and the adjacent East Bridge, a National Monument in the ownership of the local authority (RMP: GA088-047----/RPS: 221) which marks the ancient fording point of the river. This is afforded protection under both the National Monuments Act and the RPS. Elements of this bridge structure date to the 16th -century. Additionally, there are numerous sites in the wider study area dating from the prehistoric to post-industrial eras. APPENDIX E 1 & APPENDIX E 4 provide details on archaeological sites/monuments within the study area.
- The riverine environment of the River Suck within the study area, particularly in the vicinity of East Bridge; has high archaeological potential and the area has been a fording point on the river for millennia.
- Additionally, there are 92 Protected Structures within the Study Area and an additional 9 structures, buildings or features listed on the NIAH as being of '*Regional Importance*'. (APPENDIX E 2 & APPENDIX E 5).
- An Architectural Heritage Impact Assessment should be carried out for the proposed scheme.
- An Archaeological Impact Assessment should be carried out for the proposed scheme. This may include a programme of advance archaeological testing and/or monitoring of advance Site Investigations as required.
- All impacts on identified heritage – including areas to which local lore is connected – and their immediate environs, should be avoided where possible in the design of the proposed flood relief scheme.

- Where avoidance by design is not possible then archaeological investigations may be required for identified areas of archaeological potential which would be directly impacted by the proposed scheme.
- Advance investigations should be undertaken at design stage to facilitate mitigation design and allow adequate time to evaluate and record any archaeological features or deposits that may be encountered.
- Any ground disturbance works associated with the proposed scheme should be further assessed for archaeological potential. Appropriate mitigation should be determined during the design phase in consultation with the National Monuments Service (DoHLGH).
- All Protected Structures have statutory protection and design avoidance of these features should be employed where possible.
- Where works are proposed which may materially alter a Protected Structure or its setting, a Conservation Architect should have input to the design and methodology of such works.
- Additionally, a Section 57 Declaration may be required from the Local Authority to facilitate such works.
- The National Monuments Service of the Department of Housing, Local Government & Heritage should be consulted at an early stage of the scheme development.
- The Local Authority Heritage Office/Conservation Architect should be consulted during scheme development.

3.8 Landscape

This section of the Constraints Study Report addresses the landscape and visual constraints that have been identified within the Study Area. The Study Area is described with reference to Landscape Character and Landscape Type, and the ratings that have been assigned to it in terms of Value, Sensitivity and Importance. The relevant recommendations that have been set out for this area by Galway County Council in terms of landscape and visual characteristics are also addressed.

3.8.1 Methodology

This section of the Constraints Study is based on a desk study of the previous landscape character assessments and reviews that have been carried out within the Study Area. It incorporates a description of the policies and objectives of Galway County Council with regards to Landscape Character Assessment, Scenic Amenity, Views and Prospects, and Scenic Routes and Landscapes, with specific reference to the Study Area location. The primary sources of information consulted during the course of the desk study include:

- Galway County Development Plan 2015 – 2021.
- Ballinasloe Local Area Plan 2015-2021.
- Landscape and Landscape Character Assessment for County Galway for the Galway County Development Plan 2015 – 2021.
- Environmental Protection Agency CORINE Land Cover Map.

3.8.2 Receiving Environment

3.8.2.1 Landscape Character Assessment

The Landscape and Landscape Character Assessment for County Galway (as part of the Galway County Development Plan 2015 – 2021) sets out the policies and objectives of Galway County Council with regards to Environment, Heritage and Amenity Strategy.

Additionally, Chapter 9 of the Galway County Development Plan 2015 - 2021 sets out the policies and objectives of Galway County Council with regards to Environment, Heritage and Amenity Strategy.

The *Landscape Appraisal of County Galway* supporting document for the Galway County Development Plan 2015 – 2021 identified Landscape "Types" and "Landscape Character Areas". The report identified 25 different areas throughout the county.

Landscape Protection is set out in the Galway County Development Plan 2015 – 2021:

"The Planning and Development Act, 2000 (as amended) requires the inclusion of a development plan objective for: "The preservation of the character of the landscape where, and to the extent that, in the opinion of the Planning Authority, the proper planning and sustainable development of the area requires it, including the preservation of views and prospects and the amenities of places and features of natural beauty or interest". The Heritage Act, 1995 classifies landscape as 'areas, sites, vistas and features of significant scenic, archaeological, geological, historical, ecological or other scientific interest'. The European Landscape Convention was signed and ratified by Ireland in March 2002 and came into force in March 2004 and the DoECLG announced its intention to publish a National Landscape Strategy in October 2007 (to date, this Strategy has not been published by the DoECLG)."

A Landscape Character Assessment map can be found be in Appendix F.

3.8.2.2 Landscape Character and Type

The Study Area for this Constraints Study is located primarily within the following Landscape Character Areas:

- Area 1 – North East Galway (Ballinasloe to Ballymoe)
- Area 2 – Shannon and Suck River Valley between Portumna and Ballinasloe
- Area 3 – East Central Galway (Athenry, Ballinasloe to Portumna)

Area 1 which includes North East Galway has a flat landscape with undulating open pastoral land which is surrounded by field hedgerows with small scattered coniferous plantations. The area is primarily rural and includes the settlements of Ballinasloe and other villages.

Area 2 includes the Shannon and Suck River Valley between Portumna and Ballinasloe. The landscape of the river valley is flat and is bordered by deciduous trees and water edge planting. Recreational facilities for fishing, bird watching and boating line the riverbank.

Area 3 takes in east central Galway and such towns as Athenry, Ballinasloe and Portumna. This landscape is flat and has coarse grassland with occasional clumps of coniferous forestry defined by stone walls.

A small section to the east of the Study Area lies within the Roscommon border. This section of the Study Area lies within the Athleague and Lower Suck Valley and Suck Callows Landscape Character Areas.

An overview of the relevant Landscape Character Areas is provided in Figure 3.6.

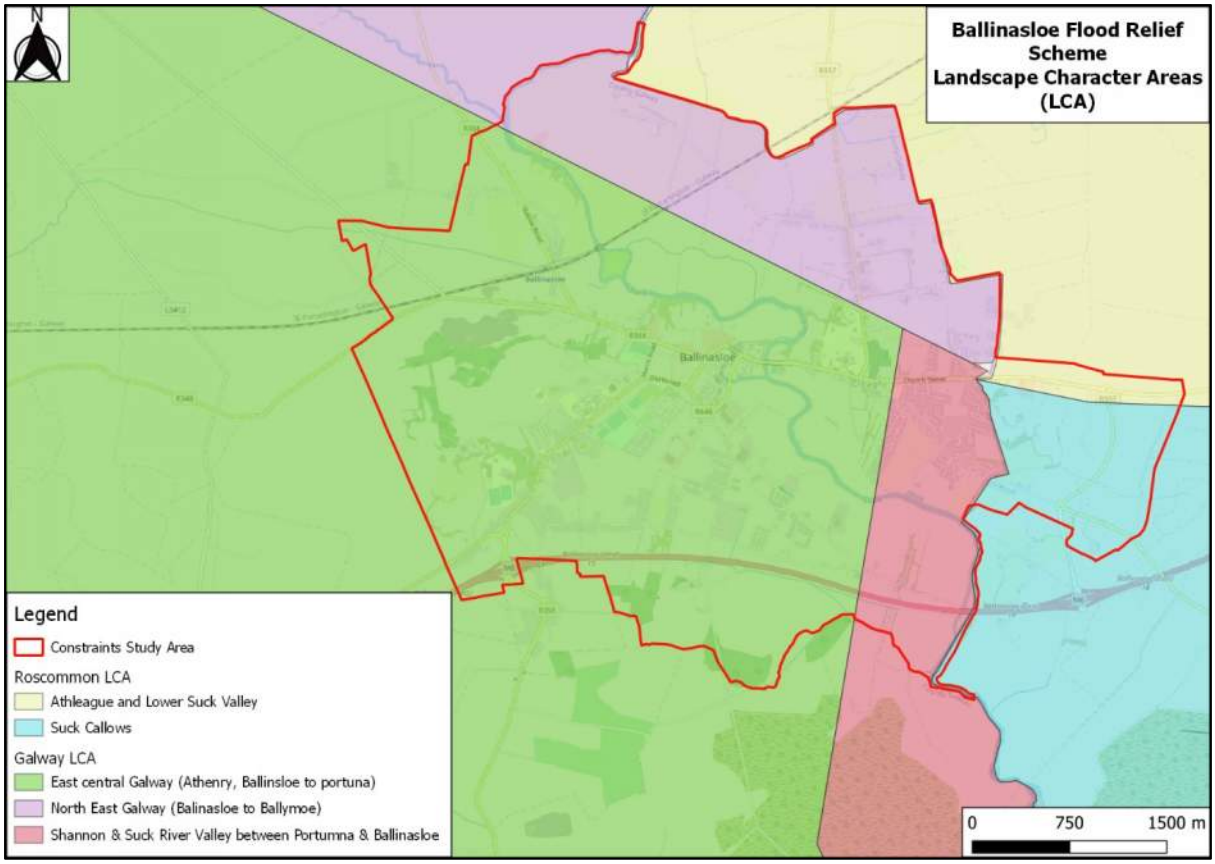


Figure 3.6: Landscape Character Areas within Study Area

3.8.2.3 Study Area Land Cover

The CORINE land cover data for the Study Area was obtained from the Environmental Protection Agency (EPA). CORINE land cover is a map of the environmental landscape based on the interpretation of satellite images. It provides comparable digital maps of land cover for each country for much of Europe.

The CORINE data for the Study Area shows that artificial surfaces with urban fabric is the primary land cover within the Study Area. Agricultural land dominated by pastures within and in the vicinity of the Study Area is interspersed with a small area of wetlands.

3.8.2.4 Landscape, Townscape and Visual Amenity

Section 3 in the Landscape and Landscape Character Assessment of Galway County supporting document for the Galway County Development Plan 2015 – 2021 outlines areas designated as scenic.

Section 3.81 of the Development Plan provides planning considerations for future protection of land. In order to protect areas of rural Galway from inappropriate development which may alter the scenic quality of the landscape consideration was given to areas for designation as Areas of Special Amenity or as a Landscape Conservation in accordance with the Planning and Development Act 2000. Section 3.82 of the Development Plan states:

"In the opinion of the Planning Authority, if an area is deemed to be of outstanding natural beauty or of its special recreation value, an area should be declared to be an area of special amenity. An order may be made to do so and should state the objective of the planning authority in relation to the preservation or enhancement of the character or special features of the area including objectives for the preservation or limitation of development in the area. 3.83 states that if it appears to a minister that an area should be declared to be of special amenity or of its special recreational value and having regard to any benefits for

nature conservation he/she may direct a planning authority to make an order in respect of this area. This order shall be revoked or amended by the minister. If two planning authorities are concerned either planning authority may make the order with the consent of the other. Any order made may be revoked by a subsequent order."

The European Landscape Convention which was signed and ratified by Ireland came into force in March 2004. It introduced a European wide concept which focused on the quality of landscape protection, management and planning and which extended to natural, urban, peri-urban and rural areas encompassing land, inland water, coastal and marine areas.

The EU Landscape Convention defines landscape as "*.....area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors*", which is also the landscape definition framework included in the Planning and Development Act, 2000 (as amended) and within the National Landscape Strategy for Ireland 2015 - 2025.

The Landscape and Landscape Character Assessment for County Galway, which forms part of the Galway County Development Plan 2015 – 2021 indicates the landscape character rating, value rating and sensitivity rating. The landscape sensitivity within County Galway ranges from Class 1 to Class 5, with Class 1 being low sensitivity, Class 2 – moderate sensitivity, Class 3 – high sensitivity, Class 4 - special sensitivity and Class 5 – unique sensitivity.

According to the Ballinasloe Local Area Plan 2015- 2021, the Ballinasloe LAP area is located within or in proximity to three landscape character areas, the East Central Galway area, the Shannon and Suck River Valley and the Northeast Galway (Ballinasloe to Ballymoe) character areas. The landscape value attributed to Ballinasloe ranges from a low value in the western area of the town, medium and high for the eastern area near the River Suck. The landscape sensitivity designation for Ballinasloe ranges from Class 1 to Class 3 to the east of the town along the River Suck. The townscape and streetscapes of Ballinasloe including the church spires are an important part of the built heritage and visual amenity of the town. The protection and enhancement of the townscape, streetscapes and historic street pattern would all need to be considered with respect to the future conservation of the character and development of the town.

3.8.3 Summary of Key Considerations and Implications for the Proposed Scheme

It is an objective of Galway County Council to ensure that landscape issues will be an important factor in all land-use proposals, thereby ensuring that a pro-active view of development is undertaken while respecting the environment so that these needs can be met not only in the present but in the indefinite future (Galway County Development Plan).

3.9 Air and Climate

3.9.1 Air Quality – Methodology

This section of the Constraints Study describes the existing air quality and noise environment within the Study Area and identifies possible issues which have the potential to constrain the design of any flood relief scheme.

The Study Area is located in an urban area and includes the county town of Ballinasloe. Due to the general character of the surrounding environment, air quality sampling was deemed to be unnecessary for the purposes of this Constraints Study.

It is expected that air quality in the existing environment is good, since there are no major sources of air pollution (e.g. heavy industry) within or in the immediate vicinity of the study area. Land-use in the vicinity of the study area is dominated by urban areas.

The following items were the principal focus of the study:

- Identification of possible issues regarding air quality,
- Identification of locations where there may be existing noise/ vibration-sensitive receptors,
- Identification of any existing noise or vibration sources in the area,
- A qualitative description of the existing noise climate.

The following were referenced as part of the Constraints Study:

- Galway County Development Plan (2015-2021),
- EPA website (http://epa.ie/)

3.9.2 Air Quality – Standards

In 1996, the Air Quality Framework Directive (96/62/EC) was published. This Directive was transposed into Irish law by the Environmental Protection Agency Act, 1992 and Ambient Air Quality Assessment and Management Regulations 1999. The Directive was followed by four Daughter Directives, which set out limit values for specific pollutants:

- The first Daughter Directive (1999/30/EC) deals with sulphur dioxide, oxides of nitrogen, particulate matter and lead.
- The second Daughter Directive (2000/69/EC) addresses carbon monoxide and benzene. The first two Daughter Directives were transposed into Irish law by the Air Quality Standards Regulations 2002 (SI No. 271 of 2002).
- A third Daughter Directive, Council Directive (2002/3/EC) relating to ozone was published in 2002 and was transposed into Irish law by the Ozone in Ambient Air Regulations 2004 (SI No. 53 of 2004).
- The fourth Daughter Directive, published in 2007, deals with polyaromatic hydrocarbons (PAHs), arsenic, nickel, cadmium and mercury in ambient air.

The Air Quality Framework Directive and the first three Daughter Directives have been replaced by the Clean Air for Europe (CAFE) Directive (Directive 2008/50/EC on ambient air quality), which encompasses the following elements:

- The merging of most of the existing legislation into a single Directive (except for the Fourth Daughter Directive) with no change to existing air quality objectives.
- New air quality objectives for PM2.5 (fine particles) including the limit value and exposure concentration reduction target.
- The possibility to discount natural sources of pollution when assessing compliance against limit values.
- The possibility for time extensions of three years (for particulate matter PM10) or up to five years (nitrogen dioxide, benzene) for complying with limit values, based on conditions and the assessment by the European Commission.

Table 3-13 sets out the limit values of the CAFE Directive, as derived from the Air Quality Framework Daughter Directives. Limit values are presented in micrograms per cubic metre (µg/m3) and parts per billion (ppb). The notation PM10 is used to describe particulate matter or particles of ten micrometres or less in aerodynamic diameter. PM2.5 represents particles measuring less than 2.5 micrometres in aerodynamic diameter.

Table 3-13 Limit values of Directive 2008/50/EC, 1999/30/EC & 2000/69/EC (Source: EPA

Pollutant	Limit Value Objective	Averaging Period	Limit Value (µg/m³)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
Sulphur dioxide (SO_2)	Protection of Human Health	1 hour	350	132	Not to be exceeded more than 24 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO_2)	Protection of human health	24 hours	125	47	Not to be exceeded more than 3 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO_2)	Protection of vegetation	Calendar year	20	7.5	Annual mean	19th Jul 2001
Sulphur dioxide (SO_2)	Protection of vegetation	1st Oct to 31st Mar	20	7.5	Winter mean	19th Jul 2001
Nitrogen dioxide (NO_2)	Protection of human health	1 hour	200	105	Not to be exceeded more than 18 times in a calendar year	1st Jan 2010
Nitrogen dioxide (NO_2)	Protection of human health	Calendar year	40	21	Annual mean	1st Jan 2010
Nitrogen monoxide (NO) and nitrogen dioxide (NO_2)	Protection of ecosystems	Calendar year	30	16	Annual mean	19th Jul 2001
Particulate matter 10 (PM_{10})	Protection of human health	24 hours	50	-	Not to be exceeded more than 35 times in a calendar year	1st Jan 2005
Particulate matter 2.5 ($PM_{2.5}$)	Protection of human health	Calendar year	40	-	Annual mean	1st Jan 2005
Particulate matter 2.5 ($PM_{2.5}$) Stage 1	Protection of human health	Calendar year	25	-	Annual mean	1st Jan 2015
Particulate matter 2.5 ($PM_{2.5}$) Stage 2	Protection of human health	Calendar year	20	-	Annual mean	1st Jan 2020
Lead (Pb)	Protection of human health	Calendar year	0.5	-	Annual mean	1st Jan 2005
Carbon Monoxide (CO)	Protection of human health	8 hours	10,000	8,620	-	1st Jan 2005
Benzene (C_6H_6)	Protection of human health	Calendar Year	5	1.5	-	1st Jan 2010

The Ozone Daughter Directive 2002/3/EC is different from the other Daughter Directives in that it sets target values and long-term objectives for ozone rather than limit values. Table 3-14 presents the limit and target values for ozone.

Table 3-14 Target values for Ozone Defined in Directive 2008/50/EC

Objective	Paramater	Target Value for 2010	Target Value for 2020
Protection of human health	Maximum daily 8 hours mean	120 mg/m^3 not to be exceeded more than 25 days per calendar year averaged over 3 years	120 mg/m^3
Protection of vegetation	AOT$_{40}$* calculated from 1-hour values from May to July	18,000 mg/m^3.h averaged over 5 years	6,000 mg/m^3.h
Information Threshold	1-hour average	180 mg/m^3	-
Alert Threshold	1-hour average	240 mg/m^3	-

*AOT_{40} ***is a measure of the overall exposure of plants to ozone. It is the sum of the excess hourly concentrations greater than 80 µg/m^3 and is expressed as µg/m^3 hours.***

3.9.3 Air Quality Zones

The Environmental Protection Agency (EPA) has designated four Air Quality Zones for Ireland:

- Zone A: Dublin City and environs
- Zone B: Cork City and environs
- Zone C: 16 urban areas with population greater than 15,000
- Zone D: Remainder of the country.

These zones were defined to meet the criteria for air quality monitoring, assessment and management described in the Framework Directive and Daughter Directives. The site of the proposed development lies within Zone D which represents rural areas located away from large population centres. The current air quality in the Ballinasloe Urban AQIH Region is rated as *1 – Good*.

The ambient air quality monitoring carried out closest to the proposed development site is at the EPA office in Roscommon town.

3.9.4 Receiving Environment

It is the objective of the Council to support the implementation of the Air Quality Regulations.

An air quality monitoring station is already in place in Roscommon located north of the Study Area so there are no immediate plans to monitor air quality in the vicinity of the Study Area.

It is not envisaged that a flood relief scheme recommended by the Engineering Study will increase the volume of traffic within the Study Area in the long term. Given the size of the Study Area, it is not envisaged that a flood relief scheme will have a long-term detrimental effect on air quality.

Air quality may be temporarily impacted during the construction phase of the scheme, due in particular to the generation of dust.

The air quality in the vicinity of the proposed development site is typical of that of rural areas in Ireland, i.e. Zone D.

Monitoring is done using a continuous monitor for particular matter; PM10 and PM2.5. Organic/Elemental Carbon (OC/EC) and a range of anions and cations are measured at the site in Roscommon town also.

3.9.5 Climate and Weather in the Existing Environment

Ballinasloe has frequent rainy days due to its position on the Western side of Ireland along the coast. Temperatures are moderate during the summer and the winter.

The Met Éireann weather and climate monitoring station at Athenry, Co. Galway is located approximately 41km west of the Study Area. Table 3-15 provides data from the Athenry monitoring station.

Table 3-15 Data from Met Éireann Weather Station Athenry; Year 2011 to present.

	Monthly and Annual Mean and Values											
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Temperature (degree Celsius)												
Max. temp	13.0	13.01	15.4	18.6	22.4	24.4	25	23.5	22.2	18.5	15	13.9
Min. temp	-3.2	-2.6	-1.7	-0.0	2.9	5.7	8.2	7.5	4.9	1.4	-1.2	-2.4
Rainfall (mm)												
Mean monthly total	113.8	90.4	81.5	60.0	69.3	71.9	81.5	92.9	83.8	100.6	110.6	128.5
Wind (knots)												
Mean monthly speed at 10m	9.5	9.6	9.1	8.7	8.6	8.1	7.7	7.8	7.9	8.4	8.5	9.3

3.9.6 Climate Change

It is widely predicted that the climate in Ireland will change in the future, leading to increases in sea level, storm event magnitude and frequency and rainfall depths, intensities and patterns. These impacts, along with others due to land use changes such as urbanisation and deforestation, are likely to have significant detrimental implications for the degree of flood hazard - and hence flood risk - in Ireland. The degree of these impacts over time are, however subject to significant uncertainty.

To provide an adequate understanding of the potential implications of the predicted impacts of climate change and other future changes, with due consideration of the significant uncertainty associated with such predictions, a minimum of two potential future scenarios should be assessed as part of the flood risk prediction. These two scenarios are referred to as the Mid-Range Future Scenario (MRFS) and the High-End Future Scenario (HEFS), as described below:

- The former (the MRFS) is intended to represent a 'likely' future scenario, based on the wide range of predictions available and with the allowances for increased flow, sea level rise, etc. within the bounds of widely accepted projections.
- The latter (the HEFS) is intended to represent a more extreme potential future scenario, but one that is nonetheless not significantly outside the range of accepted predictions available, and with the

allowances for increased flow, sea level rise, etc. at the upper the bounds of widely accepted projections.

The allowances, in terms of numerical values for future changes to 2100 in relevant phenomena or characteristics, which should typically be used for each of these scenarios, are set out in Table 3-16.

Table 3-16 Allowances for Future Scenarios (Time Horizon – 100 years)

	MRFS	HEFS
Extreme Rainfall Depths	+ 20%	+ 30%
Flood Flows	+ 20%	+ 30%
Mean Sea Level Rise	+ 500 mm	+ 1000 mm
Land Movement	- 0.5 mm / year[3]	- 0.5 mm / year[3]
Urbanisation	*No General Allowance – Review on Case-by-Case Basis*	*No General Allowance – Review on Case-by-Case Basis*
Forestation	- 1/6 Tp[4]	- 1/3 Tp[4] + 10% SPR[5]

The following should however be noted:

- The allowances are based on current knowledge and science, and will be frequently reviewed and may be updated, as further research is undertaken.
- The allowances are national, and some regionalisation or provision for the nature of the relevant catchment may be suitable where adequate knowledge or analysis would support this (although this would need to be robustly justified where the allowances are less than the assumed national allowances).

3.9.7 Noise and Vibration

It is not envisaged that the preferred flood relief scheme emerging from the Engineering Study will have a long-term detrimental effect on the noise environment within the Study Area; however noise during the construction phase of the project may have a temporary adverse impact on the environment.

3.9.7.1 Noise/Vibration Receptors within the Study Area

The closest noise / vibration sensitive receptors to the Study Area are the M6 motorway south of Ballinasloe town.

Vibration during construction has the potential to cause damage to structures such as buildings, bridges and walls in the vicinity of the works.

3.9.7.2 Prevailing Noise Climate

The dominant noise is road traffic noise from the regional roads: R446, R357, R358, the M6 motorway and surrounding local roads.

[3] Applicable to the southern part of the country only (Dublin – Galway and south of this)
[4] Reduce the time to peak (Tp) by a third: This allows for potential accelerated runoff that may arise as a result of drainage of afforested land.
[5] Add 10% to the Standard Percentage Runoff (SPR) rate: This allows for increased runoff rates that may arise following felling of forestry.

3.9.8 Summary of Key Constraints and Implications for the Proposed Scheme

- Prior to the selection of a preferred flood relief scheme as part of the Engineering Study, it is recommended that the short-listed flood alleviation measure be assessed in relation to the impact of noise and vibration during the construction phase of the project.
- It is recommended that mitigation measures be put in place to reduce the impacts on air quality and the noise environment during the construction phase of any proposed flood relief scheme.
- It is recommended that the effects of vibration during the construction phase be considered in the selection process for a potential flood alleviation measure.
- Meteorological and climatological data should be consulted in the engineering design process.
- The potential impacts of Climate change should be assessed with regard to the prediction of flood risk and should be taken into account in the design of a proposed flood relief scheme.

3.10 Material Assets

The Material Assets within the Study Area which are considered within this section of the Constraints Study include:

- Wastewater Infrastructure,
- Waste Management Facilities,
- Roads & Transportation Infrastructure,
- Utilities.

3.10.1 Methodology

The following sources were consulted in the assessment of material assets within the Study Area:

- EPA Waste Water Discharge Licence Applications database,
- Galway County Development Plan (2015-2021),
- Ballinasloe Local Area Plan (2015-2021),
- Connacht- Ulster Region Waste Management Plan (2015-2021).

3.10.2 Receiving Environment – Wastewater Infrastructure & Management

The nearest urban wastewater treatment plant (UWWTP) is the Ballinasloe and Environs UWWTP which is located within the Study Area. This WWTP treats a Population Equivalent (PE) of > 10,000, providing tertiary phosphorus removal.

3.10.3 Receiving Environment – Waste Management

The Connacht Ulster Regional Waste Management Plan (2015-2021) was consulted in relation to Waste Management Facilities in the vicinity of the Study Area.

The implementation of the Connacht Ulster Region Waste Management Plan must ensure that European and national mandatory targets are achieved and in doing so that the health of communities in the region, its people and environment are not compromised.

Ballinasloe Recycling Centre which facilitates all types of rubbish is located outside of the boundary of the Study Area.

3.11 Receiving Environment – Roads & Transportation Infrastructure

The primary road access to the Study Area is via the regional roads; R348, R446 and R357. The M6 Motorway also runs through the south section of the Study Area. The R348 runs from the Derrydonnell

junction with the R446, west of the Study Area where it joins the R446 in Ballinasloe. The R446 runs through the Study Area, north east to Athlone where it joins the N62. The R357 runs north and south east of the Study Area. Motorways, National, primary and secondary roads are maintained by TII with regional and local roads maintained by Galway County Council.

The Iarnród Éireann train line from Portarlington to Galway runs through the north section of the Study Area.

The Ballinasloe Local Area Plan 2015 – 2021 outlines that it is working towards ensuring that infrastructure is developed, in particular the Townparks Relief Road and the completion of the Link Road from Beechlawn Road into the Town Centre at Harbour Road which runs through the Study Area. These objectives are to service future developments and to accommodate for planned population growth. The Townparks Relief Road will involve the development of a single carriageway road in Ballinasloe, in the townland of Townparks, to create an inner relief road to provide better connectivity for traffic around the town. A preferred route (Route A) has been identified by Galway County Council, with a possible alternative route (Route B) also a viable option. A map illustrating the preferred potential route/s of the Townparks Relief Road is provided in Appendix G1.

The Athlone to Galway Cycleway (Greenway) is being progressed by relevant local authorities in conjunction with TII and the Dept. of Transport, Tourism & Sport. The Route Corridor Options Public Consultation stage concluded in March 2021. This project will now move to detailed assessment of route options and selection of a preferred route. Dependent on the outcome of this stage, the cycleway may present as a constraint to this project.

3.11.1 Summary of Key Constraints and Implications for the Proposed Scheme

- It is recommended that the existing and proposed location of watermains and underground services in the vicinity of any proposed flood relief scheme be ascertained as part of the Engineering Study. It is recommended that Galway County Council and other utility providers with services in the area be consulted regarding the location and priority of existing and proposed services. It is further recommended that the services be protected as part of any proposed flood relief scheme.
- It is recommended that any proposed change in the hydrological regime of the Suck River and its tributaries be assessed in relation to the assimilative capacity of the river at the locations of the discharges from Waste-Water Infrastructure within the Study Area.
- It is recommended that Galway County Council and Transport Infrastructure Ireland be consulted in relation to any effects on the existing and proposed roads infrastructure in the Study Area from a proposed flood relief scheme.
- It has been noted that an area in Townparks in the former (now derelict) convent grounds is occupied by large mature trees including Limes (Tilia spp) and other mature exotic trees. This area may be subject to multiple development proposals including the relief road and the FRS. The existence of these tree has been highlighted and may require further expert evaluation.
- It is recommended that the Galway to Athlone Cycleway Project proposed by Galway City Council and Galway, Roscommon and Westmeath County Councils, in partnership with Transport Infrastructure Ireland (TII) and the Department of Transport Tourism and Sport (DTTAS) be consulted in relation to the potential for interaction for the proposed FRS. The second public consultation has concluded and several possible routes have been presented, some of which may interact with the proposed FRS. However, as detailed assessment of the cycleway route options has not been completed, further assessment at this constraints study stage cannot be conducted. As the cycleway

development progresses further and a preferred route option is selected, the likelihood and extent for interaction with the FRS will be examined further. Further information on the Athlone to Galway Cycleway is available from: https://www.galwaytoathlonecycleway.com/pages/publications.php

4. PUBLIC CONSULTATION TO DATE

Details and analysis of the first Public Consultation (Public Information Gathering) are contained within this section of the report. A separate Public Consultation Feedback Report following the consultation day has been prepared and is available to view on the Ballinasloe Flood Relief Scheme website: https://www.floodinfo.ie/frs/en/ballinasloe/home/

4.1 Public Consultation Event

The first Ballinasloe FRS Public Consultation Event was held in the Shearwater Hotel, Ballinasloe on Thursday 5th March 2020 between 3pm - 8pm. The purpose of the public consultation day was to introduce the project team, display the process for developing the scheme, outline project objectives and to gather local knowledge from stakeholders and members of the public. This information is essential to achieve the project objectives.

4.1.1 Advertising of the Public Consultation Event

Advertising of the Public Consultation Event was undertaken in the local press in the week preceding the event. The event was advertised in 3 local newspapers and on Galway Bay FM. The event was also well publicised locally by distribution of 800 flyers by mail-drop to residents, landowners and stakeholders that may be affected by the proposed schemes.

Newsletters and Questionnaires were available at the consultation event on 5th March 2020. Stamped addressed envelopes were provided to those who wished to return questionnaires by post with a return date for the questionnaires of 16th April 2020. Any information additional to the questionnaires was also accepted on the evening of the event and subsequently by email and post.

4.2 Public Consultation Materials

4.2.1 Public Consultation Newsletter

A Constraints Study Public Consultation newsletter was produced for the scheme, which showed the Study Area under consideration and provided a brief explanation as to the process involved and the options being considered. Newsletters were freely available to the members of the public and interested parties, both during and after the exhibition. A copy of the newsletter is attached in Appendix A and is also available to view on the Ballinasloe Flood Relief Scheme website.

4.2.2 Public Consultation Questionnaire

In association with the newsletter, a questionnaire with pre-printed questions was provided to each attendee. This provided an opportunity for members of the public to express their views on the proposed scheme generally, the Study Area shown and to provide information regarding previous flooding in their area. Additionally, members of the public had the opportunity to express any other comments or observations they had relating to the design or preparation of the Environmental Constraints Study. A prepaid envelope was also provided for the return of questionnaires. A copy of the questionnaire is attached in Appendix A2.

4.2.3 Public Consultation Exhibition Posters

The format of the Environmental Constraints Study Consultation exhibition was based on a number of scheme posters. The posters included:

- Study Area Map
- Constraints Study Information
- Public Involvement
- Scheme Objectives and Overview
- Environmental Constraints
- FRMP/Flood Relief Scheme Process

4.3 Public Consultation Exhibition

4.3.1 Staffing of Exhibition

At the venue, staff from the OPW, Galway County Council, Ryan Hanley Environmental Team and ARUP and Hydro Environmental Ltd. Design Team were in attendance to show the Study Area, accept information from the general public and answer any questions at the preliminary stage.

4.3.2 Numbers of Public Attendees

Members of the public visiting the exhibition were invited to sign a visitor's book to enable a record of the number of attendees to be maintained. A total 82 people attending the event, 32 of which were 5th year geography students from Garbally College. Several local councillors were also in attendance.

4.4 Public Consultation Response

4.4.1 Verbal Comments Received at Exhibition

A number of comments were received on the evening of the Public Consultation Event. One such comment was in relation to the elevated water levels in February of 2020 due to a series of storms which affected many parts of the country. A number of residents raised concerns about this and highlighted that the areas of Derrymullen and Station Road were the worst affected. The flood defence wall and pump system, which was installed in 2011 after the 2009 flood event, was mentioned as working well.

Other issues raised by the local community included how long the project would take to come to fruition and problems regarding the insurance of properties which were previously affected by flooding. People also commented on the isolation felt by those affected; in particular, by roads being impassable.

The local authorities and hardworking people dispatched to the area received praise for their quick responses to the flooding in February of 2020. Concerns regarding the regular maintenance of gutters and drains were also raised.

Overall, the responses received and reactions to the scheme on the evening were positive and residents were eager for the project to commence.

4.4.2 Questionnaires Returned

In total eleven submissions were returned on the night. A further 4 postal submissions and 1 email submission were received in the weeks following the first Public Consultation Event.

4.5 Analysis of Public Consultation Response

4.5.1 Analysis of Questionnaires

In summary, specific individual concerns were raised about aspects of the Ballinasloe Flood Relief Scheme. The majority of these relate to the need to progress the project as soon as possible and the efficacy of the proposed works. A breakdown of the perceived importance of environmental factors for

the scheme is provided in Table 4-1 below; with Water Quality noted as the primary concern amongst the respondents.

4.5.1.1 Flooding Information

Flooding information was gathered from residents in relation to first-hand experiences and anecdotal information.

4.5.1.2 Flood Alleviation Information

Information gathered on the evening included suggestions that a general increase in the capacity of the river through dredging and additional pipework to remove water from the mill race might be components of the solution. It was also suggested that the current flood defence wall should be extended to provide protection for the remaining houses. Concern was raised that if a sluice is built at the hill in the townland of Back, it would cause areas to flood which have never flooded before.

Some issues were raised with the CFRAM proposals by landowners, as they felt in parts it removed access points as well as bisecting and isolating areas of farmland. Some were concerned about a reduction in land quality and devaluation of land due to diversion of flood waters to farmland as a result of embankments and walls.

The submissions also asked for consideration to be made in the design to ensure that the River Suck remains an amenity which the town's inhabitants and tourists can use and, if possible, for the design to improve access and connectivity to the river along with providing walk and cycle ways. There was also a suggestion that proposed works to rejuvenate areas near Main Street and Society Street be incorporated and taken into account when designing the flood relief scheme.

4.5.1.3 Environmental Constraints

In Question 13 of the questionnaire the respondents were given six environmental topics and asked to rank their opinion of the importance of each constraint, from very important to unimportant.

Overall answers to this question are summarised in Table 4-1:

Table 4-1 Percentage Summary of Answers to Question 13 – "In your opinion, how important are the following environmental constraints to the proposed Flood Relief Scheme?"

TOPIC	Very Important (%)	Important	Moderately Important	Of Little Importance	Unimportant
Biodiversity, Flora & Fauna		20%	20%	26.6%	13.3%
Land use and Agriculture	33.3%	6.66%	26.6%	6.66%	
Water Quality	58.82%	13.33%		13.33%	
Architectural and Cultural Heritage	13.33%	33.3%	13.33%	6.66%	
Landscape and Visual Amenity	6.66%	20%	20%	26.6%	

Angling, Tourism & Recreation	13.33%	6.66%	26.6%	26.6%	6.66%

4.5.1.4 Other Comments

Respondents were also given the opportunity to provide any other comments specific to the proposed scheme or the constraints.

4.6 Conclusion

In summary, progression of the Ballinasloe FRS would be welcomed in the local community. Primary concerns identified include communications and further consultation with the public as a design progresses, concerns that areas previously unaffected by flooding will be impacted and issues relating to land quality. Maintaining water quality is the primary concern of respondents to date.

Appendix A - Information issued to Consultees

A1 Newsletter sent to inform Consultees of Public Consultation Day
A2 Public Consultation Questionnaire

APPENDIX A1 NEWSLETTER ISSUED TO CONSULTEES

Newsletter **Ballinasloe Flood Relief Scheme**

Background to the Scheme

As part of the implementation of the EU Floods Directive, the OPW undertook Catchment Flood Risk Assessment and Management (CFRAM) Studies between 2012 and 2018. These studies examined 80% of Ireland's major source of flooding across 300 communities in the largest study of flood risk ever undertaken by the State.

The findings from the CFRAM Studies are set out in a series of Flood Risk Management Plans (available at http://www.floodinfo.ie/). The Plans provide the outline of 118 proposed schemes that can protect 11,500 properties. The OPW is now working closely with the Local Authorities to commence the implementation of the first tranche of prioritised schemes, which includes Ballinasloe.

Ballinasloe has a long history of flooding from the River Suck, Deerpark River and other local tributaries. In recent times, significant flooding occurred in November 2009 and during winter 2015/2016.

Following the flood of 2009, a flood relief scheme for the Derrymullen area was advanced by Galway County Council. Construction of the scheme was completed in 2011, and involved 1.19km of flood defence structures consisting primarily of walls and embankments. The existing Derrymullen scheme is proposed to be incorporated into the proposed Ballinasloe Flood Relief scheme, which will facilitate the ongoing management and maintenance of a single overall scheme for the town.

www.floodinfo.ie/ballinasloefrs

OPW in partnership with Galway County Council, has appointed Arup in conjunction with Hydro-Environmental Ltd. to assess, develop and design a viable, cost-effective and environmentally sustainable flood relief scheme for Ballinasloe. OPW has appointed Ryan Hanley to undertake the necessary environmental assessments. This project-level development includes further public and stakeholder engagement, detailed design and a local Public Exhibition or submission for planning approval or confirmation. The outputs from the detailed design may give rise at that stage to some amendment of the proposed works to ensure that it is fully adapted, developed and appropriate within the local context and that it is compliant with environmental legislation and is economically feasible.

Scheme Area

The scheme objective is to provide protection to all domestic and commercial properties currently at risk of flooding from the River Suck and its tributaries within the scheme area, up to the design standard of protection including an allowance for climate change adaptation (refer to map opposite).

Consideration will also be given to additional measures located outside of the main scheme extent to assist with provision of flood relief measures in the areas described above.

Newsletter **Ballinasloe Flood Relief Scheme**

Opening Public Consultation Day

Location
Dunlo Room, Shearwater Hotel, Ballinasloe.

Date:
Thursday 5th March 2020.

Time:
15.00 – 20.00

The purpose of this first public consultation event is to introduce the project team, display the process for developing the scheme and to gather valuable local knowledge from stakeholders and the public which is essential in achieving this project objective. In particular, we seek initial views from the public in relation to the key issues that the scheme should address and highlight points of local importance that may constrain the design of potential flood alleviation measures.

The Office of Public Works wishes to consider all viewpoints in relation to the scheme area being examined and this is your opportunity to take part at the early stages of the planning of the Flood Relief Scheme. Time spent communicating your views to the Office of Public Works is appreciated. Please examine the scheme area shown above and let your views be known. Questionnaires will be available at the public consultation event which can be filled out and handed in on the day. Alternatively submissions can be posted or emailed to the project team address.

While comments from the public will be welcomed throughout all stages of the project, we would appreciate if comments relating to the opening public consultation day could be submitted by Thursday 16th April 2020.

www.floodinfo.ie/ballinasloefrs

Additional Information

Additional information in relation to overall progress, current news items and project reports can be found on the Ballinasloe Flood Relief Scheme project website. The project team can also be reached at the following addresses:

Project website:
www.floodinfo.ie/ballinasloefrs

Email address:
ballinasloefrs@arup.com

Post address:
Ballinasloe Flood Relief Scheme Project Manager
Arup,
One Albert Quay,
Cork

What happens next?

In the following 6 months, the design team will work on:

- Data Collection and Review
- Procurement and Management of Surveys
- Initial Public consultation day
- Collaborative Workshop for stakeholders
- Environmental Constraints study
- Hydrological review analysis

All comments received in response to the Public Information Event will be considered by the Office of Public Works and will be taken into account in the preparation of the first stage of the Ballinasloe Flood Relief Scheme. The stages of the scheme are as follows:

Flood Relief Scheme Stages	
Stage I	Data Gathering, Surveying and SI
	Hydrology Study & Hydraulic Modelling
	Flood Risk Management Options
	Selection of Preferred Option
Stage II	Public Exhibition / Planning
Stage III	Ministerial Confirmation / Detailed Design
Stage IV	Construction
Stage V	Handover of Works

Outline Project Programme

Note :Timelines are the current best estimate but are subject to revision.

www.floodinfo.ie/ballinasloefrs

APPENDIX A2 PUBLIC CONSULTATION QUESTIONNAIRE

OPW Oifig na nOibreacha Poibli Office of Public Works

BALLINASLOE FLOOD RELIEF SCHEME
PUBLIC CONSULTATION NO.1 QUESTIONNAIRE

(Please complete this questionnaire and hand it in at the Public Information Day or place in the stamped addressed envelope provided, alternatively this questionnaire can be downloaded from www.floodinfo.ie/ballinasloefrs and sent by email to ballinasloefrs@arup.com. Please return by Thursday 16th April 2020.

1. **Name *(optional)*:** _____
   Address: _____
   _____
   Phone *(optional)*: _____
   Email *(optional)*: _____

2. **Do you own, rent or occupy a property within the study area being considered?** Yes ☐ No ☐

3. **Address of property (if different from home address)**
   _____

4. **Have you had any personal experience of flooding?** Yes ☐ No ☐

5. **If yes, please give date(s):** _____

6. **Type of property flooded:** _____

7. **Approximate maximum depth of flooding:** _____

8. **Source of Flooding:**
   Directly from River/ Stream ☐
   From Drains ☐
   Overground flow (surface water) ☐

9. **Do you have photographs of flooding?** Yes ☐ No ☐

10. **If you do, may the OPW have permission to use them?** Yes ☐ No ☐
    Note: Photographs will be collected at a later date

11. **Have you put in place measures to prevent or reduce the impact of flooding?** Yes ☐ No ☐
    If so, please describe:

12. **How do you think the issue of flooding in the area can be resolved?**

Page 1

13. In your opinion, how important are the following environmental constraints to the development of a Flood Risk Management Scheme for the Ballinasloe area: *(please tick appropriate boxes)*

Issue	Very Important	Important	Moderately Important	Of Little Importance	Unimportant
Biodiversity, Flora and Fauna	☐	☐	☐	☐	☐
Land Use and Agriculture	☐	☐	☐	☐	☐
Water Quality	☐	☐	☐	☐	☐
Architectural and Cultural Heritage	☐	☐	☐	☐	☐
Landscape and Visual Amenity	☐	☐	☐	☐	☐
Angling, Tourism & Recreation	☐	☐	☐	☐	☐

If you have any comments in relation to the proposed scheme or the constraints, please record them here:

Comment:

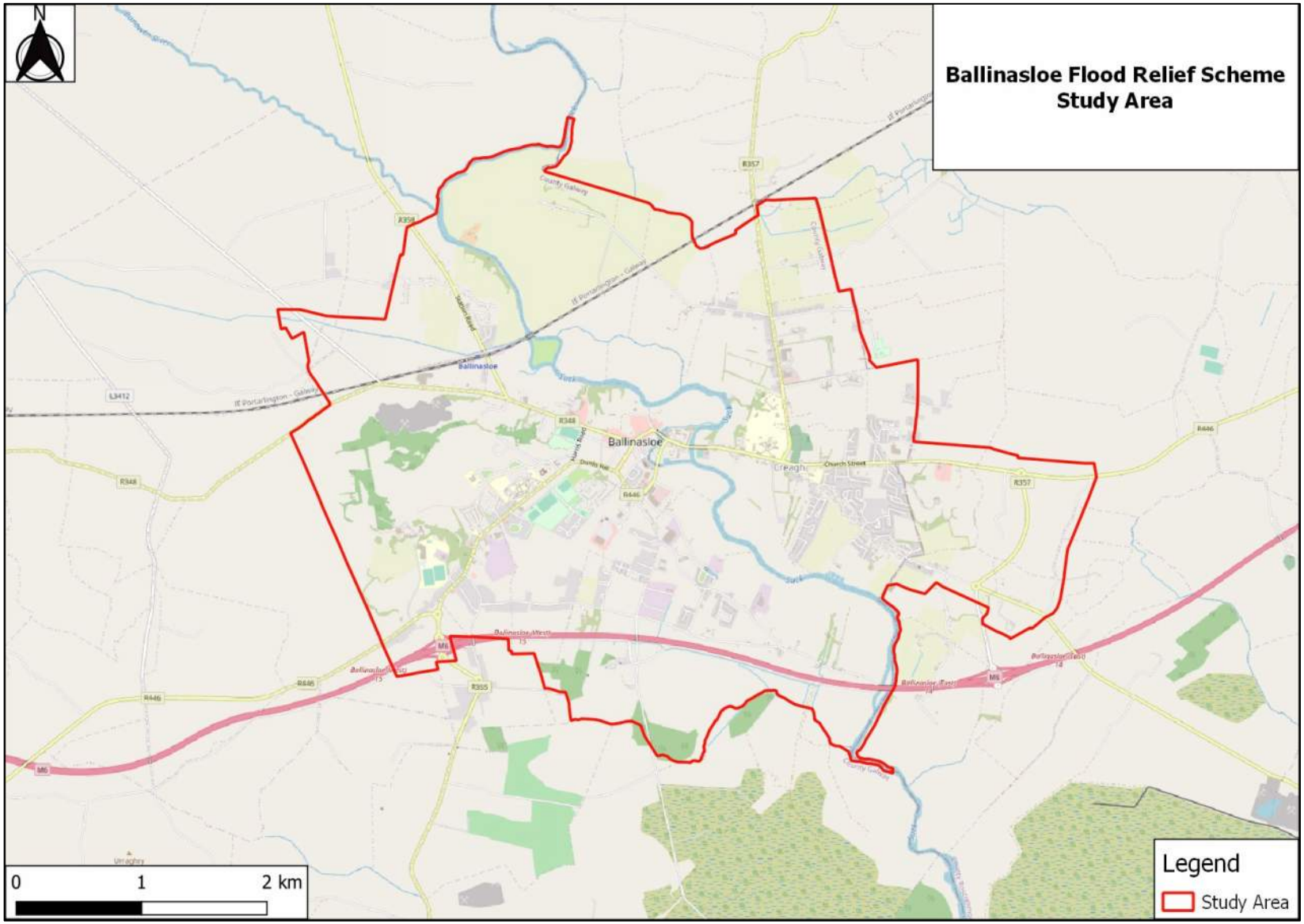
GDPR Compliance

Your contact details have been collected to aid the development of the flood relief scheme for Ballinasloe. The details will only be used for the purposes of contacting you in relation to the scheme, which may include some or all of the following: Notifying you of future consultation opportunities Arranging access to your lands for the purposes of data collection by project staff and approved third party surveyors Clarifying information, you have already provided to the project team and obtaining further inputs Your details will be securely kept on file for the duration of the project	
Signature:	I agree to the above use and retention of my contact details

THANK YOU FOR YOUR CO-OPERATION

Page 2

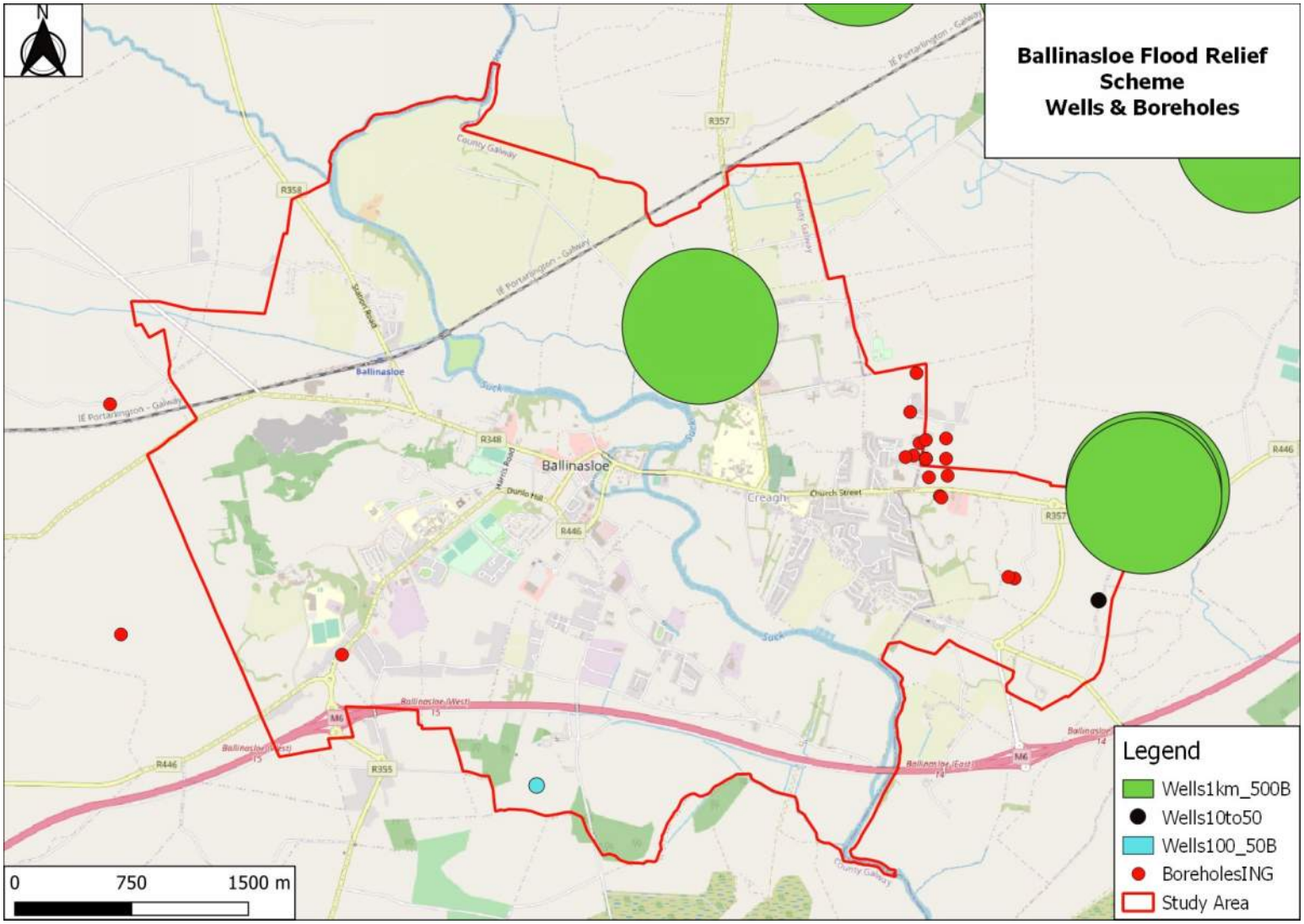
Appendix B – Study Area Maps Ballinasloe, Co. Galway


N
Ballinasloe Flood Relief Scheme
Study Area
Ballinasloe
0
1
2 km
Legend
Study Area

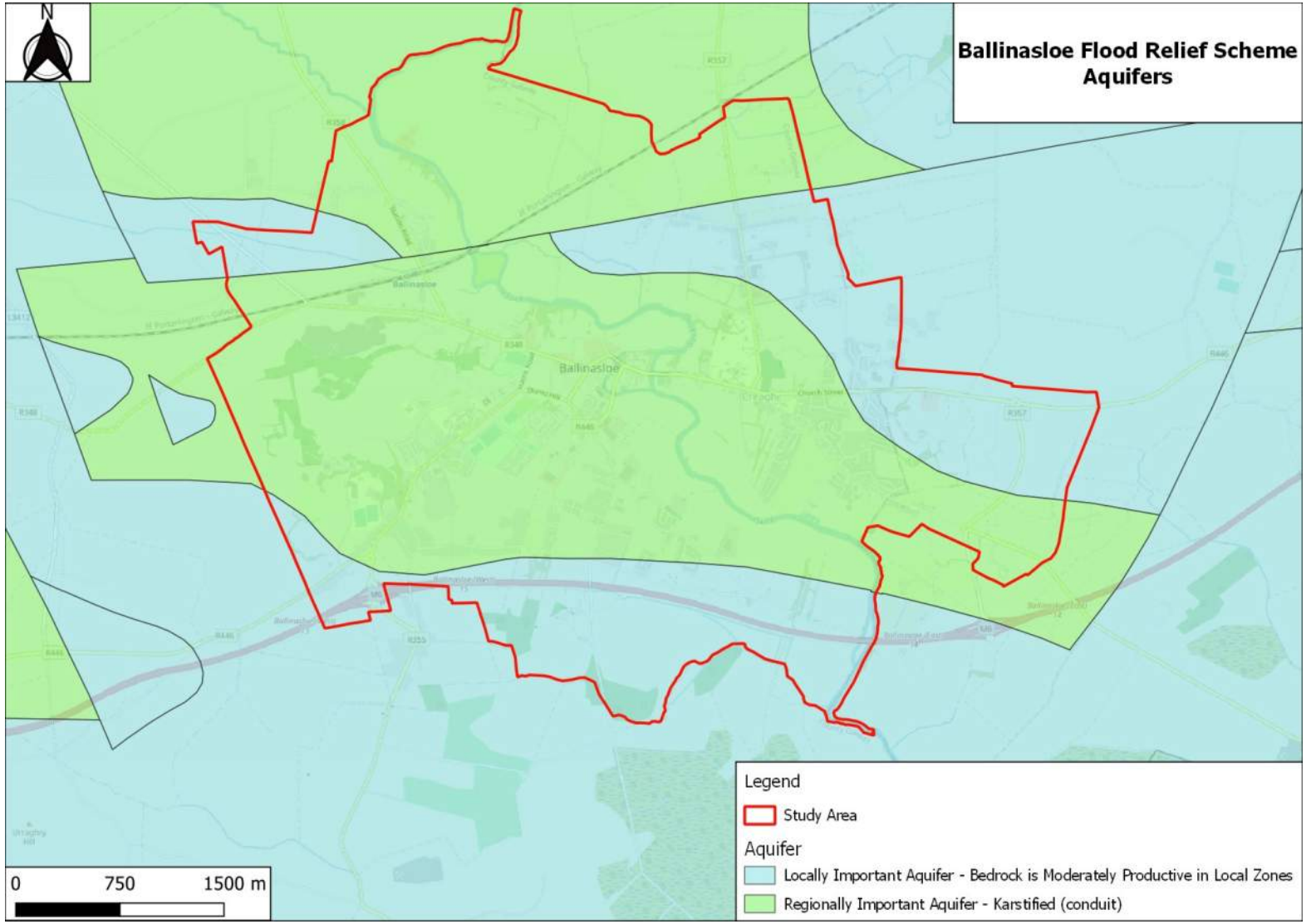
Appendix C – Aquifers & Water Abstractions

C1 Wells & Boreholes within the Study Area
C2 Aquifers in Study Area

APPENDIX C1 WELLS AND BOREHOLES IN THE STUDY AREA



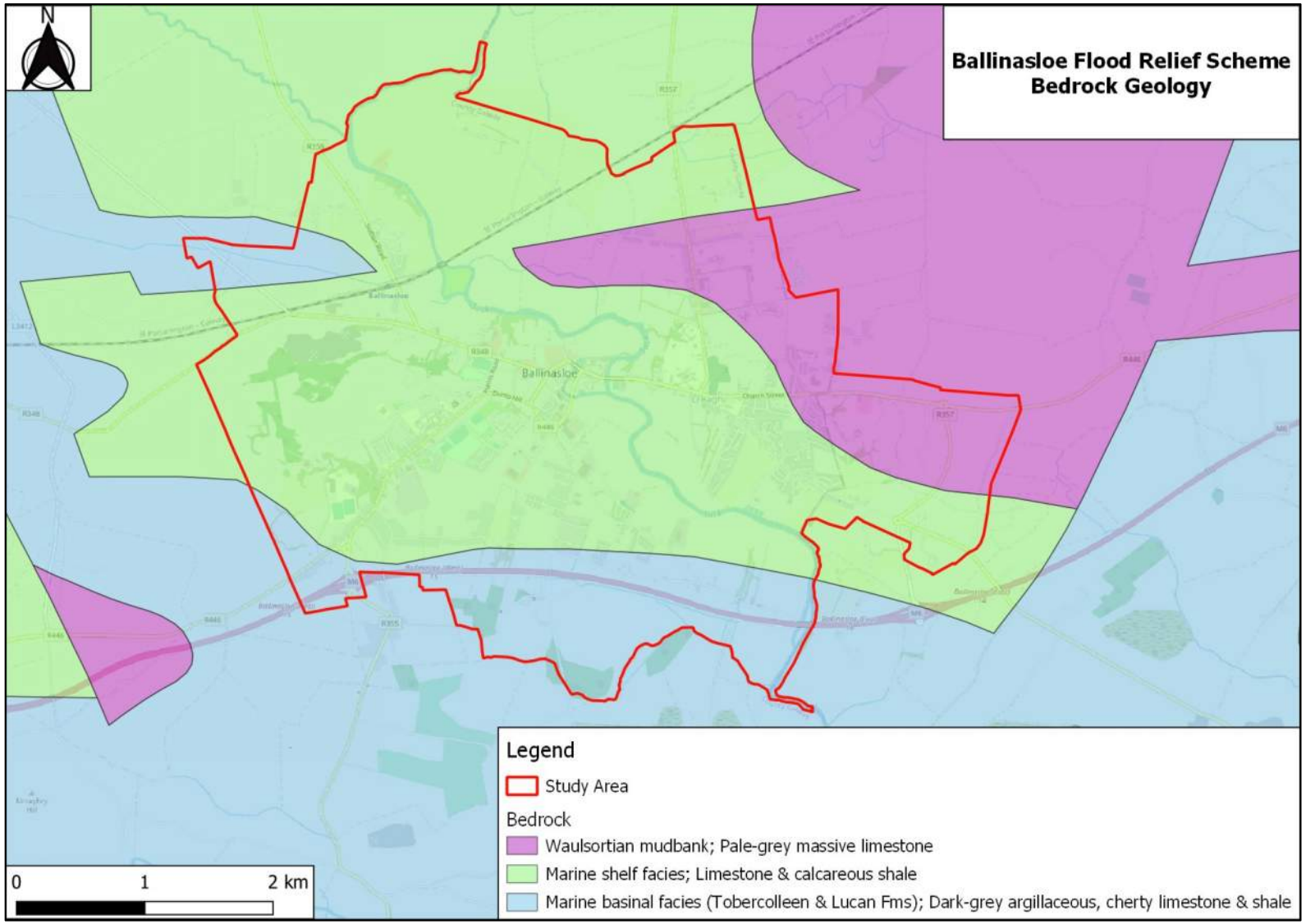
APPENDIX C2 AQUIFER CLASSIFICATION IN THE STUDY AREA



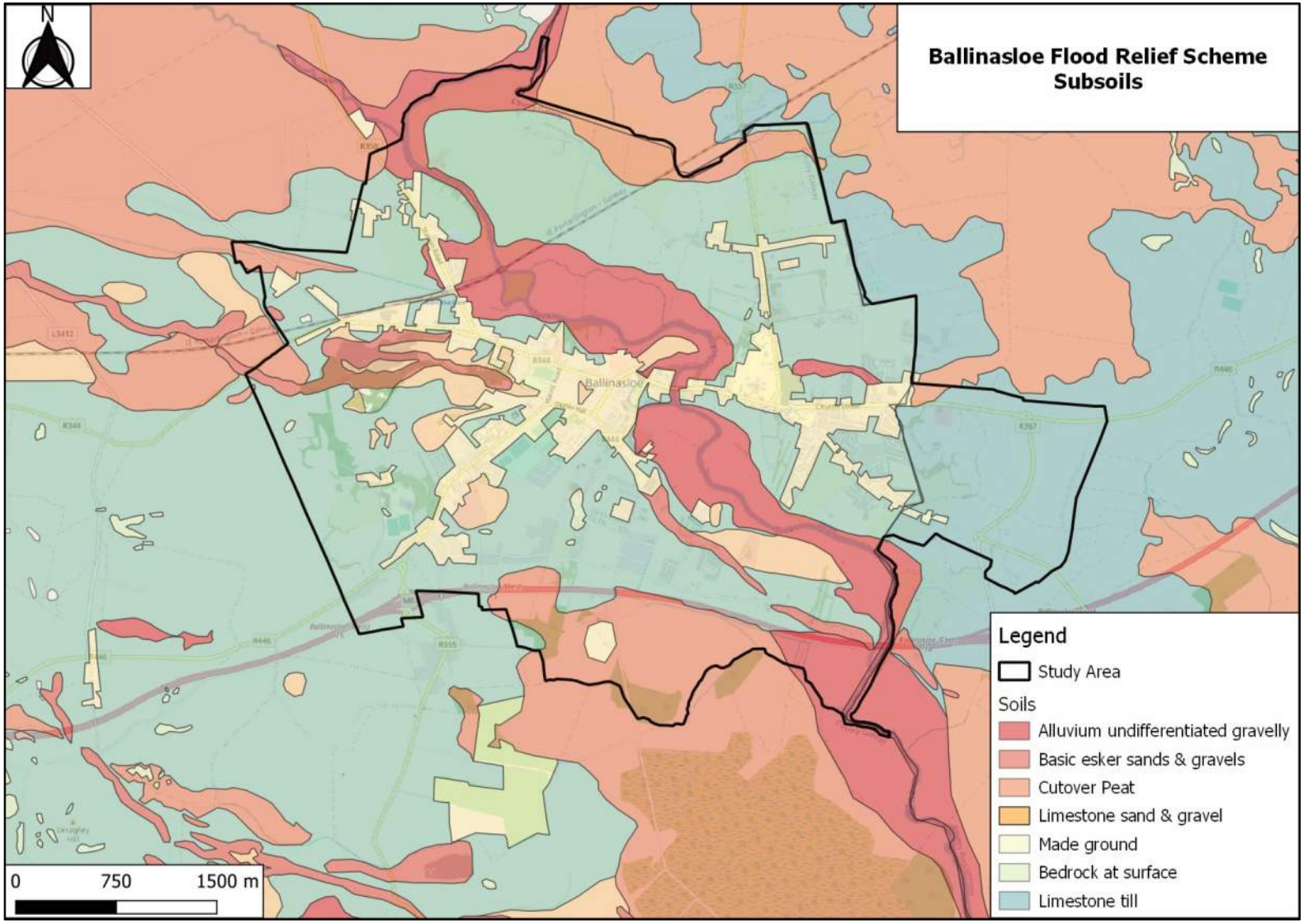
Appendix D – Soils and Geology

D1 Geology within the Study Area
D2 Soils within the Study Area

APPENDIX D1 BEDROCK GEOLOGY IN THE STUDY AREA

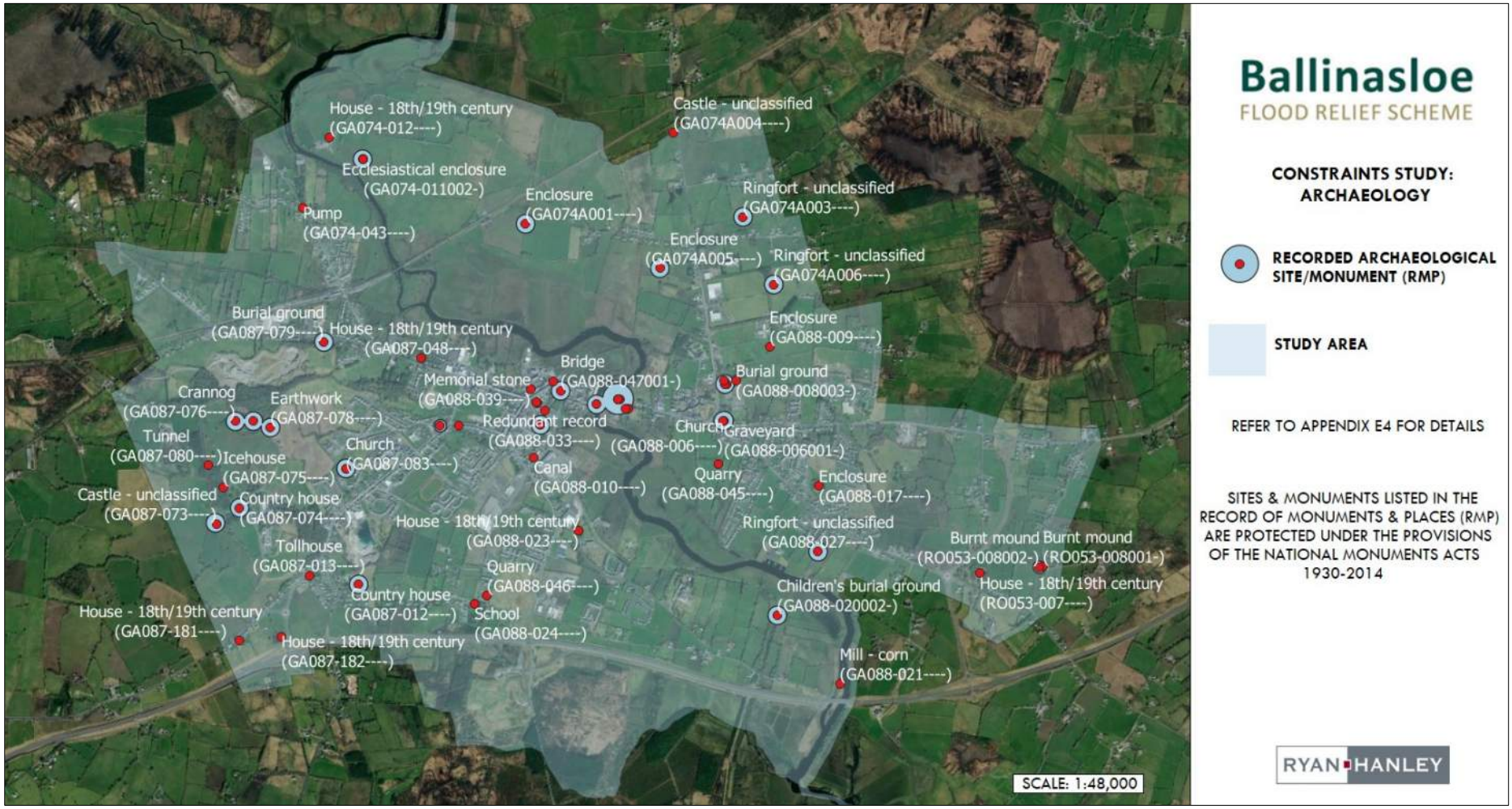


APPENDIX D2 SOIL TYPES IN THE STUDY AREA

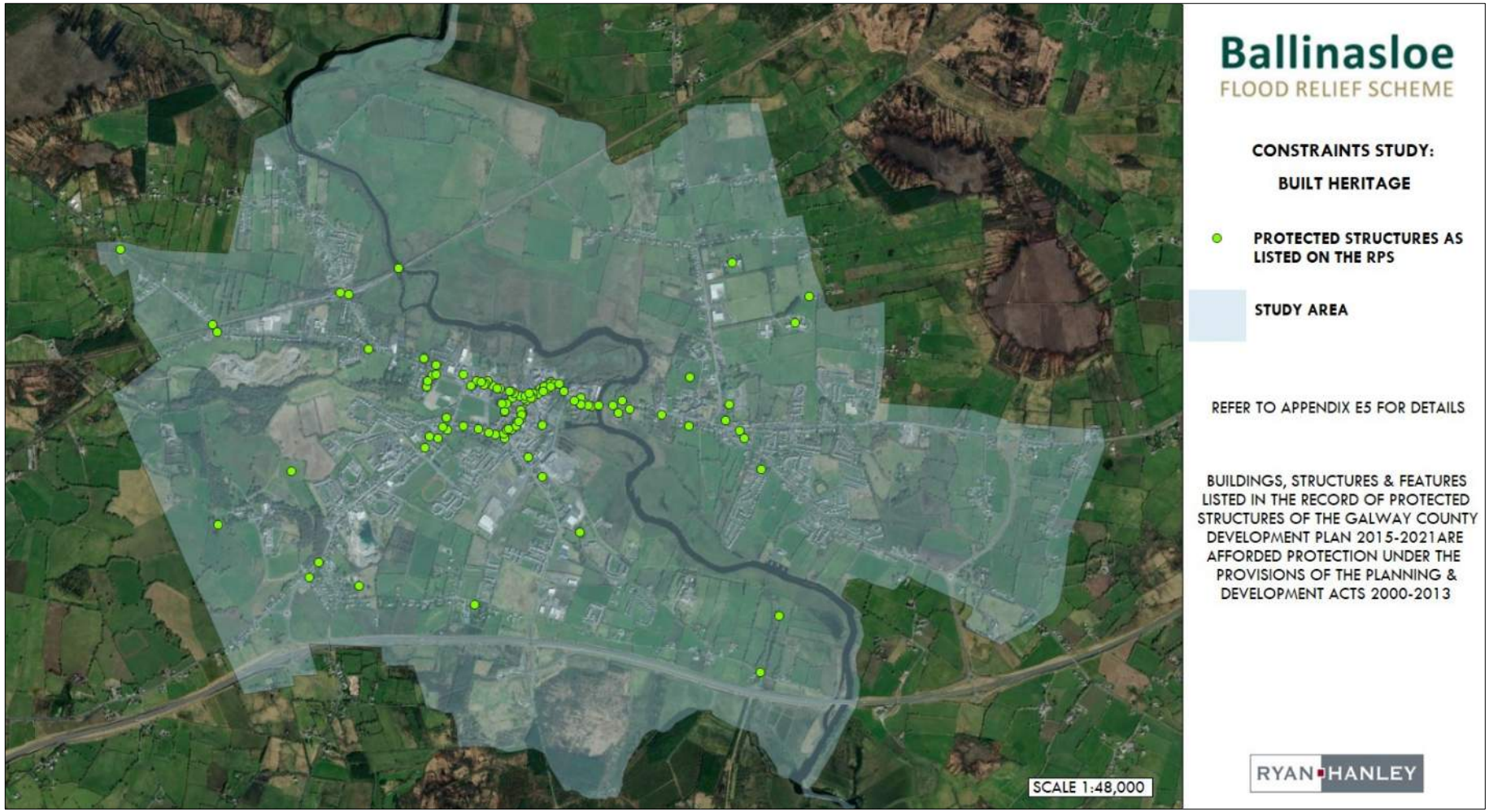


Appendix E - Archaeology & Built Heritage

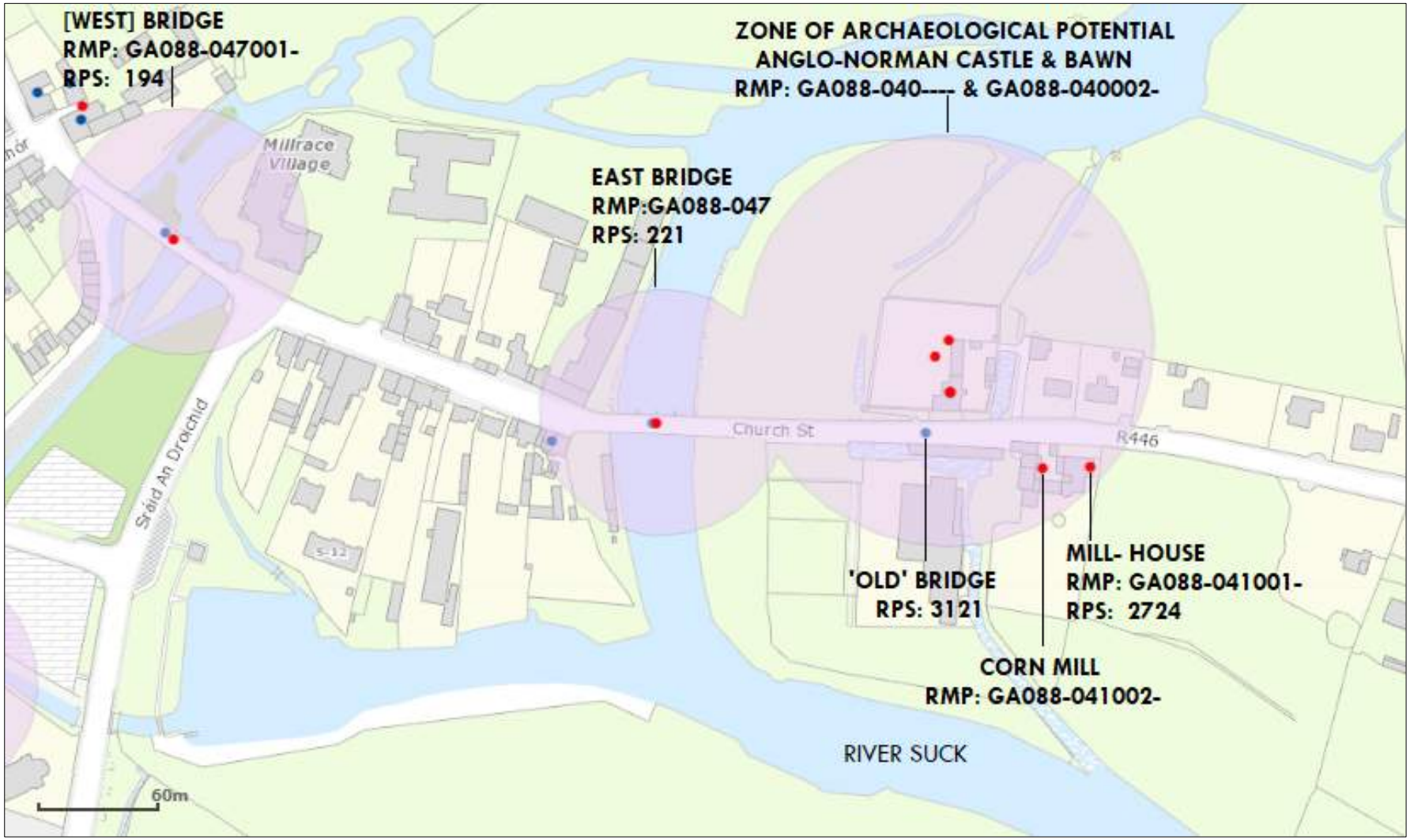
APPENDIX E 1: OVERVIEW OF ARCHAEOLOGICAL SITES & MONUMENTS WITHIN THE BALLINASLOE FLOOD RELIEF SCHEME CONSTRAINTS STUDY AREA



APPENDIX E 2: OVERVIEW OF BALLINASLOE FLOOD RELIEF SCHEME CONSTRAINTS STUDY AREA WITH PROTECTED STRUCTURES INDICATED



APPENDIX E 3: AREA OF ARCHAEOLOGICAL SENSITIVITY IN VICINITY OF EAST BRIDGE, BALLINASLOE



APPENDIX E 4: INVENTORY OF ARCHAEOLOGICAL SITES & MONUMENTS WITHIN THE STUDY AREA (REFER TO APPENDIX E1 ABOVE)

No.	RMP	Class & Description	Townland	ITM E/ N	
1.	GA074-011001-	Church	ASHFORD	584184	732695
2.	GA074-011002-	Ecclesiastical enclosure	ASHFORD	584189	732687
3.	GA074-011003-	Graveyard	ASHFORD	584189	732687
4.	GA074-012----	House - 18th/19th century	ASHFORD	583976	732829
5.	GA074-043----	Pump	DERRYMULLAN	583803	732374
6.	GA074-001----	Enclosure	ASHFORD, ROOAUN (Moycarn By.)	585244	732267
7.	GA074-003----	Ringfort - unclassified	CLEAGHMORE, PARKMORE (Moycarn By.)	586654	732307
8.	GA074-004----	Castle - unclassified	CREAGH	586205	732852
9.	GA074-005----	Enclosure	CREAGH	586114	731977
10.	GA074-006----	Ringfort - unclassified	PARKMORE (Moycarn By.)	586852	731870
11.	GA087-012----	Country house	BRACKERNAGH (Clancarty)	584154	729940
12.	GA087-013----	Tollhouse	BRACKERNAGH (Clancarty)	583833	730000
13.	GA087-048----	House - 18th/19th century	CLEAGHMORE	584563	731403
14.	GA087-066----	Monumental structure	DUNLO	584808	730965
15.	GA087-073----	Castle - unclassified	GARBALLY DEMESNE	583235	730335
16.	GA087-074----	Country house	GARBALLY DEMESNE	583384	730438
17.	GA087-075----	Icehouse	GARBALLY DEMESNE	583276	730572
18.	GA087-076----	Crannog	GARBALLY DEMESNE	583359	730997
19.	GA087-077----	Crannog	GARBALLY DEMESNE	583475	730998
20.	GA087-078----	Earthwork	GARBALLY DEMESNE	583586	730956
21.	GA087-079----	Burial ground	GARBALLY DEMESNE	583934	731508
22.	GA087-080----	Tunnel	GARBALLY DEMESNE	583184	730713
23.	GA087-083----	Church	GARBALLY DEMESNE	584075	730690
24.	GA087-083001-	Graveyard	GARBALLY DEMESNE	584075	730690
25.	GA087-085----	School	GARBALLY DEMESNE	584687	730964
26.	GA087-181----	House - 18th/19th century	MACKNEY	583379	729578
27.	GA087-182----	House - 18th/19th century	MACKNEY	583653	729605
28.	GA088-006----	Church	CREAGH	586522	730989
29.	GA088-006001-	Graveyard	CREAGH	586527	730991
30.	GA088-008----	Graveyard	CREAGH	586534	731228
31.	GA088-008001-	Church	CREAGH	586546	731224
32.	GA088-008002-	Church	CREAGH	586527	731252
33.	GA088-008003-	Burial ground	CREAGH	586604	731249
34.	GA088-009----	Enclosure	CREAGH	586846	731468
35.	GA088-010----	Canal	CLOONASCRAGH (Longford By.) , DUNLO, KELLYSGROVE, POLLBOY	585365	730630
36.	GA088-010001-	Warehouse	DUNLO	585281	730751
37.	GA088-017----	Enclosure	KILGARVE	587137	730566
38.	GA088-018----	Church	KILGARVE	586612	730928
39.	GA088-020001-	Church (Also RPS: 2751)	POLLBOY	586864	729730
40.	GA088-020002-	Children's burial ground	POLLBOY	586864	729730
41.	GA088-021----	Mill - corn	POLLBOY	587273	729288
42.	GA088-023----	House - 18th/19th century	POLLBOY	585584	730282
43.	GA088-024----	School	POLLBOY	584906	729814
44.	GA088-027----	Ringfort - unclassified	PORTNICK	587135	730143
45.	GA088-028----	Earthwork	TOWNPARKS (Clonmacnowen By.)	585337	730967

No.	RMP	Class & Description	Townland	ITM E/ N	
46.	GA088-028001-	Cathedral	TOWNPARKS (Clonmacnowen By.)	585337	730968
47.	GA088-028002-	Church	TOWNPARKS (Clonmacnowen By.)	585333	730962
48.	GA088-029----	Church	TOWNPARKS (Clonmacnowen By.)	585078	731110
49.	GA088-030----	Church	TOWNPARKS (Clonmacnowen By.)	585280	730984
50.	GA088-032----	Church	TOWNPARKS (Clonmacnowen By.)	585110	731062
51.	GA088-033----	Redundant record	TOWNPARKS (Clonmacnowen By.)	585364	731058
52.	GA088-034----	Forge	TOWNPARKS (Clonmacnowen By.)	585312	731117
53.	GA088-035----	House - 18th/19th century	TOWNPARKS (Clonmacnowen By.)	585318	731108
54.	GA088-037----	Church	TOWNPARKS (Clonmacnowen By.)	585083	731158
55.	GA088-038----	House - 18th/19th century	TOWNPARKS (Clonmacnowen By.)	585419	731248
56.	GA088-039----	Memorial stone	TOWNPARKS (Clonmacnowen By.)	585274	731198
57.	GA088-040----	Castle - Anglo-Norman masonry castle	TOWNPARKS (Moycarn By.)	585841	731109
58.	GA088-040001-	House - 18th/19th century	TOWNPARKS (Clonmacnowen By.)	585841	731109
59.	GA088-040002-	Bawn	TOWNPARKS (Moycarn By.)	585834	731126
60.	GA088-040003-	Inscribed stone	TOWNPARKS (Moycarn By.)	585840	731134
61.	GA088-041001-	House - 18th/19th century	TOWNPARKS (Clonmacnowen By.)	585909	731073
62.	GA088-041002-	Mill - corn	TOWNPARKS (Moycarn By.)	585886	731072
63.	GA088-045----	Quarry	TOWNPARKS (Moycarn By.)	586487	730713
64.	GA088-046----	Quarry	POLLBOY	584987	729865
65.	GA088-047----	Bridge	TOWNPARKS (Moycarn By.)	585698	731094
66.	GA088-047001-	Bridge	TOWNPARKS (Clonmacnowen By.), TOWNPARKS (Moycarn By.)	585463	731183

APPENDIX E 5: PROTECTED STRUCTURES AND/OR NIAH LISTED BUILT HERITAGE WITHIN THE BALLINASLOE FRS CONSTRAINTS STUDY AREA (STRUCTURES WHICH MAY BE DIRECTLY AFFECTED ARE HIGHLIGHTED)

No.	RPS No.	Reg. No	Name/Classification	Townland
1.	171	30333001	Ballinasloe Railway Station; c.1851	DEERPARK (Clonmacnowen By.)
2. I	171	30333002	Store/Warehouse – Ballinasloe Railway Station; c.1851	DEERPARK (Clonmacnowen By.)
3.	171	30333003	Railway Shelter – Ballinasloe Railway Station; c.1851	DEERPARK (Clonmacnowen By.)
4.	171	30333004	Foot Bridge - Ballinasloe Railway Station; c.1851	DEERPARK (Clonmacnowen By.)
5.	171	30333005	Signal Box - Ballinasloe Railway Station; c.1851	DEERPARK (Clonmacnowen By.)
6.	170	30333006	Former Railway Hotel, Station Road	CLEAGHMORE
7.	N/A	30333007	Former School & Teacher's House, Sarsfield Road; c.1846	CLEAGHMORE
8.	3101	30333008	Gate-Lodge – 'Dún Íde', Sarsfield Road; c.1864	GARBALLY DEMESNE
9.	N/A	30333009	Cleaghmore Villa, Sarsfield Road; c.1860	CLEAGHMORE
10.	3,103	30333010	Cleaghmore House, Sarsfield Road; c.1860	CLEAGHMORE
11.	3,104	30333011	House – Sarsfield Road; c.1860	CLEAGHMORE
12.	215	30333012	Former Union Workhouse, 1845 – now Supermacs	TOWNPARKS (Clonmacnowen By.)
13.	213	30333013	Sisters of Mercy Convent Chapel	TOWNPARKS (Clonmacnowen By.)
14.	229	30333014	Prison/Gaol/Bridewell	TOWNPARKS (Clonmacnowen By.)
15.	211	30333015	Ballinasloe Court House	TOWNPARKS (Clonmacnowen By.)
16.	3,105	30333016	Postbox (Edward VII) c.1905	TOWNPARKS (Clonmacnowen By.)
17.	210	30333017	Scoil an Chroí Naofa	TOWNPARKS (Clonmacnowen By.)
18.	209	30333018	Sisters of Mercy Convent	TOWNPARKS (Clonmacnowen By.)
19.	207	30333019	The Pillar House – Public House	TOWNPARKS (Clonmacnowen By.)
20.	205	30333020	Shop – Eason	TOWNPARKS (Clonmacnowen By.)
21.	2,736	30333021	Shop – Convenience Store	TOWNPARKS (Clonmacnowen By.)
22.	2.737 & 2,738	30333022	Shop – A Touch of Class / Willie Burke	TOWNPARKS (Clonmacnowen By.)
23.	2,739	30333023	Shop/House – Padraic Kilduff	TOWNPARKS (Clonmacnowen By.)
24.	196	30333024	Bank of Ireland	TOWNPARKS (Clonmacnowen By.)
25.	195	30333025	Lancaster House	TOWNPARKS (Clonmacnowen By.)
26.	N/A	30333026	House, Main Street; c.1870	BACK
27.	192	30333027	DNG Pat Finn / Crumbs and Cream, Bridge Street; c,1864	BACK
28.	3,107	30333028	Postbox – Main Street; c. 1885	TOWNPARKS (MOYCARN BY.)
29.	194	30333029	Ballinasloe (West) Bridge, Bridge Street – c.1745 (Medieval fabric to S. part) **Also RMP: GA088-047001-**	BACK
30.	217	30333030	River View House, Bridge Street; c.1800	TOWNPARKS (MOYCARN BY.)
31.	3,108	30333031	House, Bridge Street; c.1860	TOWNPARKS (MOYCARN BY.)
32.	3,109	30333032	House, Bridge Street; c.1860	TOWNPARKS (MOYCARN BY.)
33.	219	30333033	House, Bridge Street; c.1860	TOWNPARKS (MOYCARN BY.)
34.	220	30333034	House, Bridge Street; c.1860	TOWNPARKS (MOYCARN BY.)

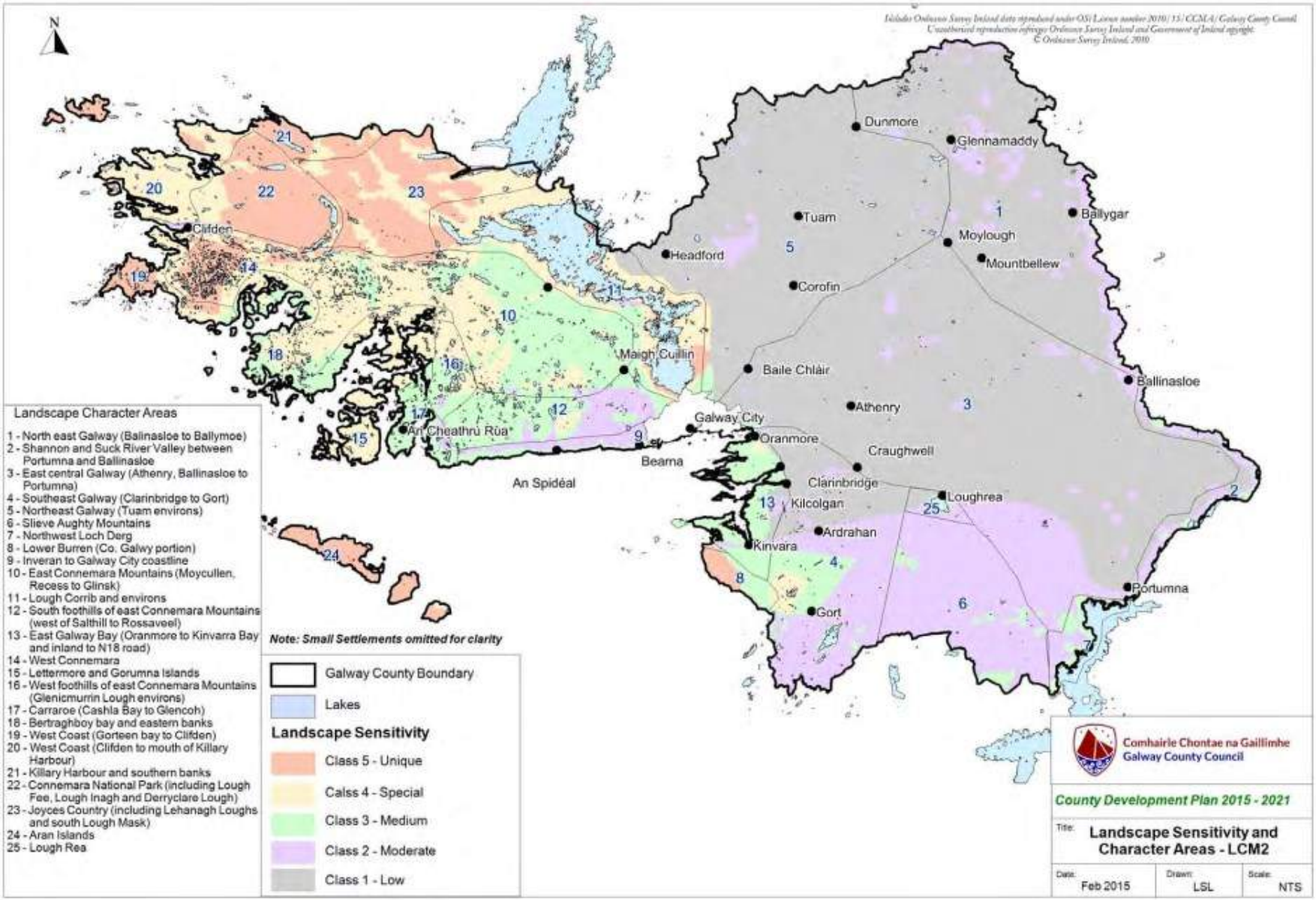
No.	RPS No.	Reg. No	Name/Classification	Townland
35.	N/A	30333035	House, Sarsfield Road; c. 1910	GARBALLY DEMESNE
36.	3,111	30333036	Postbox (Queen Victoria) c.1870	CLEAGHMORE
37.	N/A	30333037	House – 'Ashling', Mount Pleasant Avenue; c. 1870	CLEAGHMORE
38.	3,113	30333038	House – Mount Pleasant Avenue; c. 1870	CLEAGHMORE
39.	3,114	30333039	House – Mount Pleasant Avenue; c. 1870	CLEAGHMORE
40.	3,115	30333040	House – 'Sunnylawn', Mount Pleasant Avenue; c.1870	CLEAGHMORE
41.	3,115	30333040	House – 'Sunnylawn' extension to above.	CLEAGHMORE
42.	3,116	30333041	House – Mount Pleasant Avenue; c. 1870	CLEAGHMORE
43.	214	30333042	Scoil an Chroí Naofa, Society Street; c.1937	TOWNPARKS (Clonmacnowen By.)
44.	N/A	30333043	Town Hall Theatre, Society Street; c.1845	TOWNPARKS (Clonmacnowen By.)
45.	202	30333044	Presbyterian Church, Society Street; c.1845	TOWNPARKS (Clonmacnowen By.)
46.	N/A	30333045	House – Society Street; c.1890	TOWNPARKS (Clonmacnowen By.)
47.	2,748	30333046	Broderick's Pharmacy	TOWNPARKS (Clonmacnowen By.)
48.	200	30333047	Tao Yuan restaurant / Chemist	TOWNPARKS (Clonmacnowen By.)
49.	185	30333048	AIB Bank	TOWNPARKS (Clonmacnowen By.)
50.	204	30333049	Saint John the Evangelist Church of Ireland	TOWNPARKS (Clonmacnowen By.)
51.	201	30333050	Saint John the Evangelist Church of Ireland	TOWNPARKS (Clonmacnowen By.)
52.	N/A	30333051	House – Duggan Avenue, Church Hill	TOWNPARKS (Clonmacnowen By.)
53.	3,117	30333052	House – Duggan Avenue	TOWNPARKS (Clonmacnowen By.)
54.	3,118	30333053	House – Duggan Avenue	TOWNPARKS (Clonmacnowen By.)
55.	172	30333054	Old Schoolhouse, Brackernagh Road	GARBALLY DEMESNE
56.	228	30333055	Le Poer Trench Memorial, Dunlo Hill	DUNLO
57.	2,716	30333057	Dunlo Hill Hall – former school; c.1860	DUNLO
58.	2749/181	N/A	Terraced, two bay, 3-storey house, Dunlo Street 'Clothes for Cash' – formally Kelso's Garage	DUNLO
59.	177	30333058	Ballinasloe Garda Station	TOWNPARKS (Clonmacnowen By.)
60.	178	30333059	Ballinasloe Garda Station	TOWNPARKS (Clonmacnowen By.)
61.	3,119	30333060	Postbox c.1940	TOWNPARKS (Clonmacnowen By.)
62.	180	30333061	Teach an tSagairt	TOWNPARKS (Clonmacnowen By.)
63.	184	30333062	Saint Michael's Church	TOWNPARKS (Clonmacnowen By.)
64.	2,719	30333063	House – Brackernagh Road	DUNLO
65.	3,120	30333064	Former Canal Warehouse complex, Harbour Road; c. 1830	DUNLO
66.	176	30333065	Pair of Gate Lodges/ 'Garbally Lodge'; c.1850	GARBALLY DEMESNE
67.	2,745	30334001	Saint Brigid's Hospital – Former Tuberculosis Hospital; c.1935	PARKMORE (Moycarn By.)

No.	RPS No.	Reg. No	Name/Classification	Townland
68.	2,744	30334002	Saint Brigid's Hospital – Former Admissions Hospital; c. 1935	CREAGH
69.	226	30334003	Saint Brigid's Hospital – Former Asylum Master's House; c.1900	TOWNPARKS (MOYCARN BY.)
70.	226	30334004	Saint Brigid's Hospital – U-plan Hospital Building; c.1900	TOWNPARKS (MOYCARN BY.)
71.	226	30334005	Saint Brigid's Hospital – H-plan Hospital Building; c.1920	TOWNPARKS (MOYCARN BY.)
72.	221	30334006	Ballinasloe East Bridge, 4 arch limestone bridge, built 1887. **Also RMP: GA088-047----**	TOWNPARKS (MOYCARN BY.)
73.	222	30334007	Ivy Lodge, Church Street; c.1780. **Located on site of Castle RMP: GA088-040----**	TOWNPARKS (MOYCARN BY.)
74.	226	30334008	Chapel - Saint Brigid's Hospital Chapel; c.1870	TOWNPARKS (MOYCARN BY.)
75.	226	30334009	Hospital Building – Saint Brigid's Hospital; c.1880	TOWNPARKS (MOYCARN BY.)
76.	226	30334010	Saint Brigid's Hospital – X-plan Hospital Building; c.1833	TOWNPARKS (MOYCARN BY.)
77.	3,121	30334011	Bridge over east channel of River Suck; c.1780 with earlier medieval fabric. **Also part of RMP: GA088-047----.**	TOWNPARKS (MOYCARN BY.)
78.	226	30334012	Saint Brigid's Hospital – Gate Lodge/Gates; c. 1833	TOWNPARKS (MOYCARN BY.)
79.	2,715	30334013	Saint Brigid's Hospital – Nurse's Home; c.1930	TOWNPARKS (MOYCARN BY.)
80.	223	30334014	Church of Our Lady of Lourdes; c.1931	KILGARVE
81.	875	N/A	Creagh National School; c.1939	KILGARVE
82.	227	30334015	The Pines – former C.of I. Seminary	PORTNICK
83.	3270	30407405	Kilcloony Bridge – 2 arch bridge over Deerpark River; c.1850	KILCLOONY (Clonmacnowen By.)
84.	3,960	30407406	Railway Bridge over River Suck	DERRYMULLAN
85.	3.962	30408705	Road over Rail bridge; c.1851	DEERPARK (Clonmacnowen By.)
86.	173	30408706	Former Gate-Lodge; c.1860	GARBALLY DEMESNE
87.	N/A	30408711	Outbuilding, Coláiste Sheosamh Naofa; c.1820	GARBALLY DEMESNE
88.	2,713	30408712	Icehouse, Coláiste Sheosamh Naofa; c.1800	GARBALLY DEMESNE
89.	2,713	30408713	Obelisk, Coláiste Sheosamh Naofa; c.1811	GARBALLY DEMESNE
90.	174 Protected as an RMP	30408714/ 30408710	Garbally Country House, Coláiste Sheosamh Naofa; c.1819. **Also RMP: GA087-074----.**	GARBALLY DEMESNE
91.	2713	30408715	Garbally School Building, Coláiste Sheosamh Naofa; c.1940.	GARBALLY DEMESNE
92.	2714	N/A	Toll-House - Detached, five bay, single-storey former toll house with advanced central bays c.1850. **Also RMP: GA087-013----**	BRACKERNAGH (Clancarty)

No.	RPS No.	Reg. No	Name/Classification	Townland
93.	2,713	30408716	Stable-yard, Coláiste Sheosamh Naofa; c.1820	GARBALLY DEMESNE
94.	166	30408717	Gate Lodge, Coláiste Sheosamh Naofa; c.1860	GARBALLY DEMESNE
95.	2,713	30408718	Demesne walls/gates/railings - Coláiste Sheosamh Naofa	GARBALLY DEMESNE
96.	2742	30408719	Brackernagh Lodge, c.1860	BRACKERNAGH (CLANCARTY)
97.	2713	30408731	Demesne walls/gates/railings, W. of Gate Lodge RPS: 173; c.1860	GARBALLY DEMESNE
98.	2717	30408801	Beechlawn House; c.1850	POLLBOY
99.	4017	30408802	Pollboy Bridge - Single-arch limestone canal bridge, c.1828	POLLBOY
100.	2741	N/A	Poolboy Mansion	POLLBOY
101.	2751	N/A	Ruinous medieval church , situated on a mound with a base batter. **Also RMP: GA088-020001-**	POLLBOY

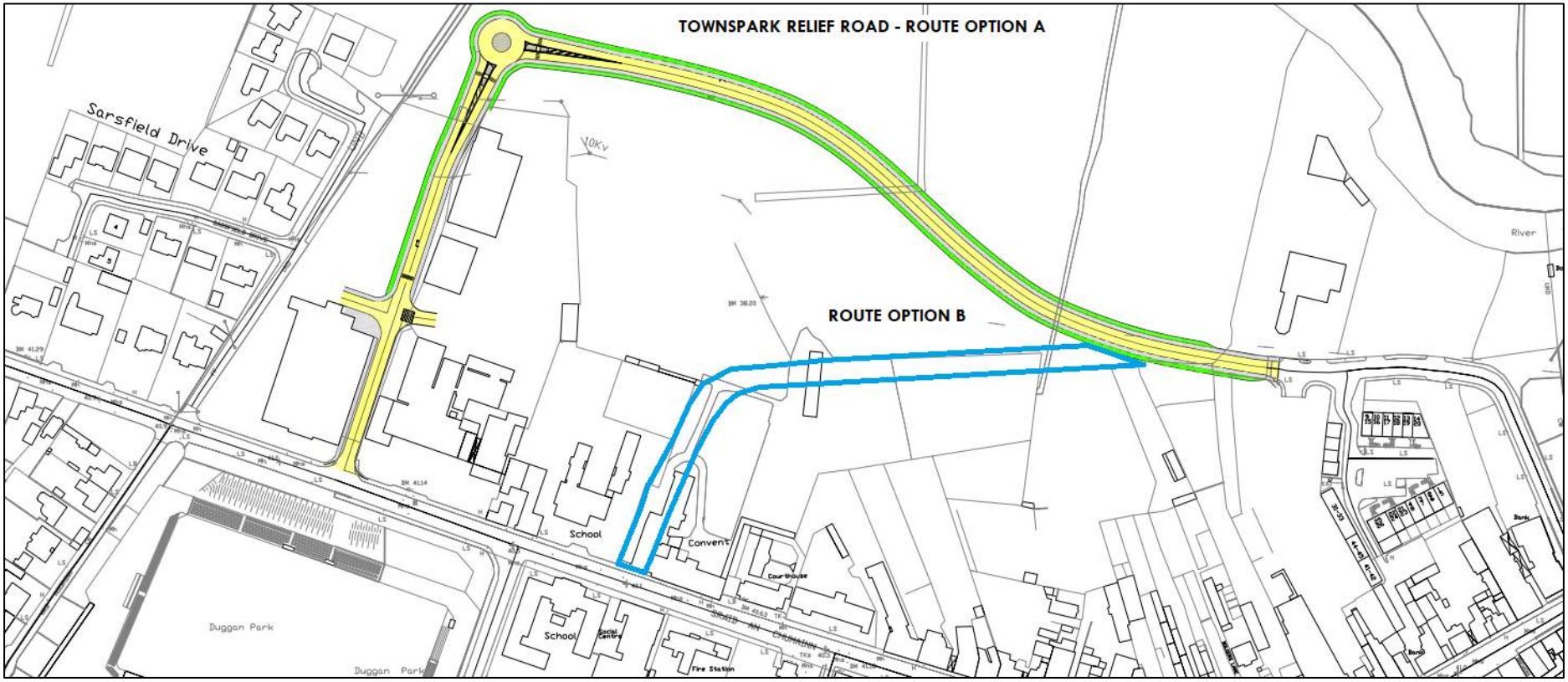
Appendix F – Landscape Mapping

F1 Landscape Character Area


Landscape Character Areas
1 - North east Galway (Balinasloe to Ballymoe)
2 - Shannon and Suck River Valley between Portumna and Ballinasloe
3 - East central Galway (Athenry, Ballinasloe to Portumna)
4 - Southeast Galway (Clarinbridge to Gort)
5 - Northeast Galway (Tuam environs)
6 - Slieve Aughty Mountains
7 - Northwest Loch Derg
8 - Lower Burren (Co. Galwy portion)
9 - Inveran to Galway City coastline
10 - East Connemara Mountains (Moycullen, Recess to Glinsk)
11 - Lough Corrib and environs
12 - South foothills of east Connemara Mountains (west of Salthill to Rossaveel)
13 - East Galway Bay (Oranmore to Kinvarra Bay and inland to N18 road)
14 - West Connemara
15 - Lettermore and Gorumna Islands
16 - West foothills of east Connemara Mountains (Glenicmurrin Lough environs)
17 - Carraroe (Cashla Bay to Glencoh)
18 - Bertraghboy bay and eastern banks
19 - West Coast (Gorteen bay to Clifden)
20 - West Coast (Clifden to mouth of Killary Harbour)
21 - Killary Harbour and southern banks
22 - Connemara National Park (including Lough Fee, Lough Inagh and Derryclare Lough)
23 - Joyces Country (including Lehanagh Loughs and south Lough Mask)
24 - Aran Islands
25 - Lough Rea
Note: Small Settlements omitted for clarity
Galway County Boundary
Lakes
Landscape Sensitivity
Class 5 - Unique
Calss 4 - Special
Class 3 - Medium
Class 2 - Moderate
Class 1 - Low
Dunmore
Glennamaddy
Tuam
Ballygar
Moylough
Mountbellew
Headford
Corofin
Clifden
Maigh Cuilin
Baile Chláir
Ballinasloe
Athenry
Galway City
An Cheathrú Rua
Oranmore
Craughwell
Bearna
An Spidéal
Clarinbridge
Kilcolgan
Loughrea
Ardrahan
Kinvara
Gort
Portumna
Comhairle Chontae na Gaillimhe
Galway County Council
County Development Plan 2015 - 2021
Title: Landscape Sensitivity and Character Areas - LCM2
Date: Feb 2015
Drawn: LSL
Scale: NTS

Appendix G – Townparks Relief Road & Athlone to Galway Greenway

APPENDIX G1: TOWNPARKS RELIEF ROAD – POSSIBLE ROUTE OPTIONS (APRIL 2021)



APPENDIX G2: OVERVIEW OF THE PROPOSED ATHLONE TO GALWAY CYCLEWAY ROUTE OPTIONS & CONSULTATION AREA (APRIL 2021)