McCloy Consulting

Stage 2 Flood Risk Assessment

Strokestown, Co. Roscommon

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WATER & ENVIRONMENTAL CONSULTANTS

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1 INTRODUCTION

1.1 Terms of Reference

This Stage 2 Flood Risk Assessment (FRA) was commissioned by BDP to provide an initial assessment of the potential risk of flooding to proposed development at Strokestown, Co. Roscommon (hereafter referred to as 'the site').

1.2 Statement of Authority

This FRA has been prepared and reviewed by qualified professionals with appropriate experience in flood risk, drainage, and hydraulic modelling studies. The key staff members involved in this project are:

- Duncan Hartwick *BEng (Hons) BSc (Hons) MIEI* – Project Engineer with experience in flood risk assessment, hydrology, and hydraulic modelling.
- Paul Singleton *BEng (Hons) MSc CEng MIEI* – Chartered Civil and Environmental Engineer specialising in hydrology, flood risk assessment, and Sustainable Drainage Systems (SuDS); recognised industry professional providing training courses on these topics to the public and private sectors.

1.3 Purpose

The purpose of this Stage 2 FRA is to review and appraise the adequacy of available flood risk information, to identify sources of flooding that may affect the site, and to broadly assess the extent of the risk of flooding at the site and the potential impact of future development of the site on flooding elsewhere. Where available information is deemed inadequate, this FRA will outline what further analysis is required. This FRA will also recommend mitigation measures to be considered as part of future development proposals to ensure compliance with relevant planning objectives and guidance.

1.4 Approach to the Assessment

1.4.1 Method of Assessment

Consideration has been given to the sources and extent of fluvial flooding at the site, as well as flooding from pluvial sources, overland flow, and ponding of localised rainfall at the site. A topographical survey of the site was also commissioned and undertaken by a third party.

The method of assessment complies with the Source-Pathway-Receptor model, allowing for a spatial assessment of flood risk to people, properties, and the environment at the site. The assessment investigates the existing runoff characteristics and the potential impact the proposed development will have on pluvial / surface water runoff.

1.4.2 Hydraulic Model Status

Office of Public Works (OPW) and Roscommon County Council (CC) data forms the basis of this FRA. Relevant flood data is referred to and included in this report.

1.4.3 Planning Guidelines

The requirements for FRAs are generally as set out in the OPW's 'The Planning System and Flood Risk Management – Guidelines for Planning Authorities, Technical Appendix A' published by the OPW and Department of the Environment, Heritage and Local Government in November 2009 (hereafter referred to as the 'OPW Guidelines'). The OPW Guidelines are supplemented by 'Departmental Circular PL 2/2014', issued by the Department of Environment, Community and Local Government on 13th August 2014, which relates to the use of OPW flood mapping in assessing planning applications and provides clarifications of advice contained within the OPW Guidelines. Further guidance is also provided in the CIRIA Research Project 624 'Development and Flood Risk: Guidance for the Construction Industry'.

Planning objectives and guidance applicable to the site are set out in the 'Roscommon County Development Plan 2022-2028' and 'Strategic Flood Risk Assessment for the Roscommon County Development Plan 2022-2028' (hereafter referred to as 'the SFRA').

The SFRA was prepared in accordance with the requirements of the OPW Guidelines and adopts an identical 'Flood Zone' standard. Flood Zones are extents associated with specific design flood events used to determine the suitability of different types of development from a flood risk perspective. They are defined in both the OPW Guidelines and SFRA as follows:

- Flood Zone A – where the probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 for river flooding or 0.5% or 1 in 200 for coastal flooding)
- Flood Zone B – where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 and 0.5% or 1 in 200 for coastal flooding)
- Flood Zone C – where the probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding)

The OPW Guidelines specify that Flood Zones are to be used to determine the suitability of proposed developments and are to be derived from 'present day' hydrological estimates (i.e., without inclusion of climate change allowances) without taking account of flood defences. The OPW Guidelines also clarify that proposed developments should be designed to be resilient to the effects of climate change.

The OPW Guidelines state that Stage 2 FRAs should "*confirm sources of flooding that may affect a plan area of proposed development site, to appraise the adequacy of existing information, and to determine what surveys and modelling approach is appropriate*". Planning and development decisions can therefore be made based on the outcomes of a Stage 2 FRA provided a precautionary approach was used. However, further work as part of a Stage 3 FRA may be recommended and / or required.

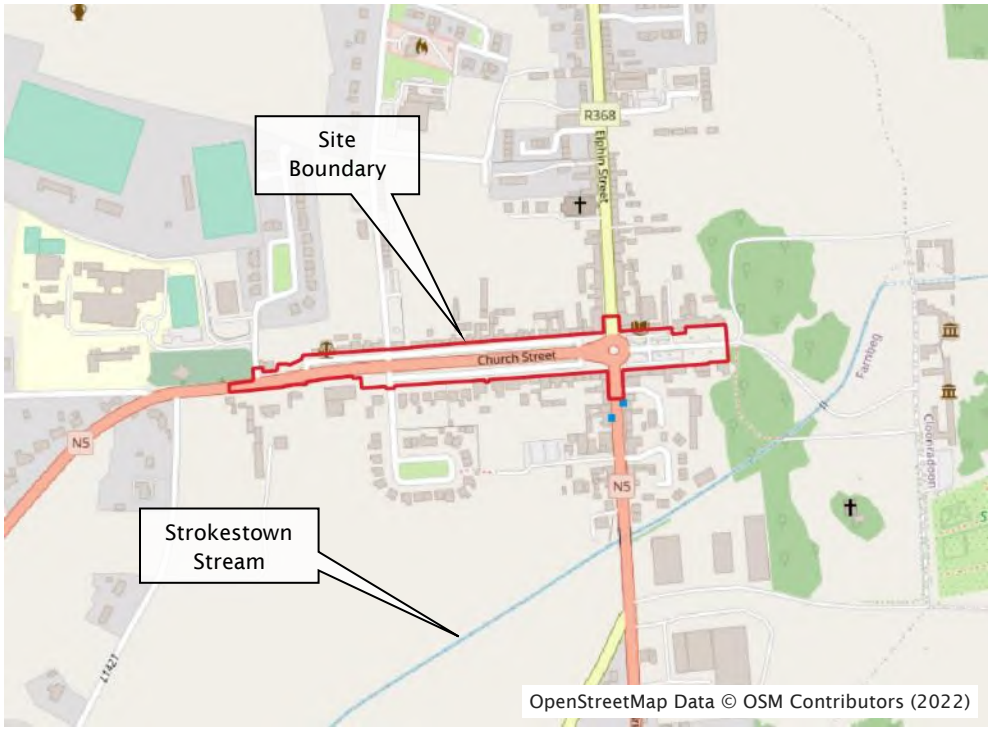
2 SITE AND DEVELOPMENT DETAILS

2.1 Site Location and Context

The site location is shown in Figure 2.1. The site boundary and affecting water features are shown in Figure 2.2.

Figure 2.1: Site Location

Figure 2.2: Site Boundary and Affecting Water Features



2.2 Site Description

The existing site comprises existing developed land on and surrounding Bawn Street and Church Street in Strokestown, Co. Roscommon.

A watercourse, referred to as the 'Strokestown Stream' on the EPA 'Streams' datasets is approximately 100 m south east of the site.

2.3 Proposed Development

This FRA is intended to support the proposed Strokestown Public Realm Enhancement Scheme, which will include the following:

- Alternation to existing road carriageway widths & roundabout dimensions.
- Provision of footpaths, along with shared pedestrian & cycle routes.
- Provision of controlled & uncontrolled pedestrian crossing facilities.
- Relocation of Bus Stops Provision from Bridge Street to Church Street.
- Alteration to existing parking provision to include the provision of disabled parking spaces.
- Soft Landscaping work to include provision of trees, shrubs & green space through the scheme.
- Provision of street furniture throughout the scheme to include, benches, seating, picnic tables, bollards, cycle stands, etc.
- Provision of new road & wayfinding signage, road marking & public lighting.
- All other ancillary site works.

The detail design of these components will be developed at a later stage. Proposed layout drawings for the current stage of development are included in Appendix A.

2.4 Vulnerability Classification

The proposal comprises development with the vulnerability classifications shown in Table 2.1, based on the classification criteria set out in the OPW Guidelines.

Table 2.1: Vulnerability Classification

Part	Use	Classification
Green Areas / Public Realm Regeneration	Open Amenity Space	Water-Compatible Development

3 AVAILABLE FLOOD RISK INFORMATION

Several available sources of flood risk information were appraised and used to build an understanding of the potential risk of flooding to the site. This section highlights key findings from this information.

3.1 Internet Search

News articles published online report on past flooding from various sources that affected Strokestown in 2016[1]. However, there is no evidence of flooding on roads or lands within the site boundary.

3.2 Roscommon County Council

3.2.1 Roscommon County Development Plan 2022-2028

The 'Roscommon County Development Plan (CDP) 2022-2028 sets out the following relevant objectives:

- ITC 7.51: Have regard to the EU Flood Risk Directive, the Flood Risk Regulations (S.I. No. 122 of 2010) and the Guidelines for Planning Authorities on the Planning System and Flood Risk Management and Circular PL2/2014, through the use of the sequential approach and application of the Justification Tests in Development Management.
- ITC 7.52: Ensure that a flood risk assessment is carried out for development proposals impacting on flood risk areas, in accordance with the Guidelines for Planning Authorities on the Planning System and Flood Risk Management.
- ITC 7.56: Ensure each flood risk management activity is examined to determine actions required to embed and provide for effective climate change adaptation as set out in the OPW Climate Change Sectoral Adaptation Plan for Flood Risk Management applicable at the time.

3.2.2 Strategic Flood Risk Assessment

To support the CDP, a SFRA was published in April 2021. The current SFRA sets out the following relevant guidance:

- Significant areas of Benefited lands in the south of [Strokestown]. Strokestown River rises to the south of the town and flows via channel to the north east through Strokestown Park House and Gardens. Limited flood plain in the upper course of this river.
- Strokestown includes areas that are considered to be 'constrained land use zoning' and as such, is identified as an area subject to a 'settlement plan'.
- Flood maps for 'settlement plans', including Storkestown, are included in the following sections of this assessment.

3.2.2.1 SFRA Flood Zone Mapping

The SFRA included a series of flood maps for Strokestown and surrounding area, as follows:

- Figure 3.1 shows historic flooding and OPW drainage districts and benefitting lands
- Figure 3.2 demonstrates that Flood Zones in the vicinity of the site
- Figure 3.3 includes present day CFRAM data
- Figure 3.4 includes climate change CFRAM data
- Figure 3.5 shows GSI groundwater flood data

In summary, the SFRA flood maps demonstrate that the site is not at risk of flooding from any source, lies in Flood Zone C and has not been affected by historic flooding.

Full SFRA flood maps are included in Appendix B.

[1] roscommonpeople.ie/six-homes-flooded-near-strokestown/ [accessed 12th January 2023]

Figure 3.1: Roscommon SFRA Historical Indicators

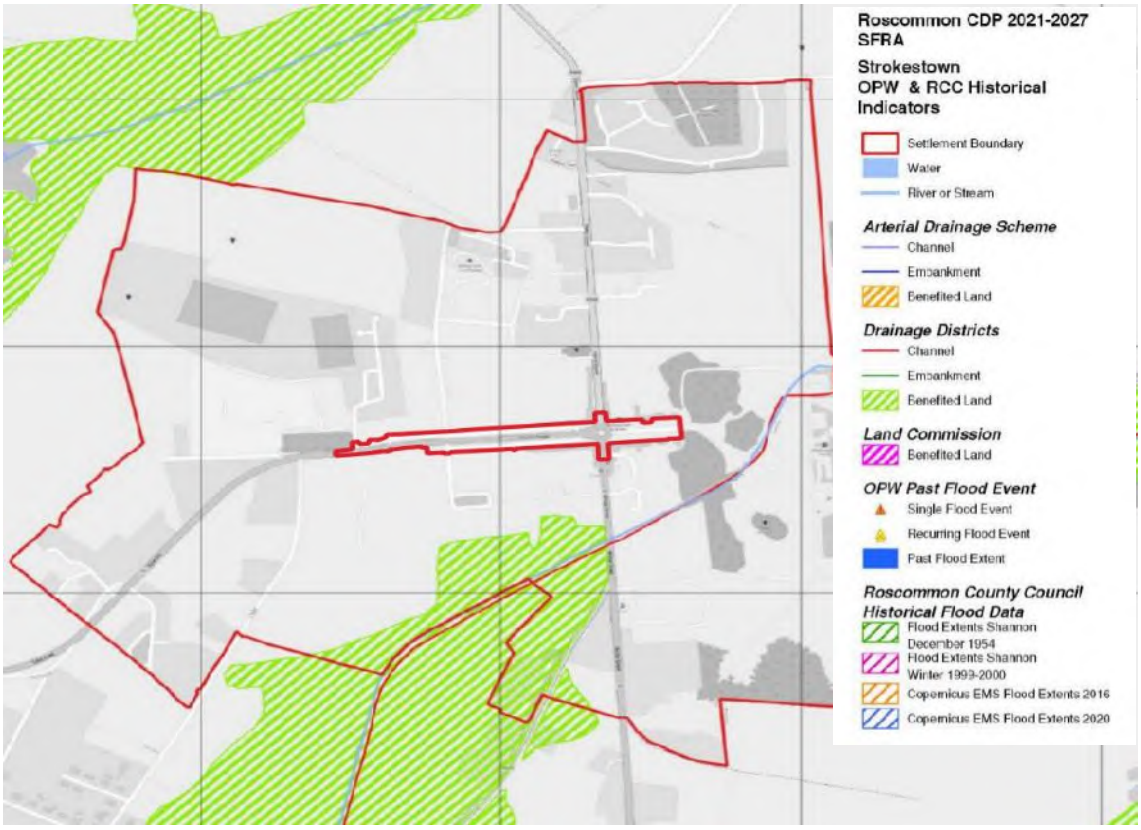


Figure 3.2: Roscommon SFRA Flood Zones

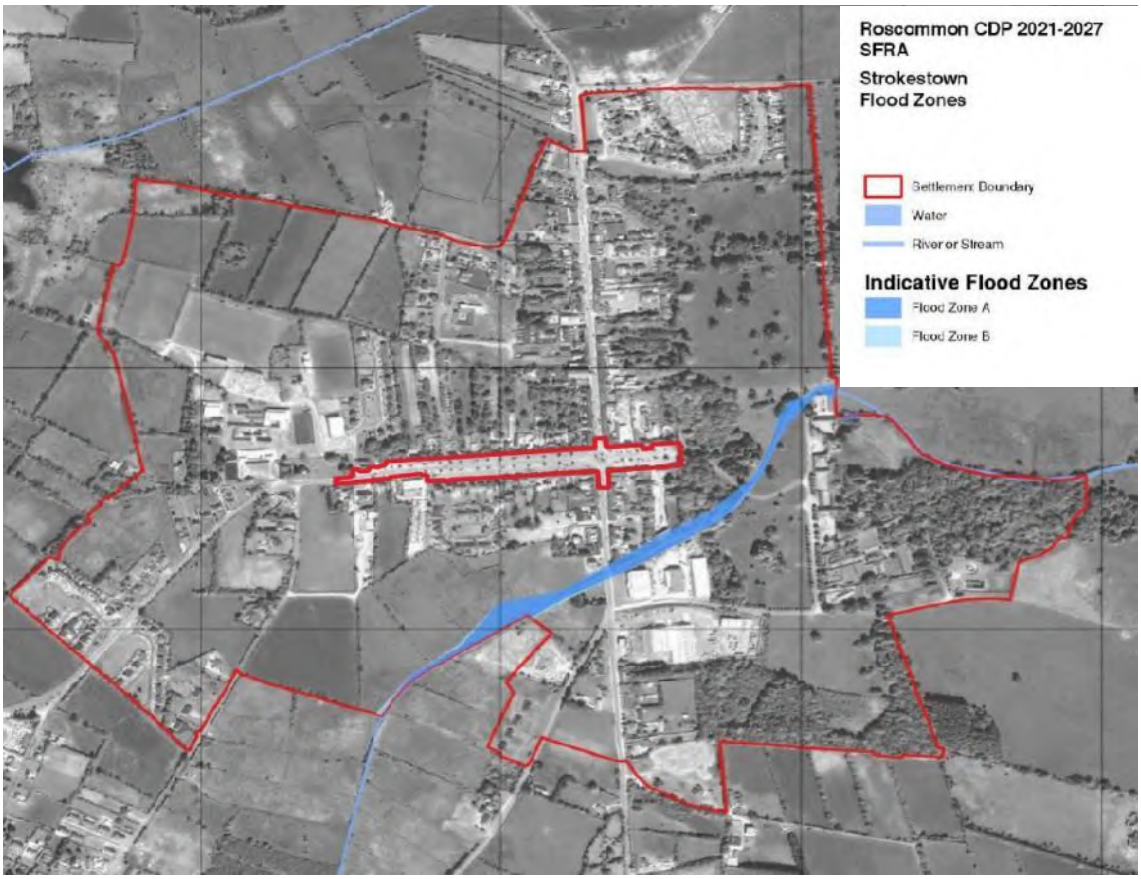


Figure 3.3: Roscommon SFRA OPW CFRAM Present Day

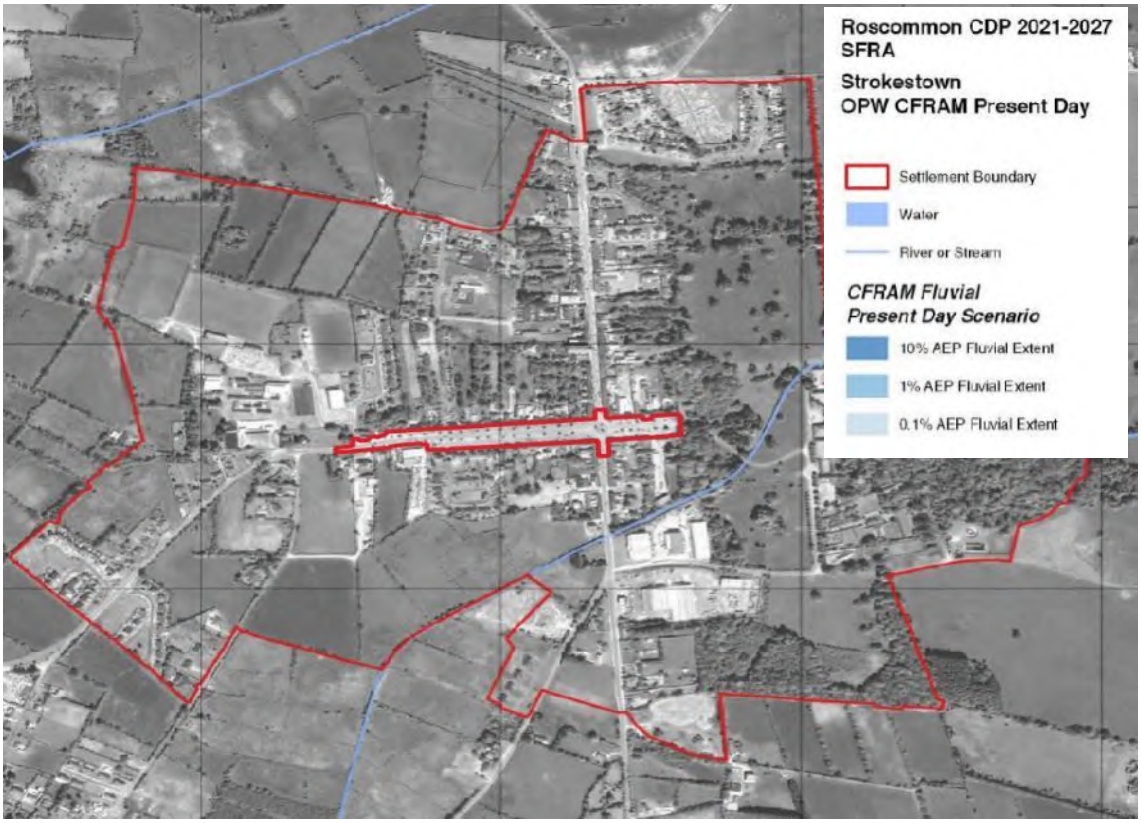


Figure 3.4: Roscommon SFRA OPW CFRAM All Scenarios

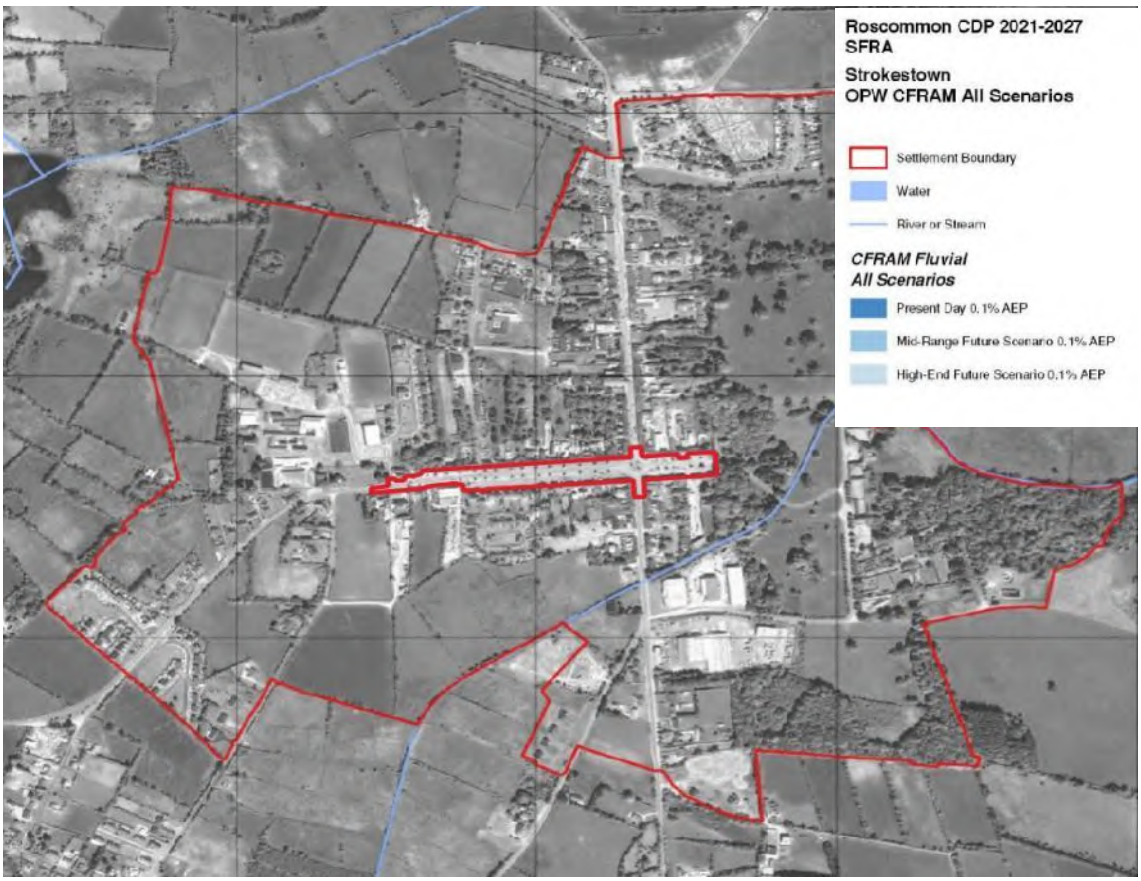
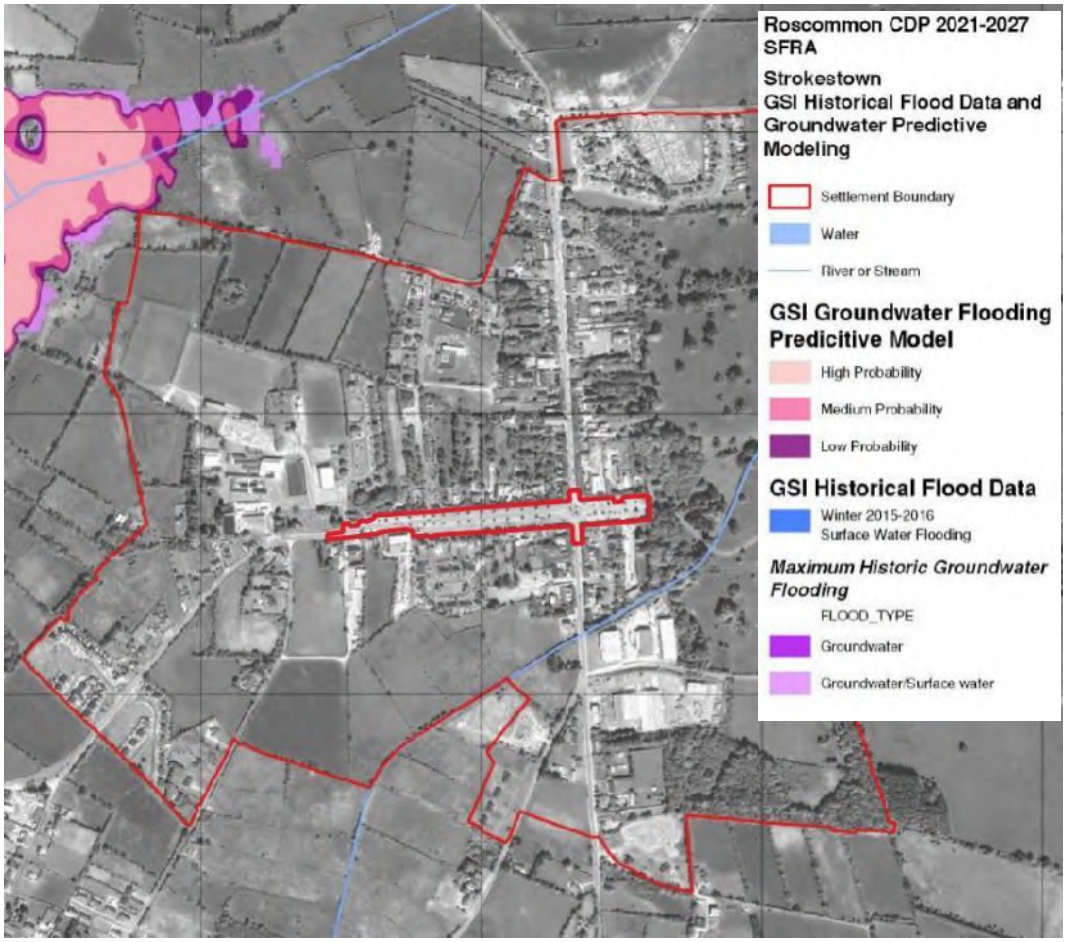


Figure 3.5: Roscommon SFRA GSI Flood Data and Modelling



3.3 Office of Public Works

3.3.1 Past Flood Event Mapping

OPW 'Past Flood Events' dataset has no records of flooding in Strokestown.

3.3.2 Catchment Flood Risk Assessment and Management

OPW CFRAM flood maps were produced during the second stage of the National CFRAM Programme. These flood maps are more detailed than the (first stage) PFRA indicative flood maps. The site and surrounding area are not included on pdf maps produced as part of a particular CFRAM study and the nearest present day and climate change floodplain shown as part the 'CFRAM River Flood Extents' on floodinfo.ie are approx. 3 km to the east of the site.

3.3.3 National Indicative Fluvial Mapping

The National Indicative Fluvial Mapping (NIFM) was released by the OPW in 2021 as a partial update / replacement of the Preliminary Flood Risk Assessment (PFRA). It shows the extent of flooding from modelled river reaches for catchments greater than 5 km^2 in areas that were not previously mapped as part of the CFRAM study.

A review of floodplain data on floodinfo.ie shows that the closest NIFM fluvial flood extent (present day and climate change) is c. 1 km north west and as such, does not impact the site.

4 INITIAL ASSESSMENT OF FLOOD MECHANISMS

Development control procedures aim to avoid inappropriate development in areas determined to be at risk of flooding and new development that has the potential to increase flood risk elsewhere, in accordance with the OPW Guidelines. This section provides an initial assessment of the extent of the risk of flooding at the site and the potential impact of future development of the site on flooding elsewhere.

4.1 Initial Assessment

Table 4.1 presents an initial assessment of potential sources of flooding at the site based on available flood risk information review and stakeholder consultation. Flooding mechanisms determined to be significant or possibly significant are assessed in further detail within this section.

Table 4.1: Initial Assessment of Potential Flooding Mechanisms

Source / Pathway	Significant?	Reason
Fluvial Flooding	No	OPW and Local Authority flood mapping indicates that the site is not affected by fluvial flooding.
Coastal Flooding	No	N/A
Pluvial / Surface Water Flooding	Possible	There is no evidence of pluvial / surface water flooding at the site. Impermeable areas do exist in the vicinity of the site.
Urban Drainage Systems	No	There is no evidence of surcharging / flooding from urban drainage systems on roads or lands within the site boundary or directly adjacent to the site.
Groundwater Flooding	No	Based on the site topography, there are no areas that would cause impoundment of groundwater.
Impoundments / Artificial Sources	No	There are no impoundments or artificial sources (e.g., reservoirs, canals) in close proximity to or that drain towards the site.

4.2 Pluvial / Surface Water Flooding

4.2.1 Pluvial Flooding onto the Site

While no available flood mapping indicates a pluvial flood risk, the site is at a similar or lower elevation compared to adjacent lands. Surface water runoff from adjacent developments could therefore be directed towards the site.

Any surface water not intercepted by surface water drainage networks serving adjacent development would tend to pond over the large open spaces at the site at relatively shallow depths and be directed via preferential flow paths towards the open watercourse away from the site.

Mitigation of residual risk from pluvial flooding by providing adequate drainage is discussed in Section 5.2.

4.2.2 Pluvial Flooding from the Site

The proposed development may lead to a change in impermeable area, which would amend the existing rates and volumes from the site.

Any change in impermeable area at the site will therefore require consideration of surface water drainage system requirements and surface water management plan. Mitigation is discussed in Section 5.2.

5 FINDINGS AND RECOMMENDATIONS

5.1 Summary of Findings

This initial assessment has determined that the site lies wholly in Flood Zone C and is therefore appropriate for development of any vulnerability classification.

Design measures to further mitigate the risk of flooding to the proposed development are outlined in the following sections. These measures are to be incorporated into proposals submitted as part of a planning application and further developed in any detailed design or variation post-determination of the planning application.

5.2 Design Measures

5.2.1 Land Use

The site lies in Flood Zone C so there is no policy-based restriction on water-compatible development. Notwithstanding, the proposal is considered 'appropriate' in any Flood Zone.

5.2.2 Effect of Development

The proposed development will be wholly sited in Flood Zone C so as such, can have no impact on flood risk elsewhere.

5.2.3 Design Levels

The OPW Guidelines require freeboard to be applied to relevant design flood levels when setting Finished Floor Levels (FFLs) and Finished Ground Levels (FGLs). Generally, freeboard is applied to Flood Zone A for less vulnerable development (access roads, commercial units, etc.) and to Flood Zone B for highly vulnerable development (residential units, creches, etc.).

There is no design level or freeboard requirement for water compatible development, meaning no minimum FFLs / FGLs will apply.

5.2.4 Access Levels

In accordance with the OPW Guidelines, access to and egress from the development will be in Flood Zone C.

5.2.5 Drainage Design

Surface water drainage design should comply with the requirements of the 'Roscommon County Development Plan 2021-2027' and standards of Roscommon CC. The 'Roscommon County Development Plan 2021-2027' states that it is an objective to incorporate and promote the use of SuDS. SuDS components (green roofs, rainwater harvesting, permeable pavement, infiltration trenches, soakaways, etc.) should be considered in relation to the nature and character of the site.

The type of SuDS deemed suitable for the site will be subject to outline and detailed design. The SuDS design should demonstrate how water quantity and quality are dealt with as well as make provision for amenity and biodiversity, where practicable.

Drainage design (if required) is to be carried out by others and submitted separately at a later stage.

5.2.5.1 Drainage System Maintenance

The owner / occupier(s) shall be responsible for maintenance of drainage networks at the site and ensure that maintenance of the drainage system is provided for. The detailed drainage layout for the site should ensure that key SuDS components requiring maintenance are situated in accessible public locations.

Maintenance plans for drainage assets should include (where applicable):

- Cyclical (min. annually) check of all surface water drainage features – in particular, clearing of debris.
- Cyclical (min. annually) visual inspection of any surface or underground features – blockages and obstructions to be removed by jetting, as required.

5.3 Summary of Flood Risk and Mitigation Measures

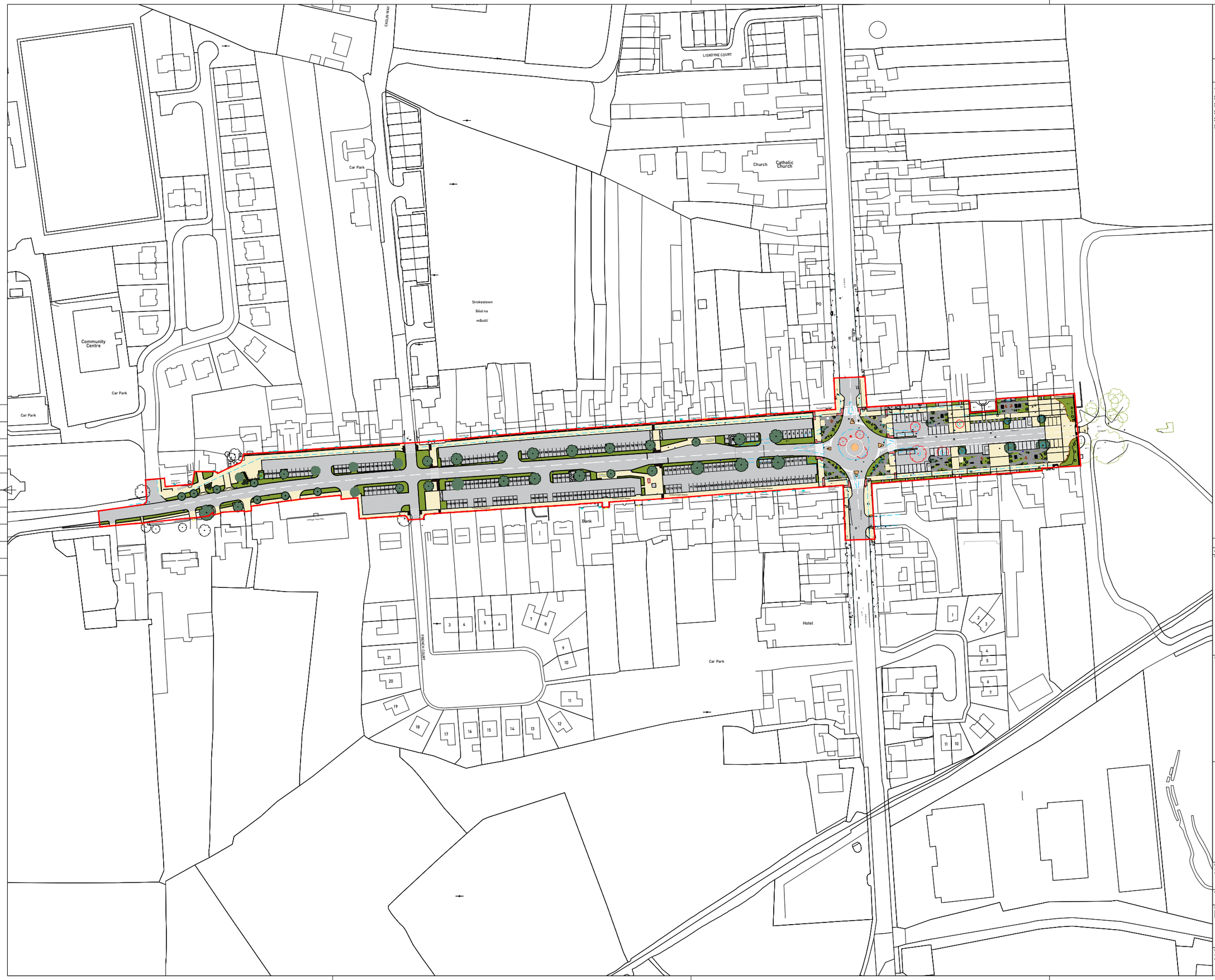
Table 5.1 summarises the mechanisms of flooding identified by this FRA, their associated hazards / consequence, and recommended measures to mitigate the predicted flood risk.

Table 5.1: Summary of Flood Risk and Mitigation Measures

Flood Risk	Hazards / Consequence	Mitigation Measures
Fluvial / coastal flooding (present day)	Risk to life and property	The site lies wholly in Flood Zone C. There is no policy-based restriction on water-compatible development and the proposal is considered 'appropriate' in any Flood Zone.
Fluvial / coastal flooding (effect of climate change)	Risk to life and property	The site is not affected by any climate change floodplain.
Fluvial / coastal flooding (effect of development)	Increased risk to adjacent lands and developments	The site is situated in Flood Zone C so development can have no impact on flood risk elsewhere.
Pluvial / surface water flooding	Risk to property on the site, and risk to adjacent lands and property	On-site surface water flooding will be mitigated by a drainage system that complies with Roscommon CC's drainage standards. Any increase in impermeable area on the site will be mitigated by provision of SuDS to ensure no increase in the volumes and rates of surface water runoff from the site caused by development.

Appendix A

Site Drawings



NOTES

TO BE READ IN CONJUNCTION WITH:
STR(90)LP201 - GENERAL ARRANGEMENT SHEET 1 OF 5
STR(90)LP202 - GENERAL ARRANGEMENT SHEET 2 OF 5
STR(90)LP203 - GENERAL ARRANGEMENT SHEET 3 OF 5
STR(90)LP204 - GENERAL ARRANGEMENT SHEET 4 OF 5
STR(90)LP205 - GENERAL ARRANGEMENT SHEET 5 OF 5

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SCALE @ A1
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DATE
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P01

Appendix B

Roscommon CC Flood Maps

Roscommon CDP 2021-2027 SFRA

Strokestown OPW & RCC Historical Indicators

- Settlement Boundary
- Water
- River or Stream

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Land

Drainage Districts

- Channel
- Embankment
- Benefited Land

Land Commission

- Benefited Land

OPW Past Flood Event

- Single Flood Event
- Recurring Flood Event
- Past Flood Extent

Roscommon County Council Historical Flood Data

- Flood Extents Shannon December 1954
- Flood Extents Shannon Winter 1999-2000
- Copernicus EMS Flood Extents 2016
- Copernicus EMS Flood Extents 2020

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Roscommon County Council

Coordinates in ITM

Roscommon CDP 2021-2027
SFRA

Strokestown
Flood Zones

- Settlement Boundary
- Water
- River or Stream

Indicative Flood Zones

- Flood Zone A
- Flood Zone B

Coordinates in ITM
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Roscommon CDP 2021-2027
SFRA

Strokestown
OPW CFRAM Present Day

Settlement Boundary

Water

River or Stream

CFRAM Fluvial
Present Day Scenario

10% AEP Fluvial Extent

1% AEP Fluvial Extent

0.1% AEP Fluvial Extent

Coordinates in ITM

Roscommon CDP 2021-2027
SFRA

Strokestown
OPW CFRAM All Scenarios

- Settlement Boundary
- Water
- River or Stream

CFRAM Fluvial
All Scenarios

- Present Day 0.1% AEP
- Mid-Range Future Scenario 0.1% AEP
- High-End Future Scenario 0.1% AEP

CAAS

ROSCOMMON Comhairle Contae Ros Comáin Roscommon County Council

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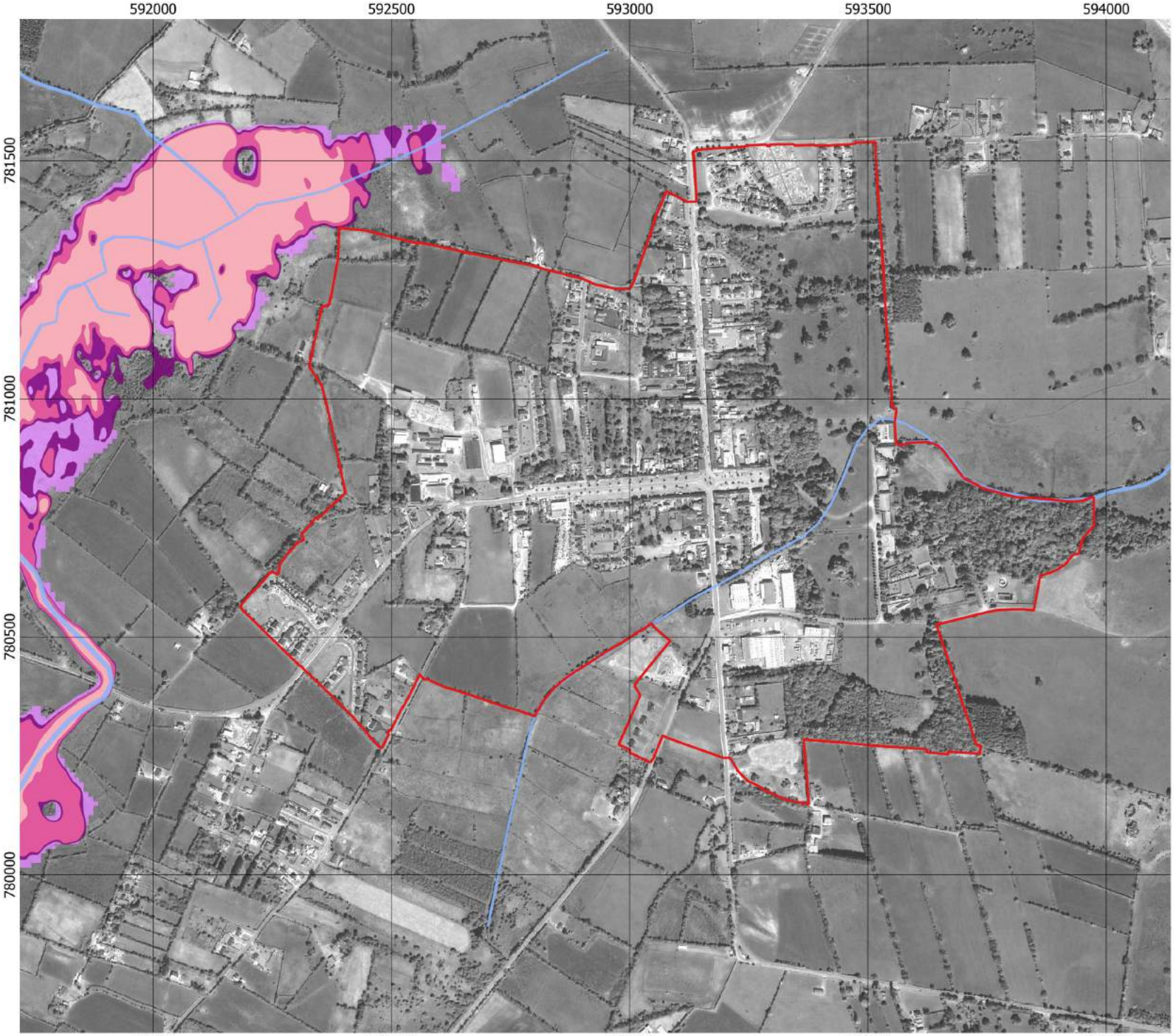

Roscommon CDP 2021-2027
SFRA

Strokestown
GSI Historical Flood Data and Groundwater Predictive Modeling

- Settlement Boundary
- Water
- River or Stream

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

FLOOD_TYPE

- Groundwater
- Groundwater/Surface water

Coordinates in ITM