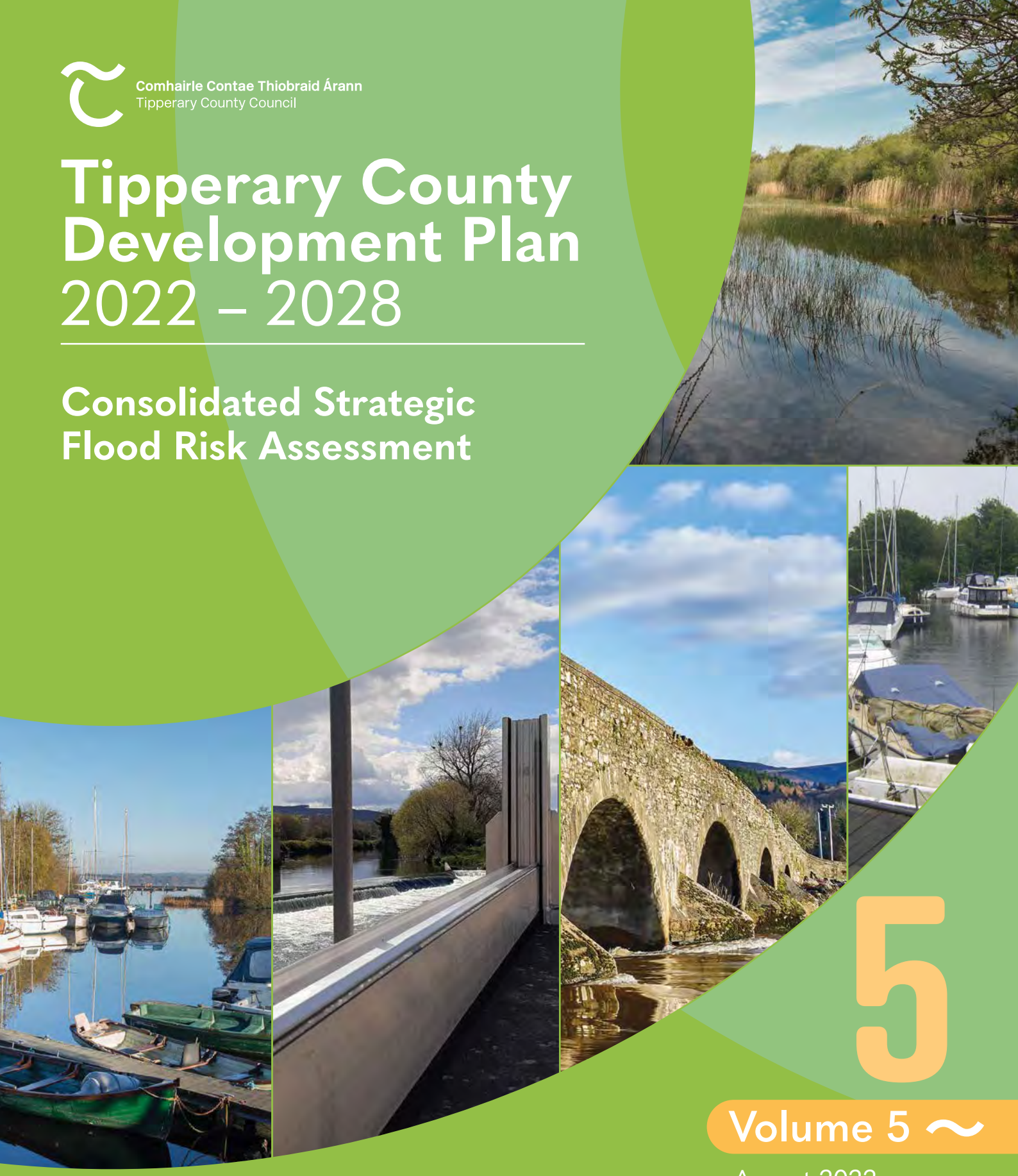
Comhairle Contae Thiobraid Árann
Tipperary County Council

Tipperary County Development Plan 2022 – 2028

Consolidated Strategic Flood Risk Assessment



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Volume 5

August 2022

Shaping *Our* Future

STRATEGIC FLOOD RISK ASSESSMENT

FOR THE

TIPPERARY COUNTY DEVELOPMENT PLAN 2022-2028

for: **Tipperary County Council**

Civic Offices

Nenagh

County Tipperary

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Table of Contents

Section 1 Introduction and Policy Background

1.1 Introduction and Terms of Reference

Tipperary County Council has prepared the Tipperary County Development Plan 2022-2028 hereafter referred to as the "Plan".

The preparation of the Plan has undergone an appropriate level of Strategic Flood Risk Assessment (SFRA) in accordance with *The Planning System and Flood Risk Management - Guidelines for Planning Authorities* (Department of the Environment, Heritage and Local Government and Office of Public Works, 2009) and Department of the Environment, Community and Local Government Circular PL 2/2014. The SFRA provides an assessment of flood risk and includes mapped boundaries for Flood Risk Zones.

The SFRA has been updated to take into account submissions received as part of the Plan's public consultation process.

1.2 Summary of Conclusion and Recommendations

The purpose of this document is to detail the findings of the SFRA that has been undertaken alongside the preparation of the Plan.

The SFRA has informed the Plan and enables compliance with the Flood Risk Management Guidelines. All SFRA recommendations – including those related to land use zoning and flood risk management provisions – have been integrated into the Plan.

The findings of the SFRA process have been integrated into the Plan throughout the process of preparing the Plan. This included informing both the Draft Plan and the Proposed Material Alterations. None of the Proposed Material Alterations were found to conflict with the Flood Risk Management Guidelines or to adversely affect efforts to appropriately manage flood risk. Submissions made on the Draft Plan and associated documents, including an earlier version of this SFRA report, while on public display, were taken into account and resulted in various updates being made to both this SFRA report and the Draft Plan.

1.3 Flood Risk and its Relevance as an Issue to the Plan

1.3.1 Flood Risk

Flooding is an environmental phenomenon and can pose a risk to human health as well as causing economic and social effects. Some of the effects of flooding are identified on Table 1 below.

Certain lands within the County have the potential to be vulnerable to flooding and this vulnerability could be exacerbated by changes in both the occurrence of severe rainfall events and associated flooding. Local conditions such as low-lying lands and slow surface water drainage can increase the risk of flooding.

Table 1 Potential effects that may occur as a result of flooding

Tangible Effects	Intangible Human and Other Effects
Damage to buildings (houses)	Loss of life
Damage to contents of buildings	Physical injury
Damage to new infrastructure e.g. roads	Increased stress
Loss of income	Physical and psychological trauma
Disruption of flow of employees to work causing knock on effects	Increase in flood related suicide
Enhanced rate of property deterioration and decay	Increase in ill health
Long term rot and damp	Homelessness
	Loss of uninsured possessions

1.4 Flood Risk Management Policy

1.4.1 EU Floods Directive

The European Directive 2007/60/EC on the assessment and management of flood risk aims to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity. The Directive applies to inland waters as well as all coastal waters across the whole territory of the EU. The Directive requires Member States to:

- Carry out a preliminary assessment by 2011 in order to identify the river basins and associated coastal areas where potential significant flood risk exists (preliminary mapping was prepared and a list of Areas for Further Assessment finalised in 2012).
- Prepare flood extent maps for the identified areas (finalised in 2016 for inclusion in Flood Risk Management Plans – see below).
- Prepare flood risk management plans focused on prevention, protection and preparedness. These plans are to include measures to reduce the probability of flooding and its potential consequences. These Plans were adopted in 2018.

Implementation of the EU Floods Directive is required to be coordinated with the requirements of the EU Water Framework Directive and the current National River Basin Management Plan.

1.4.2 National Flood Policy

Historically, flood risk management focused on land drainage for the benefit of agricultural improvement. With increasing urbanisation, the Arterial Drainage Act, 1945, was amended in 1995 to permit the Office of Public Works (OPW) to implement localised flood relief schemes to provide flood protection for cities, towns and villages.

In line with changing national and international paradigms on how to manage flood risk most effectively and efficiently, a review of national flood policy was undertaken in 2003-2004. The review was undertaken by an Inter-Departmental Review Group, led by the Minister of State at the Department of Finance with special responsibility for the OPW. The Review Group prepared a report that was put to Government, and subsequently approved and published in September 2004 (Report of the Flood Policy Review Group, OPW, 2004).

The scope of the review included a review of the roles and responsibilities of the different bodies with responsibilities for managing flood risk, and to set a new policy for flood risk management in Ireland into the future. The adopted policy was accompanied by many specific recommendations, including:

- Focus on managing flood risk, rather than relying only flood protection measures aimed at reducing flooding;
- Taking a catchment-based approach to assess and manage risks within the whole-catchment context; and

- Being proactive in assessing and managing flood risks, including the preparation of flood maps and flood risk management plans.

1.4.3 National CFRAM Programme

The national Catchment Flood Risk Assessment and Management (CFRAM) programme commenced in Ireland in 2011. The CFRAM Programme is intended to deliver on core components of the National Flood Policy, adopted in 2004, and on the requirements of the EU Floods Directive. The Programme is being implemented through CFRAM studies that have been undertaken for each of the river basin districts in Ireland.

The CFRAM Programme comprises three phases as follows:

- The Preliminary Flood Risk Assessment[1] (PFRA) mapping exercise, which was completed in 2012;
- The CFRAM Studies and parallel activities, with Flood Risk Management Plans finalised in 2018; and
- Implementation and Review.

The Programme provides for three main consultative stages as follows:

- Consultation for the PFRA mapping that was adopted in 2012;
- Consultation for Flood Extent mapping, that was finalised in 2016 for inclusion in Flood Risk Management Plans; and
- Consultation for Flood Risk Management Plans, that were adopted in 2018.

The OPW is the lead agency for flood risk management in Ireland. The coordination and implementation of Government policy on the management of flood risk in Ireland is part of its responsibility. The European Communities (Assessment and Management of Flood Risks) Regulations 2010 (S.I. No. 122) identifies the Commissioners of Public Works as the 'competent authority' with overall responsibility for implementation of the Floods Directive 2007/60/EC. The OPW is the principal agency involved in the preparation of CFRAM Studies.

1.4.4 Flood Risk Management Guidelines

1.4.4.1 Introduction

In 2009, the OPW and the then Department of the Environment and Local Government (DEHLG) published Guidelines on flood risk management for planning authorities entitled *The Planning System and Flood Risk Management - Guidelines for Planning Authorities*. The Guidelines introduce mechanisms for the incorporation of flood risk identification, assessment and management into the planning process. Implementation of the Guidelines is intended to be achieved through actions at the national, regional, local authority and site-specific levels. Planning authorities and An Bord Pleanála are required to have regard to the Guidelines in carrying out their functions under the Planning Acts.

The core objectives of the Guidelines are to:

- Avoid inappropriate development in areas at risk of flooding;
- Avoid new developments increasing flood risk elsewhere, including that which may arise from surface water run-off;
- Ensure effective management of residual risks for development permitted in floodplains;
- Avoid unnecessary restriction of national, regional or local economic and social growth;
- Improve the understanding of flood risk among relevant stakeholders; and
- Ensure that the requirements of EU and national law in relation to the natural environment and nature conservation are complied with at all stages of flood risk management.

[1] The PFRAs identified areas at risk of significant flooding and includes maps showing areas deemed to be at risk. The areas deemed to be most significant risk, where the flood risk that is of particular concern nationally, are identified as Areas for Further Assessment (AFAs). AFAs in County Tipperary include Roscrea, Nenagh, Killaloe & Ballina, Newport, Templemore, Borrisoleigh, Thurles, Hollycross, Clonmel, Knocklofty, Fethard, Golden, Cahir, Ardfinnan and Carrick on Suir.

1.4.4.2 Principles of Flood Risk Management

The key principles of flood risk management set out in the flood Guidelines are to:

- Avoid development that will be at risk of flooding or that will increase the flooding risk elsewhere, where possible;
- Substitute less vulnerable uses, where avoidance is not possible; and
- Mitigate and manage the risk, where avoidance and substitution are not possible.

The Guidelines follow the principle that development should not be permitted in flood risk areas, particularly floodplains, except where there are no alternative and appropriate sites available in lower risk areas that are consistent with the objectives of proper planning and sustainable development.

Development in areas that have the highest flood risk should be avoided and/or only considered in exceptional circumstances (through a prescribed *Justification Test*) if adequate land or sites are not available in areas that have lower flood risk. Most types of development would be considered inappropriate in areas that have the highest flood risk. Only water-compatible development such as docks and marinas, dockside activities that require a waterside location, amenity open space, outdoor sports and recreation and essential transport infrastructure that cannot be located elsewhere would be considered appropriate in these areas.

1.4.4.3 Stages of SFRA

The Flood Risk Management Guidelines recommend a staged approach to flood risk assessment that covers both the likelihood of flooding and the potential consequences. The stages of appraisal and assessment are:

> **Stage 1 Flood risk identification** – to identify whether there may be any flooding or surface water management issues related to either the area of Regional Spatial and Economic Strategies, Development Plans and LAP's or a proposed development site that may warrant further investigation at the appropriate lower-level plan or planning application levels.
>
> **Stage 2 Initial flood risk assessment** – to confirm sources of flooding that may affect a Plan area or proposed development site, to appraise the adequacy of existing information and to scope the extent of the risk of flooding which may involve preparing flood zone maps. Where hydraulic models exist the potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures can be assessed. In addition, the requirements of the detailed assessment are scoped.
>
> **Stage 3 Detailed flood risk assessment** – to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development or land to be zoned, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures.

1.4.4.4 Flood Zones

Flood risk is an expression of the combination of the flood probability or likelihood and the magnitude of the potential consequences of the flood event. It is normally expressed in terms of the following relationship:

Flood risk = Likelihood of flooding x Consequences of flooding

Likelihood of flooding is normally defined as the percentage probability of a flood of a given magnitude or severity occurring or being exceeded in any given year. For example, a 1% Annual Exceedance Probability (AEP) indicates the severity of a flood that is expected to be exceeded on average once in 100 years, i.e. it has a 1 in 100 (1%) chance of occurring in any one year.

Consequences of flooding depend on the hazards associated with the flooding (e.g. depth of water, speed of flow, rate of onset, duration, wave-action effects, water quality) and the vulnerability of people, property and the environment potentially affected by a flood (e.g. the age profile of the population, the type of development and the presence and reliability of mitigation measures).

Flood zones are geographical areas within which the likelihood of flooding is in a particular range and they are a key tool in flood risk management within the planning process as well as in flood warning and emergency planning.

There are three types of flood zones defined for the purposes of the Flood Guidelines:

- **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 year and 0.5% or 1 in 200 for coastal flooding); and
- **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). Flood Zone C covers all other areas that are not in zones A or B.

County Tipperary is not affected by coastal flooding. A summary of the requirements of the Flood Guidelines for land uses across each of the above flood zones is provided at **Appendix I**.

1.5 Emerging Information and Disclaimer

It is important to note that compliance with the requirements of the Flood Risk Management Guidelines is currently based on emerging and best available data at the time of preparing the assessment, including Flood Risk Management Plans, which will be updated on a cyclical basis as part of CFRAM activities.

Following adoption of the Plan, information in relation to flood risk may be altered in light of future data and analysis, by, for example, the OPW, or future flood events. As a result, all landowners and developers are advised that Tipperary County Council and their agents can accept no responsibility for losses or damages arising due to assessments of the vulnerability to flooding of lands, uses and developments. Owners, users and developers are advised to take all reasonable measures to assess the vulnerability to flooding of lands and buildings (including basements) in which they have an interest prior to making planning or development decisions. Any future SFRAs for the area will integrate other new and emerging data.

1.6 Content of the Plan

The Plan is a land use plan and overall strategy for the proper planning and sustainable development of the functional area of County Tipperary over the six-year period 2022-2028. The Plan sets out the Council's proposed policies and objectives for the development of the County over the Plan period.

The Plan is set out over five volumes:

- Volume 1: Written Statement
- Volume 2: Settlement Statements and Maps, and Serviced Land Assessment
- Volume 3: Appendices
- Volume 4: Built Heritage
- Volume 5: Environmental Reports

Volume 1 is set out in 16 chapters under key headings that broadly reflect the themes of the RSES as follow:

1) Introduction
2) Core Strategy
3) Low-Carbon Society & Climate Action
4) Settlement Strategy
5) Housing
6) Supporting Sustainable Communities
7) Town Centres & Placemaking
8) Enterprise and Rural Employment
9) Tourism
10) Renewable Energy and Bio-Economy
11) Environment and Natural Assets
12) Sustainable Transport
13) Built Heritage

14) Green and Blue Infrastructure
15) Water and Energy Utilities
16) Monitoring and Evaluation

Volume 2 sets out the village statements and maps for the rural settlements. Volume 3 sets out the appendices that inform the Plan as follows:

- County Housing Strategy
- Renewable Energy Strategy
- Landscape Character Assessment and schedule of scenic Views and Routes
- Rural Housing Design Guide
- Cluster Housing Design Guide
- Development Management Standards
- Statement of Compliance with Ministerial Guidelines

Volume 4 sets out the Record of Protected Structures with proposed additions and deletions and a schedule of Architectural Conservation areas, and Volume 5 contains the SEA Environmental Report, this AA NIR and the SFRA.

The most relevant parts of the Plan for this SFRA relate to land use zoning and provisions relating to flood risk management[2].

1.7 Sustainable Drainage Systems

New developments should be adequately serviced with surface water drainage infrastructure and incorporate the use of SuDS and water sensitive urban design. Planning applications for new developments will be required to provide details of surface water drainage, and sustainable drainage systems proposals.

The integration of nature-based solutions, such as amenity areas, ecological corridors and attenuation ponds, into public and private development initiatives should be encouraged. Where multiple individual proposals are being made, in larger settlements, for example, area based Sustainable Drainage Systems should be integrated where appropriate and relevant.

The applicability of different water sensitive urban design/SuDS techniques is dependent on the site in question combined with the proposed development, the nature and design of which at Plan level is not known. Proposals for development should consider Greater Dublin Strategic Drainage Study documents in designing SUDS solutions, including the New Development Policy, the Final Strategy Report, the Code of Practice and “Irish SuDS: guidance on applying the GDSDS surface water drainage criteria”.

[2] Flood risk management recommendations made by the SFRA process and integrated into the Plan are provided under Section 4.

Section 2 Stage 1 SFRA - Flood Risk Identification

2.1 Introduction

Stage 1 SFRA (flood risk identification) was undertaken in order to identify whether there may be any flooding or surface water management issues within or adjacent to zoned lands and consequently whether Stage 2 SFRA (flood risk assessment) should be proceeded to.

Different areas of County Tipperary are subject to different Flood Risk Management Plans:

- Shannon Upper and Lower River Basin (UOM25-26)
- Suir River Basin (UOM16)
- Nore River Basin (UOM15)
- Blackwater (Munster) River Basin (UOM18)
- Shannon Estuary South River Basin (UOM24)

Stage 1 SFRA is based on existing information on flood risk indicators based on historical evidence and computational models. **Appendix II** (pages 2-6) show the spatial distribution of County-wide historical and predictive flood risk indicators.

Appendix II also provides maps of these historical and predictive indicators for settlements which are provided with land use zoning by the Plan. These comprise Urban Service Centres (Ballina, Fethard and Newport) and Rural Service Centres (Ardfinnin, Ballyclerihan, Borrisokane, Borrisoleigh, Clogheen, Cloughjordan, Hollycross, Kilenaule, Kilsheelan, Mullinahone, Portroe and Two Mile Borris).

Key Towns and District Towns are not provided with land use zoning by the Plan; however, they have been considered as appropriate, including at:

- Table 3, which identifies CFRAMS Flood Risk Management measures for relevant settlements.
- Table 7, which identifies flood risk management provisions from the Draft Plan that will need to be complied with by all development, as relevant; and
- Appendix II, which includes mapping of County-wide flood risk indicators.

As the Plan does not provide land use zoning for these settlements, the delineation of Flood Zones is not appropriate.

Flood information for Smaller Settlements is provided at Appendix III.

2.2 Drainage, Defences and Early Warning Systems

With regard to areas benefitting from drainage and defences (flood relief scheme works), there are various measures that have been implemented in County Tipperary that will contribute towards flood risk management. These include the culverting of various streams and rivers in many urban areas.

Embankments, channels and associated predicted benefitting lands under a number of historical government schemes are mapped in **Appendix II**.

Arterial Drainage Schemes were carried out by the Office of Public Works under the Arterial Drainage Act 1945 to improve land for agricultural purposes and to mitigate flooding. Arterial drainage maintenance and monitoring of these schemes is still carried out by OPW on rivers, lakes, weirs, bridges and embankments to maintain adequate conveyance and ensure that flood waters (of varying magnitude) are retained in bank by lowering water levels during the growing season thus reducing waterlogging on the adjacent land during wetter periods. There are various arterial drainage

maintenance schemes in Tipperary and, as can be seen in **Appendix II**, various settlements and/or their surrounding areas benefit from these schemes.

Benefitting Areas have been notified to Insurance Ireland under the Clonmel Flood Relief Scheme which protects properties to a 1% AEP fluvial flood event.

The 2018 Flood Risk Management Plans identify various general measures under "Measures Applicable for all Areas"[3].

Catchment-wide measures for each of the Flood Risk Management Plan areas are shown on Table 2.

Table 2 Catchment Wide Measures for Individual Settlements

Flood Risk Management Plan	Measures
Shannon Upper and Lower River Basin (UOM25-26)	Existing Measure: Maintenance of Arterial Drainage Schemes Outline: The OPW has a statutory duty under the Arterial Drainage Act, 1945, and the Amendment of the Act, 1995, to maintain the Arterial Drainage and Flood Relief Schemes constructed by it under those Acts. Existing Measure: Maintenance of Drainage Districts Outline: The statutory duty of maintenance for 4,600 km of river channel benefiting from Drainage District Schemes rests with the relevant Local Authorities. Proposed Measure: Improve Long-Range Forecasting on the river Shannon to Optimise Operation of Water Level Management Infratructure Outline: The introduction of a long range flood forecasting system to allow, within current water level requirements, the optimisation of the sluices at Athlone weir and storage within Lough Ree in advance of forecasted Summer flood events Proposed Measure: Coordination of water level management on the River Shannon Outline: Currently there are three agencies with a statutory interest in the water levels along the River Shannon; namely the OPW, ESB and Waterways Ireland (WI). A background to these agencies and their statutory responsibilities for the River Shannon is provided in the River Shannon Level Operation Review, which is available to download at www.opw.ie/FloodPlans. The water levels on the three lakes (Lough Allen, Lough Ree and Lough Derg) are controlled and managed by the ESB. The levels of Lough Derg are managed for the purpose of electricity generation. Levels in Lough Allen and Lough Ree are managed to ensure minimum navigation levels in the river during dry periods and to reduce the impacts of floods as far as reasonably possible. The levels of the navigation channel in between the lakes are managed by Waterways Ireland. The management of water levels for the purpose of reducing flood risk must take into account the existing statutory minimum operating levels, the potential impacts on the environment, water supply and waterway infrastructure (both private and public) and the avoidance of causing downstream flooding. The OPW, ESB and WI are working together, through the Shannon Flood Risk State Agency Co-ordination Working Group to build on the existing co-ordination of water level management activities and to trial the lowering of the lake levels in Lough Allen to help mitigate potential flood risk during Winter months.
Suir River Basin (UOM16)	Existing Measure: Maintenance of Arterial Drainage Schemes Outline: The OPW has a statutory duty under the Arterial Drainage Act, 1945, and the Amendment of the Act, 1995, to maintain the Arterial Drainage and Flood Relief Schemes constructed by it under those Acts. Existing Measure: Maintenance of Drainage Districts Outline: The statutory duty of maintenance for 4,600 km of river channel benefiting from Drainage District Schemes rests with the relevant Local Authorities.
Nore River Basin (UOM15)	Existing Measure: Maintenance of Arterial Drainage Schemes Outline: The OPW has a statutory duty under the Arterial Drainage Act, 1945, and the Amendment of the Act, 1995, to maintain the Arterial Drainage and Flood Relief Schemes constructed by it under those Acts. Existing Measure: Maintenance of Drainage Districts Outline: The statutory duty of maintenance for 4,600 km of river channel benefiting from Drainage District Schemes rests with the relevant Local Authorities.

[3] Including under the headings of: Prevention - Sustainable Planning and Development Management; Prevention - Sustainable Urban Drainage Systems (SUDS); Prevention - Adaptation Planning; Prevention - Land Use Management and Natural Flood Risk Management; Protection - Maintenance of Channels not part of a Scheme; Preparedness - Flood Forecasting and Warning; Preparedness - Emergency Response Planning; Preparedness - Promotion of Individual and Community Resilience; Preparedness - Individual Property Protection; Preparedness - Flood-Related Data Collection; Prevention - Voluntary Home Relocation

Flood Risk Management Plan	Measures
Blackwater (Munster) River Basin (UOM18)	Existing Measure: Maintenance of Arterial Drainage Schemes Outline: The OPW has a statutory duty under the Arterial Drainage Act, 1945, and the Amendment of the Act, 1995, to maintain the Arterial Drainage and Flood Relief Schemes constructed by it under those Acts. Existing Measure: Maintenance of Drainage Districts Outline: The statutory duty of maintenance for 4,600 km of river channel benefiting from Drainage District Schemes rests with the relevant Local Authorities.
Shannon Estuary South River Basin (UOM24)	Existing Measure: Maintenance of Arterial Drainage Schemes Outline: The OPW has a statutory duty under the Arterial Drainage Act, 1945, and the Amendment of the Act, 1995, to maintain the Arterial Drainage and Flood Relief Schemes constructed by it under those Acts. Existing Measure: Maintenance of Drainage Districts Outline: The statutory duty of maintenance for 4,600 km of river channel benefiting from Drainage District Schemes rests with the relevant Local Authorities.

Measures for individual settlements are shown on Table 3.

Table 3 Measures for Individual Settlements

Settlement	Flood Risk Management Plan	Measures
Roscrea	Shannon Upper and Lower River Basin (UOM25-26)	Proposed Measure: Progress the development of a Flood Relief Scheme for Roscrea Outline: Progress the project-level development and assessment of a Flood Relief Scheme for Roscrea, including environmental assessment as necessary and further public consultation, for refinement and preparation for planning / exhibition and, if and as appropriate, implementation. The proposed measure for Roscrea that may be implemented after project-level assessment and planning or Exhibition and confirmation might include construction of 630m of new structural flood defence walls and 213m of flood defence embankments.
Nenagh	Shannon Upper and Lower River Basin (UOM25-26)	Proposed Measure: Progress the development of a Flood Relief Scheme for Nenagh AFA Outline: Progress the project-level development and assessment of a Flood Relief Scheme for Nenagh, including environmental assessment as necessary and further public consultation, for refinement and preparation for planning / exhibition and, if and as appropriate, implementation. The proposed measure for Nenagh that may be implemented after project-level assessment and planning or Exhibition and confirmation might include; • Construct a new 480m embankment along Nenagh River to defend properties. • Replace culvert on Benedin Stream with hydraulic control to limit flows downstream during flood events. • Flood forecasting unit on River Nenagh. • Targeted public awareness. • Introduction of a storage area.
Killaloe & Ballina	Shannon Upper and Lower River Basin (UOM25-26)	Proposed Measure: Progress the development of a Flood Relief Scheme for Killaloe The proposed measure for Killaloe & Ballina that may be implemented after project-level assessment and planning or Exhibition and confirmation might include; • Deepen and widen the Drumbane channel. • Deepen and widen the Grange channel. • Replace Bridge on the Grange watercourse.
Newport	Shannon Upper and Lower River Basin (UOM25-26)	Existing Measure: Maintain the existing Ballymakeogh (Newport) Flood Relief Scheme Outline: There is an existing Flood Relief Scheme providing protection to properties in Ballymakeogh (Newport). Ongoing maintenance will be undertaken of this scheme. The Mulkear River (Ballymackeogh) Certified Drainage Scheme in Newport was initiated in 1997 and was constructed from 1997 to 1999. The works were primarily to restore the old Drainage District scheme and comprised making good the embankments and some improvements, such as the deepening and widening of the restrictive stretch alongside the Bunky tributary. The scheme provides protection for 53 properties in Newport against flooding from the Mulkear River.
Templemore	Suir River Basin (UOM16)	Measure Underway: Progress a Flood Relief Scheme for the River Mall (Templemore) Status: Stage IV: Implementation/Construction Outline: The River Mall (Templemore) Flood Relief Scheme includes construction of a new channel of 750m, with an additional inlet structure of 70m which will accommodate a gravel and debris trap, a new outflow from Templemore lake to flow under Blackcastle road and

Settlement	Flood Risk Management Plan	Measures
		link with the new channel, two culverts to run the channel under Richmond road and Talavera, a new outflow point south of Talavera to link to new channel back with the old river, widening of the old river channel downstream of the town, embankments at various locations and surface and foul diversions as necessary. The scheme is expected to provide protection against a 100-year flood (1% Annual Exceedance Probability)
Borrisoleigh	Suir River Basin (UOM16)	Proposed Measure: Progress the development of a Flood Relief Scheme for Borrisoleigh Outline: Progress the project-level development and assessment of a Flood Relief Scheme for Borrisoleigh, including environmental assessment as necessary and further public consultation, for refinement and preparation for planning / exhibition and, if and as appropriate, implementation. The potential measure would protect at-risk properties against the 1% AEP Fluvial flood event by a combination of flood defences and improved channel conveyance. The potential flood defences would consist of a series of flood embankments (average height of 1.0 m and a total length of 78m), flood walls (average height of 1.2m and a total length of 90m) and road raising (0.4m over bridge) on the Cromoge River. The potential improvement in channel conveyance would consist of a bridge replacement with a culvert (1.6m x 6m wide) on the Cromoge River and pipe replacement with culvert (2m x 8m x 15m long) on the Coolataggle tributary. The potential improvement in channel conveyance would also consist of 2m of channel widening and 110m of channel conveyance on the Cromoge River and channel conveyance of 95m and 88m of new channel to be cut on the tributary river.
Thurles	Suir River Basin (UOM16)	Proposed Measure: Progress the development of a Flood Relief Scheme for Thurles Outline: Progress the project-level development and assessment of a Flood Relief Scheme for Thurles, including environmental assessment as necessary and further public consultation, for refinement and preparation for planning / exhibition and, if and as appropriate, implementation. The potential measure would protect at-risk properties against the 1% AEP Fluvial flood event by flood defences. The potential flood defences would consist of a series of flood embankments (average height of 1.5 m and a total length of 493m), flood walls (average height of 1.2m and total length of 589m) and flood gate (1m at bridge opening at crossing of Emmet Street and Thomond Road).
Hollycross	Suir River Basin (UOM16)	Proposed Measure: Progress the development of a Flood Relief Scheme for Holycross Outline: Progress the project-level development and assessment of a Flood Relief Scheme for Holycross, including environmental assessment as necessary and further public consultation, for refinement and preparation for planning / exhibition and, if and as appropriate, implementation.
Clonmel	Suir River Basin (UOM16)	Existing Measure: Maintain the existing Clonmel Flood Relief Scheme Outline: There is an existing Flood Relief Scheme providing protection to properties in Clonmel. Ongoing maintenance will be undertaken of this scheme. The Clonmel Flood Defence Scheme was constructed between 2008 to 2012. The Scheme comprises of flood defence walls, demountable elements, and embankments, channel conveyance improvements and pumping stations for storm water that would otherwise accumulate behind the defences. It provides protection against a 100 -Year flood (1% Annual Exceedance Probability) for 500 properties against flooding from the River Suir.
Knocklofty	Suir River Basin (UOM16)	Proposed Measure: Progress the development of a Flood Relief Scheme for Knocklofty Outline: Progress the project-level development and assessment of a Flood Relief Scheme for Knocklofty, including environmental assessment as necessary and further public consultation, for refinement and preparation for planning / exhibition and, if and as appropriate, implementation. The potential measure would protect at-risk properties against the 1% AEP Fluvial flood event by flood defences. The proposed flood defences would include a series of flood embankments (average height of 1.4m and a total length of 469m) and a flood gate (1 No. over 6m and 1 No. over 1m).
Fethard	Suir River Basin (UOM16)	Proposed Measure: Progress the development of a Flood Relief Scheme for Fethard Outline: Progress the project-level development and assessment of a Flood Relief Scheme for Fethard, including environmental assessment as necessary and further public consultation, for refinement and preparation for planning / exhibition and, if and as appropriate, implementation. The potential measure would protect at-risk properties against the 1% AEP Fluvial flood event by flood defences. The potential flood defences would consist of the following: • Flood embankments (average height of 1.2m and a total length of 621m) • Flood walls (average height of 1.3m and a total length of 184m) • Upgrading existing walls (average height 1.3m and a total length of 116m) • Installation of flood gates (3 No. 2m x 3m and 4 No. 2m)

Settlement	Flood Risk Management Plan	Measures
Golden	Suir River Basin (UOM16)	Proposed Measure: Progress the development of a Flood Relief Scheme for Golden Outline: Progress the project-level development and assessment of a Flood Relief Scheme for Golden, including environmental assessment as necessary and further public consultation, for refinement and preparation for planning / exhibition and, if and as appropriate, implementation. The potential measure would protect at-risk properties against the 1% AEP Fluvial flood event by flood defences. The proposed flood defences would include sheet piles to counter the underground flow paths which exist between the river and flood receptors and consist of a series of flood embankments (average height of 1m and a total length of 425m), flood walls (average height of 1.2m and a total length of 50m) and a demountable barrier (1.5m length x 1.2m high).
Cahir	Suir River Basin (UOM16)	Proposed Measure: Progress the development of a Flood Relief Scheme for Cahir Outline: Progress the project-level development and assessment of a Flood Relief Scheme for Cahir, including environmental assessment as necessary and further public consultation, for refinement and preparation for planning / exhibition and, if and as appropriate, implementation. The potential measure would protect at-risk properties against the 1% AEP Fluvial flood event by a combination of flood defences, improved channel conveyance and other works. The potential flood defences would consist of a series of flood embankments (average height of 1.2 m and a total length of 265m) and flood walls (average height of 1.2m and a total length of 503m) on the Suir River and its tributary. The potential improvement of channel conveyance would consist of upgrading one existing weir in the diversion channel and upgrading one existing culvert on the tributary river, and Installation of a Penstock Sluice Gate in the diversion channel of the River Suir – 2 m height x 8 m width.
Ardfinnan	Suir River Basin (UOM16)	Proposed Measure: Progress the development of a Flood Relief Scheme for Ardfinnan Outline: Progress the project-level development and assessment of a Flood Relief Scheme for Ardfinnan, including environmental assessment as necessary and further public consultation, for refinement and preparation for planning / exhibition and, if and as appropriate, implementation. The potential measure would protect at-risk properties against the 1% AEP Fluvial flood event by a combination of flood defences, road raising and two electrically operated penstocks. The proposed flood defences would include sheet piles to counter the underground flow paths which exist between the river and flood receptors and consist of a series of flood embankments (average height of 1.25m and a total length of 667m) and retaining walls (average height of 1.5m and a total length of 300m).
Carrick on Suir	Suir River Basin (UOM16)	Existing Measure: Maintain the existing Carrick on Suir Flood Relief Scheme Outline: There is an existing Flood Relief Scheme providing protection to properties in Carrick on Suir. Ongoing maintenance will be undertaken of this scheme. The Carrick on Suir Flood Defence Scheme was constructed in 2001. The Scheme comprises of flood defence walls, embankments, localised floating barriers and pumping stations for storm water that would otherwise accumulate behind the defences. It provides protection against a 50-Year flood (2% Annual Exceedance Probability) for 110 properties against flooding from the River Suir.

The provision of flood protection measures can significantly reduce flood risk. However, the Ministerial Guidelines require that the presence of flood protection structures should be ignored in determining flood zones. This is because of risks relating to failure and severe flood events that exceed design capacity (the risk of severe events is exacerbated with climate change). Notwithstanding this, new development can proceed in areas that are at elevated levels of flood risk subject to the Justification Test provided for by the Guidelines being passed, which takes into account proposals to manage flood risk, such as the development of defences. Although insurance can be challenging to attain in these instances.

Various rivers and their banks and culverts in the County are maintained by the Office of Public Works and Tipperary County Council.

Met Éireann currently issues flood warnings for County Tipperary. Met Éireann, in collaboration with the OPW, is currently engaged in the establishment of a National Flood Forecasting and Warnings Service to forecast for fluvial and coastal flood events.

2.3 Other Flood Studies

Other Flood Studies considered in the preparation of this assessment include:

- Flood Risk Management Plan for the Shannon Upper and Lower River Basin (UOM25-26);
- Flood Risk Management Plan for the Suir River Basin (UOM16);
- Flood Risk Management Plan for the Nore River Basin (UOM15);
- Flood Risk Management Plan for the Blackwater (Munster) River Basin (UOM18);
- Flood Risk Management Plan for the Shannon Estuary South River Basin (UOM24);
- Previous SFRAs in County Tipperary; and
- Regional Flood Risk Assessment for the Southern Regional Spatial and Economic Strategy, 2020.

2.4 Flood Risk Indicators

Indicators of flood risk that are based on historical flooding events are identified and described on Table 4 and mapped at county and settlement level in **Appendix II**.

Indicators of flood risk that are based on computational models – predictive flood risk indicators – are identified and described on Table 5 and mapped at county and settlement level in **Appendix II**.

Table 4 Historical Flood Risk Indicators

Information Source	Description	Strategic Limitations
Recorded Flood Events from the OPW	A flood event is the occurrence of recorded flooding at a given location on a given date. The flood event is derived from different types of information (reports, photographs etc.).	This dataset only provides a spot location
Recurring Flood Events	A flood event that has occurred more than once at a certain area is named a recurring flood event.	This dataset only provides a spot location
Alluvium Soils	Mineral alluvial soil mapping is indicative of recurrent or significant fluvial flooding at some point in the past and was generated by Teagasc with co-operation of the Forest Service, EPA and GSI. This project was completed May 2006.	Drainage may have changed significantly since these soils were deposited.
Benefitting lands (OPW)	Benefitting lands mapping is a dataset identifying land that might benefit from the implementation of Arterial (Major) Drainage Schemes (under the Arterial Drainage Act 1945) and indicating areas of land estimated or reported to be subject to flooding or poor drainage.	Identifies broad areas - low resolution for flood risk management
Drainage Districts (OPW)	This drainage scheme mapping dataset was prepared on behalf of the Drainage Districts (Local Authorities with statutory responsibility for maintenance under the Arterial Drainage Act, 1925). These maps identify land that might benefit from the implementation of Arterial (Major) Drainage Schemes and indicate areas of land subject to flooding or poor drainage.	Identifies large broad areas - very low resolution for flood risk management
Land Commission (OPW)	This dataset indicates areas of land defended to some degree against flooding that were formerly the responsibility of the Land Commission.	Identifies broad areas - low resolution for flood risk management
Historical groundwater flooding	Historic groundwater flood map: The historic groundwater flood map is a national-scale flood map presenting the maximum historic observed extent of karst groundwater flooding. The map is primarily based on the winter 2015/2016 flood event, which in most areas represented the largest groundwater flood event on record. The map was produced based on the SAR imagery of the 2015/2016 event as well as any available supplementary evidence. The floods were classified by flood type differentiating between floods dominated by groundwater (GW) and floods with significant contribution of groundwater and surface water (GWSW). In addition to the historic groundwater flood map, the flood mapping methodology was also adapted to produce a surface water flood map of the 2015/2016 flood event. This flood map encompasses fluvial and pluvial flooding in non-urban areas and has been developed as a separate product.	-

Table 5 Predictive Flood Risk Indicators

Information Source	Description	Strategic Limitations
CFRAM Study, Flood Extent Mapping, 2016	Following the undertaking of the PFRA, the OPW, through its engineering consultants and working with local authorities and other stakeholders, conducted extensive engineering assessments to better understand and detail the actual risk from flooding for areas that were	Spatial spread is limited, including to the areas that are considered to be at most risk of flooding.

Information Source	Description	Strategic Limitations
	at highest levels of risk. This was the subject of public consultation. The outcome of that work includes Predicted Flood Extent maps that were finalised in 2016. For fluvial flood levels, calibration and verification of the models make use of the best available data including hydrometric records, photographs, videos, press articles and anecdotal information.	
OPW Preliminary Flood Risk Assessment (PFRA) Fluvial, Groundwater and Pluvial flood maps, 2012[4]	The OPW PFRA mapping dataset has been arrived at by: • Reviewing records of floods that have happened in the past; • Undertaking analysis to determine which areas might flood in the future, and what the impacts might be; and • Extensive consultation with each local authorities and other Government departments and agencies. This assessment has considered all types of flooding, including that which can occur from rivers, the sea and estuaries, heavy rain, groundwater, the failure of infrastructure, and so on. It has also considered the impacts flooding can have on people, property, businesses, the environment and cultural assets. Further information on the purpose and development of the OPW PFRA Maps are available on www.floodinfo.ie. National Coastal Protection Strategy Study flood and coastal erosion risk maps: the predicted flood extents that were produced under the Irish Coastal Protection Strategy Study (ICPSS) are based on analysis and modelling. The project included: • Analysis of historic recorded sea levels • Numerical modelling and statistical analysis of combined tide levels and storm surges to estimate extreme water levels along the national coastline • for defined probabilities • Calculation of the extent of the predictive flooding, by comparing calculated extreme tide and surge waters levels along the coast with ground level based on a Digital Terrain Model (DTM). These indicative national coastal flood maps are included in the Draft PFRA Maps, provided in a separate volume, for the purposes of consultation on the PFRA.	The PFRA is only a preliminary assessment, based on available or readily derivable information. Analysis has been undertaken to identify areas prone to flooding, and the risks associated with such flooding, but this analysis is purely indicative and undertaken for the purpose of completing the PFRA. The mapping has been developed using simple and cost-effective methods and is based on broad-scale simple analysis and may not be accurate for a specific location/use.
Predictive groundwater flood map	The predictive groundwater flood map presents the probabilistic flood extents for locations of recurrent karst groundwater flooding. It consists of a series of stacked polygons at each site representing the flood extent for specific AEP's mapping floods that are expected to occur every 10, 100 and 1000 years (AEP of 0.1, 0.01, and 0.001 respectively). The map is focussed primarily (but not entirely) on flooding at seasonally inundated wetlands known as turloughs. Sites were chosen for inclusion in the predictive map based on existing turlough databases as well as manual interpretation of SAR imagery. The mapping process tied together the observed and SAR-derived hydrograph data, hydrological modelling, stochastic weather generation and extreme value analysis to generate predictive groundwater flood maps for over 400 qualifying sites.	Not all turloughs are included in the predictive map as some sites could not be successfully monitored with SAR and/or modelled.
National Indicative Fluvial Mapping (NIFM) 2021	The OPW NIFM project has produced second generation indicative fluvial flood spatial data that are of a higher quality and accuracy to those produced for the first cycle PFRA. This project has covered 27,000 km of river reaches, separated into 37 drainage areas, consisting of 509 sub-catchments.	Does not cover smaller sized catchments

2.5 Conclusion of Stage 1 SFRA

The information detailed above indicates elevated levels of flood risk in various locations across the County; therefore, a Stage 2 SFRA has been proceeded to.

[4] **Appendix II** of this assessment includes PFRA Fluvial and Coastal mapping. Pluvial and groundwater flood risk is present in the County, however; it is not taken into account in the delineation of flood zones. Nonetheless, it has informed the development of recommendations detailed in Section 4.

Section 3 Stage 2 SFRA - Flood Risk Assessment

3.1 Introduction

Stage 2 SFRA (flood risk assessment) has been undertaken to:

- Confirm the sources of flooding that may affect zoned and adjacent areas;
- Appraise the adequacy of existing information as identified by the Stage 1 SFRA; and
- Scope the extent of the risk of flooding through the preparation of flood zone maps.

3.2 Findings and Adequacy of Existing Information and Delineation of Flood Zones

Desk and in-field studies were undertaken taking into account the following factors:

- OPW's CFRAMS fluvial flood extent mapping (2016) and other predictive indicators;
- Historical indicators of flood risk;
- Aerial photography;
- Documented Council knowledge of lands;
- Local knowledge;
- The potential source and direction of flood paths from the sea and rivers and streams;
- Vegetation indicative of flood risk; and
- The locations of topographic/built features that coincide with the flood indicator related boundaries/topographical survey.

Within the annual exceedance probabilities specified by the Flood Guidelines for Flood Zones A and B, there are elevated levels of flood risk within the majority of the County's settlements for which land use zoning is included in the Plan, as shown in **Appendix II**.

3.3 Flood Risk Zone Mapping

Flood Risk Zone maps have been produced taking into account the findings of the Stage 1 and Stage 2 SFRA desk and in field studies as identified above[5].

The maps are provided in **Appendix II** and identify Flood Zone A (darker blue) and Flood Zone B[6] (lighter blue). All other areas fall within Flood Zone C. As per the Guidelines, the flood zones in County Tipperary are as follows:

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

[5] Including taking into account predictive and historical indicators of flood risk, documented Council knowledge of lands, local knowledge, the potential source and direction of flood paths from rivers and streams, vegetation indicative of flood risk and the locations of topographic/built features that coincide with the flood indicator related boundaries/topographical survey.

[6] As identified by the Guidelines, in rivers with a well-defined floodplain or where the coastal plain is well defined at its rear, the limits of Zones A and B will virtually coincide. Zone B will only be significantly different in spatial extent from Zone A where there is extensive land with a gentle gradient away from the river or the sea.

3.4 Sensitivity to Climate Change

'The Planning System and Flood Risk Management Guidelines for Planning Authorities and Technical Appendices, 2009' recommends that a precautionary approach to climate change is adopted due to the level of uncertainty involved in the potential effects. In this regard, the Guidelines recommends:

- Recognising that significant changes in the flood extent may result from an increase in rainfall or tide events and accordingly adopting a cautious approach to zoning land in these potential transitional areas;
- Ensuring that the levels of structures designed to protect against flooding such as flood defences[7], land raising or raised floor levels are sufficient to cope with the effects of climate change over the lifetime of the development they are designed to protect (normally 85-100 years); and
- Ensuring that structures to protect against flooding and the development protected are capable of adaptation to the effects of climate change when there is more certainty about the effects and still time for such adaptation to be effective.

Advice on the expected impacts of climate change and the allowances to be provided for future flood risk management in Ireland is given in the OPW Draft Guidance on Assessment of Potential Future Scenarios for Flood Risk Management (2009). Two climate change scenarios are considered. These are the Mid-Range Future Scenario (MRFS) and the High-End Future Scenario (HEFS). The MRFS is intended to represent a "likely" future scenario based on the wide range of future predictions available. The HEFS represents a more "extreme" future scenario at the upper boundaries of future projections. Based on these two scenarios the OPW recommended allowances for climate change in relation to river flows and sea levels are given in Table 6. These climate change allowances are particularly important at the development management stage of planning, and will ensure that proposed development is designed and constructed to take into account best current knowledge. Climate change allowances have been integrated into the recommendations provided at Section 4 of this report and MRFS and HEFS mapping is available from the OPW for certain areas, including AFAs, and provided in **Appendix II** to this SFRA report.

Table 6 Allowances for Future Scenarios (100-Year Time Horizon)[8]

Criteria	MRFS – to be considered for most development scenarios	HEFS – to be considered in relation to high value, high vulnerability development which cannot be relocated
Extreme Rainfall Depths	+20%	+30%
Flood Flows	+20%	+30%
Mean Sea Level Rise	+500mm	+1000mm

[7] Defended areas are highly sensitive to climate change as the likelihood of defence failure and resulting flooding increases.
[8] OPW Draft Guidance on Assessment of Potential Future Scenarios for Flood Risk Management (2009)

Section 4 Recommendations

4.1 Introduction

In order to comply with *The Planning System and Flood Risk Management - Guidelines for Planning Authorities* (Department of the Environment, Heritage and Local Government and Office of Public Works, 2009) and Department of the Environment, Community and Local Government Circular (*PL 2/2014*) and contribute towards flood risk management within the Plan area, the recommendations below have been made by the SFRA process and integrated into the Plan.

4.2 Introduction

In order to comply with *The Planning System and Flood Risk Management - Guidelines for Planning Authorities* (Department of the Environment, Heritage and Local Government and Office of Public Works, 2009) and Department of the Environment, Community and Local Government Circular (*PL 2/2014*) and contribute towards flood risk management within the County, the recommendations below have been made by the SFRA process.

4.3 Land Use Zoning

Previously undeveloped lands within Zones A or B should not be zoned for incompatible uses, unless a Justification Test is passed (including a planning judgement that there are no alternative locations available for accommodating such uses).

With respect to **previously developed lands**, the Guidelines can be complied with by applying a constrained land use approach, with Volume 2 Settlement Guide "4.0 Flooding and Strategic Flood Risk Assessment" and Volume 3 Development Management Standard "2.2 Flooding" applied on the land use zone mapping[9] in order to differentiate that there is a flood risk issue. Written measures on Table 7 provide for this constrained land use zoning approach.

The Land Use Zoning Objectives for each settlement have excluded vulnerable uses to the effects of flooding on previously undeveloped areas that are at elevated risk of flooding. These areas have been identified as being at risk of flooding through the undertaking of a SFRA.

The extent of the 'Constrained Land Uses' are shown with a hatching corresponding to the extent of Flood Zones A and B, which are overlain on the land use zoning objective underneath. Where such flood risk extents correspond with undeveloped lands, an appropriate land use zoning objective which would not facilitate the development of classes of development vulnerable to the effects of flooding, has been identified, such as 'Amenity'.

The 'Constrained Land Use' designation extends to existing developed lands in a number of settlements, which could include lands in the centre of towns and villages. In other incidences, the actual buildings may be located outside of areas identified as being at risk of flooding, but the curtilage of the property to the rear may be located at a lower level falling towards a watercourse, and identified as being located within Flood Zone A and / or B. The 'Constrained Land Use' designation overlain on land use zoning objectives generally restricts new development vulnerable to the effects of flooding, while recognising that existing development uses may require small scale additional development which would contribute towards the compact, and sustainable urban development of the individual town / village.

[9] It is recommended that Flood Zone A and B are combined and mapped as a "Constrained Land Use " – either across all zoned lands or across lands that have been previously developed for which the underlying LUZ objective would be inappropriate to the Flood Zone.

Where development proposals submitted to the Planning Authority relate to existing buildings, or developed areas, the sequential approach cannot be used to locate them in lower-risk areas, and the Justification Test will not therefore apply.

Proposals seeking to change the use of existing buildings from a less vulnerable use, to a more vulnerable use to the effects of flooding, will not normally be considered acceptable to the Planning Authority, whilst some change-of-use proposals not increasing the vulnerability to the effects of flooding, or small-scale extensions to such buildings, will be considered on their individual merits, but are acceptable in principle.

An existing dwelling or building that is not located within an area at risk of flooding, but has a large rear garden / curtilage that is located within Flood Zone A or B, would not be suitable for a more in-depth residential development proposal which would propose a residential use within a designated constrained land use area.

Development proposals within the areas designated as 'Constrained Land Use' shall be accompanied by a detailed Flood Risk Assessment, carried out in accordance with 'The Planning System and Flood Risk Assessment Guidelines' and 'Circular PL 2/2014' (or as updated), which shall assess the risks of flooding associated with the proposed development.

Proposals shall only be considered favourably by the Planning Authority where it is demonstrated that they would not have adverse impacts or impede access to a watercourse, floodplain or flood protection and management facilities, or increase the risk of flooding to other locations. The nature and design of structural and non-structural flood risk management measures, required for development in such areas, will also be required to be demonstrated (see Volume 3, Appendix 6, Development Management Standard 2.2 Flooding), to ensure that flood hazard and risk will not be increased. Measures proposed shall follow best practice in the management of health and safety for users and residents of the development. Specifications for developments in flood vulnerable areas set out in this Plan shall be complied with as appropriate.

Tables 1.4 & 1.5 from the 'The Planning System and Flood Risk Assessment Guidelines' will guide the Planning Authority in the assessment of development proposals within areas designated as 'Constrained Land Uses'. These tables demonstrate the vulnerability of differing land uses in the three different flood risk zones, to demonstrate the appropriateness of development in each zone, and that which is required to meet the Justification Test. It has not been considered necessary to include this designation within the land use zoning objectives matrix as it is not considered a land use.

Advice Note: Flood hazard mapping and flood risk information as set out in the Draft Plan may change in light of further analysis, and having consideration to the potential impacts of climate change. Therefore, all landowners, users and developers are advised by the Council to take all reasonable measures to assess the vulnerability to flooding of any development or property in a particular area at all times, and prior to submitting a planning application.

4.4 Integration of written provisions relating to flood risk management into the Plan

The written provisions relating to flood risk management detailed on Table 7, have been integrated into the Plan.

Various provisions have been integrated into the text of the Plan over multiple iterations through the Plan-preparation and SEA/SFRA process. The Council sought to ensure that: provisions integrated into the Plan were as non-technical in so far as practical and as concise as possible; no provisions within the Plan replicated those already set out in higher tier policy or legislation that any new development under the Plan would have to comply with in any case.

Table 7 Flood Risk Management Provisions from the Plan

Recommendations integrated into the Plan, included in:
11.5.1 Flood Risk Data The most significant water bodies in Tipperary are the Rivers Shannon and Suir, forming the core of a network of water bodies. The control of flooding, in the face of climate change, is a key land-use management issue and collective responsibility for everyone. The EU Directive on the Assessment and Management of Flood Risks, often referred to as the 'Floods Directive' requires management of flood risk on a RBMP basis, and having consideration to national water retention measures. The Office of Public Works (OPW) manages relevant data, available on www.floodinfo.ie. including, and not limited to Past Flood Events, Predicative Flood Risk Maps, and Arterial Drainage Schemes etc. The Council is committed to supporting and implementing, in co-operation with the OPW, the requirements of the 'Flood Directive', the Flood Risk Regulations (2010) and the provisions of The Planning System and Flood Risk Management Guidelines (DEHLG and OPW, 2009) and Circular PL2/2014. This Plan has been subject to a SFRA (Volume 5), having consideration to available and relevant data. **11.5.2 Assessing Flood Risk** In accordance with the Planning System and Flood Risk Management Guidelines for Planning Authorities, (DEHLG 2009), the Council will adopt a precautionary approach to flood risk management, and will seek to avoid inappropriate development in all areas at risk of flooding[10]. In this respect, the Council will have regard to planning applications within Flood Risk Zones A and B as outlined in OPW predicative flood mapping. Applicants should, and may be requested to, consider a 'Staged Approach' to individual site assessment in line with Section 2.21 of the Guidelines in support of development. Where proposals for new development are located in flood Zones A and B, the applicant should consider a site outside of the flood zones, or may be required to submit a flood risk assessment to demonstrate that the development complies with the 'Justification Test' set out in the Guidelines. 'Constrained Land Use' approach was applied to land use zoning as set out within Volume 2 of this Draft Plan. Flood risk assessments submitted shall consider climate change impacts and adaptation measures, including details of structural and non-structural flood risk management measures, such as those relating to floor levels, internal layout, flood-resistant construction, flood-resilient construction, emergency response planning and access and egress during flood events. These structural and non-structural flood risk management measures are further addressed in Volume 3 Development Management standards. In Flood Zone C, where the probability of flooding is low (less than 0.1%, Flood Zone C), site-specific flood risk assessment may be required, and the developer should satisfy themselves that the probability of flooding is appropriate to the development being proposed. The Plan SFRA datasets and the most up to date Catchment Flood Risk Assessment and Management (CFRAM) Programme climate scenario mapping, should be consulted by prospective applicants for developments in this regard. SFRAs and site-specific flood risk assessment shall provide information on the implications of climate change with regard to flood risk in relevant locations. The 2009 OPW Draft Guidance on Assessment of Potential Future Scenarios for Flood Risk Management (or any superseding document) shall be consulted with to this effect. Applications for development on land identified as benefitting land may be prone to flooding, and as such site-specific flood risk assessments may be required in these areas. The Council will also, though both public and private sector development, and in collaboration with the OPW, seek opportunities to enhance biodiversity and amenity, and to ensure the protection of environmentally sensitive sites and habitats, through methods such as SUDS (refer to Chapter 15 Water and Energy Utilities), non-porous surfacing etc in new development to minimise the risk of flooding.

[10] Flood hazard mapping and flood risk information as set out in this Draft Plan may change in light of further analysis and having consideration to the potential impacts of climate change. Therefore, all landowners, users and developers are advised by the Council to take all reasonable measures to assess the vulnerability to flooding of any development or property in a particular area at all times, and prior to submitting a planning application.

Recommendations integrated into the Plan, included in:

11.5.3 Climate Change and Flooding
'The Planning System and Flood Risk Management Guidelines for Planning Authorities and Technical Appendices, 2009' recommends that a 'precautionary approach' to climate change is adopted due to the level of uncertainty involved in potential effects. In contributing towards compliance with the Guidelines, climate change scenario mapping has been considered as part of the Plan SFRA.
The Plan requires that SFRA mapping, and the most up to date Catchment Flood Risk Assessment and Management (CFRAM) Programme climate scenario mapping is consulted by prospective applicants for developments, and that it is made available to lower-tier Development Management processes in the Council.
Chapter 11.5.2 Assessing Flood Risk of this Plan requires that:
- Flood risk assessments submitted shall consider climate change impacts,
- CFRAM Programme climate scenario mapping should be consulted by prospective applicants for developments; and,

SFRAs and site-specific flood risk assessment shall provide information on the implications of climate change with regard to flood risk in relevant locations.

11.5.4 Arterial Drainage Schemes and Drainage Districts
There are a number of Arterial Drainage Schemes (ADS) and Drainage Districts (DD) in Tipperary. Under the Arterial Drainage Acts, 1945 and 1995, construction and alteration of watercourses, bridges, weirs and embankments require the prior consent of the OPW. These legal requirements mainly serve to ensure that proposed construction and alteration projects do not increase the risk of flooding or have a negative impact on drainage of land. The Council will have consideration to developments proposed in ADS and DD and the impact a new development may have on these areas.
Policy 11 - 9 Assess all new developments (both within and without designated Flood Risk Zones) in line with the 'Staged Approach' and pre-cautionary principle set out in the Planning System and Flood Risk Management Guidelines for Planning Authorities, (DEHLG, 2009) and any amendment thereof, and the following:
(a) Require the submission of site-specific Flood Risk Assessments for developments undertaken within Flood Zones A & B and on lands subject to the mid-range future scenario floods extents, as published by the OPW. These Flood Risk Assessments shall consider climate change impacts and adaptation measures including details of structural and non-structural flood risk management measures, such as those relating to floor levels, internal layout, flood-resistant construction, flood-resilient construction, emergency response planning and access and egress during flood events.
(b) SFRAs and site-specific flood risk assessments shall provide information on the implications of climate change with regard to flood risk in relevant locations. The 2009 OPW Draft Guidance on Assessment of Potential Future Scenarios for Flood Risk Management (or any superseding document) shall be consulted with to this effect.
(c) 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.
(d) Applications for development on land identified as 'benefitting land' may be prone to flooding, and as such site-specific flood risk assessments may be required in these areas.
(e) Require applications for new development, or for an extension to an existing development on land zoned for 'Social and Public' or 'Amenity' use and where a potential flood risk is identified, and where the proposed use might be vulnerable, to be subject to site-specific flood risk assessment to the satisfaction of the Council.

Policy 11 - 10 (a) Ensure that new developments proposed in Arterial Drainage Schemes and Drainage Districts do not result in a significant negative impact on the integrity, function and management of these areas.
(b) Consult with the OPW in relation to proposed developments in the vicinity of Flood Relief Schemes and drainage channels and rivers for which the OPW are responsible, and to retain a strip on either side of such channels, where required, to facilitate maintenance access thereto.
(c) Protect the integrity of any formal flood risk management infrastructure (see key flood risk infrastructure identified in Section 2.2 "Drainage, Key Flood Risk Infrastructure and Early Warning Systems" of the SFRA), thereby ensuring that any new development does not negatively impact any existing defence infrastructure or compromise any proposed new defence infrastructure.

Objective 11 - F (a) To support and facilitate the CFRAM Programme, and to support the OPW in the development and implementation of sustainable flood risk management plans and actions. (b) To consider, as appropriate any new and/or emerging data, including, when available, any relevant information contained in the CFRAM Flood Risk Management Plans.

11 -0 (a) Require flood risk assessments to incorporate consideration of climate change impacts and adaptation measures with regard to flood risk, and, (b) Require that flood risk management planning determines actions 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.

Policy 8 - J In conjunction with Coillte and other stakeholders to support the development of forestry resources with a number of functions including, flood retention, biodiversity, water quality/catchment management and tourism and recreation.

Policy 12 – 8 Ensure that in assessing new development, the capacity and efficiency of the national road network drainage regimes in County Tipperary will be safeguarded for national road drainage purposes.

Section 15.3 Sustainable Surface Water Management, including: The Council is responsible for the on-going maintenance and monitoring of sustainable drainage systems within our towns and villages, and will seek to maintain drainage having consideration **to Water Sensitive Urban Design and application of** a SuDS approach. The Council will require **all new development to provide a separate foul and surface water drainage system and to incorporate Water**

Recommendations integrated into the Plan, included in:

Sensitive Urban Design and a SuDS approach, where appropriate, in new development and the public realm. The provisions of Nature-Based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas (water sensitive urban design) Best Practice Interim Guidance Document (DHLGH, 2001) and any review there off, will apply. The Council will require the implementation of **water sensitive urban design** as an integral part of the design of new developments to reduce the generation of storm water run-off, and to ensure that all storm water generated is disposed of on-site or is attenuated and treated prior to discharge to an approved storm water system, with consideration to the following:...

Volume 2 Settlement Guide
4.0 Flooding and Strategic Flood Risk Assessment
4.1 Land Use Zoning
In accordance with The Planning System and Flood Risk Management: Guidelines for Planning Authorities, the Settlement Plans have been subject to Stage 1 Flood Risk Identification process the report and findings of this process are set out in Appendix 1 of this Plan. In this respect, a sequential and a precautionary approach has been applied to the zoning of land within all settlements and undeveloped land which is liable to flood has been zoned for open space or agricultural purposes.
With respect to lands which have been developed which have been identified in the SFRA as of flood risk will be appropriately managed, to ensure sustainable use of flood risk areas.
4.2 Flood Risk Management in Settlements
A Strategic Flood Risk Assessment (SFRA) has been prepared in accordance with the requirements of The Planning System and Flood Risk Assessment Guidelines (DEHLG, 2009) and Circular PL02/2014 (August 2014). All SFRA recommendations have been integrated into the proposed Plan with a precautionary approach applied to the zoning of lands identified as potentially at risk of flooding.

Volume 3 Appendix 6
2.2 Flooding
The Council will require proposals for development to comply with requirements of the Planning System and Flood Risk Assessment Guidelines (DEHLG and OPW, 2009) and any up-dated thereof) including providing detailed design specifications as may be required to facilitate the impact of development.
(a) Extensions of existing uses or minor development within flood risk areas will be supported, provided they do not: obstruct important flow paths; introduce a number of people into flood risk areas; entail the storage of hazardous substances; have adverse impacts or impede access to a watercourse, floodplain or flood protection and management facilities; or increase the risk of flooding elsewhere.
(b) Applications for development on previously developed lands within Flood Zones A or B, shall be subject to site specific flood risk assessment and shall provide details of structural and non-structural flood risk management measures, to include, but not be limited to specifications of the following:

2.2.1 Floor Levels
In areas of limited flood depth, the specification of the threshold and floor levels of new structures shall be raised above expected flood levels to reduce the risk of flood losses to a building, by raising floor heights within the building structure using a suspended floor arrangement or raised internal concrete platforms.

When designing an extension or modification to an existing building, an appropriate flood risk reduction measure shall be specified to ensure the threshold levels into the building are above the design flood level. However, care must also be taken to ensure access for all is provided in compliance with Part M of the Building Regulations.

Where threshold levels cannot be raised to the street for streetscape, conservation or other reasons, the design shall specify a mixing of uses vertically in buildings - with less vulnerable uses located at ground floor level, along with other measures for dealing with residual flood risk.

2.2.2 Internal Layout
Internal layout of internal space shall be designed and specified to reduce the impact of flooding [for example, living accommodation, essential services, storage space for provisions and equipment shall be designed to be located above the predicted flood level]. In addition, designs and specifications shall ensure that, wherever reasonably practicable, the siting of living accommodation (particularly sleeping areas) shall be above flood level.

With the exception of single storey extensions to existing properties, new single storey accommodation shall not be deemed appropriate where predicted flood levels are above design floor levels. In all cases, specifications for safe access, refuge and evacuation shall be incorporated into the design of the development.

2.2.3 Flood-Resistant Construction
Developments in flood vulnerable zones shall specify the use of flood-resistant construction aimed at preventing water from entering buildings - to mitigate the damage floodwater caused to buildings.

Developments shall specify the use of flood resistant construction prepared using specialist technical input to the design and specification of the external building envelope – with measures to resist hydrostatic pressure (commonly referred to as “tanking”) specified for the outside of the building fabric.
The design of the flood resistant construction shall specify the need to protect the main entry points for floodwater into buildings - including doors and windows (including gaps in sealant around frames), vents, air-bricks and gaps around conduits or pipes passing through external building fabric.

Recommendations integrated into the Plan, included in:
The design of the flood resistant construction shall also specify the need to protect against flood water entry through sanitary appliances as a result of backflow through the drainage system. **2.2.4 Flood-Resilient Construction** Developments in flood vulnerable zones that are at risk of occasional inundation shall incorporate design and specification for flood resilient construction which accepts that floodwater will enter buildings and provides for this in the design and specification of internal building services and finishes. These measures limit damage caused by floodwater and allow relatively quick recovery. This can be achieved by specifying wall and floor materials such as ceramic tiling that can be cleaned and dried relatively easily, provided that the substrate materials (e.g. blockwork) are also resilient. Electrics, appliances and kitchen fittings shall also be specified to be raised above floor level, and one-way valves shall be incorporated into drainage pipes. **2.2.5 Emergency Response Planning** In addition to considering physical design issues for developments in flood vulnerable zones, the developer shall specify that the planning of new development also takes account of the need for effective emergency response planning for flood events in areas of new development. Applications for developments in flood vulnerable zones shall provide details that the following measures will be put in place and maintained: • Provision of flood warnings, evacuation plans and ensuring public awareness of flood risks to people where they live and work; • Coordination of responses and discussion with relevant emergency services i.e. Local Authorities, Fire and Rescue, Civil Defence and An Garda Siochána through the SFRA; and • Awareness of risks and evacuation procedures and the need for family flood plans. **2.2.6 Access and Egress During Flood Events** Applications for developments in flood vulnerable zones shall include details of arrangements for access and egress during flood events. Such details shall specify that: flood escape routes have been kept to publicly accessible land; such routes will have signage and other flood awareness measures in place, to inform local communities what to do in case of flooding; and this information will be provided in a welcome pack to new occupants. **Further Information** Further and more detailed guidance and advice can be found at http://www.flooding.ie and in the Building Regulations.

4.5 Justification Test

Table 8 overleaf addresses the Justification Test outlined in the Flood Risk Management Guidelines (see Appendix I).

Table 8 Justification Tests

Settlement	Zoning in Draft Plan (for mapping of the intersects, refer to the maps in Appendix II)	Justification Test Fails, if one of the following fails; All must be passed for the test to be passed			
		Is the settlement targeted for growth under the RSES, existing CDP and/or Draft CDP?	Is the zoning of the lands required to achieve the proper planning and sustainable development of the settlement? All sub-criteria[11] must be satisfied	SFRA recommendation integrated into the Plan for management of risk?	Overall Result
Ballina	Employment and Enterprise (west of Marine Village)	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
	Town/Village Centre (north of Lakeside Drive)	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
	Social and Public (Ballina WWTP)	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
	Existing Residential (east of R494)	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
Fethard	Existing Residential (south of the town)	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
	Existing Residential (north west)	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
	Town/Village Centre	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
	Social & Public (south of R692)	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
	Employment & Enterprise (south east – south of R706)	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
Newport	Social & Public (St Mary's Secondary School)	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
Ardfinnan	Existing Residential (north of the Suir)	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
	Town/Village Centre (north of the Suir)	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass

[11] (i) Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement;
(ii) Comprises significant previously developed and/or under-utilised lands;
(iii) Is within or adjoining the core of an established or designated urban settlement;
(iv) Will be essential in achieving compact and sustainable urban growth; and
(v) There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.

Settlement	Zoning in Draft Plan (for mapping of the intersects, refer to the maps in Appendix II)	Justification Test Fails, if one of the following fails; All must be passed for the test to be passed			
		Is the settlement targeted for growth under the RSES, existing CDP and/or Draft CDP?	Is the zoning of the lands required to achieve the proper planning and sustainable development of the settlement? All sub-criteria[11] must be satisfied	SFRA recommendation integrated into the Plan for management of risk?	Overall Result
	Existing Residential (south of Main Street)	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
	Town/Village Centre	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
	Social & Public (WWTP)	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
	Social & Public (Church and School)	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
Borrisokane	Town Centre	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
Borrisoleigh	Employment and Enterprise	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
Clogheen	Town Centre	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
Clogheen	Existing Residential	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
Cloughjordan	Existing Residential	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
Holycross	Social & Public (Holycross Abbey)	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
	Employment and Enterprise (adjacent to Holycross Abbey)	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
Killenaule	Social & Public (WWTP)	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
Kilsheelan	Social & Public (Council Depot)	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
	Existing Residential	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
Mullinahone	Existing Residential	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
	Town Centre	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
	Social & Public (WWTP)	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass

Settlement	Zoning in Draft Plan (for mapping of the intersects, refer to the maps in Appendix II)	Justification Test Fails, if one of the following fails; All must be passed for the test to be passed			
		Is the settlement targeted for growth under the RSES, existing CDP and/or Draft CDP?	Is the zoning of the lands required to achieve the proper planning and sustainable development of the settlement? All sub-criteria[11] must be satisfied	SFRA recommendation integrated into the Plan for management of risk?	Overall Result
Twomileborris	Existing Residential	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
	Social & Public (WWTP)	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
Ballylooby	Social & Public (Church car park)	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
Ballyporeen	Social & Public (WWTP)	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass
Bansha	Social & Public (WWTP)	Yes	This land use zoning proposal fulfils all sub-criteria and would contribute towards overall sustainable, compact and balanced regional development by inclusion as part of the Development Plan - as confirmed by the Planning Department.	Yes, see Volume 5, Section 4.3 Land Use Zoning, including provisions relating to Land Use Zoning and Constrained Land Uses	Pass

Section 5 Conclusion

Stage 2 SFRA has been undertaken as part of the Plan-preparation process and the SFRA has informed the preparation of the Plan.

The SFRA has mapped boundaries for Flood Risk Zones, taking into account factors including: predictive and historical indicators of flood risk; documented Council knowledge of lands; local knowledge; the potential source and direction of flood paths from rivers and streams; vegetation indicative of flood risk; and the locations of topographic/built features that coincide with the flood indicator related boundaries/topographical survey.

All SFRA recommendations have been integrated into the Plan and the Plan complies with the Guidelines and associated Circular.

Appendix I: Summary of the requirements of the Flood Guidelines for land uses in Flood Zones

Requirements relating to land uses in Flood Zones as set out in the Department of Environment, Heritage and Local Government (DEHLG) and Office of Public Works (OPW) 2009 Flood Guidelines (including at Chapter 3 Principles and Key Mechanisms and Chapter 5 Flooding and Development Management) and Departmental Circular PL2/2014 should be adhered to.

- The Sequential Approach, including the Justification test -

The key principles of the Guidelines' risk-based sequential approach (see Figure 1) are:

- Avoid development in areas at risk of flooding. If this is not possible, consider substituting a land use that is less vulnerable to flooding. Only when both avoidance and substitution cannot take place should consideration be given to mitigation and management of risks.

- Inappropriate types of development that would create unacceptable risks from flooding should not be planned for or permitted.

- Exceptions to the restriction of development due to potential flood risks are provided for through the use of a Justification Test, where the planning need and the sustainable management of flood risk to an acceptable level must be demonstrated.

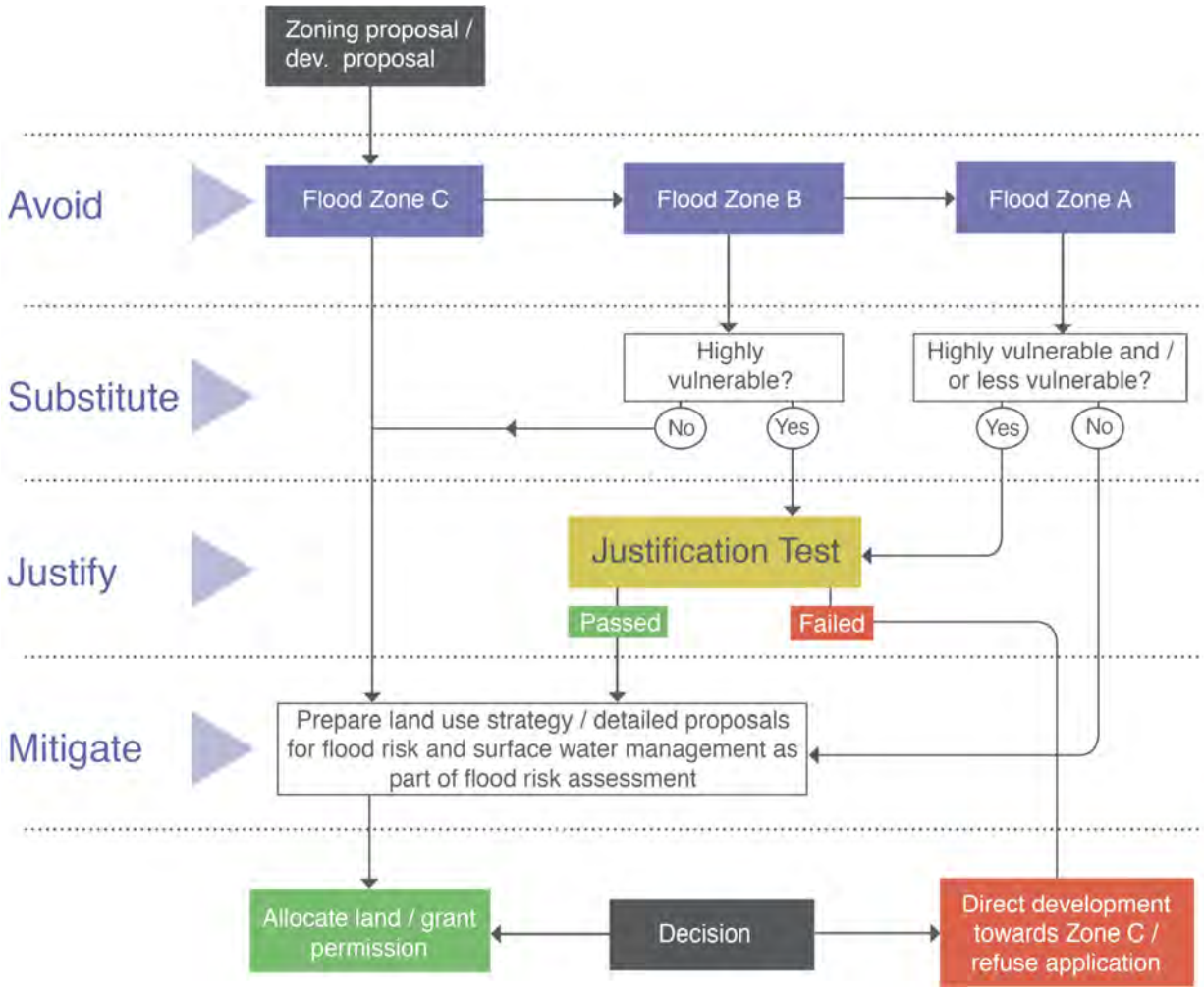


Figure 1 Sequential Approach Process[12]

In summary, the **planning implications** for each of the flood zones are:

Zone A - High probability of flooding. Most types of development would be considered inappropriate in this zone. Development in this zone should be avoided and/or only considered in exceptional circumstances, such as in city and town centres, or in the case of essential infrastructure that cannot be located elsewhere, and where the Justification Test has been applied. Only water-compatible development, such as docks and marinas, dockside activities that require a waterside location, amenity open space, outdoor sports and recreation, would be considered appropriate in this zone.

Zone B - Moderate probability of flooding. Highly vulnerable development, such as hospitals, residential care homes, Garda, fire and ambulance stations, dwelling houses and primary strategic transport and utilities infrastructure, would generally be considered inappropriate in this zone, unless the requirements of the Justification Test can be met. Less vulnerable development, such as retail, commercial and industrial uses, sites used for short-let for caravans and camping and secondary strategic transport and utilities infrastructure, and water-compatible development might be considered appropriate in this zone. In general however, less vulnerable development should only be considered in this zone if adequate lands or sites are not available in Zone C and subject to a flood risk assessment to the appropriate level of detail to demonstrate that flood risk to and from the development can or will adequately be managed.

Zone C - Low probability of flooding. Development in this zone is appropriate from a flood risk perspective (subject to assessment of flood hazard from sources other than rivers and the coast) but would need to meet the normal range of other proper planning and sustainable development considerations.

[12] Flood Zone C covers all areas outside of Zones A and B

Table 9 overleaf classifies the vulnerability of different types of development while Table 10 identifies the appropriateness of development belonging to each vulnerability class within each of the flood zones as well as identifying what instances in which the Justification Test should be undertaken. Inappropriate development that does not meet the criteria of the Justification Test should not be considered at the plan-making stage or approved within the development management process.

Table 9 Classification of vulnerability of different types of development

Vulnerability class	Land uses and types of development which include*:
Highly vulnerable development (including essential infrastructure)	Garda, ambulance and fire stations and command centres required to be operational during flooding; Hospitals; Emergency access and egress points; Schools; Dwelling houses, student halls of residence and hostels; Residential institutions such as residential care homes, children's homes and social services homes; Caravans and mobile home parks; Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.
Less vulnerable development	Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions; Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans; Land and buildings used for agriculture and forestry; Waste treatment (except landfill and hazardous waste); Mineral working and processing; and Local transport infrastructure.
Water-compatible development	Flood control infrastructure; Docks, marinas and wharves; Navigation facilities; Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location; Water-based recreation and tourism (excluding sleeping accommodation); Lifeguard and coastguard stations; Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).

*Uses not listed here should be considered on their own merits

Table 10 Vulnerability Classes and Flood Zones

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development (including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

The **Justification Test** which is referred to as part of the Sequential Approach is an assessment of whether a development proposal within an area at risk of flooding meets specific criteria for proper planning and sustainable development and demonstrates that it will not be subject to unacceptable risk nor increase flood risk elsewhere. The Justification Test should be applied only where development is within flood risk areas that would be defined as inappropriate under the screening test of the sequential risk based approach outlined above. This Justification Test is shown below.

Where, as part of the preparation and adoption or variation and amendment of a development/local area plan[1], a planning authority is considering the future development of areas in an urban settlement that are at moderate or high risk of flooding, for uses or development vulnerable to flooding that would generally be inappropriate as set out in Table 3.2, all of the following criteria must be satisfied:

1 The urban settlement is targeted for growth under the National Spatial Strategy, regional planning guidelines, statutory plans as defined above or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act, 2000, as amended.

2 The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and, in particular:

(i) Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement[2];

(ii) Comprises significant previously developed and/or under-utilised lands;

(iii) Is within or adjoining the core[3] of an established or designated urban settlement;

(iv) Will be essential in achieving compact and sustainable urban growth; and

(v) There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement[4]

3 A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere.

N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment.

Figure 2 Justification Test [13]

[13] Footnotes: [1] Including Strategic Development Zones and Section 25 Schemes in the area of the Dublin Docklands Development Authority [2]In the case of Gateway planning authorities, where a number of strategic growth centres have been identified within the overall area of the authority, the Justification Test may be applied for vulnerable development within each centre. [3] See definition of the core of an urban settlement in Glossary of Terms. [4] This criterion may be set aside where section 4.27b applies.

Appendix II: Flood Mapping

County Tipperary Development Plan 2022-2028

Strategic Flood Risk Assessment

Appendix II

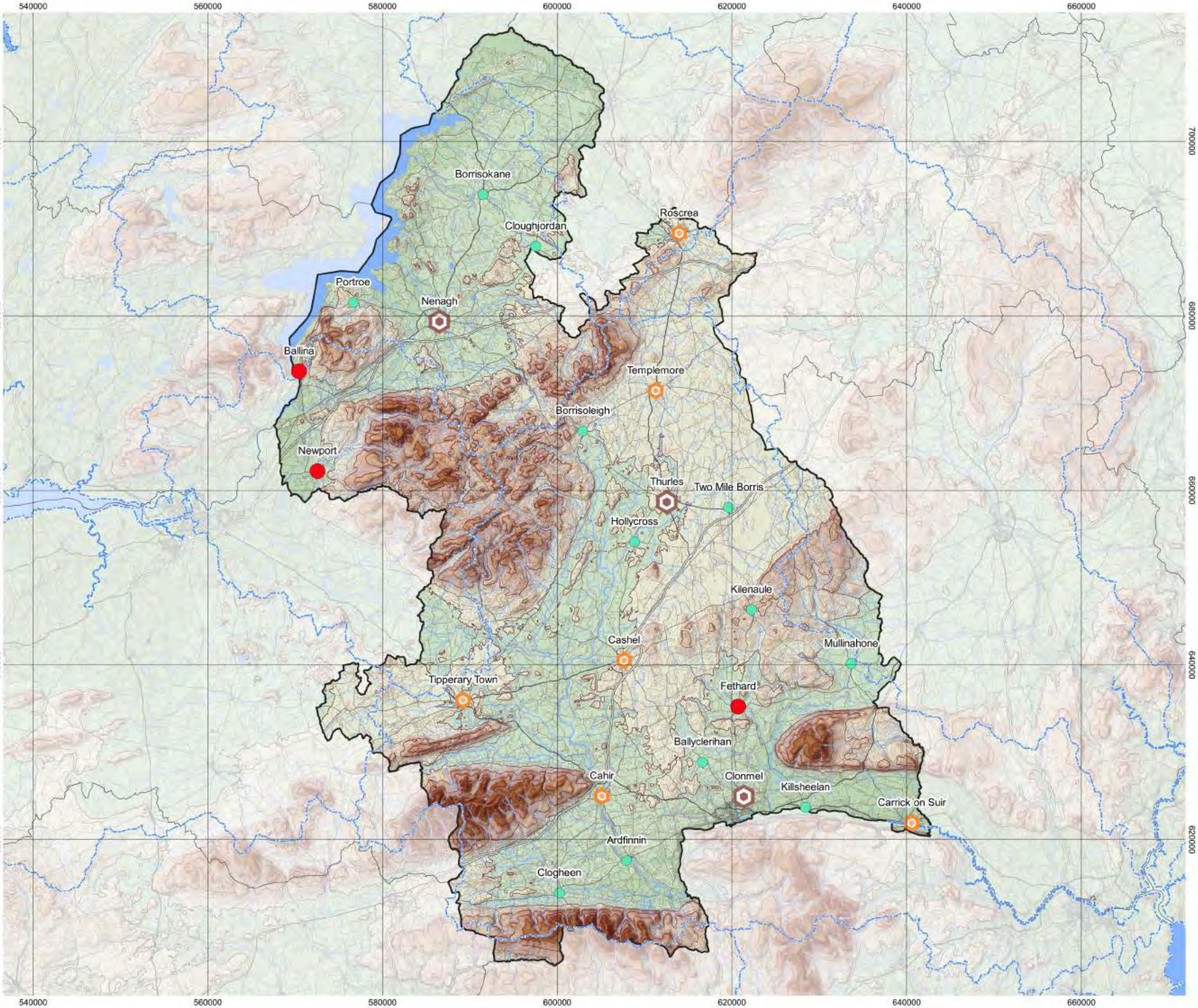
Comhairle Contae Thiobraid Árann
Tipperary County Council

09/05/2022

Table of Contents

County-Wide Maps

Settlement Flood Risk Indicators



County Tipperary Development Plan 2022-2028

SFRA Settlements

- County Tipperary
- Other County Boundary
- WFD Catchment
- Water
- River or Stream

SFRA Settlements

- Urban Service Centre
- Rural Service Centre

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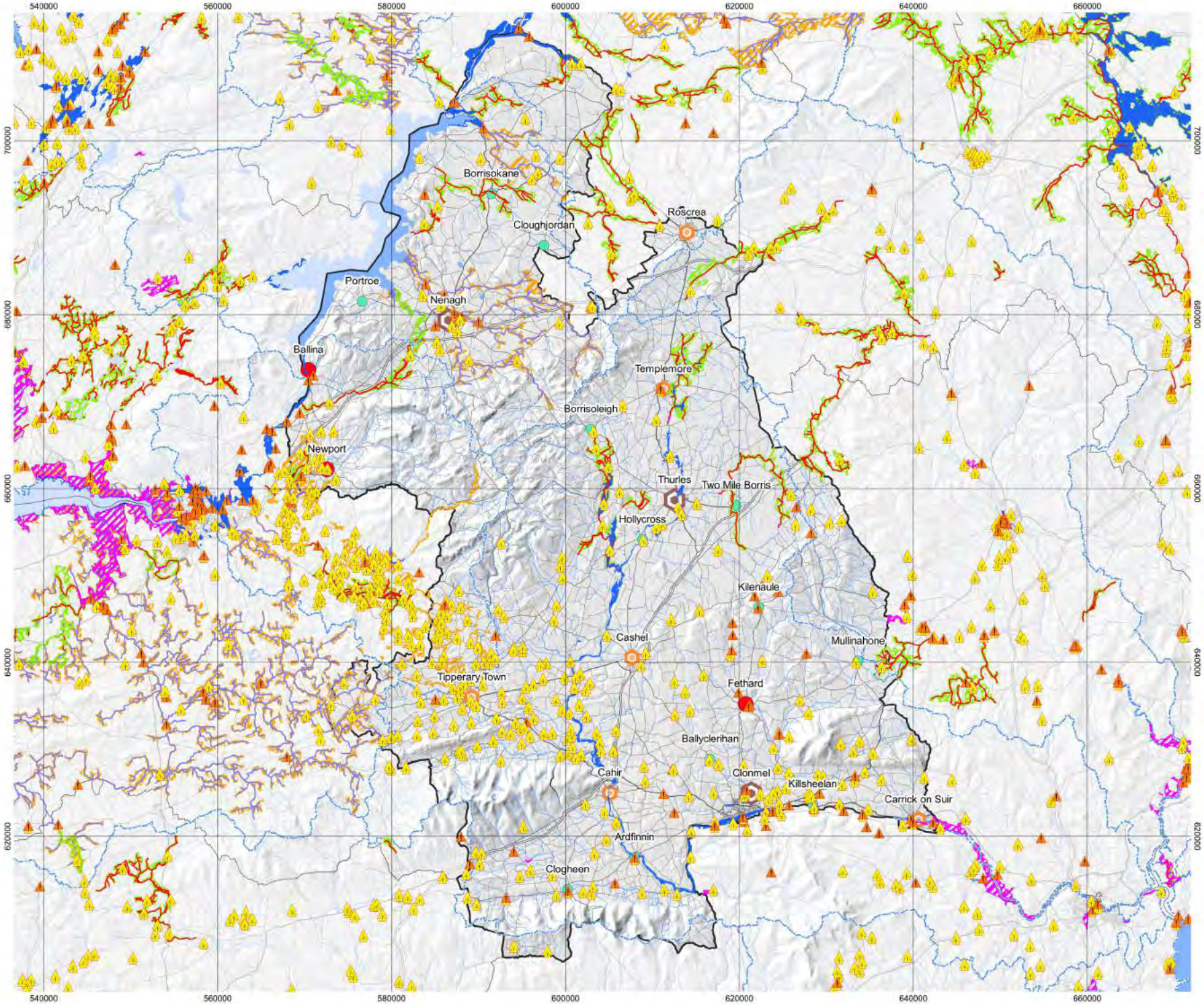
CAAS

Coordinates in ITM



County Tipperary Development Plan 2022-2028

OPW Historical Flood Data

- County Tipperary
- Other County Boundary
- WFD Catchment
- Water
- River or Stream

SFRA Settlements

- Urban Service Centre
- Rural Service Centre

OPW Past Flood Events

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

Land Commission

- Benefited Lands

Drainage District

- Channel
- Embankment
- Benefited Lands

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Lands

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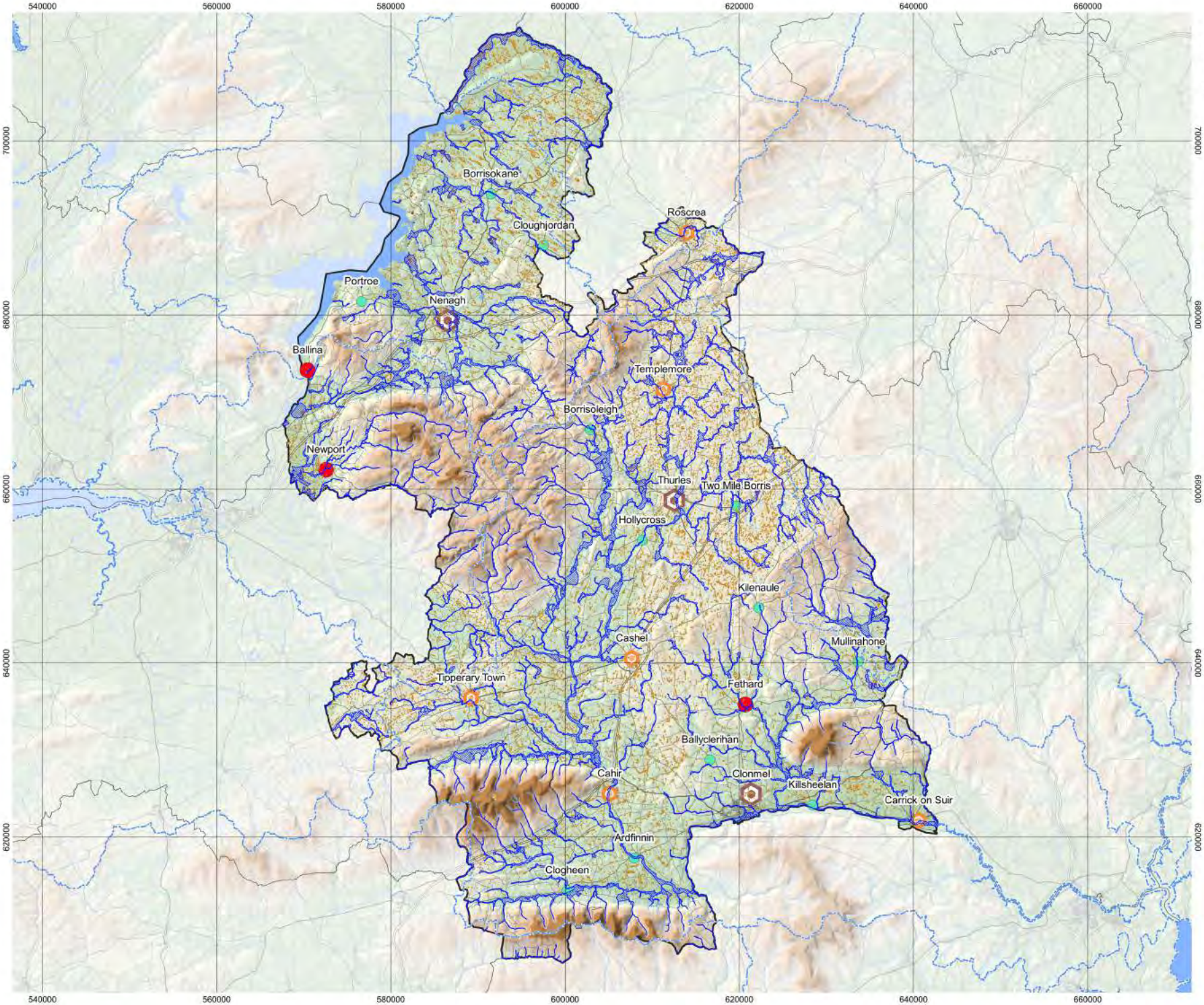
CAAS



County Tipperary Development Plan 2022-2028

OPW Preliminary Flood Risk Assessment (PFRA)

- County Tipperary
- Other County Boundary
- WFD Catchment
- Water
- River or Stream

SFRA Settlements

- Urban Service Centre
- Rural Service Centre

PFRA

- Fluvial 1% AEP
- Fluvial 0.1% AEP
- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

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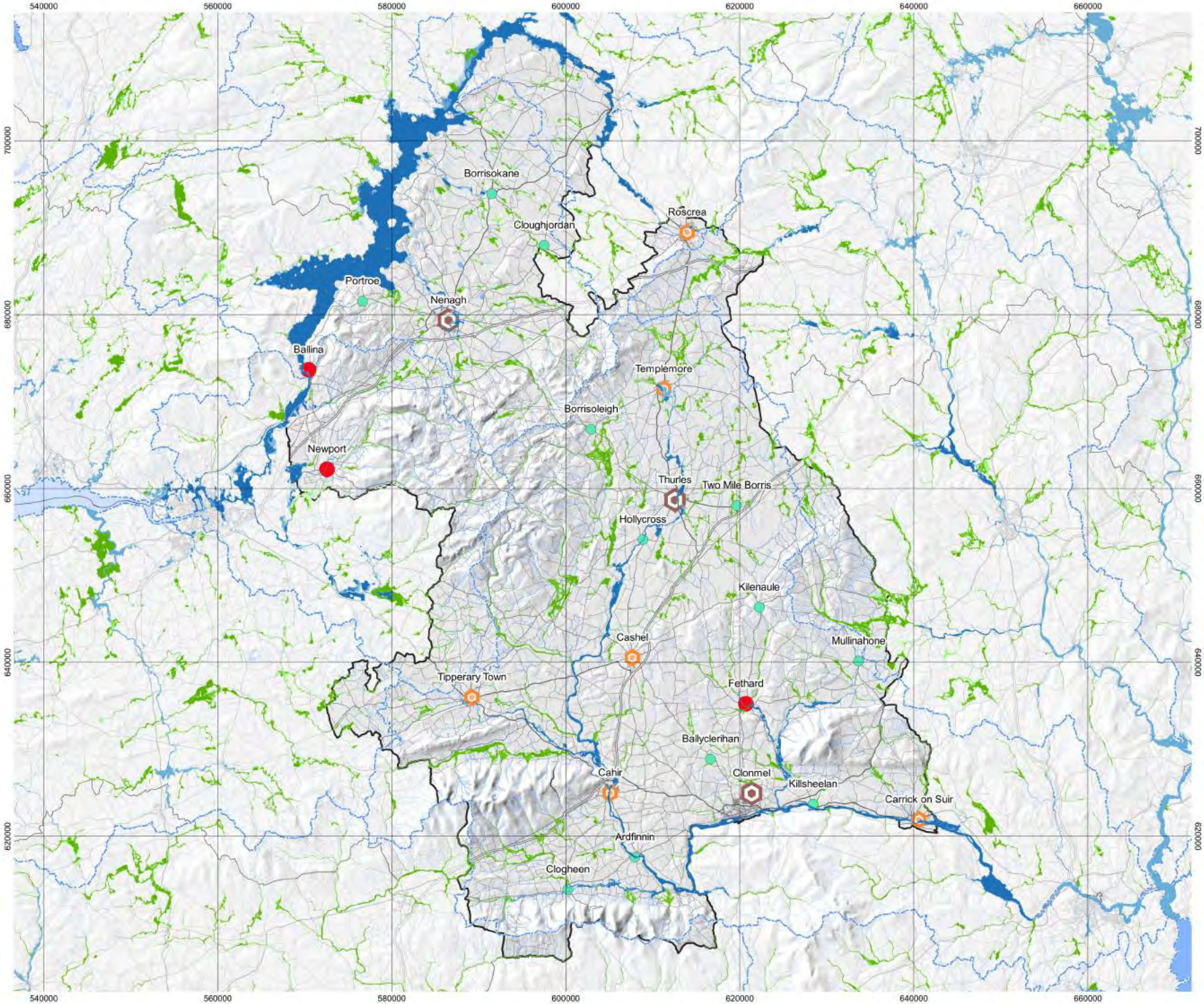
Tipperary County Council

CAAS

Coordinates in ITM



County Tipperary Development Plan 2022-2028

OPW Catchment Flood Risk Assessment & Management (CFRAM) and National Indicative Fluvial Mapping (NIFM) Present Day Scenario

- County Tipperary
- Other County Boundary
- WFD Catchment
- Water
- River or Stream

SFRA Settlements

- Urban Service Centre
- Rural Service Centre

CFRAM Fluvial Present Day Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

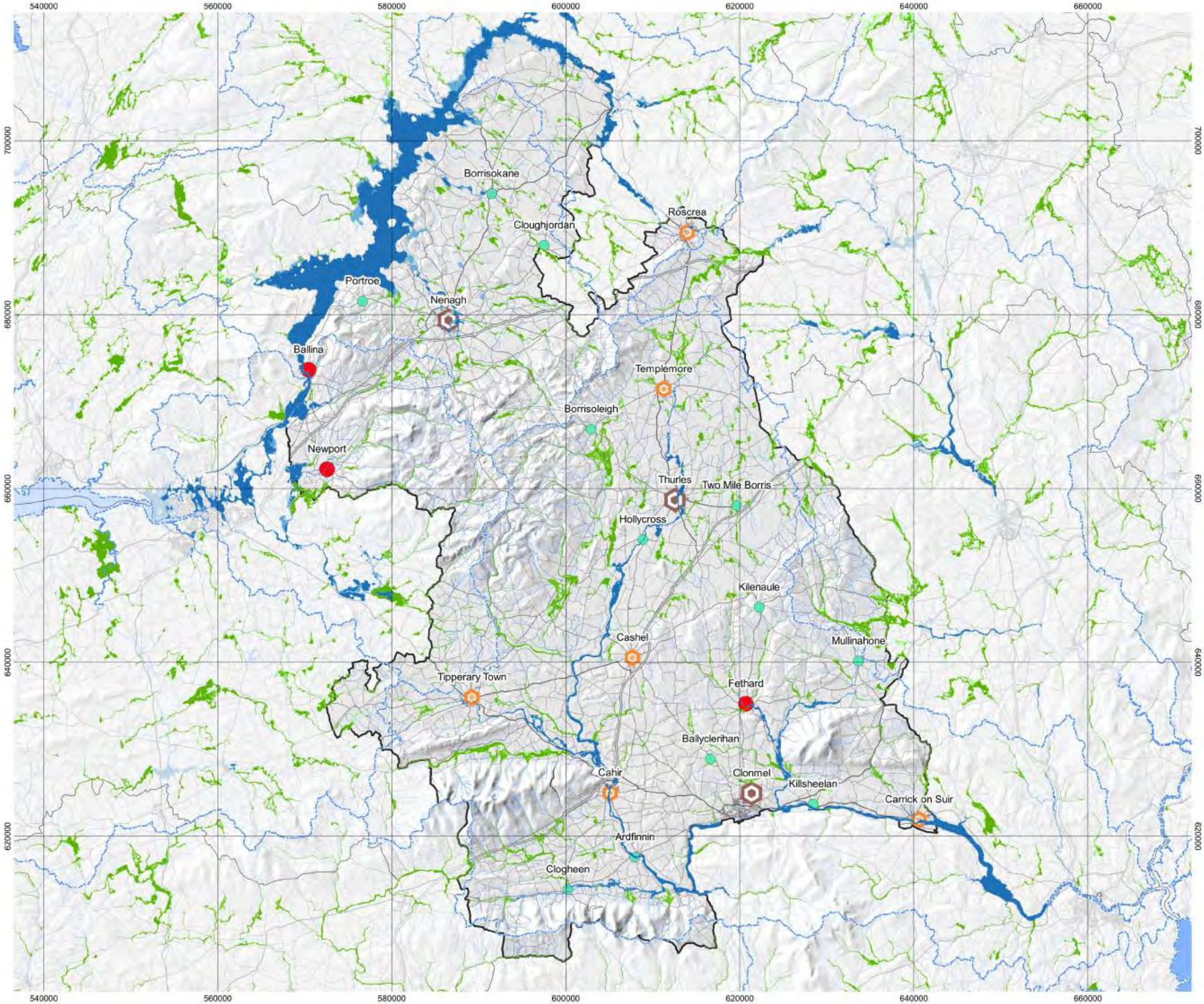
NIFM Present Day Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

Comhairle Contae Thiobraid Árann
Tipperary County Council

CAAS

Coordinates in ITM



County Tipperary Development Plan 2022-2028

OPW Catchment Flood Risk Assessment & Management (CFRAM) and National Indicative Fluvial Mapping (NIFM)
Mid-Range Future Scenario

- County Tipperary
- Other County Boundary
- WFD Catchment
- Water
- River or Stream

SFRA Settlements

- Urban Service Centre
- Rural Service Centre

CFRAM Fluvial Mid-Range Future Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

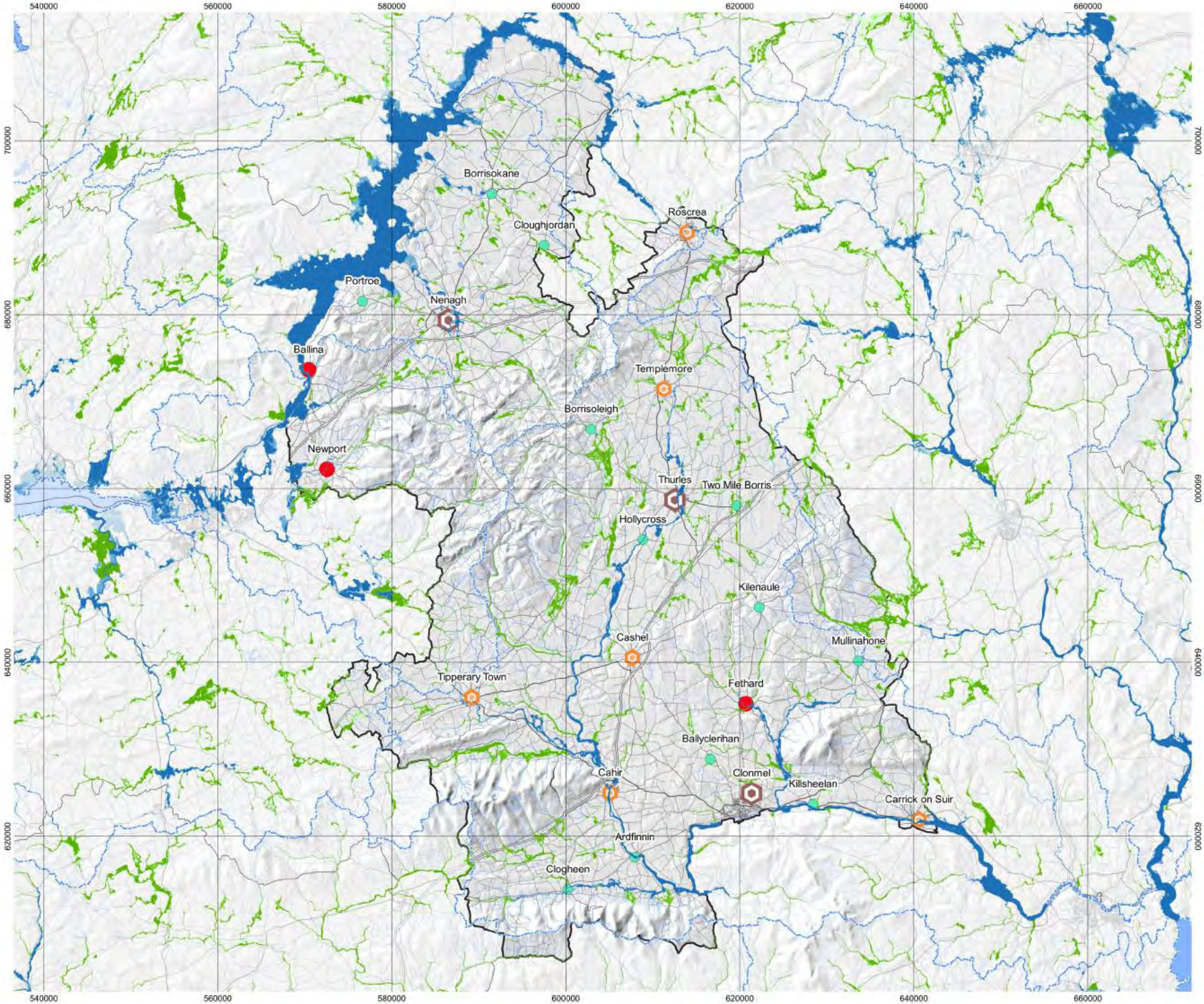
NIFM Mid-Range Future Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

Comhairle Contae Thiobraid Árann
Tipperary County Council

CAAS

Coordinates in ITM



County Tipperary Development Plan 2022-2028

OPW Catchment Flood Risk Assessment & Management (CFRAM) and National Indicative Fluvial Mapping (NIFM) High-End Future Scenario

- County Tipperary
- Other County Boundary
- WFD Catchment
- Water
- River or Stream

SFRA Settlements

- Urban Service Centre
- Rural Service Centre

CFRAM Fluvial Hign-End Future Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

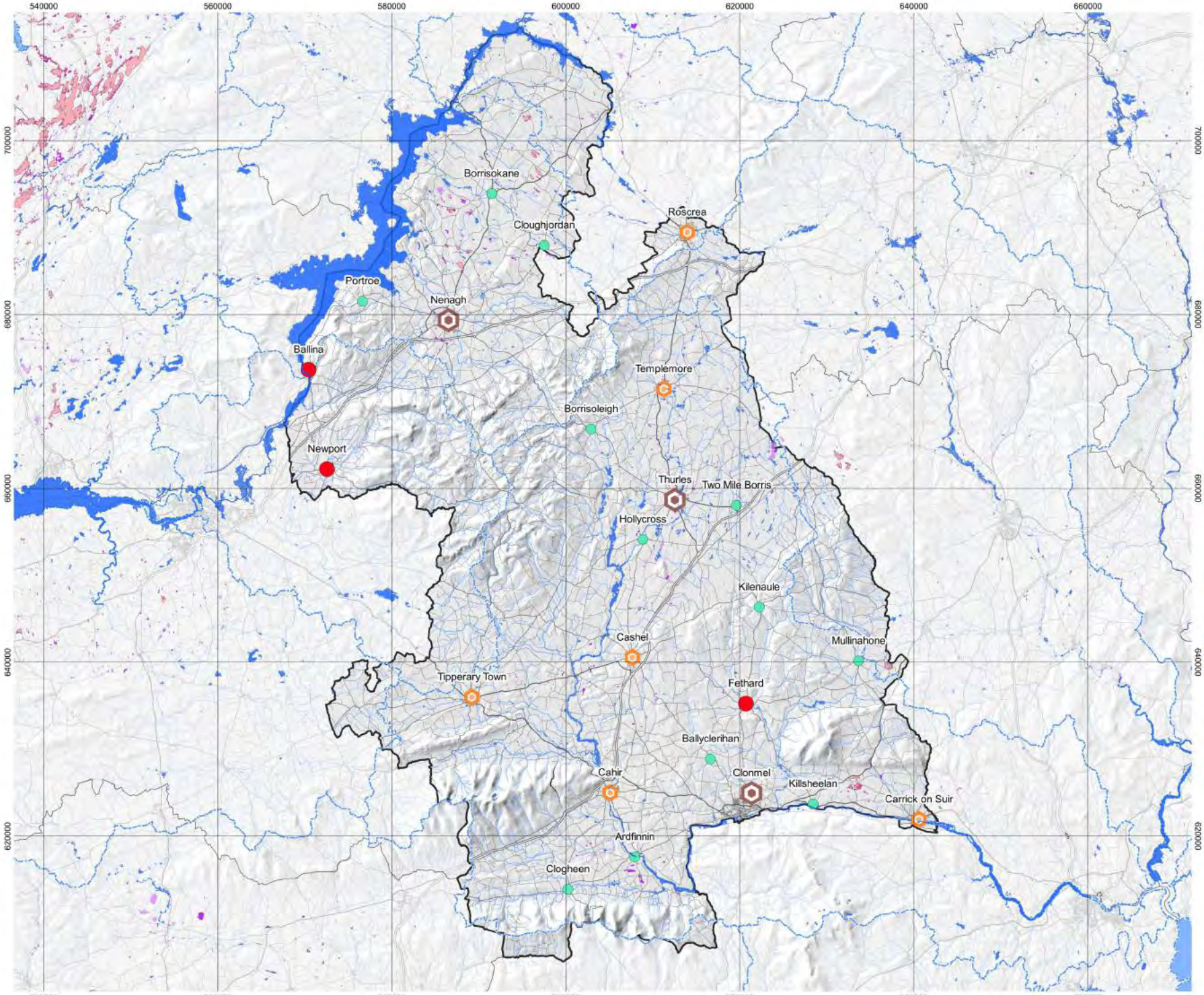
NIFM High-End Future Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

Comhairle Contae Thiobraid Árann
Tipperary County Council

CAAS

Coordinates in ITM



County Tipperary Development Plan 2022-2028

GSI Historical Flood Data and Groundwater Predictive Modeling

- County Tipperary
- Other County Boundary
- WFD Catchment
- Water
- River or Stream

SFRA Settlements

- Urban Service Centre
- Rural Service Centre

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

Surface Water Flooding

- Winter 2015-2016 Surface Water Flooding

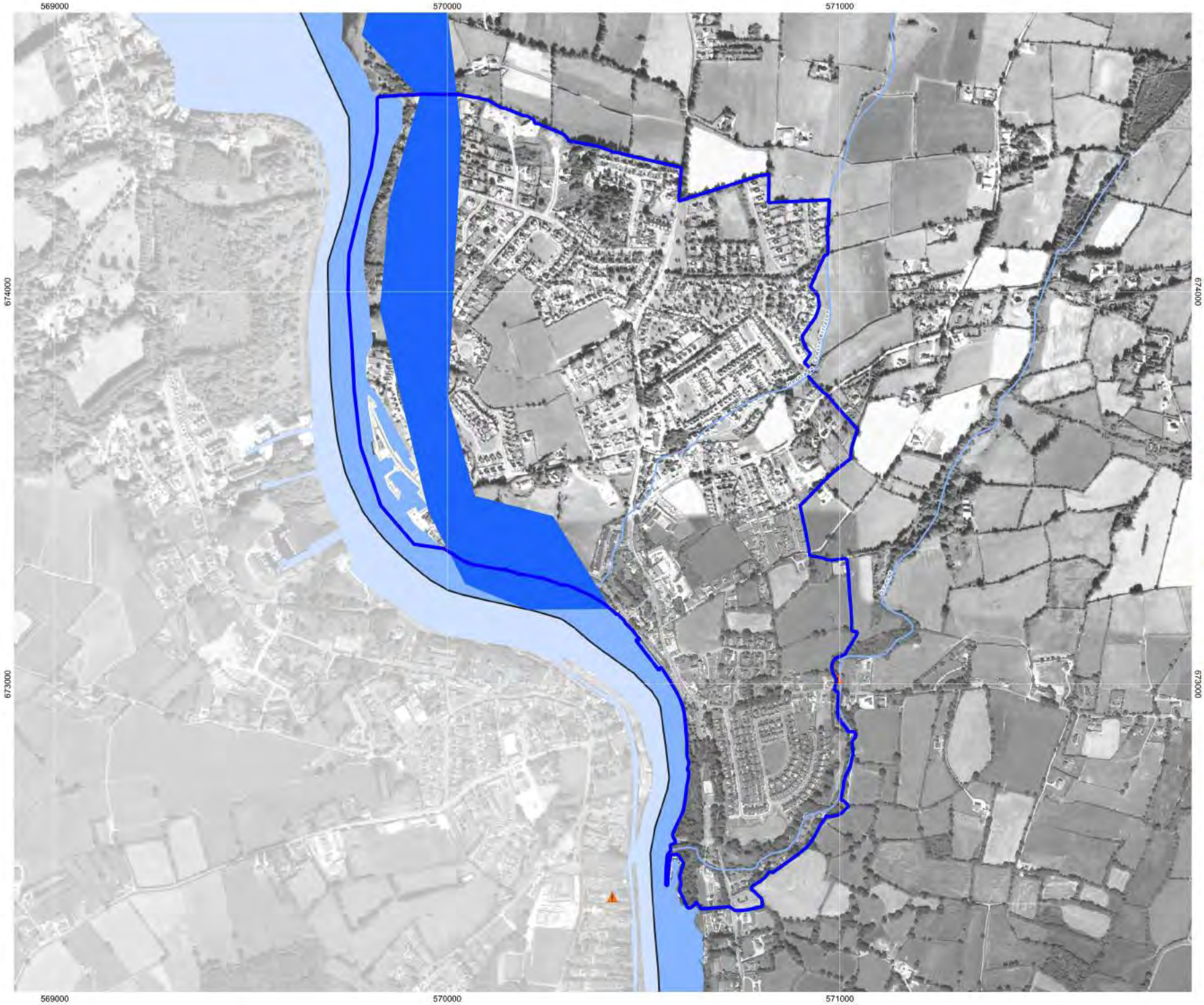
Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

Comhairle Contae Thiobraid Árann
Tipperary County Council

CAAS

Coordinates in ITM



County Tipperary Development Plan 2022-2028

Ballina
Urban Service Centre
OPW Historical Flood Data

- Plan Boundary
- County Boundary
- Water
- River or Stream

OPW Past Flood Events

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

Land Commission

- Benefited Lands

Drainage District

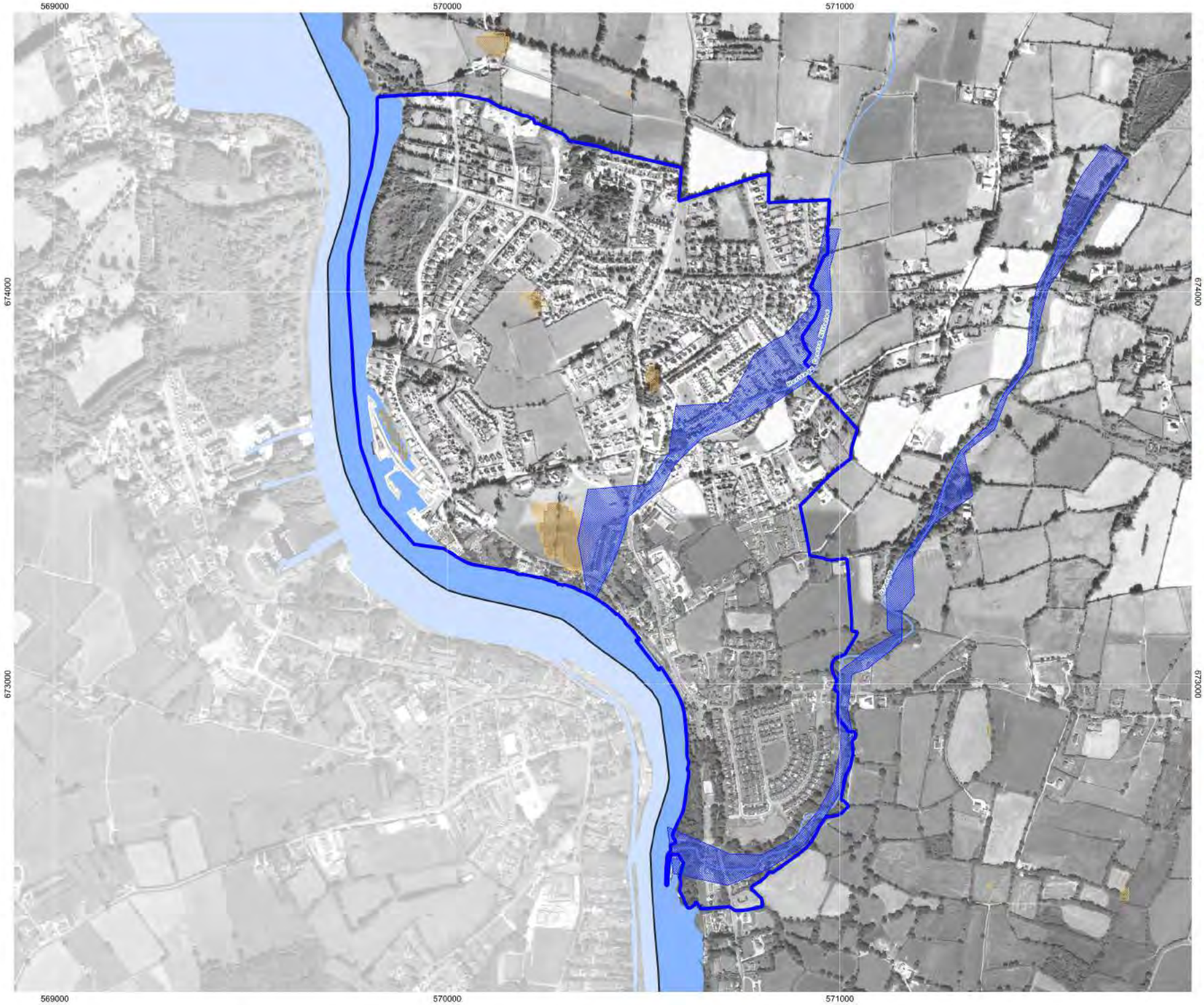
- Channel
- Embankment
- Benefited Lands

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Lands

Comhairle Contae Thiobraid Árann
Tipperary County Council

CAAS



County Tipperary Development Plan 2022-2028

Ballina
Urban Service Centre
OPW Preliminary Flood Risk Assessment (PFRA)

- Plan Boundary
- County Boundary
- Water
- River or Stream

PFRA

- Fluvial 1% AEP
- Fluvial 0.1% AEP
- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

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Tipperary County Council

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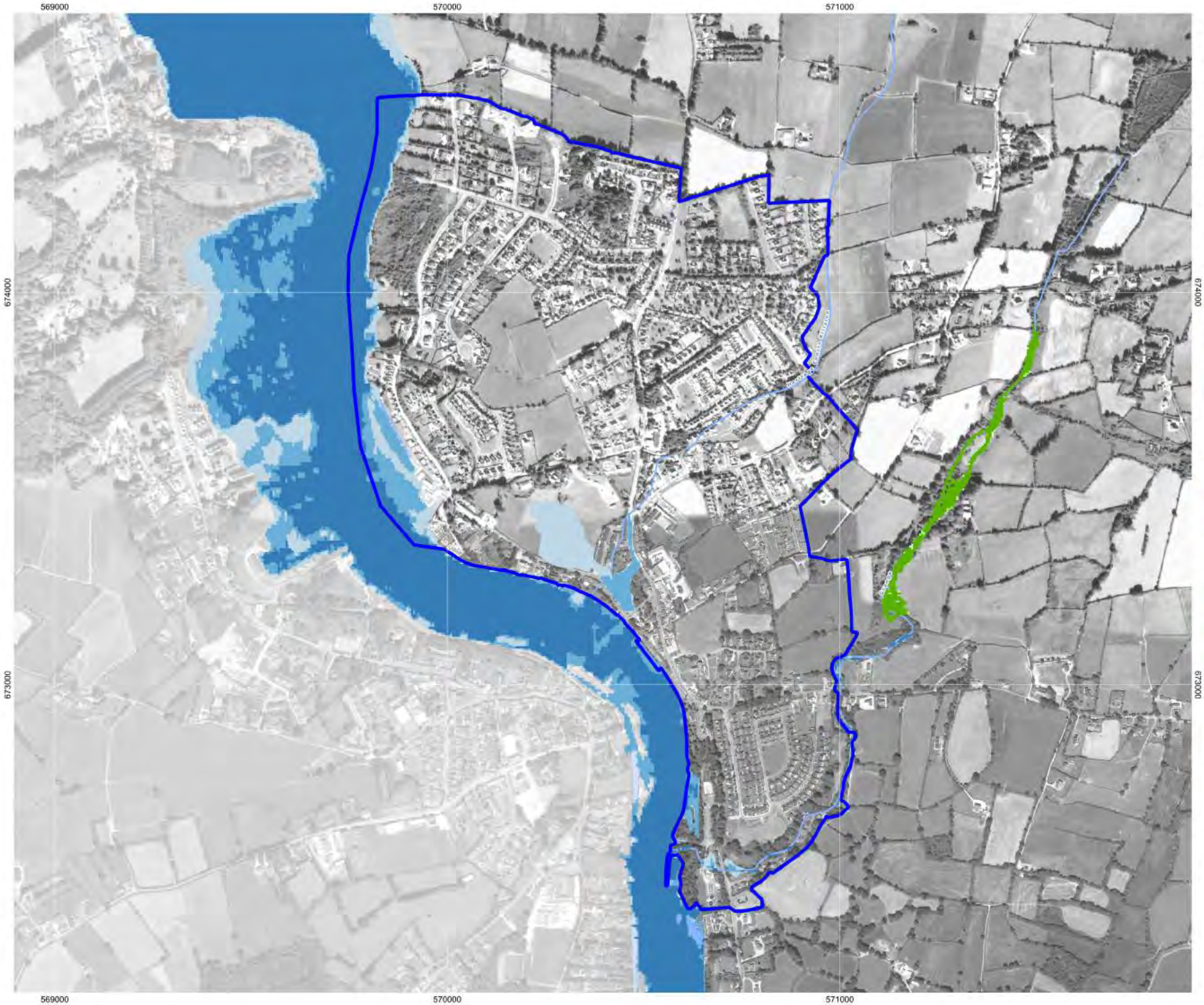


County Tipperary Development Plan 2022-2028

Ballina Urban Service Centre OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM) Present Day Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Present Day Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

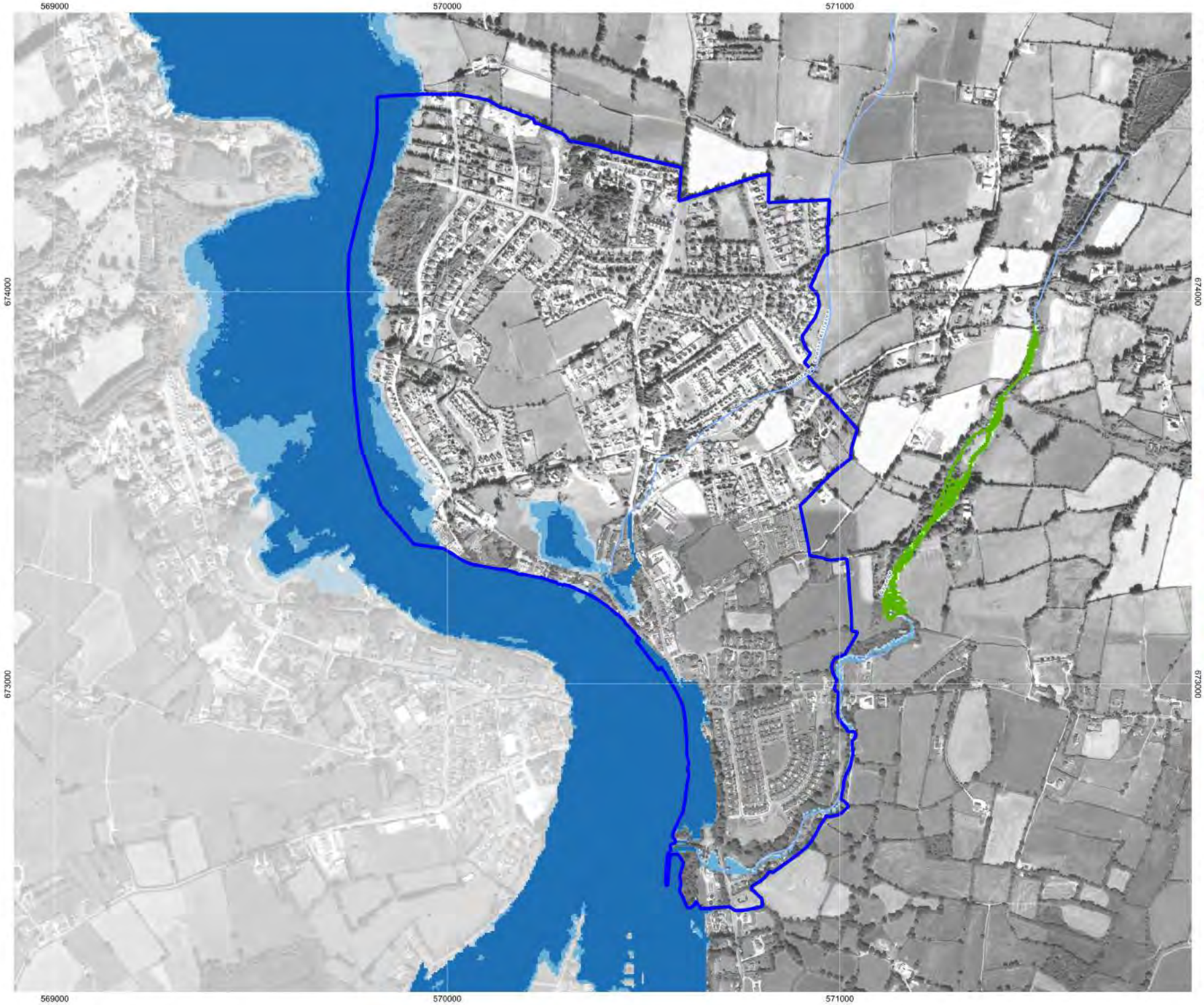
NIFM Present Day Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

Comhairle Contae Thiobraid Árann
Tipperary County Council

CAAS

Coordinates in ITM



County Tipperary Development Plan 2022-2028

Ballina
Urban Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
Mid-Range Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Mid-Range Future Scenario
- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Mid-Range Future Scenario
- 5% AEP
- 1% AEP
- 0.1% AEP

Comhairle Contae Thiobraid Árann
Tipperary County Council

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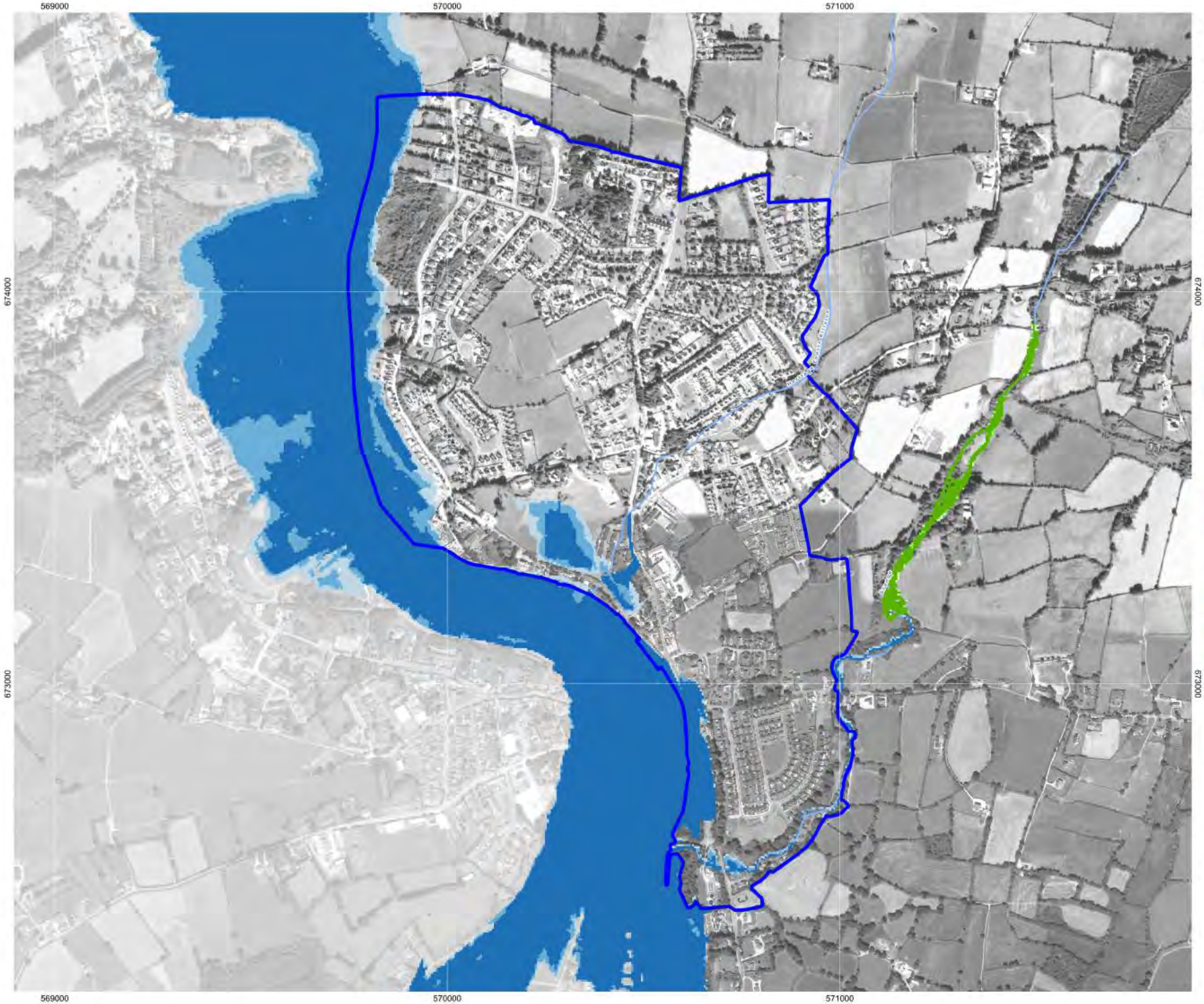

County Tipperary Development Plan 2022-2028

Ballina
Urban Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
High-End Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial High-End Future Scenario
- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM High-End Future Scenario
- 5% AEP
- 1% AEP
- 0.1% AEP

Comhairle Contae Thiobraid Árann
Tipperary County Council

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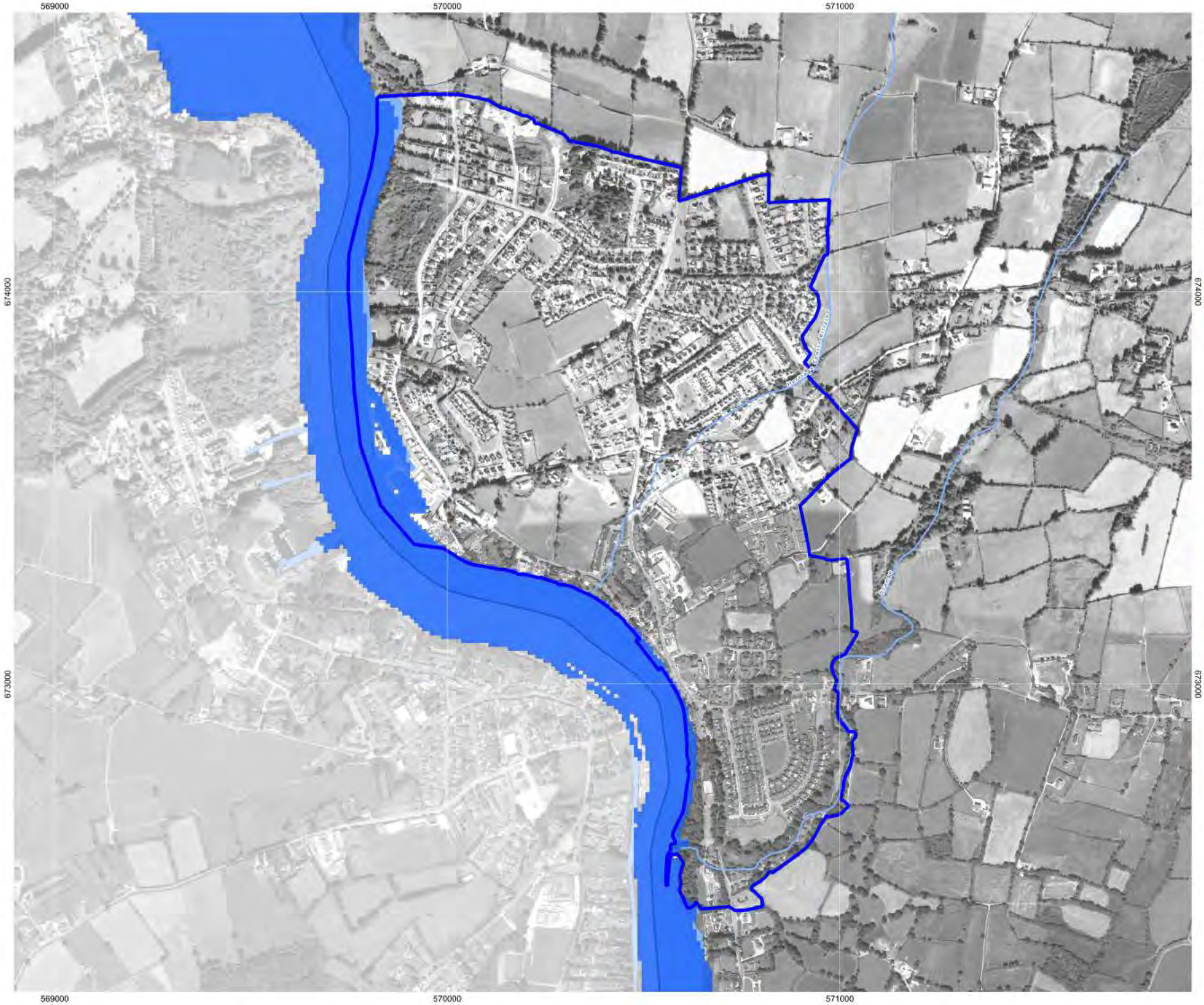

County Tipperary Development Plan 2022-2028

Ballina
Urban Service Centre
GSI Historical Flood Data and Groundwater Predictive Modeling

- Plan Boundary
- County Boundary
- Water
- River or Stream

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

Surface Water Flooding

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

Comhairle Contae Thiobraid Árann
Tipperary County Council

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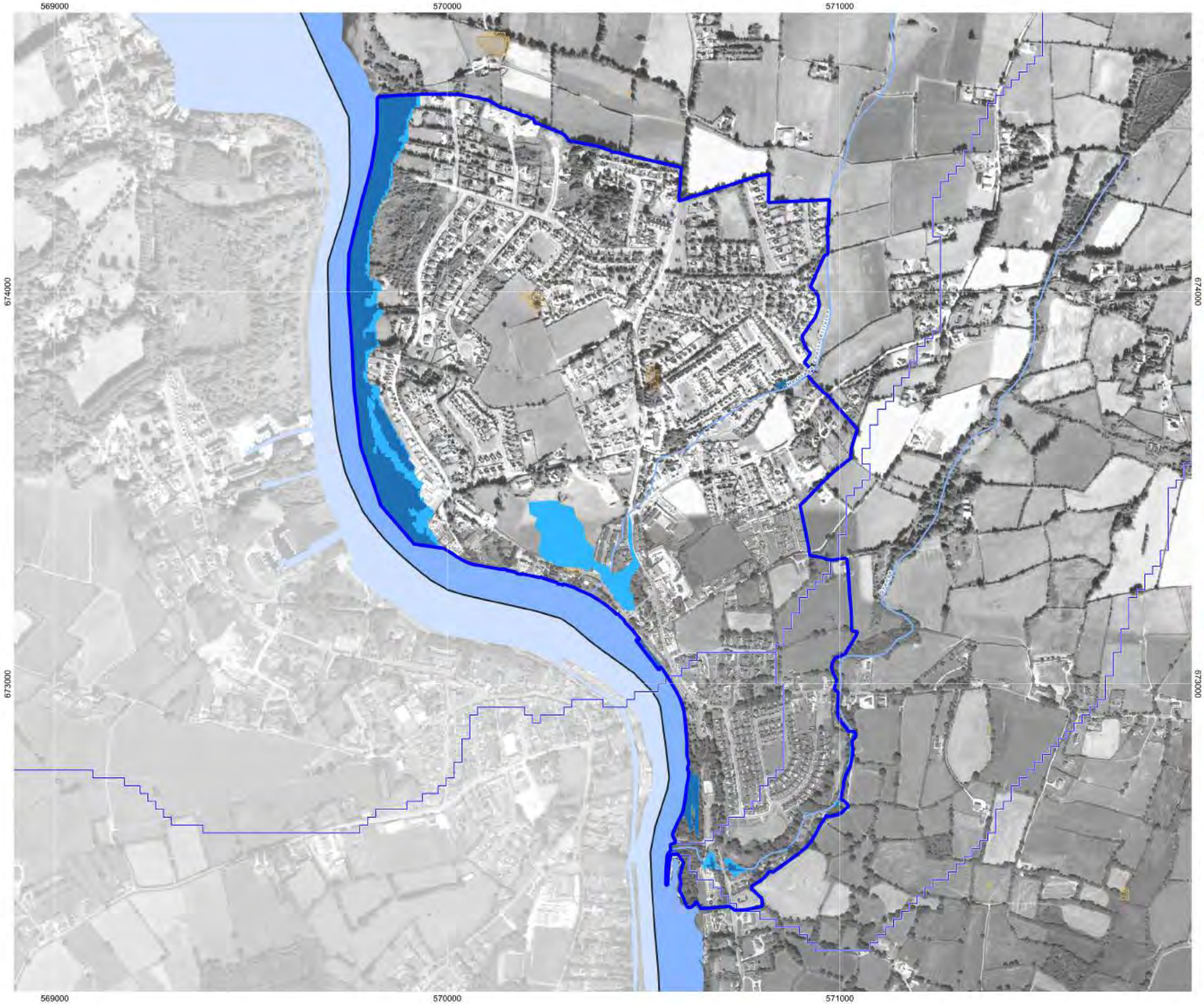

County Tipperary Development Plan 2022-2028

Ballina
Urban Service Centre
Indicative Flood Zones

- PlanBoundary
- County Boundary
- WFD River Sub-Basins
- Water
- River or Stream

Indicative Flood Zones

- Flood Zone A
- Flood Zone B

PFRA Pluvial

- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

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Tipperary County Council

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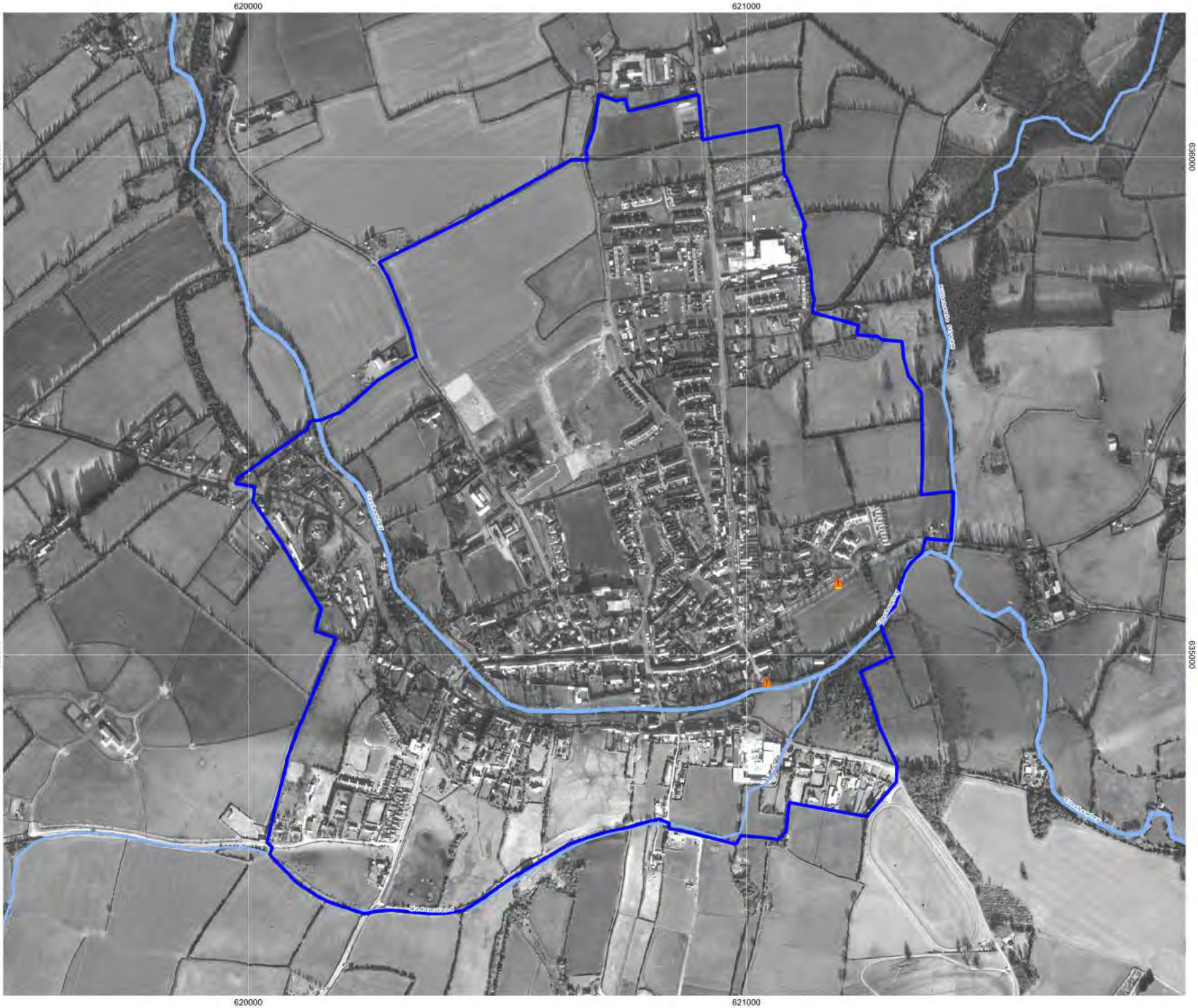

County Tipperary Development Plan 2022-2028

Fethard
Urban Service Centre
OPW Historical Flood Data

- Plan Boundary
- County Boundary
- Water
- River or Stream

OPW Past Flood Events

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

Land Commission

- Benefited Lands

Drainage District

- Channel
- Embankment
- Benefited Lands

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Lands

Comhairle Contae Thiobraid Árann
Tipperary County Council

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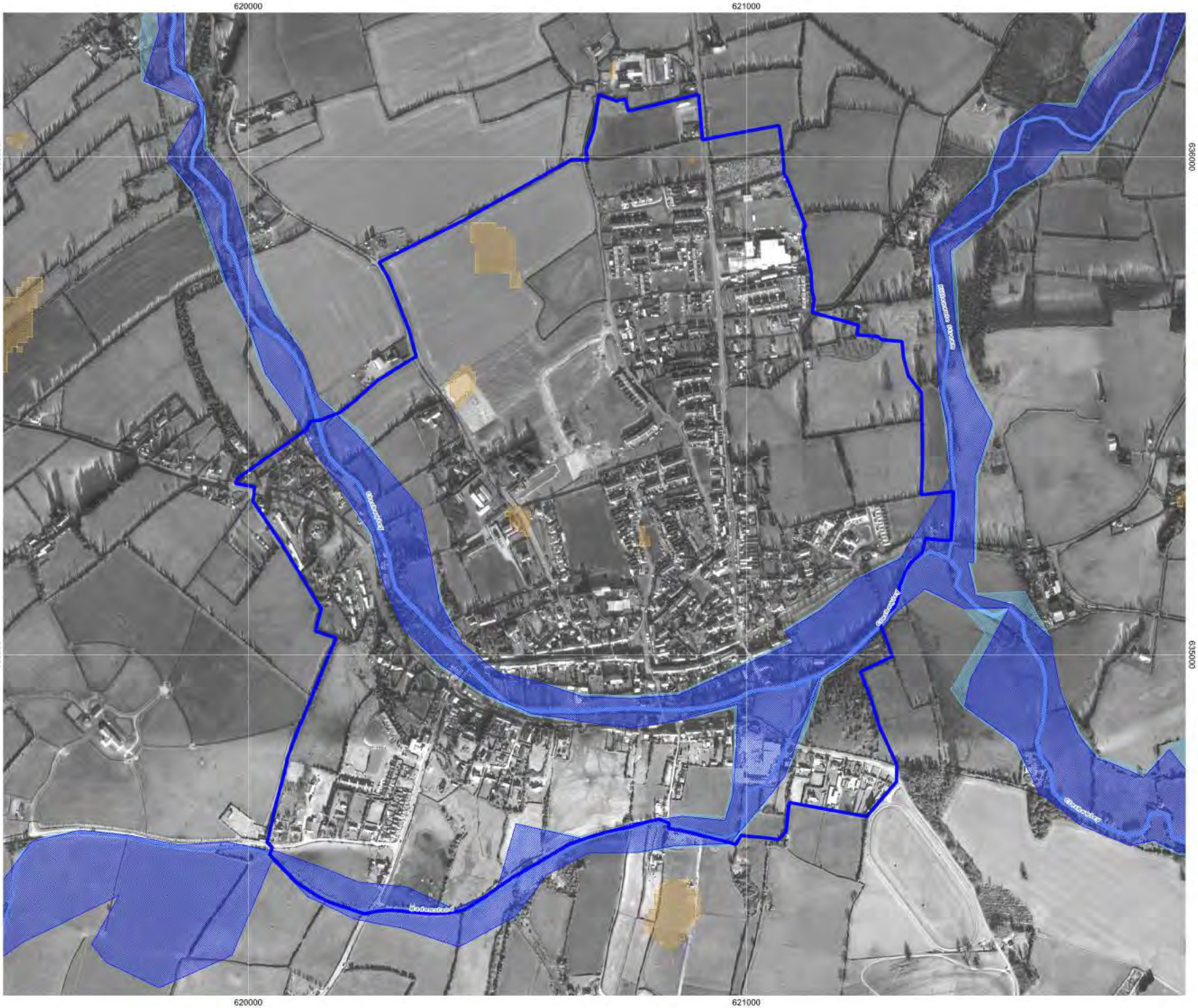

County Tipperary Development Plan 2022-2028

Fethard
Urban Service Centre
OPW Preliminary Flood Risk Assessment (PFRA)

- Plan Boundary
- County Boundary
- Water
- River or Stream

PFRA

- Fluvial 1% AEP
- Fluvial 0.1% AEP
- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

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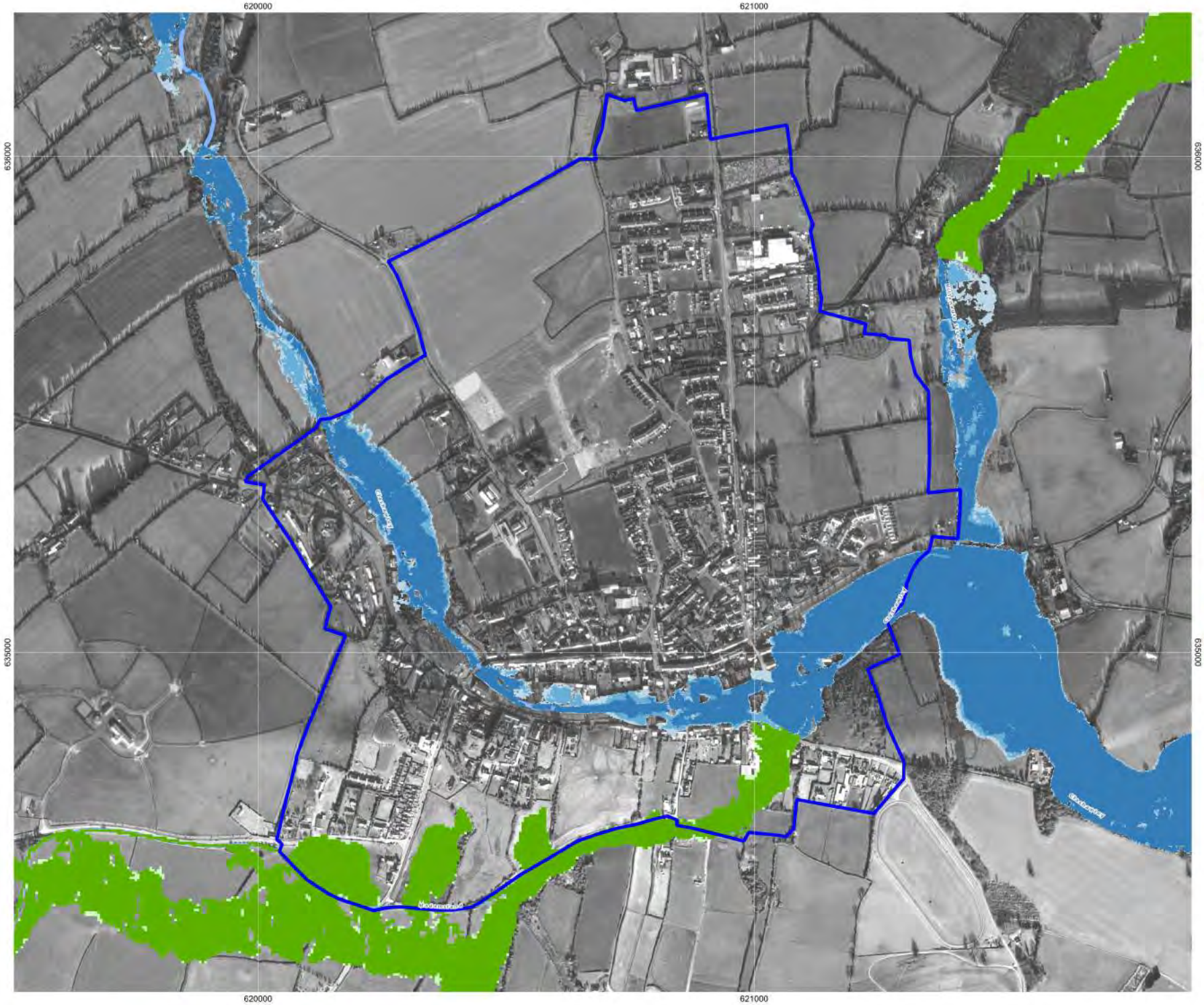

County Tipperary Development Plan 2022-2028

Fethard Urban Service Centre OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM) Present Day Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Present Day Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Present Day Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

Comhairle Contae Thiobraid Árann
Tipperary County Council

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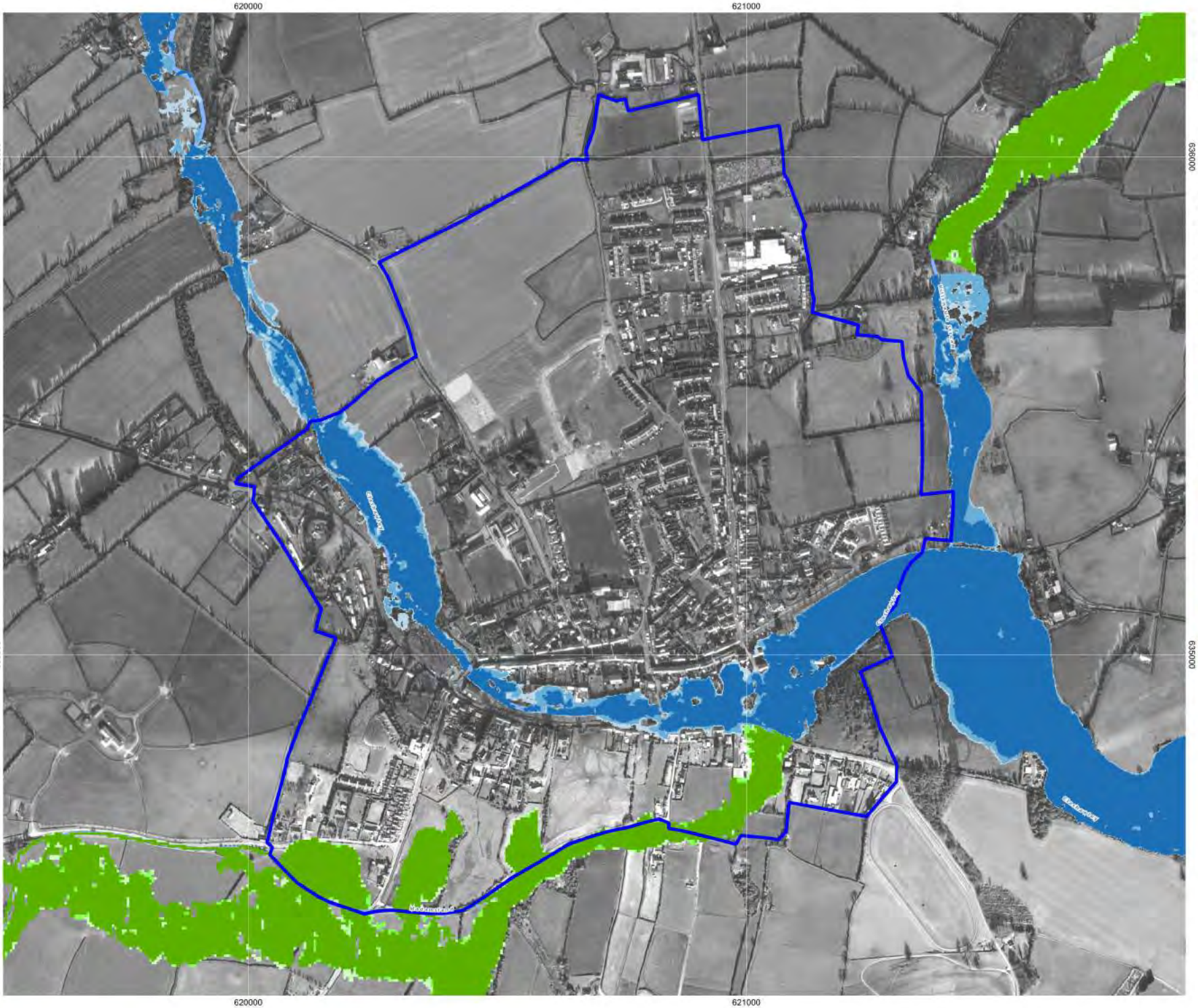

County Tipperary Development Plan 2022-2028

Fethard
Urban Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
Mid-Range Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Mid-Range Future Scenario
- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Mid-Range Future Scenario
- 5% AEP
- 1% AEP
- 0.1% AEP

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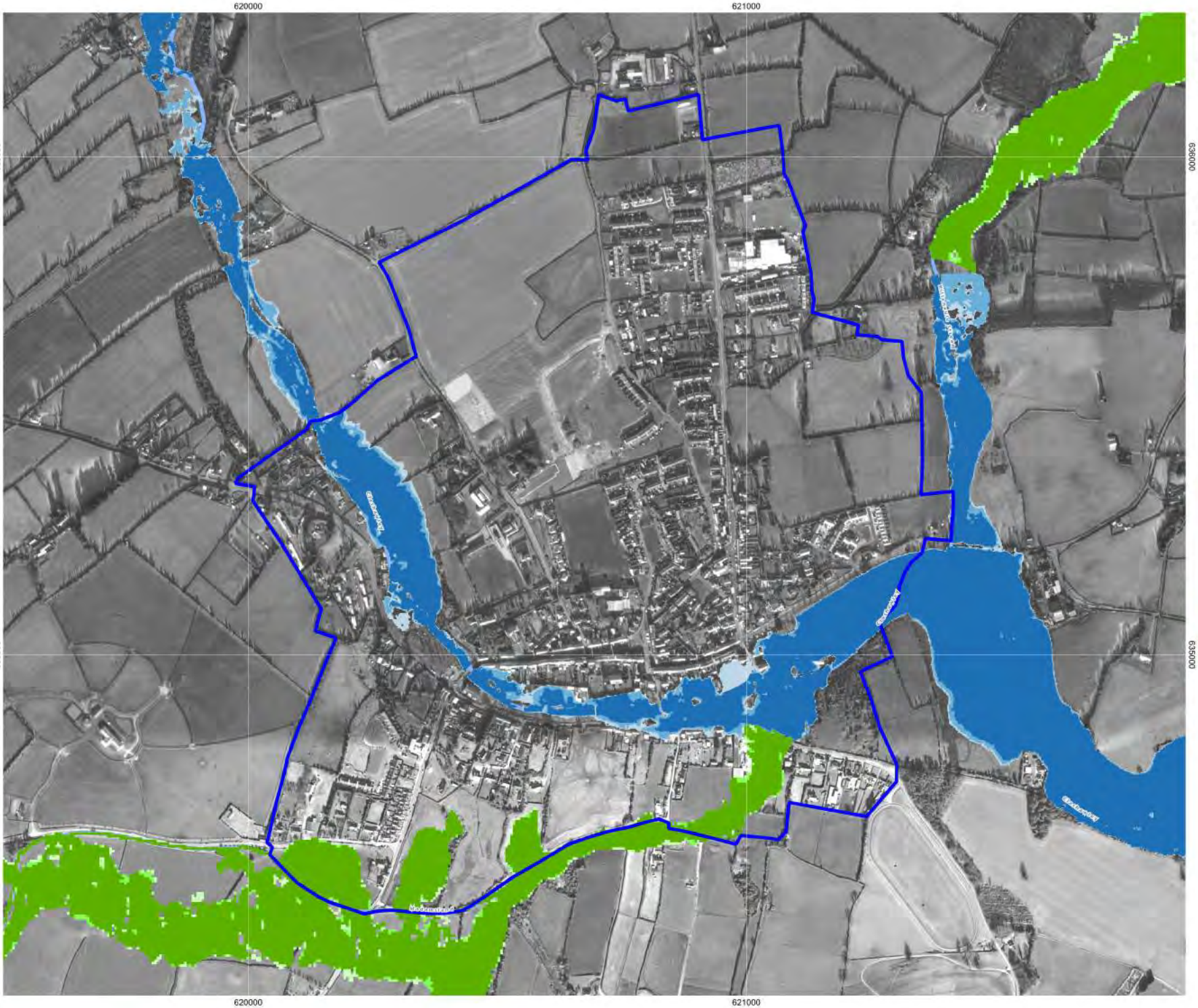

County Tipperary Development Plan 2022-2028

Fethard
Urban Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
High-End Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial High-End Future Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM High-End Future Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

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Tipperary County Council

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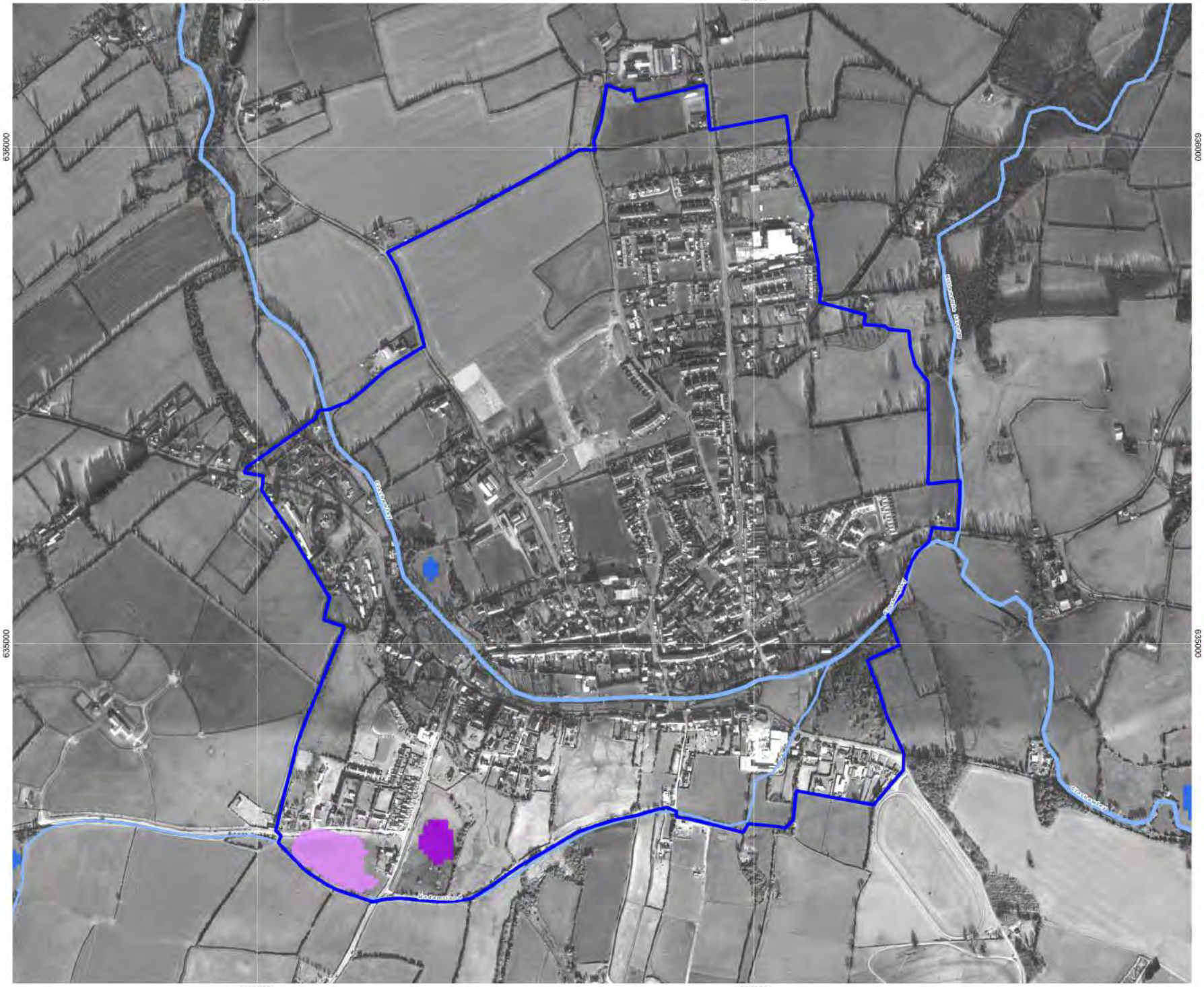

County Tipperary Development Plan 2022-2028

Fethard
Urban Service Centre
GSI Historical Flood Data and Groundwater Predictive Modeling

- Plan Boundary
- County Boundary
- Water
- River or Stream

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

Surface Water Flooding

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

Comhairle Contae Thiobraid Árann
Tipperary County Council

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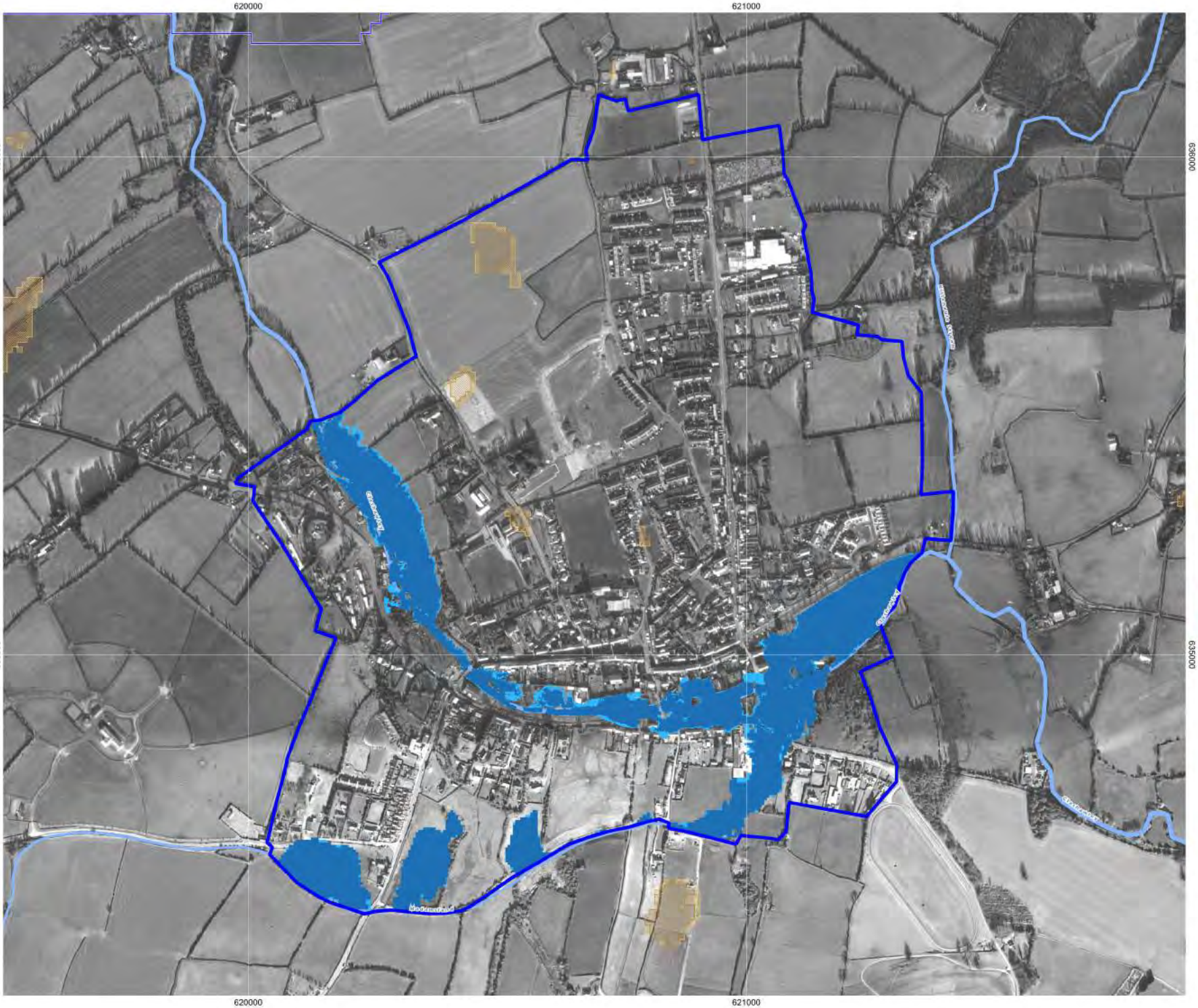


County Tipperary Development Plan 2022-2028

Fethard
Urban Service Centre
Indicative Flood Zones

- PlanBoundary
- County Boundary
- WFD River Sub-Basins
- Water
- River or Stream

Indicative Flood Zones

- Flood Zone A
- Flood Zone B

PFRA Pluvial

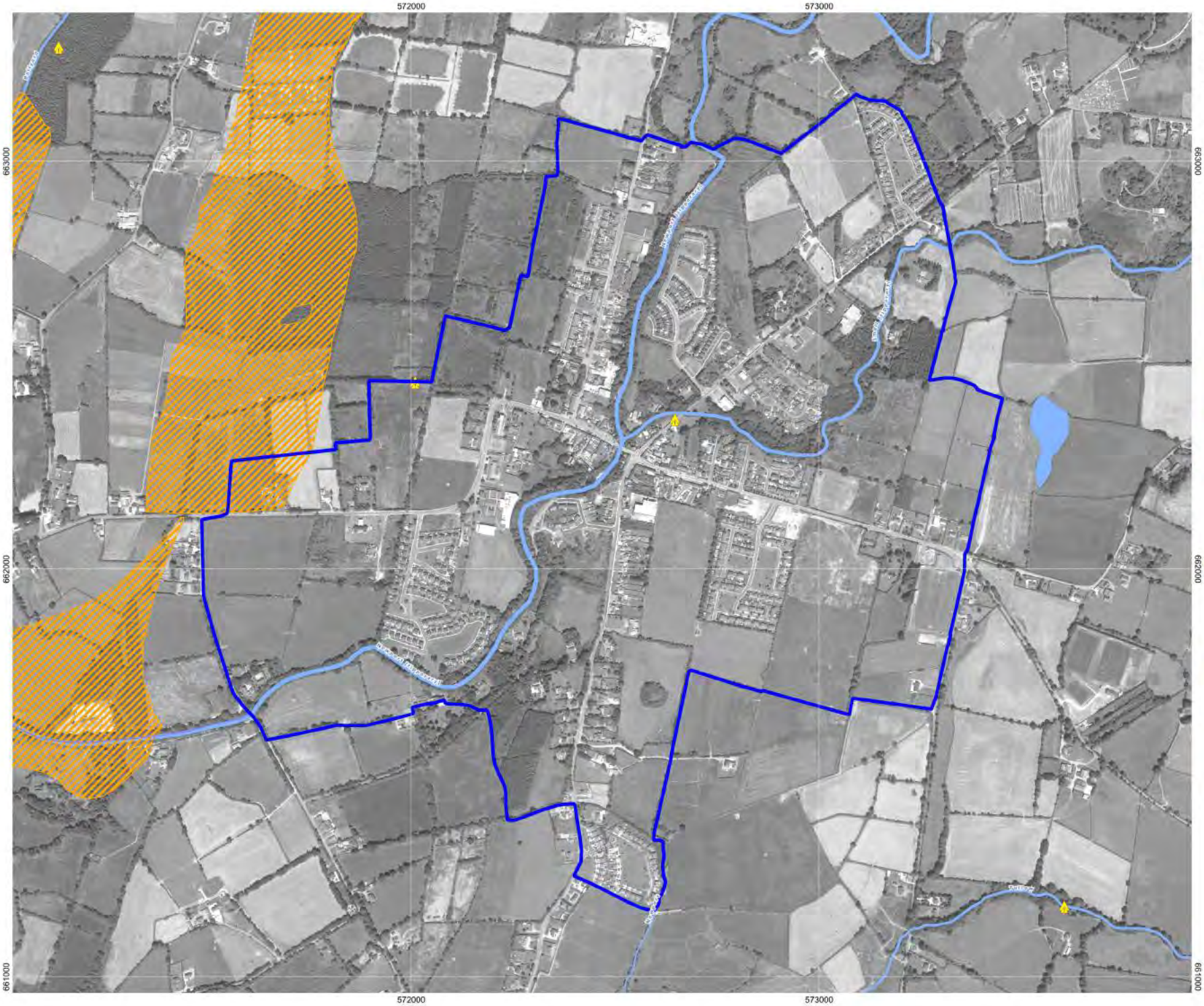
- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

Comhairle Contae Thiobraid Árann
Tipperary County Council

CAAS



County Tipperary Development Plan 2022-2028

Newport Urban Service Centre OPW Historical Flood Data

- Plan Boundary
- County Boundary
- Water
- River or Stream

OPW Past Flood Events

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

Land Commission

- Benefited Lands

Drainage District

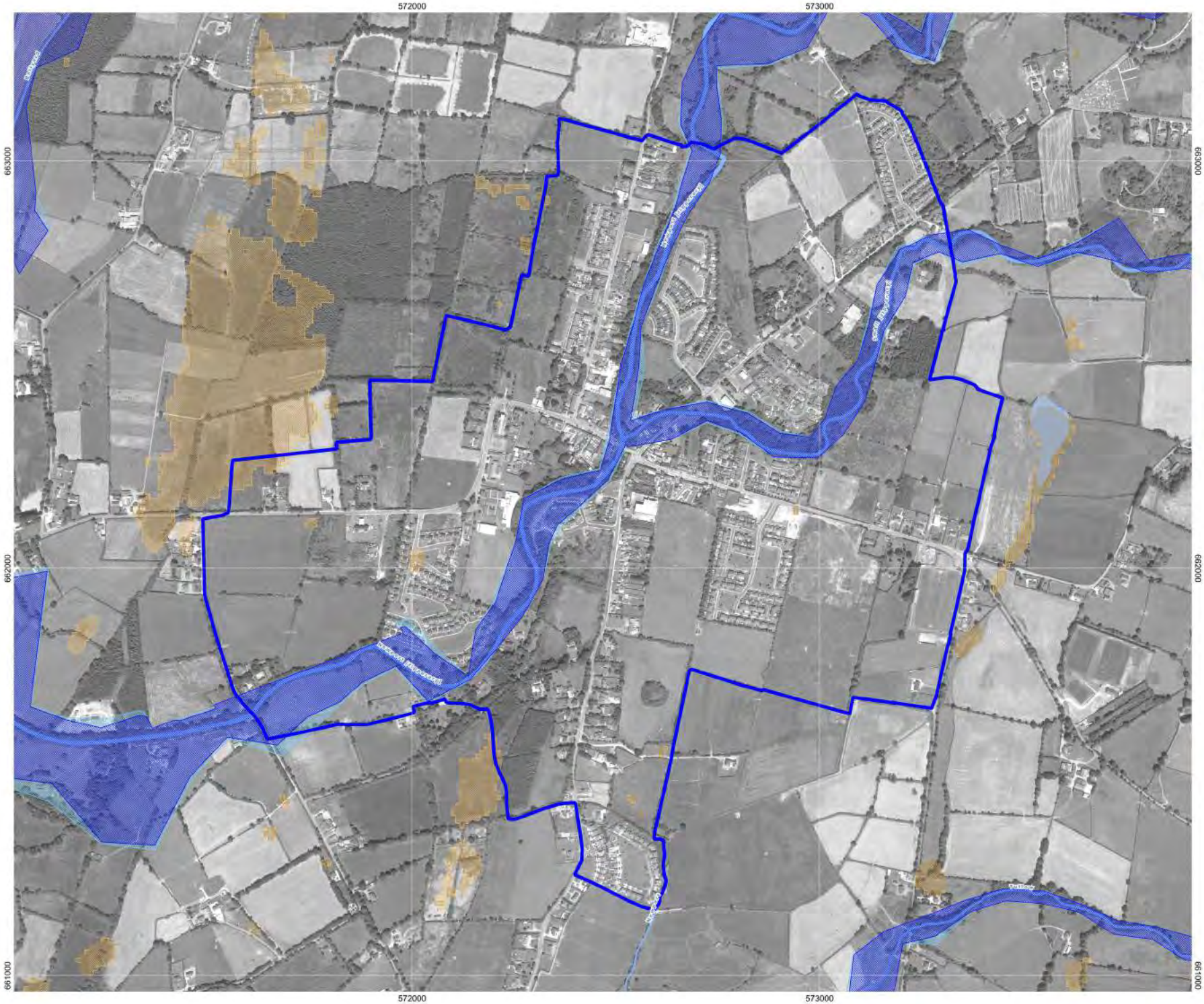
- Channel
- Embankment
- Benefited Lands

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Lands

Comhairle Contae Thiobraid Árann
Tipperary County Council

CAAS



County Tipperary Development Plan 2022-2028

Newport
Urban Service Centre
OPW Preliminary Flood Risk Assessment (PFRA)

- Plan Boundary
- County Boundary
- Water
- River or Stream

PFRA

- Fluvial 1% AEP
- Fluvial 0.1% AEP
- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

Comhairle Contae Thiobraid Árann
Tipperary County Council

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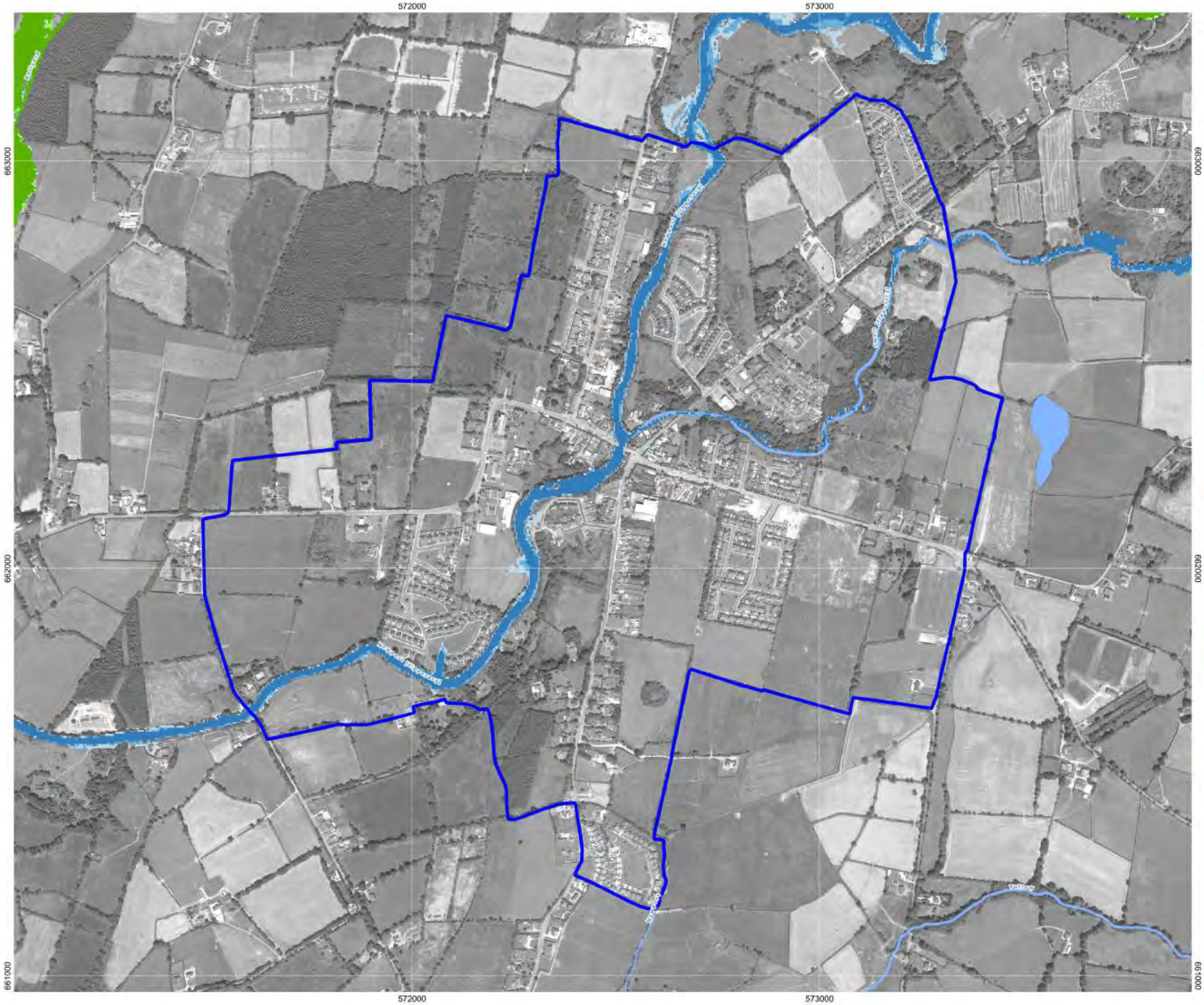


County Tipperary Development Plan 2022-2028

Newport
Urban Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM) Present Day Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Present Day Scenario

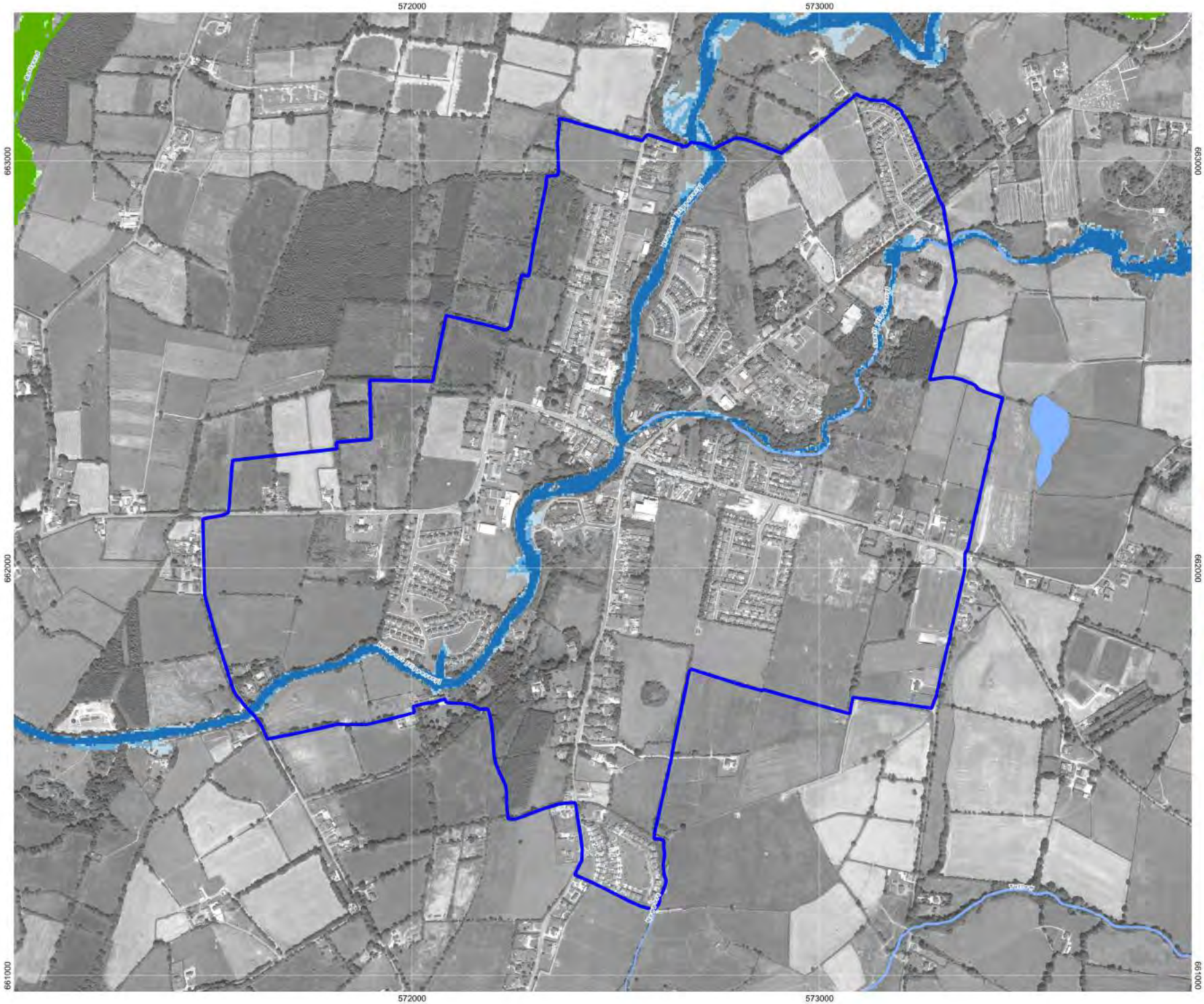
- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Present Day Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

Comhairle Contae Thiobraid Árann
Tipperary County Council

CAAS



County Tipperary Development Plan 2022-2028

Newport
Urban Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
Mid-Range Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Mid-Range Future Scenario
- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Mid-Range Future Scenario
- 5% AEP
- 1% AEP
- 0.1% AEP

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Tipperary County Council

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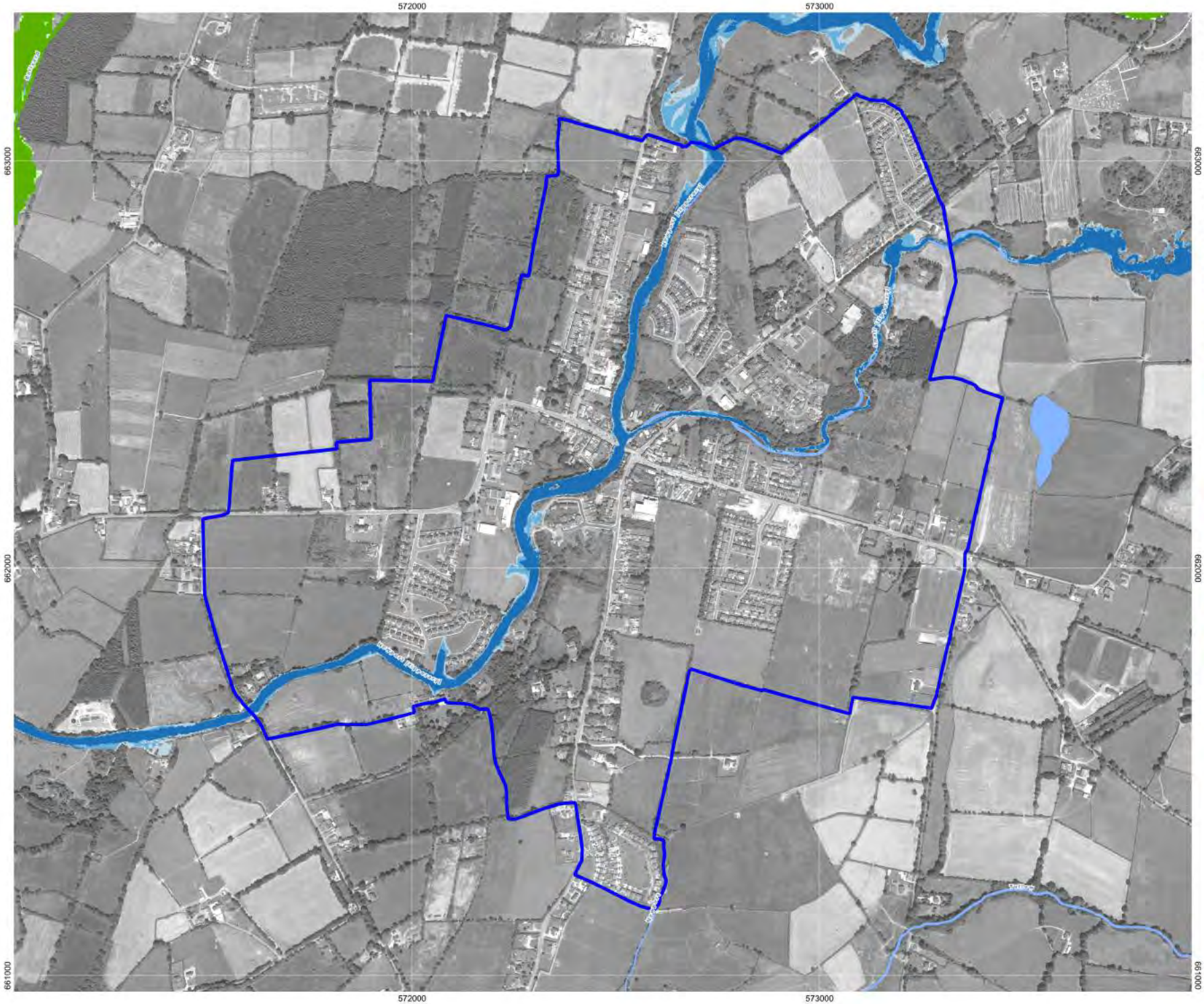

County Tipperary Development Plan 2022-2028

Newport
Urban Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
High-End Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial High-End Future Scenario
- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM High-End Future Scenario
- 5% AEP
- 1% AEP
- 0.1% AEP

Comhairle Contae Thiobraid Árann
Tipperary County Council

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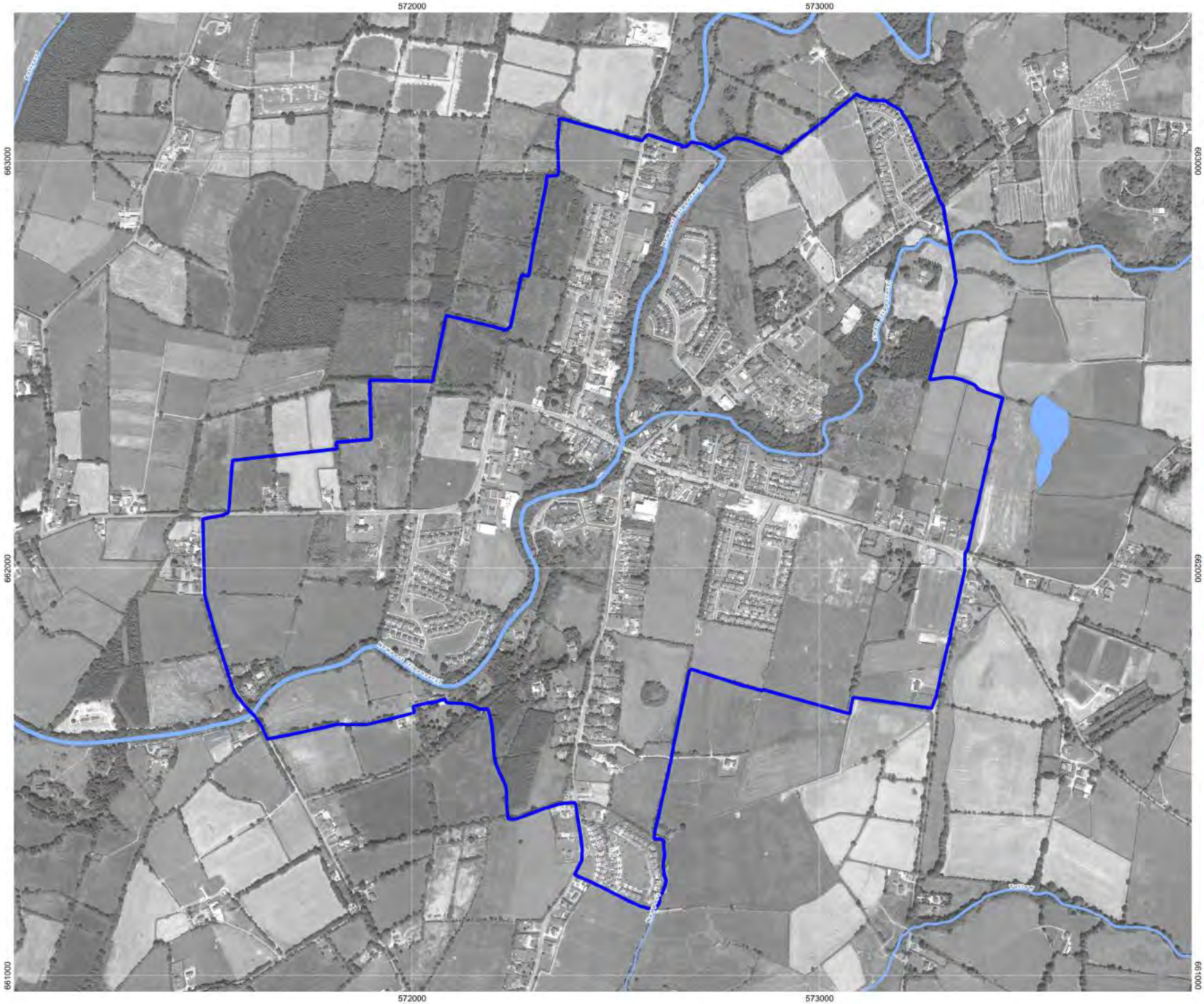

County Tipperary Development Plan 2022-2028

Newport
Urban Service Centre
GSI Historical Flood Data and Groundwater Predictive Modeling

- Plan Boundary
- County Boundary
- Water
- River or Stream

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

Surface Water Flooding

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

Comhairle Contae Thiobraid Árann
Tipperary County Council

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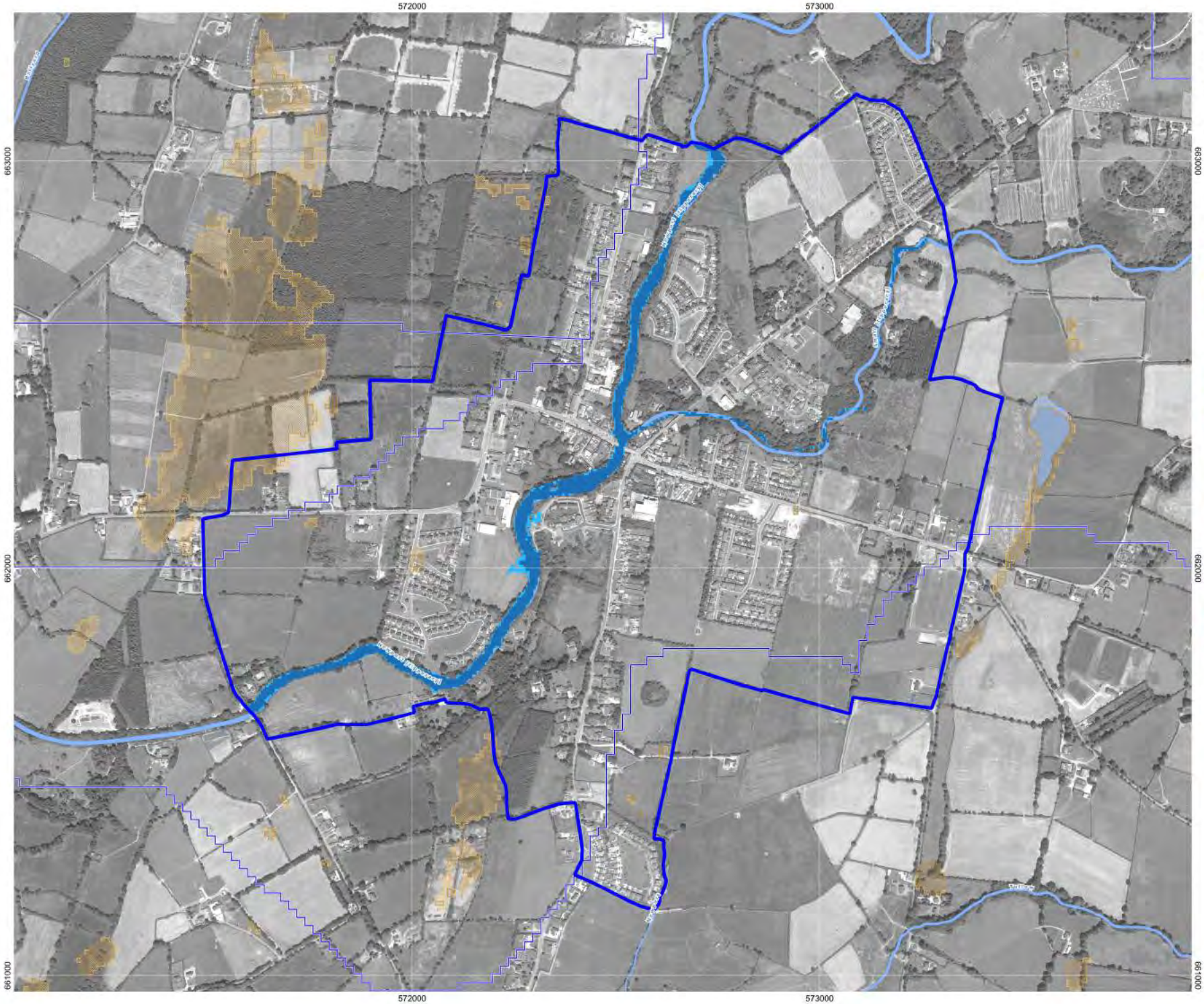
County Tipperary Development Plan 2022-2028

Newport
Urban Service Centre
Indicative Flood Zones



- PlanBoundary
- County Boundary
- WFD River Sub-Basins
- Water
- River or Stream

Indicative Flood Zones
- Flood Zone A
- Flood Zone B

PFRA Pluvial
- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

GSI Groundwater Flooding Predicitive Model
- High Probability
- Medium Probability
- Low Probability

Comhairle Contae Thiobraid Árann
Tipperary County Council

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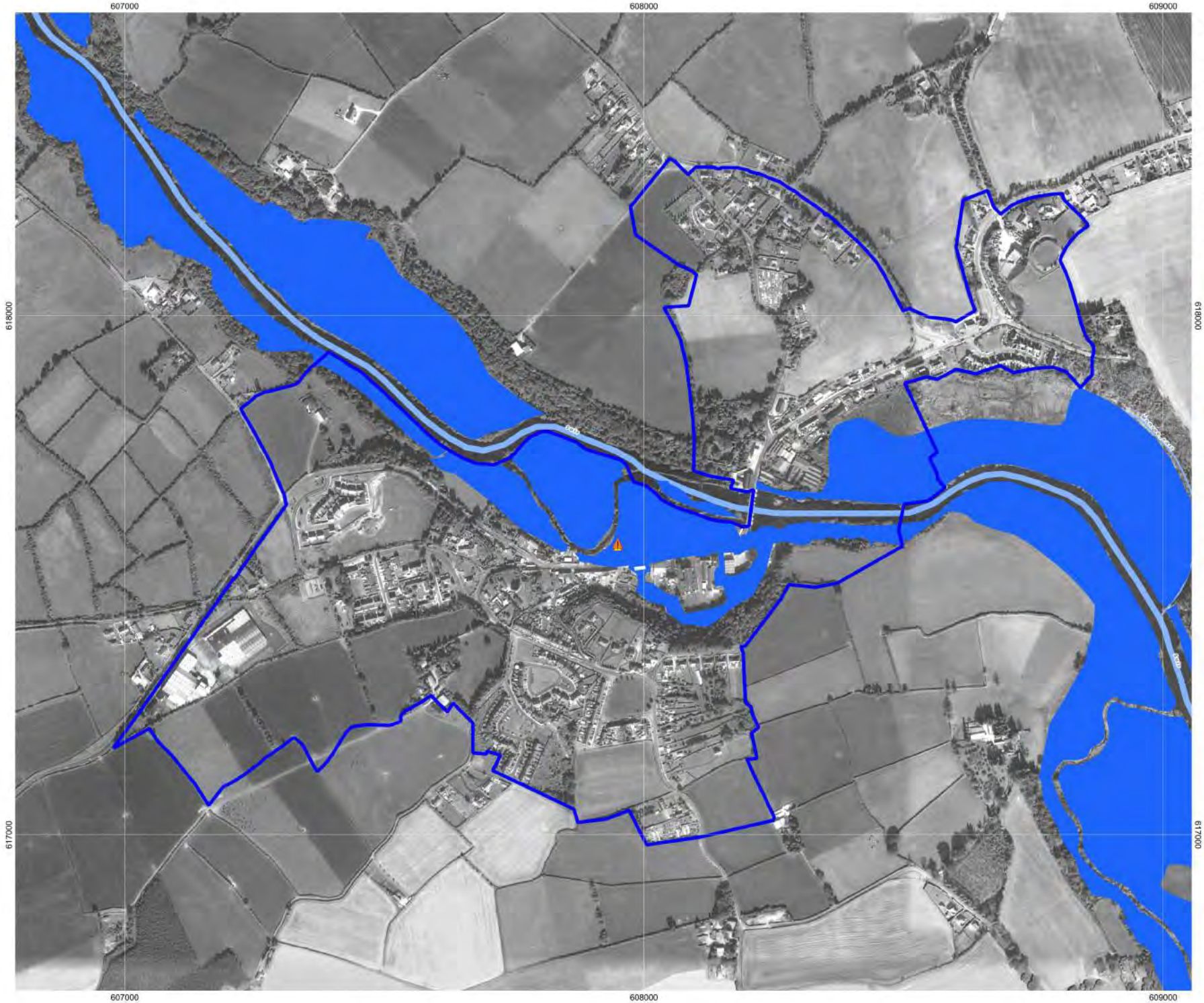

County Tipperary Development Plan 2022-2028

Ardfinnin
Rural Service Centre
OPW Historical Flood Data

- Plan Boundary
- County Boundary
- Water
- River or Stream

OPW Past Flood Events

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

Land Commission

- Benefited Lands

Drainage District

- Channel
- Embankment
- Benefited Lands

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Lands

Comhairle Contae Thiobraid Árann
Tipperary County Council

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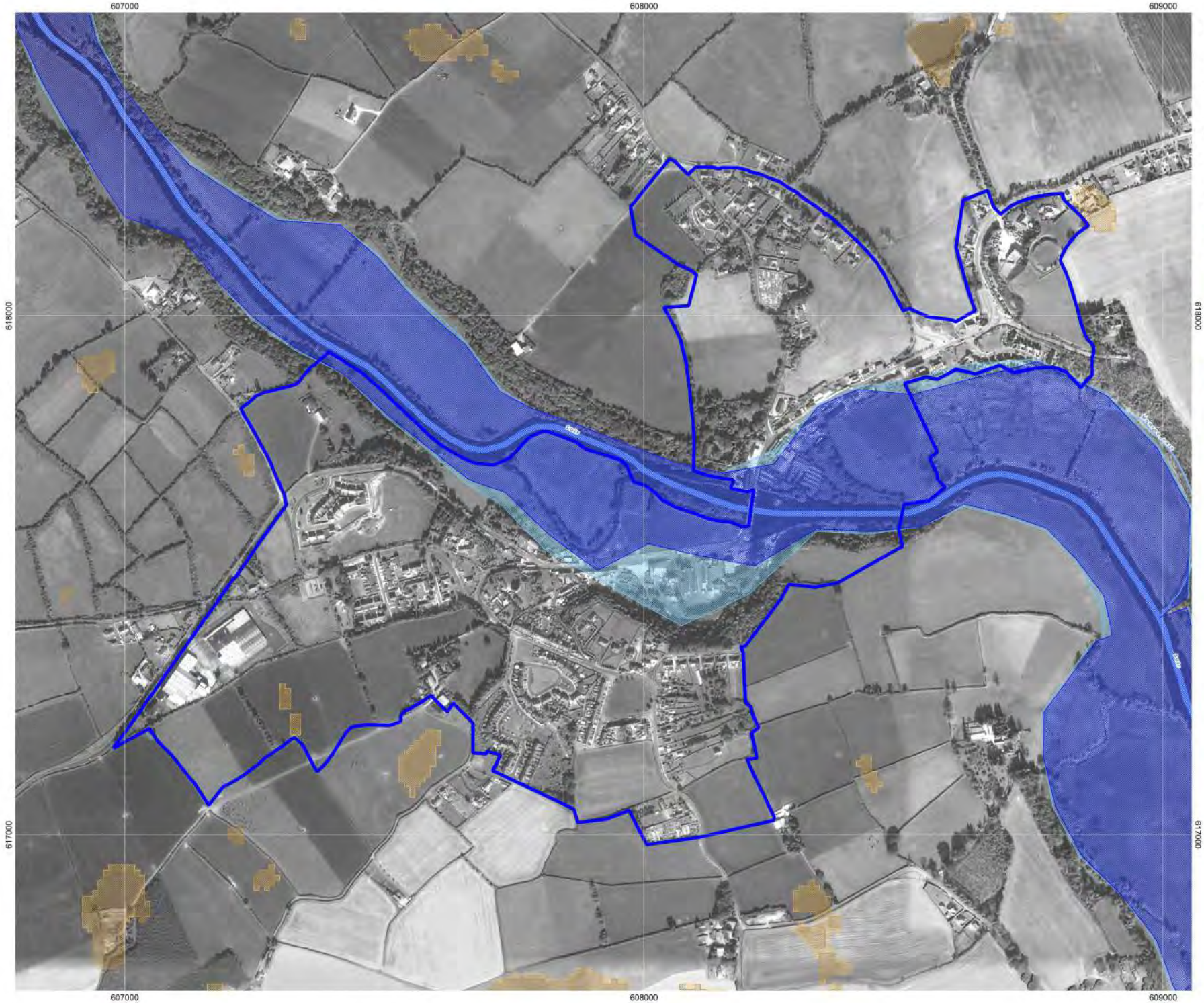

County Tipperary Development Plan 2022-2028

Ardfinnin
Rural Service Centre
OPW Preliminary Flood Risk Assessment (PFRA)

- Plan Boundary
- County Boundary
- Water
- River or Stream

PFRA

- Fluvial 1% AEP
- Fluvial 0.1% AEP
- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

Comhairle Contae Thiobraid Árann
Tipperary County Council

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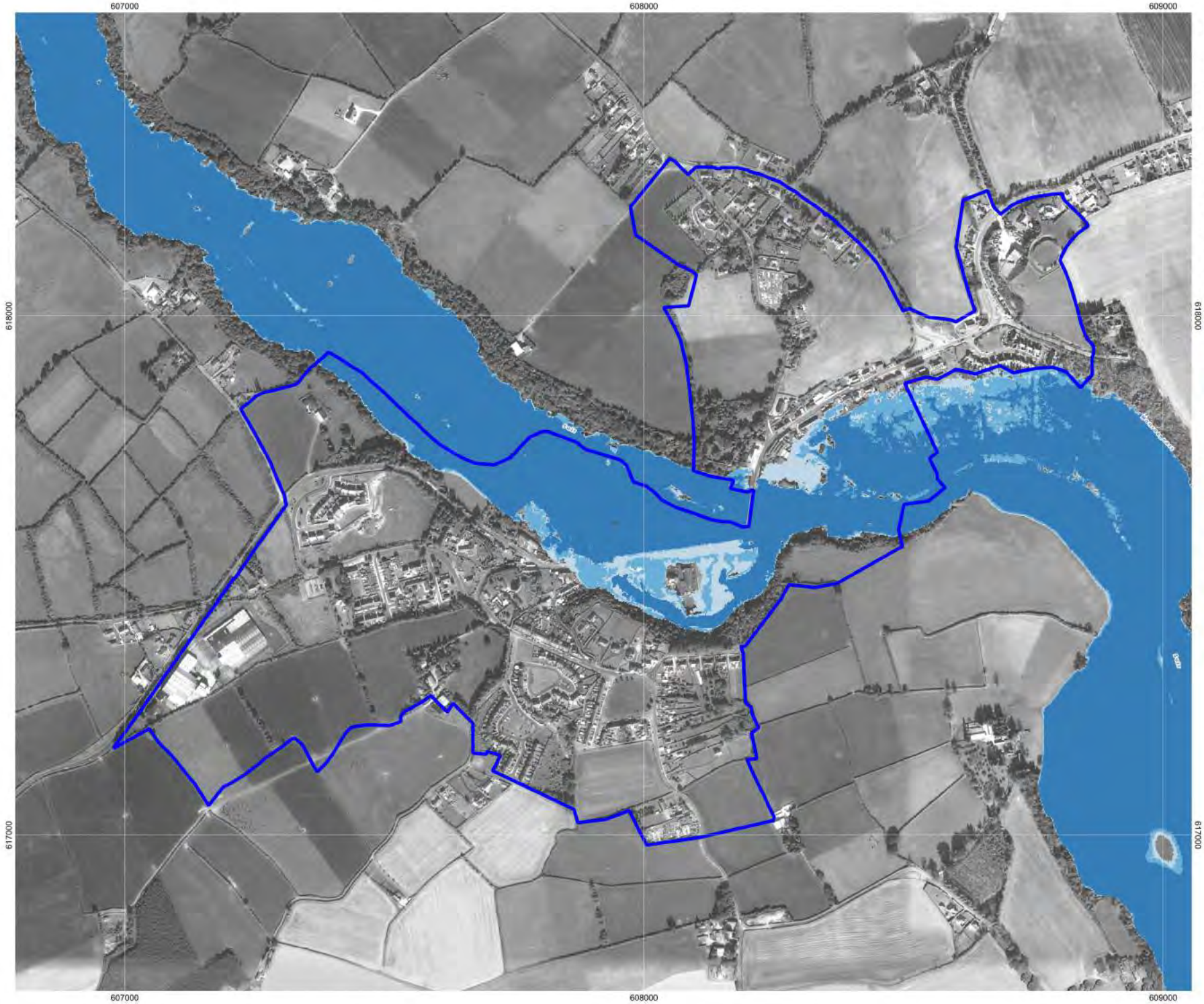

County Tipperary Development Plan 2022-2028

Ardfinnin
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM) Present Day Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Present Day Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Present Day Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

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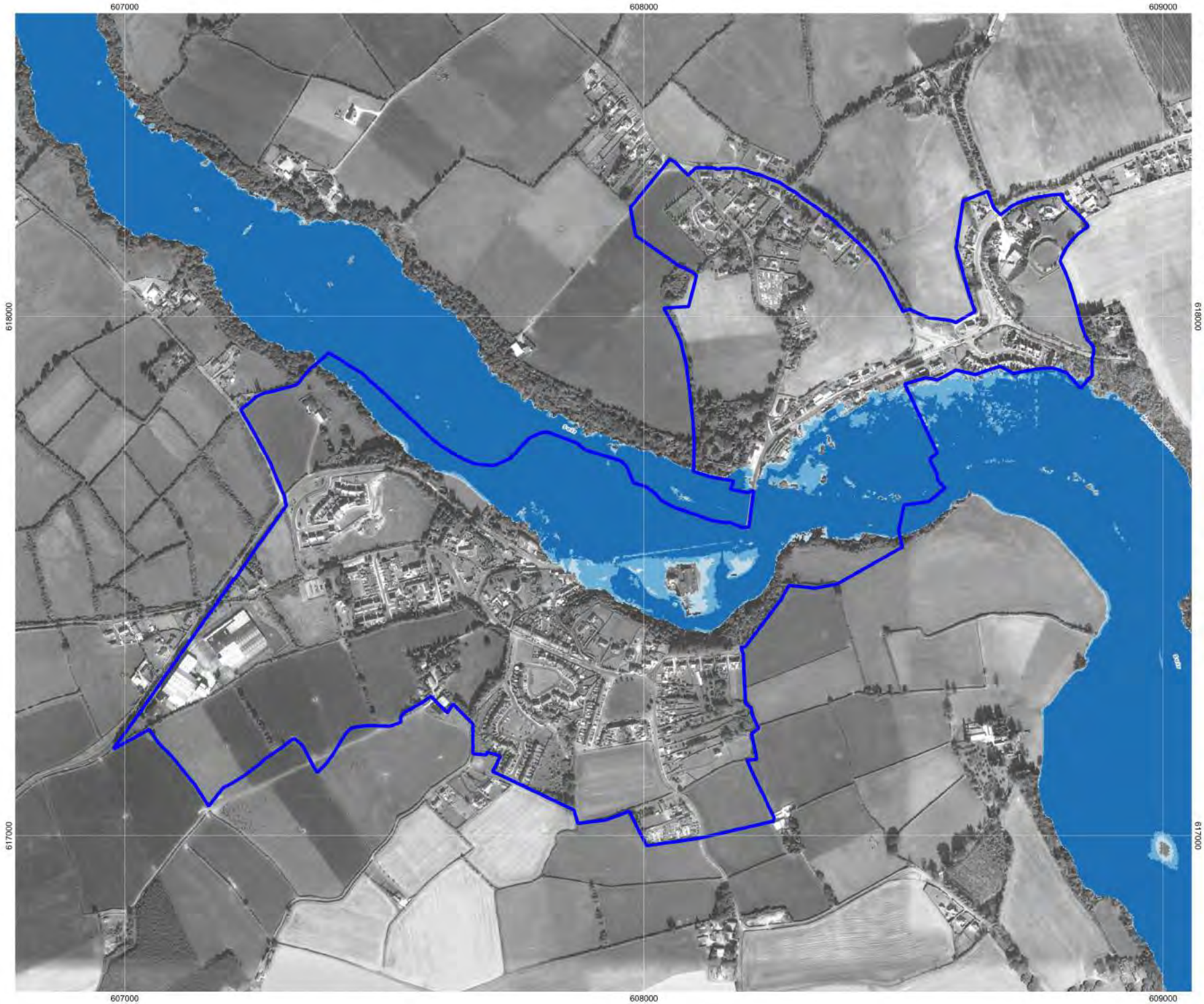

County Tipperary Development Plan 2022-2028

Ardfinnin
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
Mid-Range Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Mid-Range Future Scenario
- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Mid-Range Future Scenario
- 5% AEP
- 1% AEP
- 0.1% AEP

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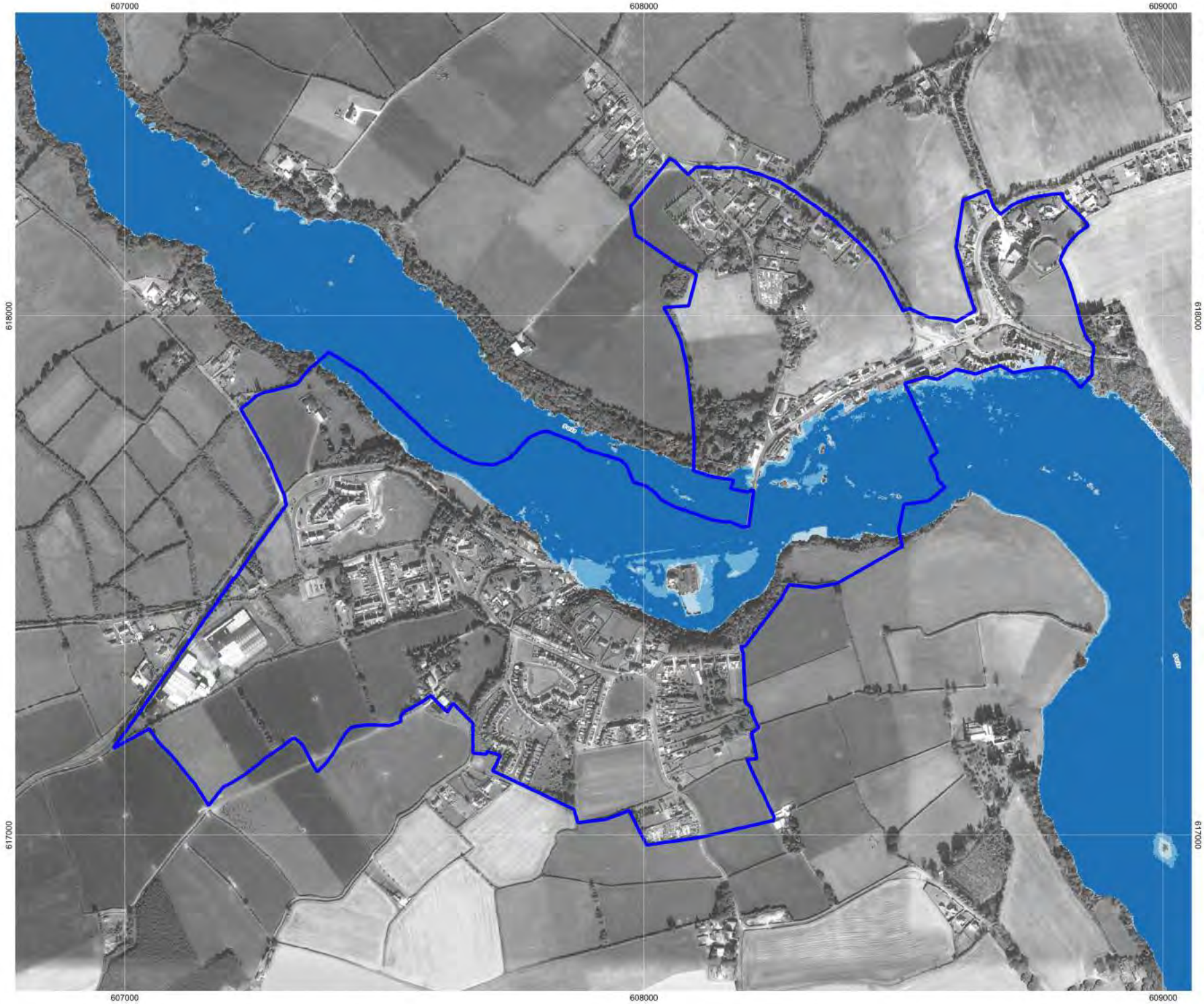

County Tipperary Development Plan 2022-2028

Ardfinnin
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
High-End Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial High-End Future Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM High-End Future Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

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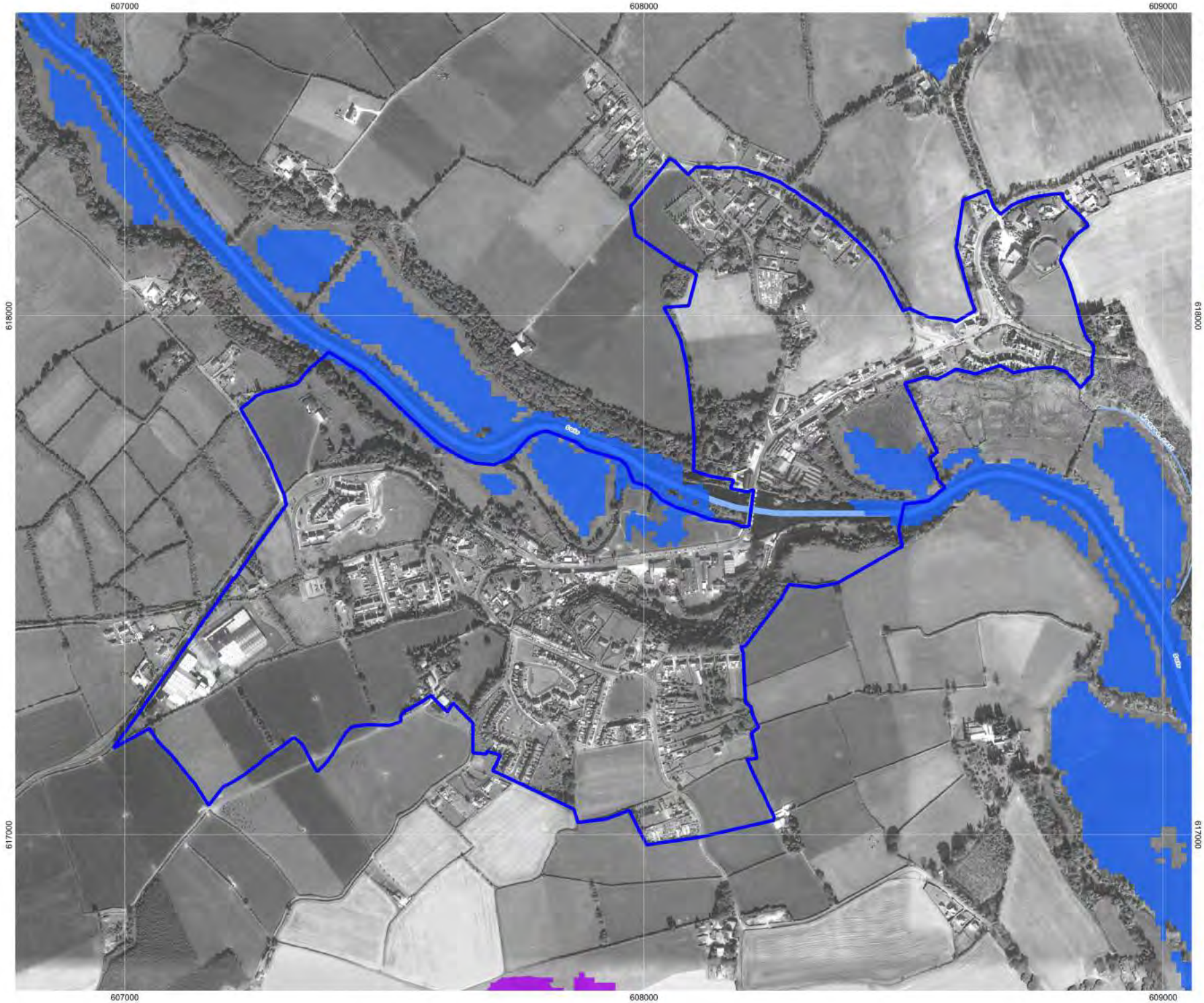

County Tipperary Development Plan 2022-2028

Ardfinnin
Rural Service Centre
GSI Historical Flood Data and Groundwater Predictive Modeling

- Plan Boundary
- County Boundary
- Water
- River or Stream

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

Surface Water Flooding

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

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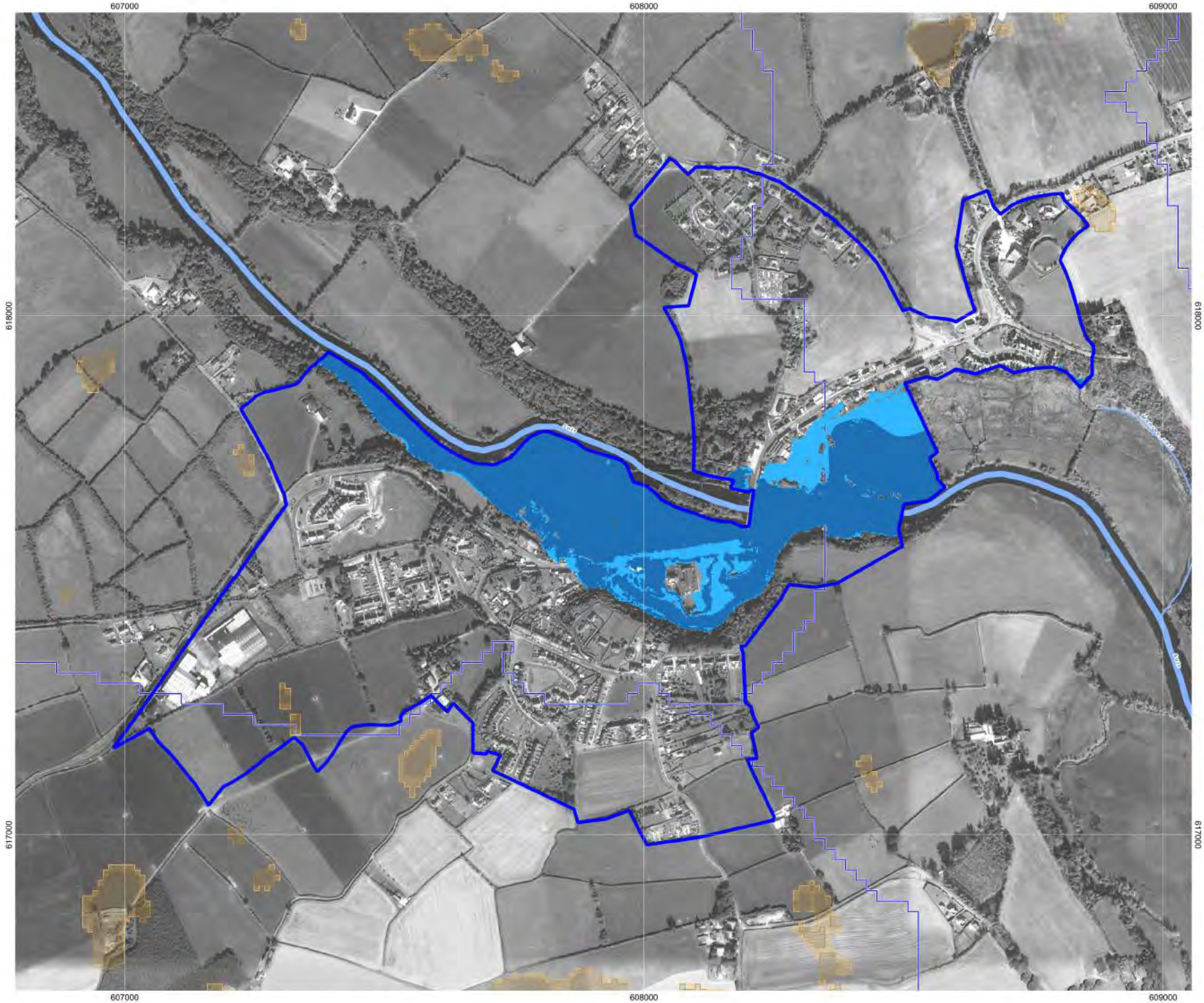

County Tipperary Development Plan 2022-2028

Ardfinnin
Rural Service Centre
Indicative Flood Zones

- PlanBoundary
- County Boundary
- WFD River Sub-Basins
- Water
- River or Stream

Indicative Flood Zones

- Flood Zone A
- Flood Zone B

PFRA Pluvial

- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

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County Tipperary Development Plan 2022-2028

Ballyclerihan Rural Service Centre OPW Historical Flood Data

- Plan Boundary
- County Boundary
- Water
- River or Stream

OPW Past Flood Events

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

Land Commission

- Benefited Lands

Drainage District

- Channel
- Embankment
- Benefited Lands

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Lands

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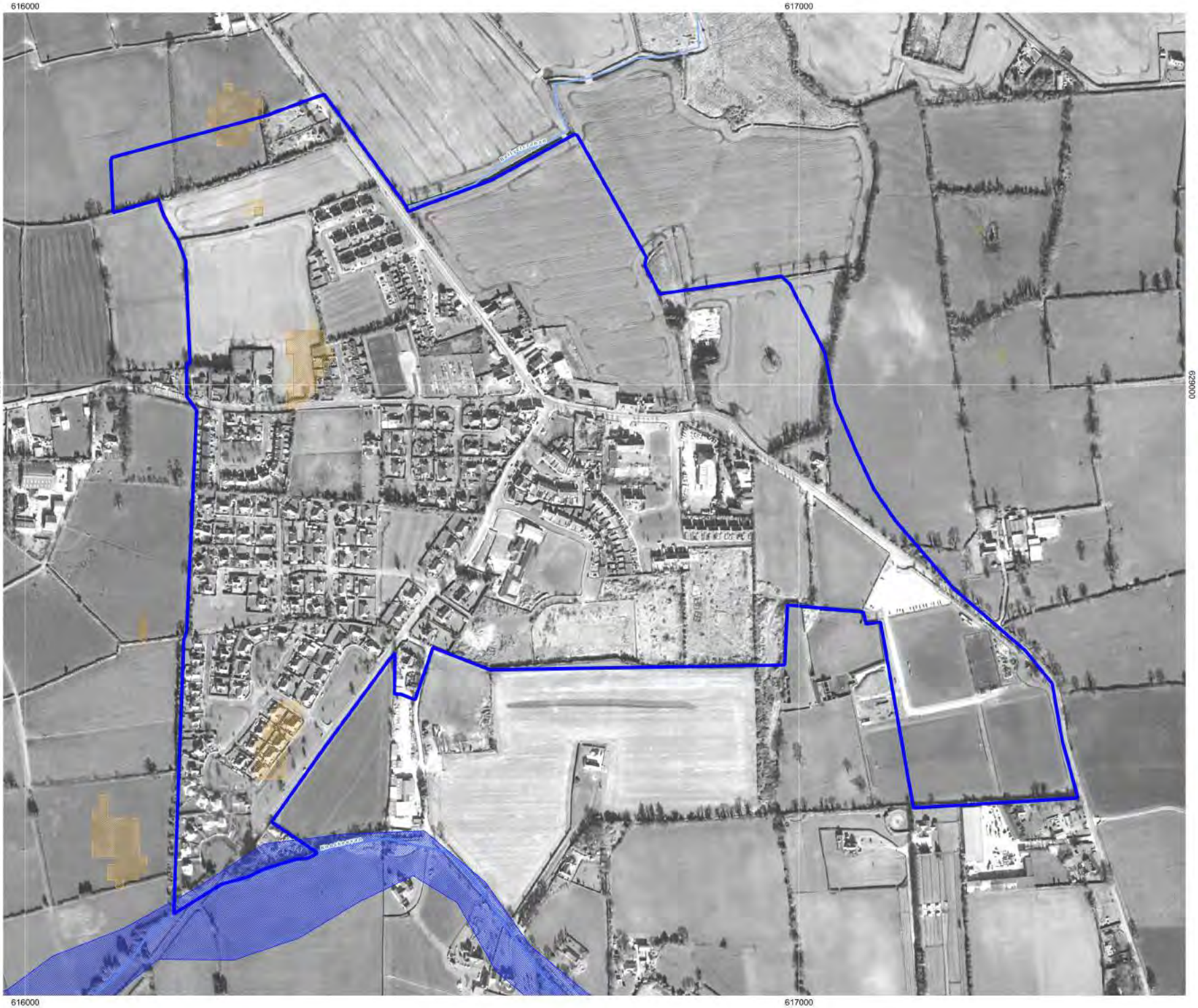

County Tipperary Development Plan 2022-2028

Ballyclerihan Rural Service Centre OPW Preliminary Flood Risk Assessment (PFRA)

- Plan Boundary
- County Boundary
- Water
- River or Stream

PFRA

- Fluvial 1% AEP
- Fluvial 0.1% AEP
- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

Comhairle Contae Thiobraid Árann
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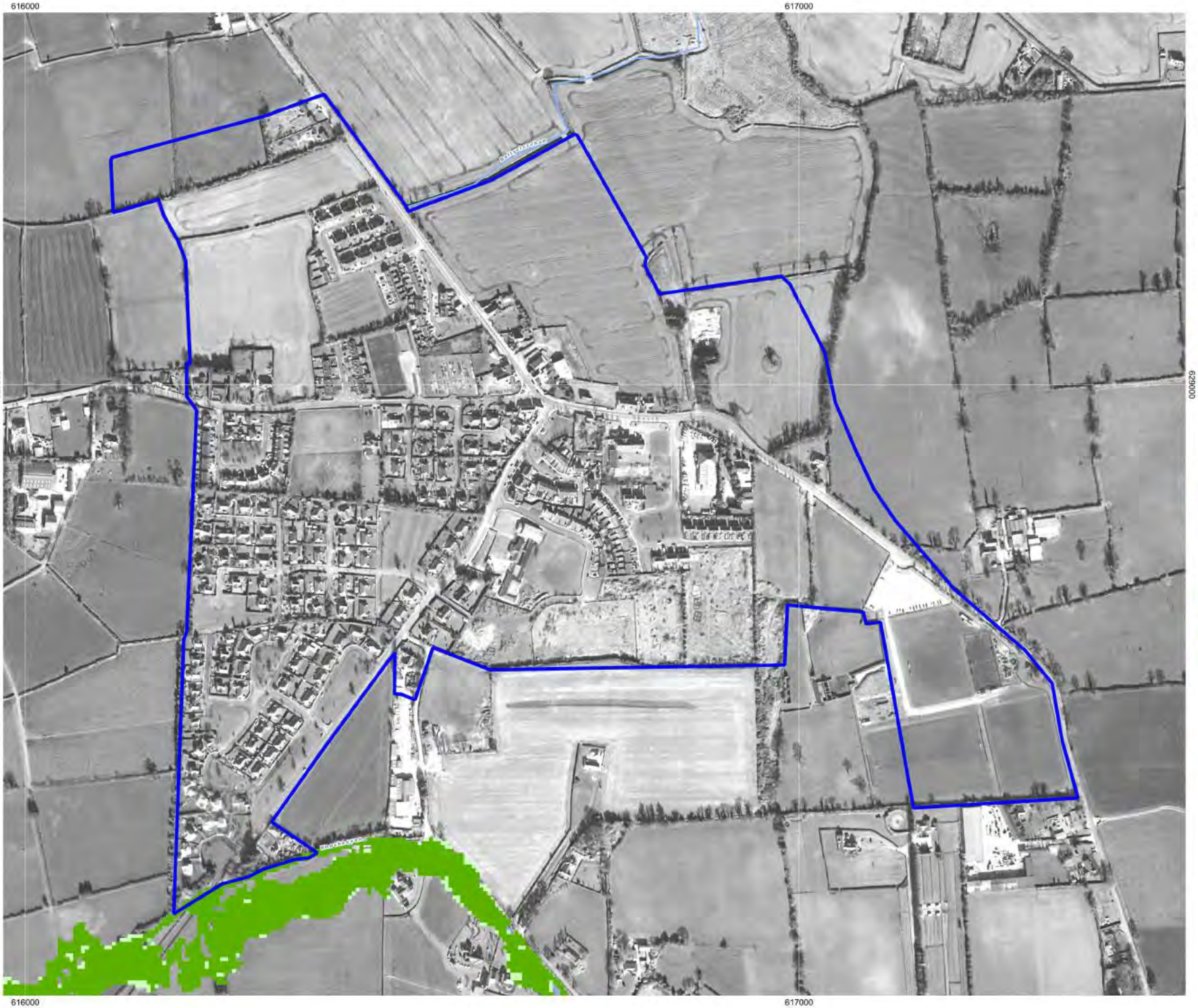

County Tipperary Development Plan 2022-2028

Ballyclerihan
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM) Present Day Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Present Day Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Present Day Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

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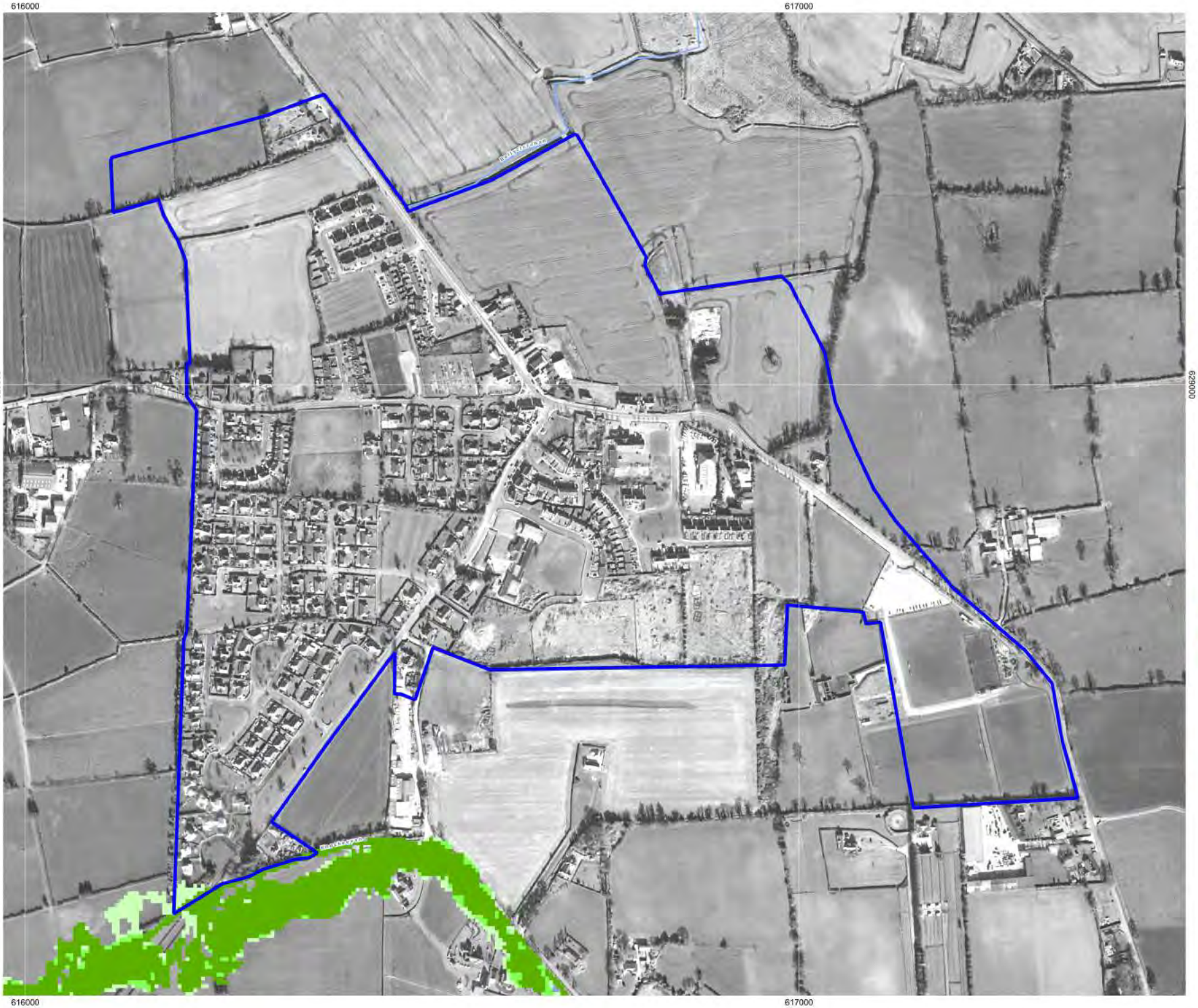

County Tipperary Development Plan 2022-2028

Ballyclerihan
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
Mid-Range Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Mid-Range Future Scenario
- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Mid-Range Future Scenario
- 5% AEP
- 1% AEP
- 0.1% AEP

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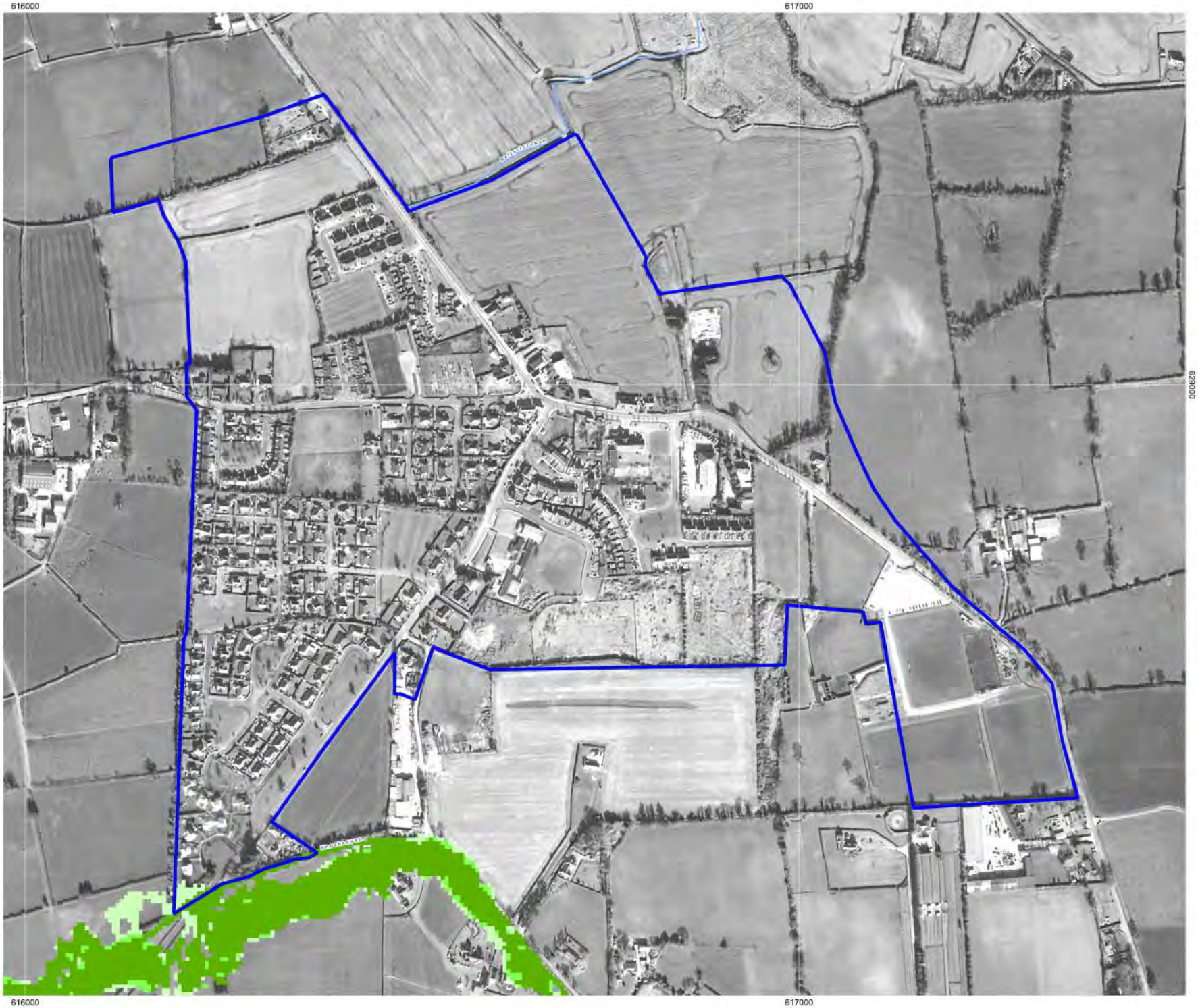

County Tipperary Development Plan 2022-2028

Ballyclerihan
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
High-End Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial High-End Future Scenario
- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM High-End Future Scenario
- 5% AEP
- 1% AEP
- 0.1% AEP

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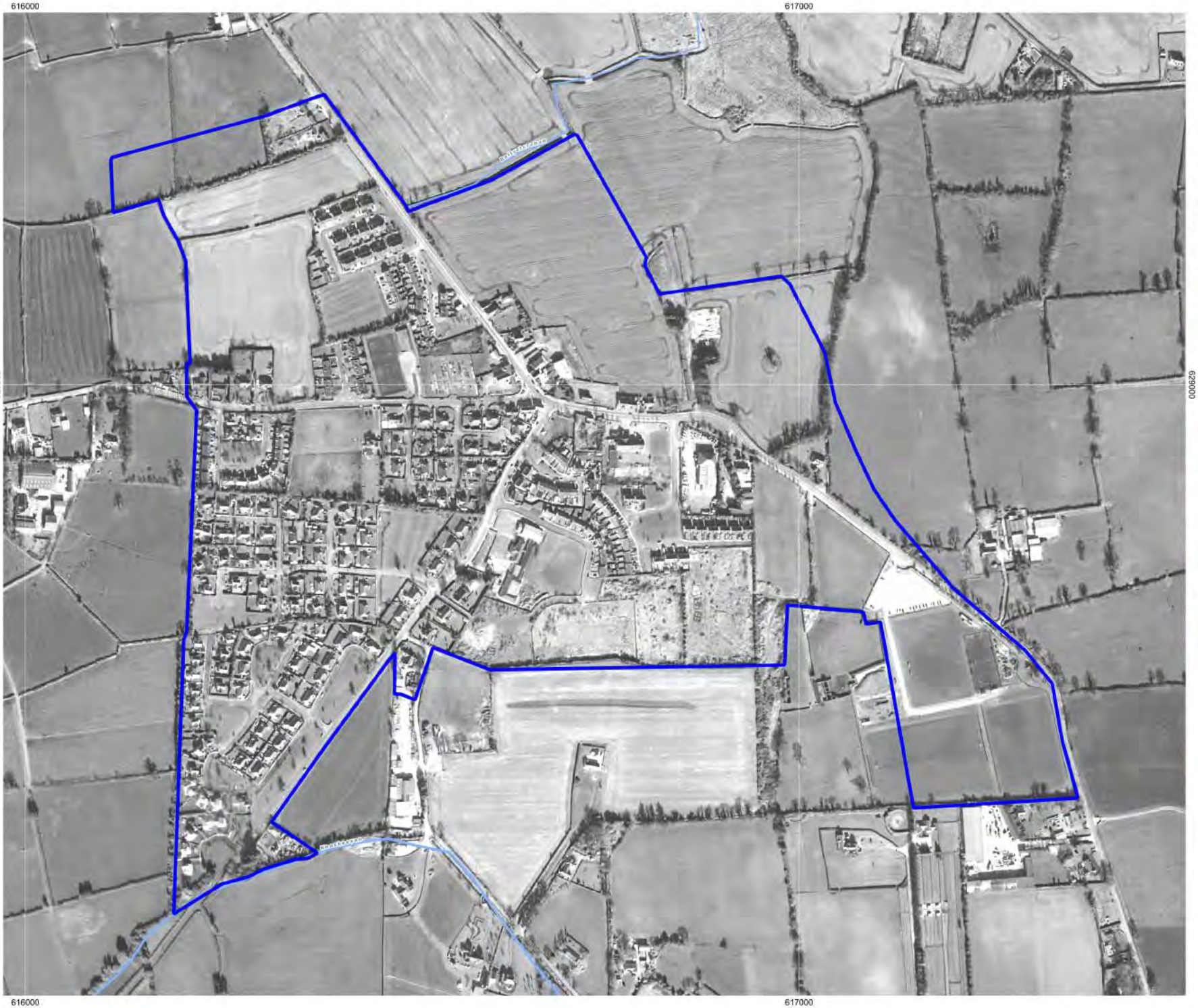

County Tipperary Development Plan 2022-2028

Ballyclerihan Rural Service Centre GSI Historical Flood Data and Groundwater Predictive Modeling

- Plan Boundary
- County Boundary
- Water
- River or Stream

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

Surface Water Flooding

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

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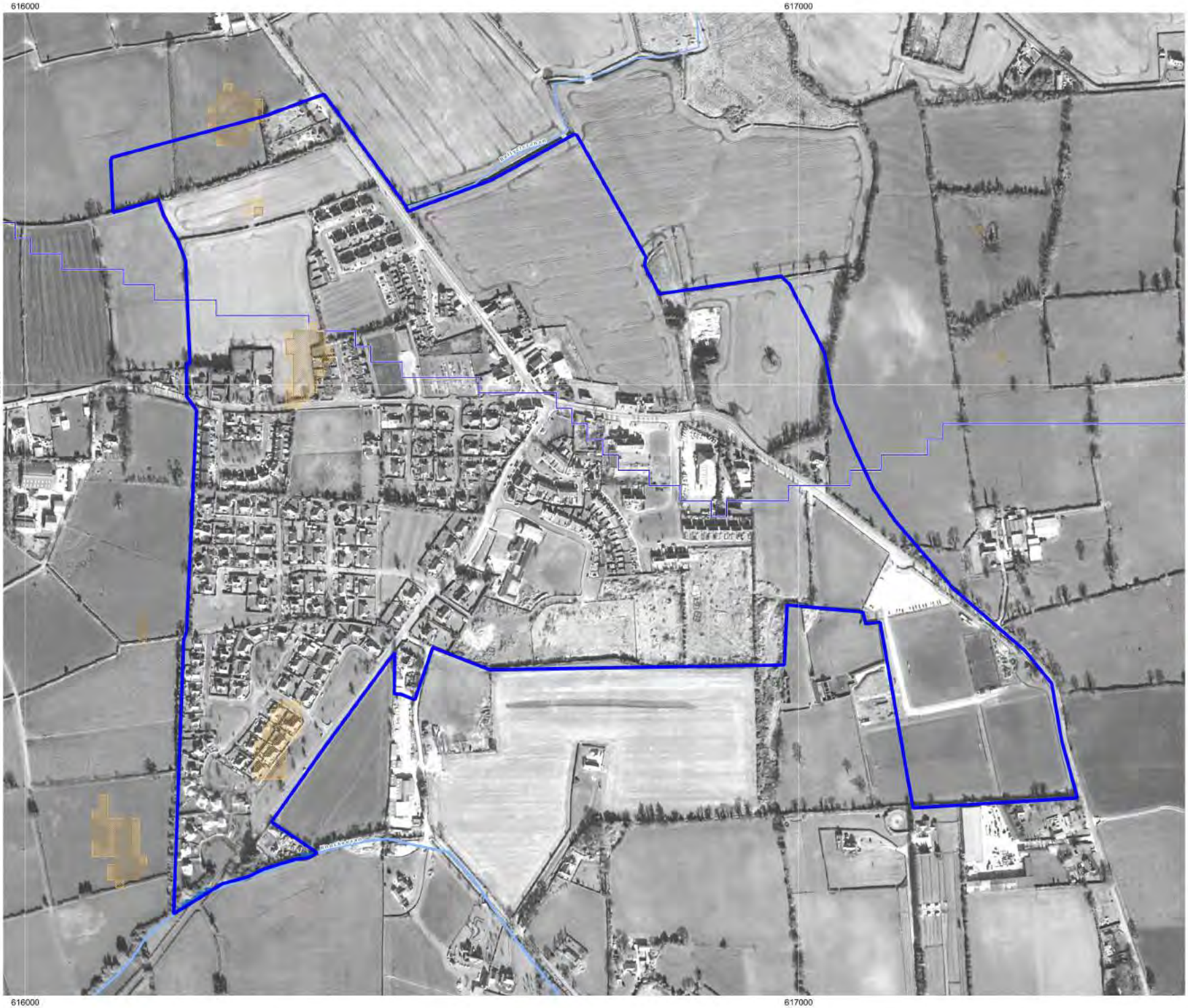

County Tipperary Development Plan 2022-2028

Ballyclerihan Rural Service Centre Indicative Flood Zones

- PlanBoundary
- County Boundary
- WFD River Sub-Basins
- Water
- River or Stream

Indicative Flood Zones

- Flood Zone A
- Flood Zone B

PFRA Pluvial

- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

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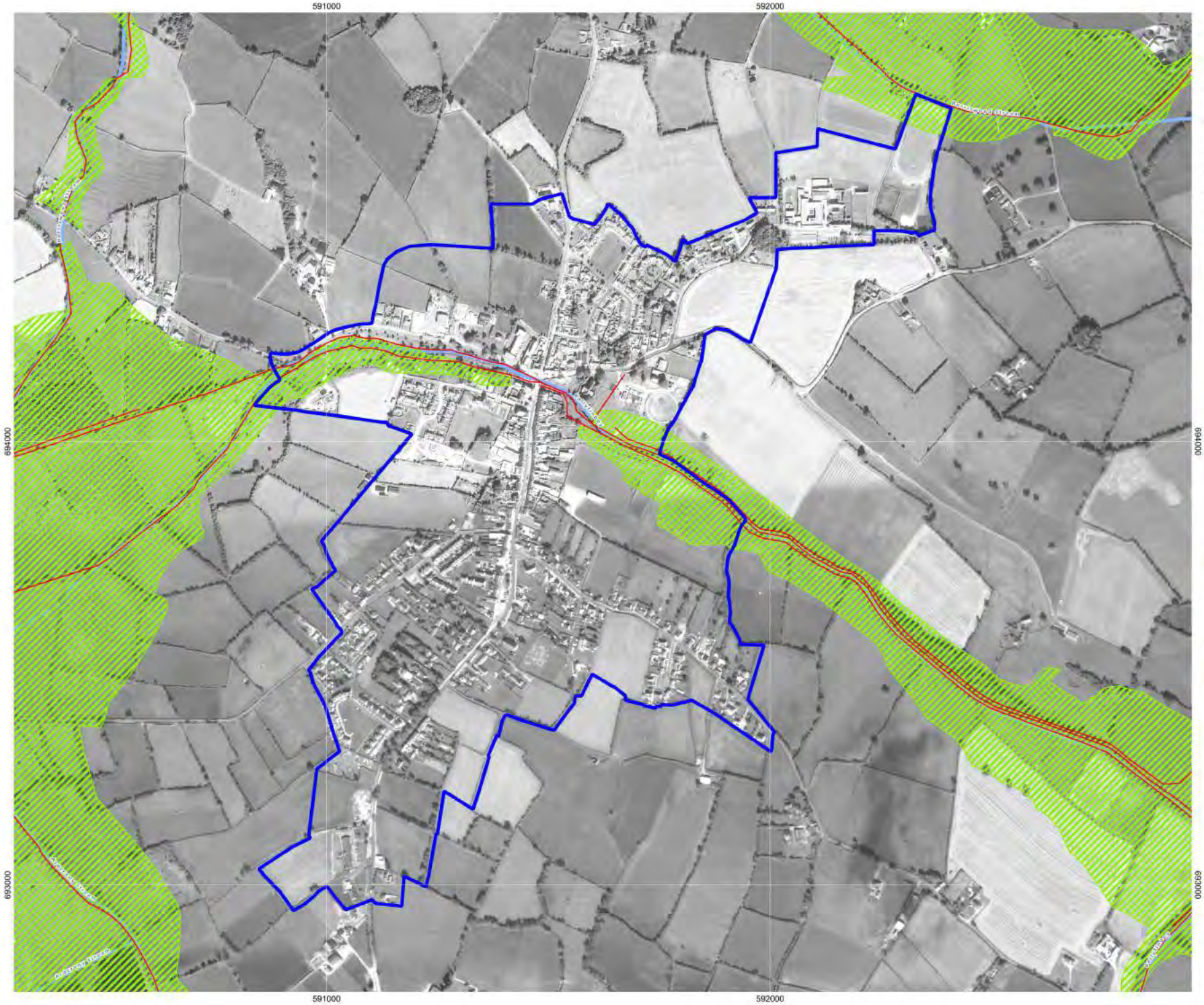

County Tipperary Development Plan 2022-2028

Borrisokane Rural Service Centre OPW Historical Flood Data

- Plan Boundary
- County Boundary
- Water
- River or Stream

OPW Past Flood Events

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

Land Commission

- Benefited Lands

Drainage District

- Channel
- Embankment
- Benefited Lands

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Lands

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County Tipperary Development Plan 2022-2028

Borrisokane Rural Service Centre OPW Preliminary Flood Risk Assessment (PFRA)

- Plan Boundary
- County Boundary
- Water
- River or Stream

PFRA

- Fluvial 1% AEP
- Fluvial 0.1% AEP
- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

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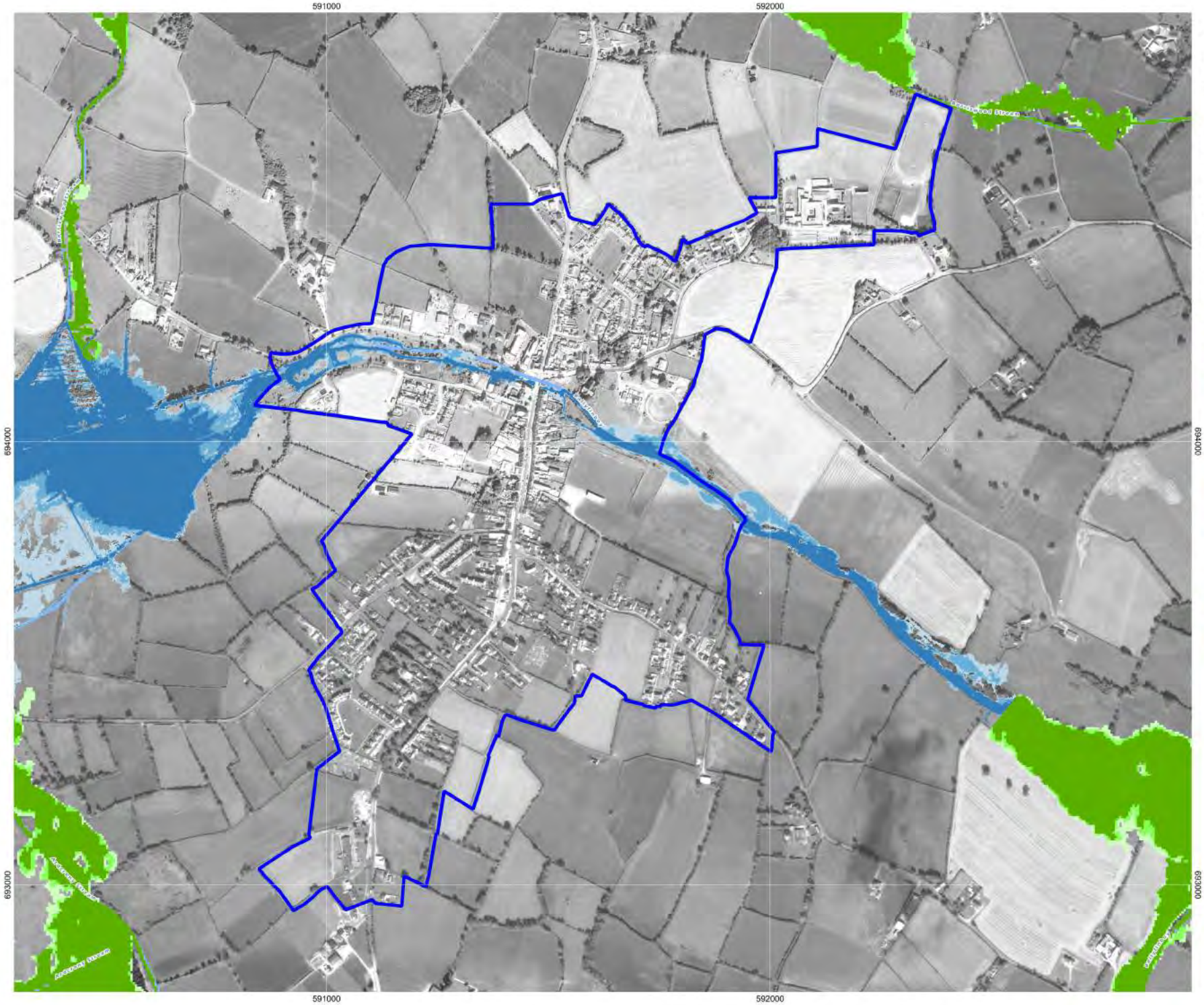

County Tipperary Development Plan 2022-2028

Borrisokane
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM) Present Day Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Present Day Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Present Day Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

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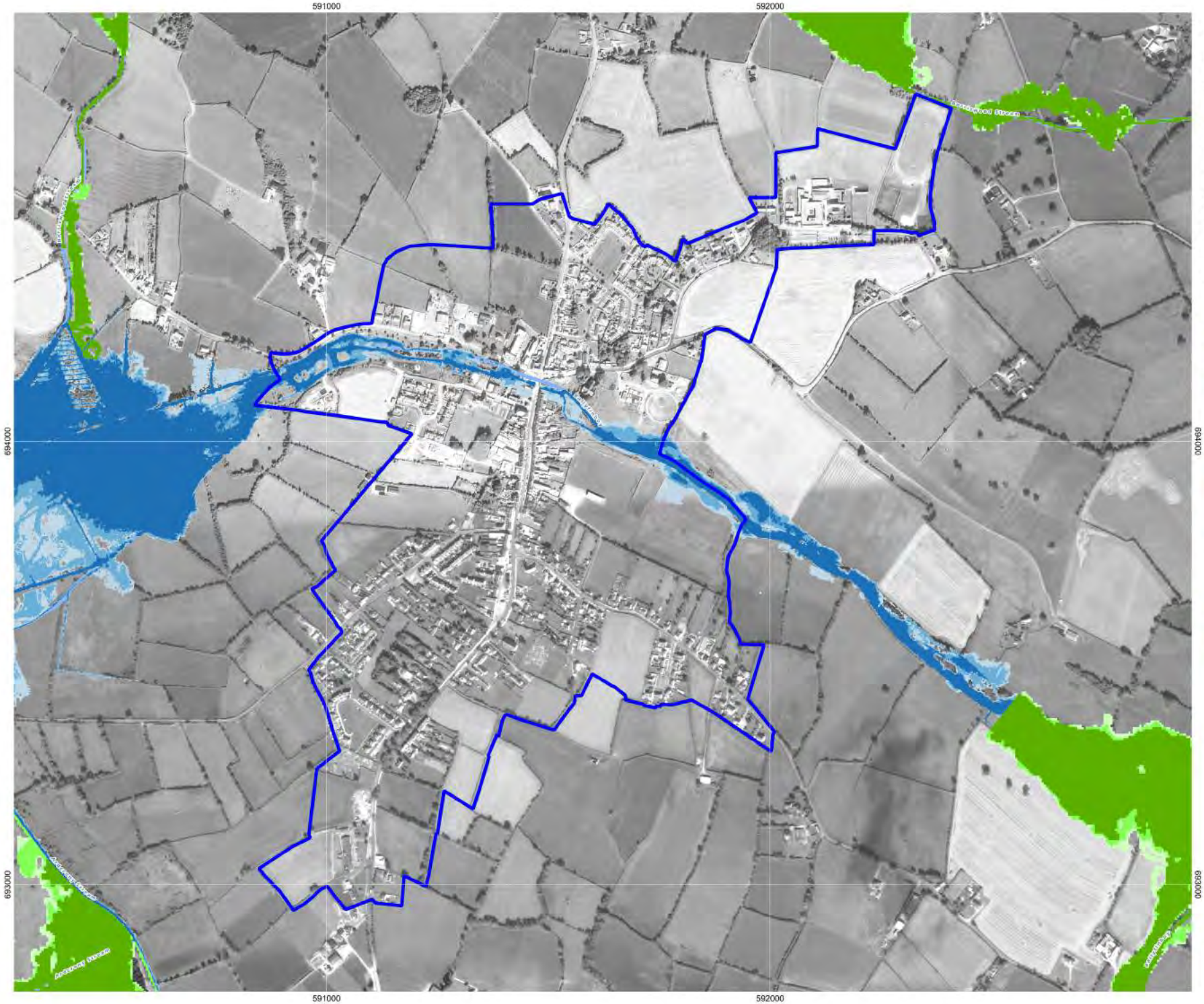
County Tipperary Development Plan 2022-2028

Borrisokane
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
Mid-Range Future Scenario



- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Mid-Range Future Scenario
- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Mid-Range Future Scenario
- 5% AEP
- 1% AEP
- 0.1% AEP

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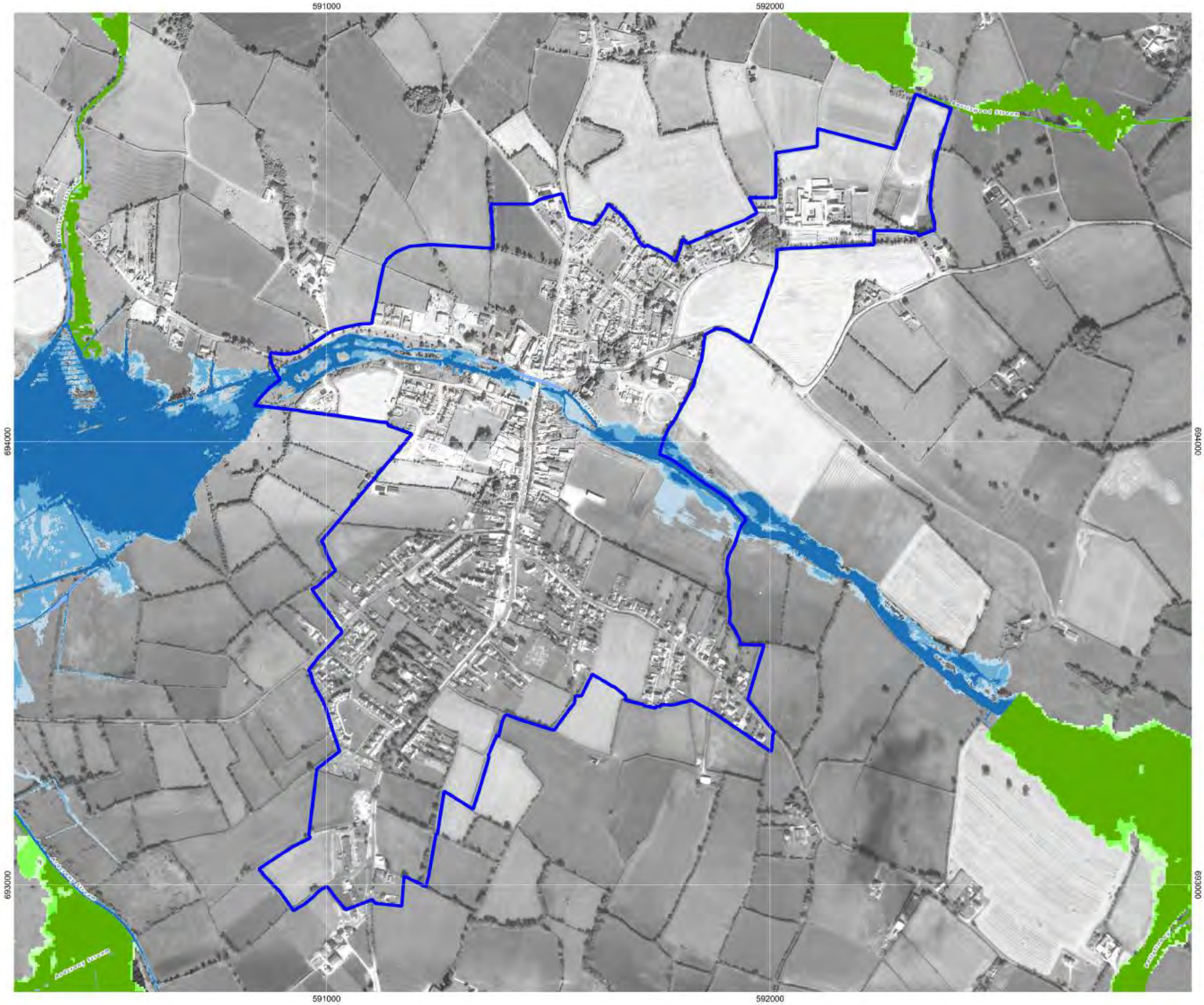

County Tipperary Development Plan 2022-2028

Borrisokane
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
High-End Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial High-End Future Scenario
- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM High-End Future Scenario
- 5% AEP
- 1% AEP
- 0.1% AEP

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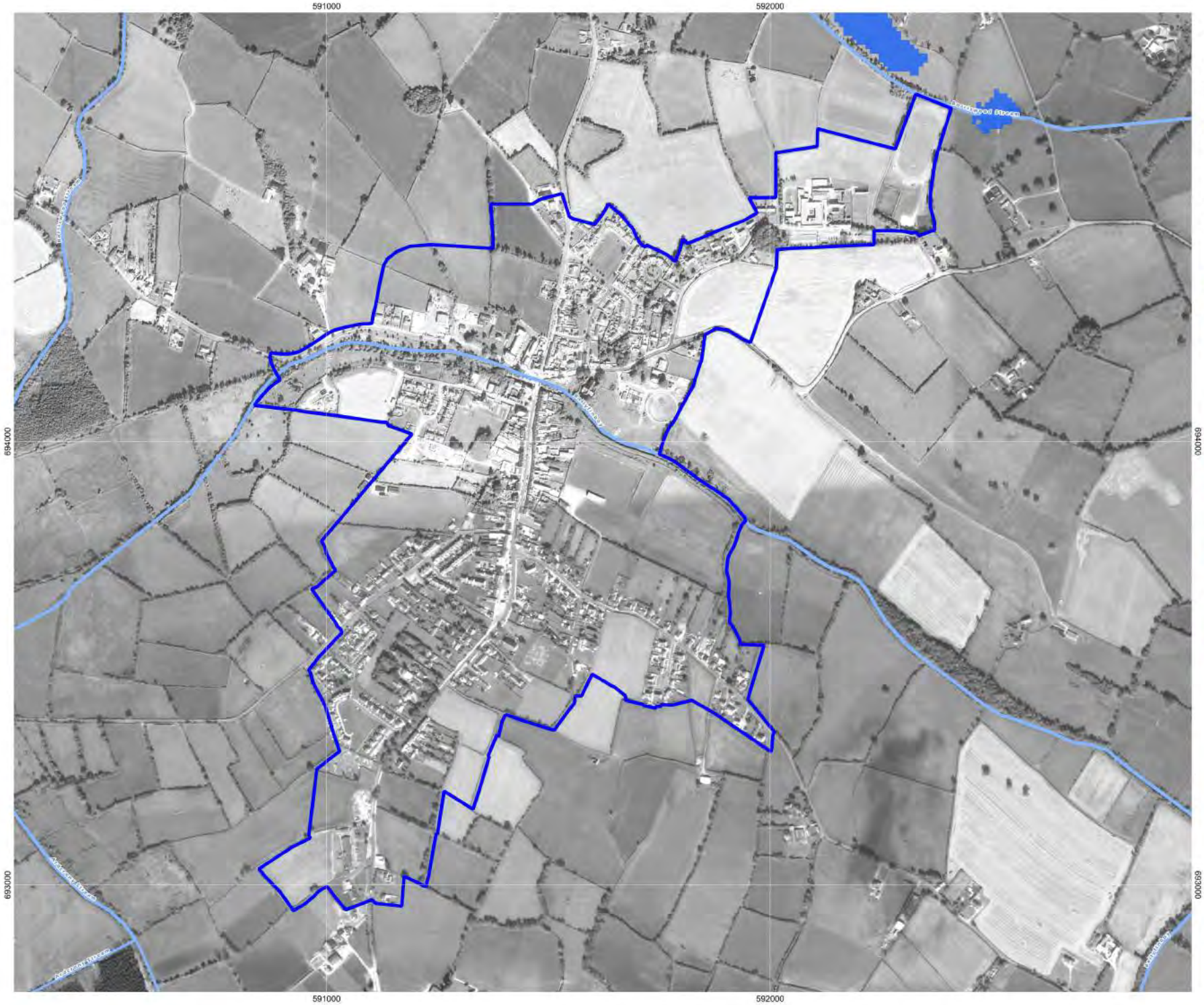

County Tipperary Development Plan 2022-2028

Borrisokane Rural Service Centre GSI Historical Flood Data and Groundwater Predictive Modeling

- Plan Boundary
- County Boundary
- Water
- River or Stream

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

Surface Water Flooding

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

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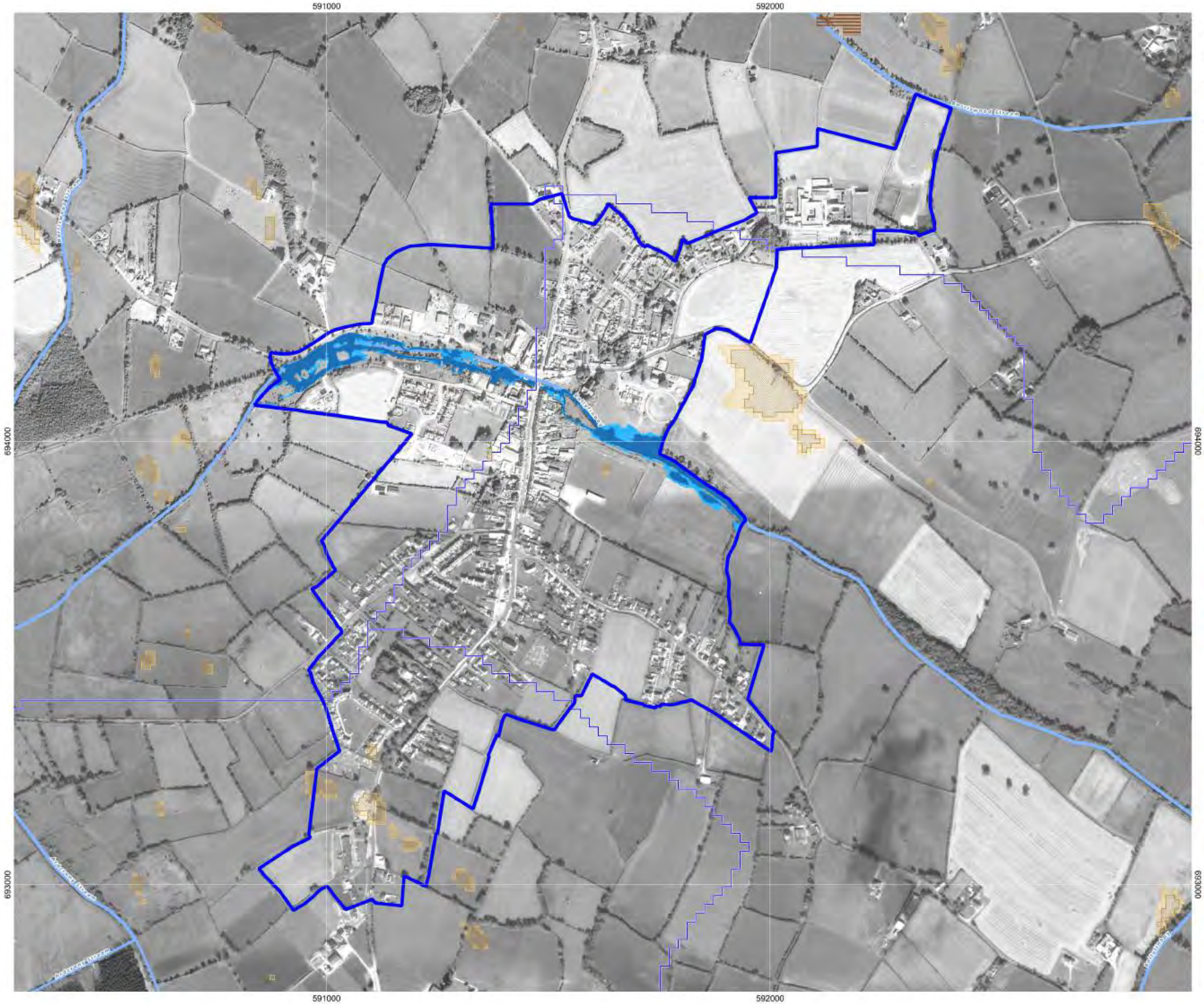

County Tipperary Development Plan 2022-2028

Borrisokane Rural Service Centre Indicative Flood Zones

- PlanBoundary
- County Boundary
- WFD River Sub-Basins
- Water
- River or Stream

Indicative Flood Zones

- Flood Zone A
- Flood Zone B

PFRA Pluvial

- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

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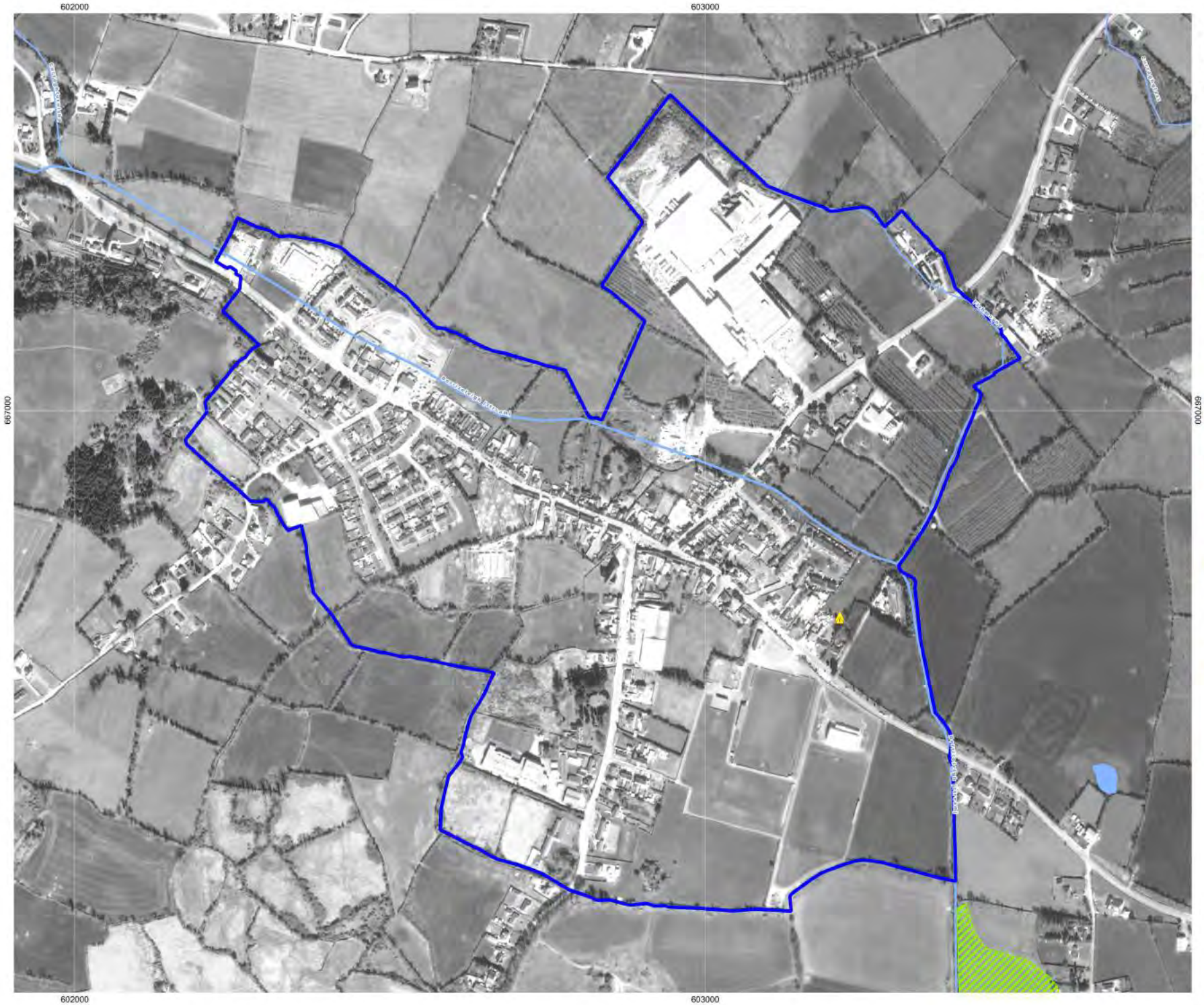

County Tipperary Development Plan 2022-2028

Borrisoleigh Rural Service Centre OPW Historical Flood Data

- Plan Boundary
- County Boundary
- Water
- River or Stream

OPW Past Flood Events

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

Land Commission

- Benefited Lands

Drainage District

- Channel
- Embankment
- Benefited Lands

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Lands

Comhairle Contae Thiobraid Árann
Tipperary County Council

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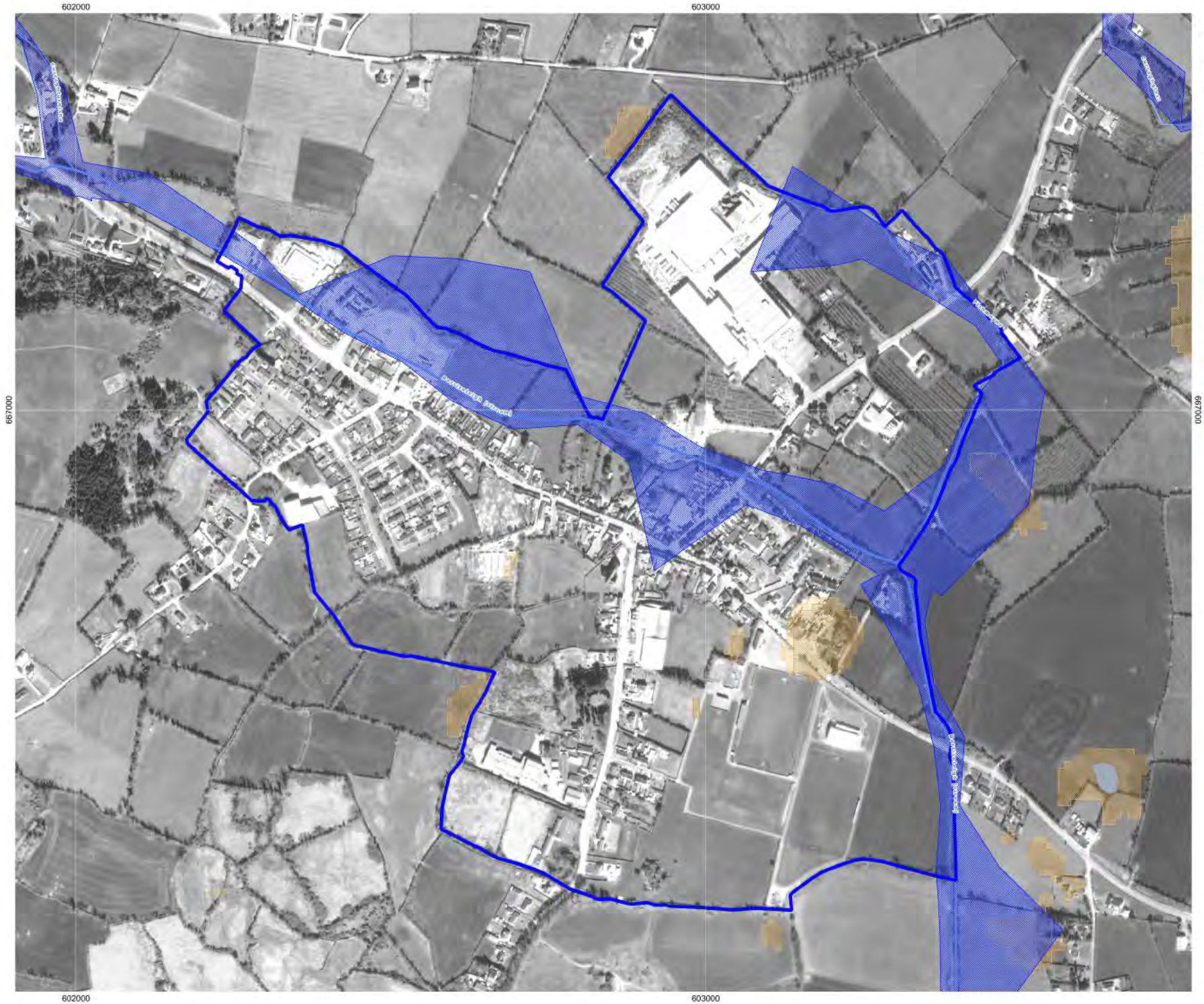

County Tipperary Development Plan 2022-2028

Borrisoleigh Rural Service Centre OPW Preliminary Flood Risk Assessment (PFRA)

- Plan Boundary
- County Boundary
- Water
- River or Stream

PFRA

- Fluvial 1% AEP
- Fluvial 0.1% AEP
- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

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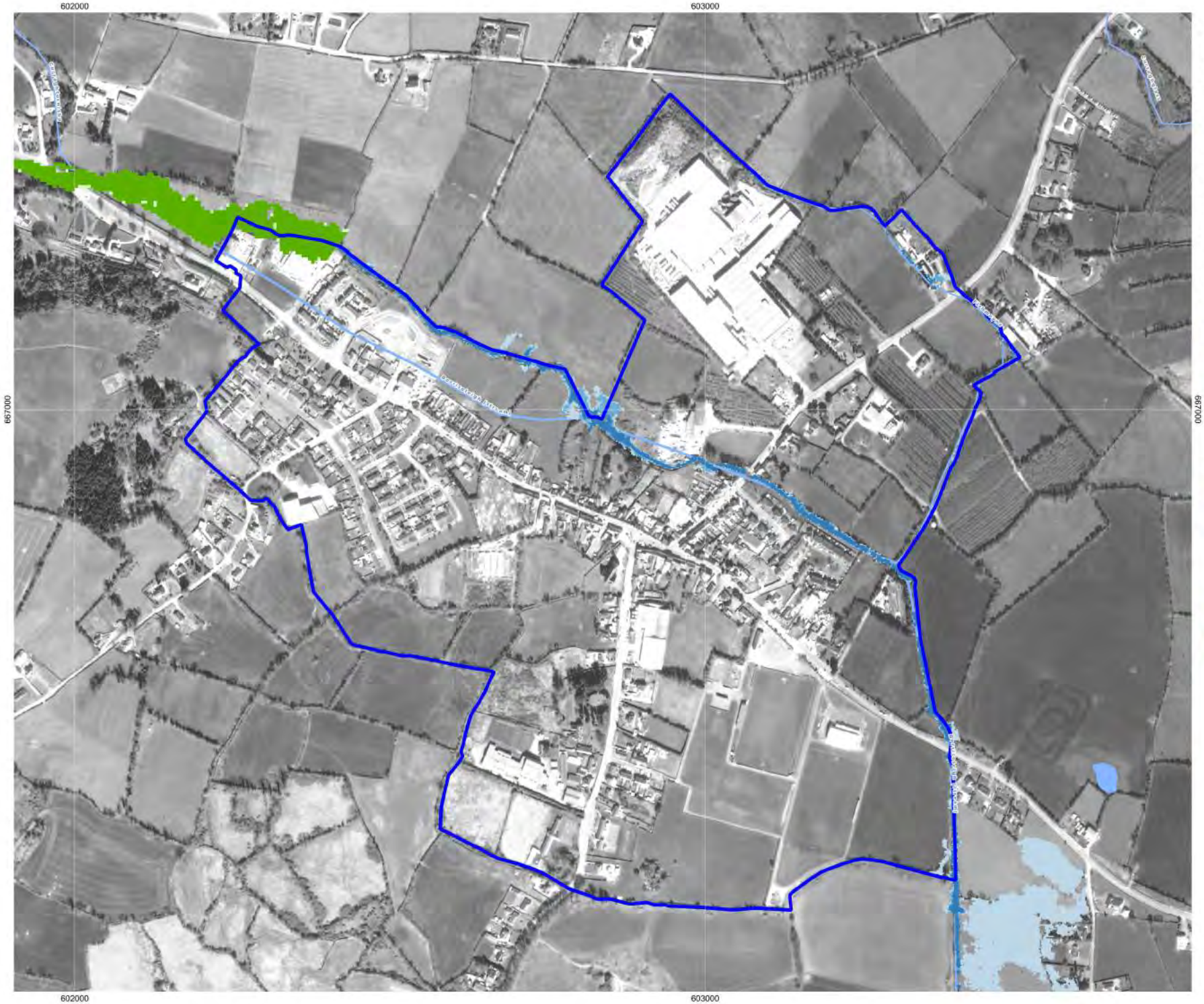

County Tipperary Development Plan 2022-2028

Borrisoleigh Rural Service Centre OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM) Present Day Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Present Day Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Present Day Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

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Tipperary County Council

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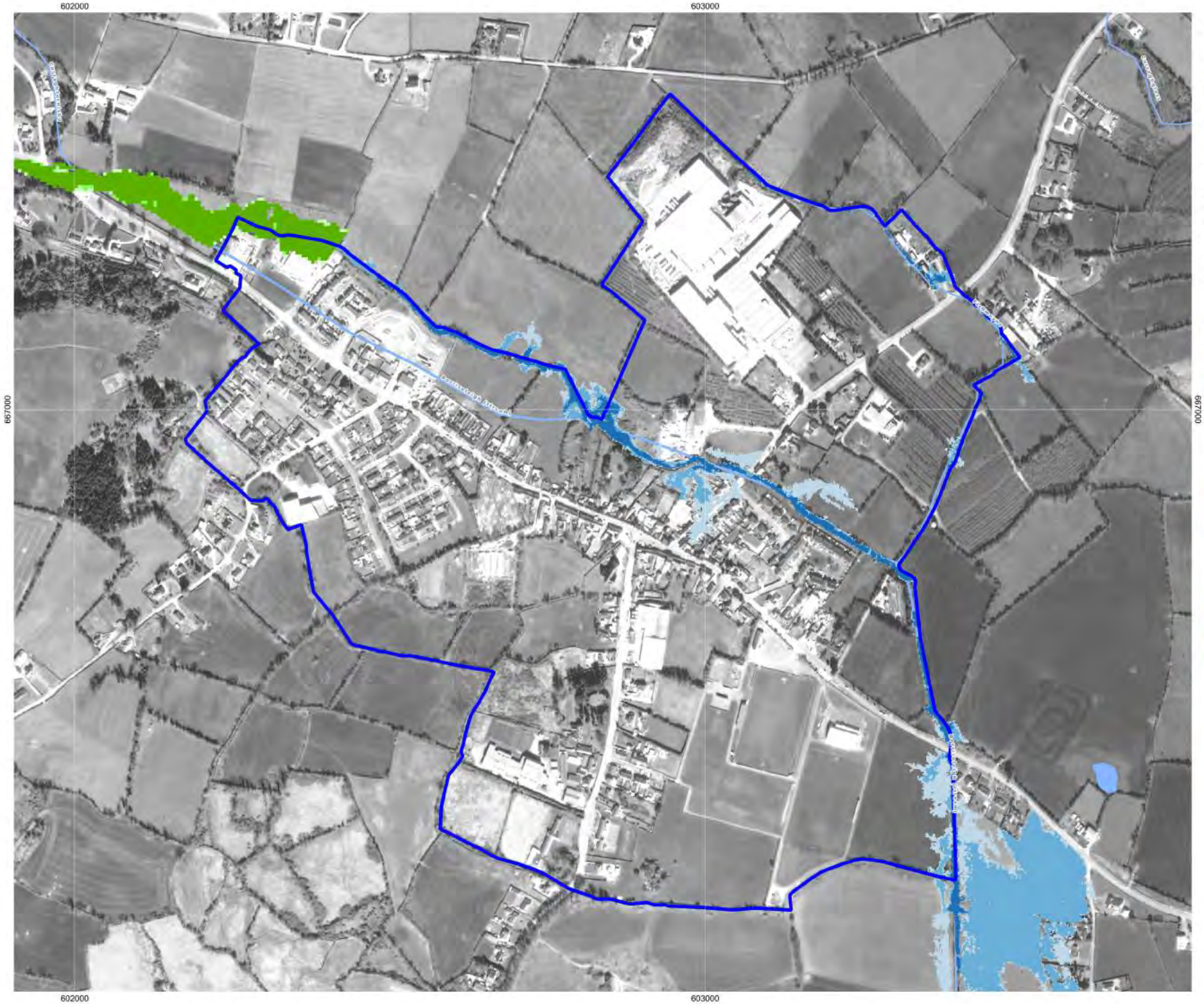

County Tipperary Development Plan 2022-2028

Borrisoleigh
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
Mid-Range Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Mid-Range Future Scenario
- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Mid-Range Future Scenario
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- 1% AEP
- 0.1% AEP

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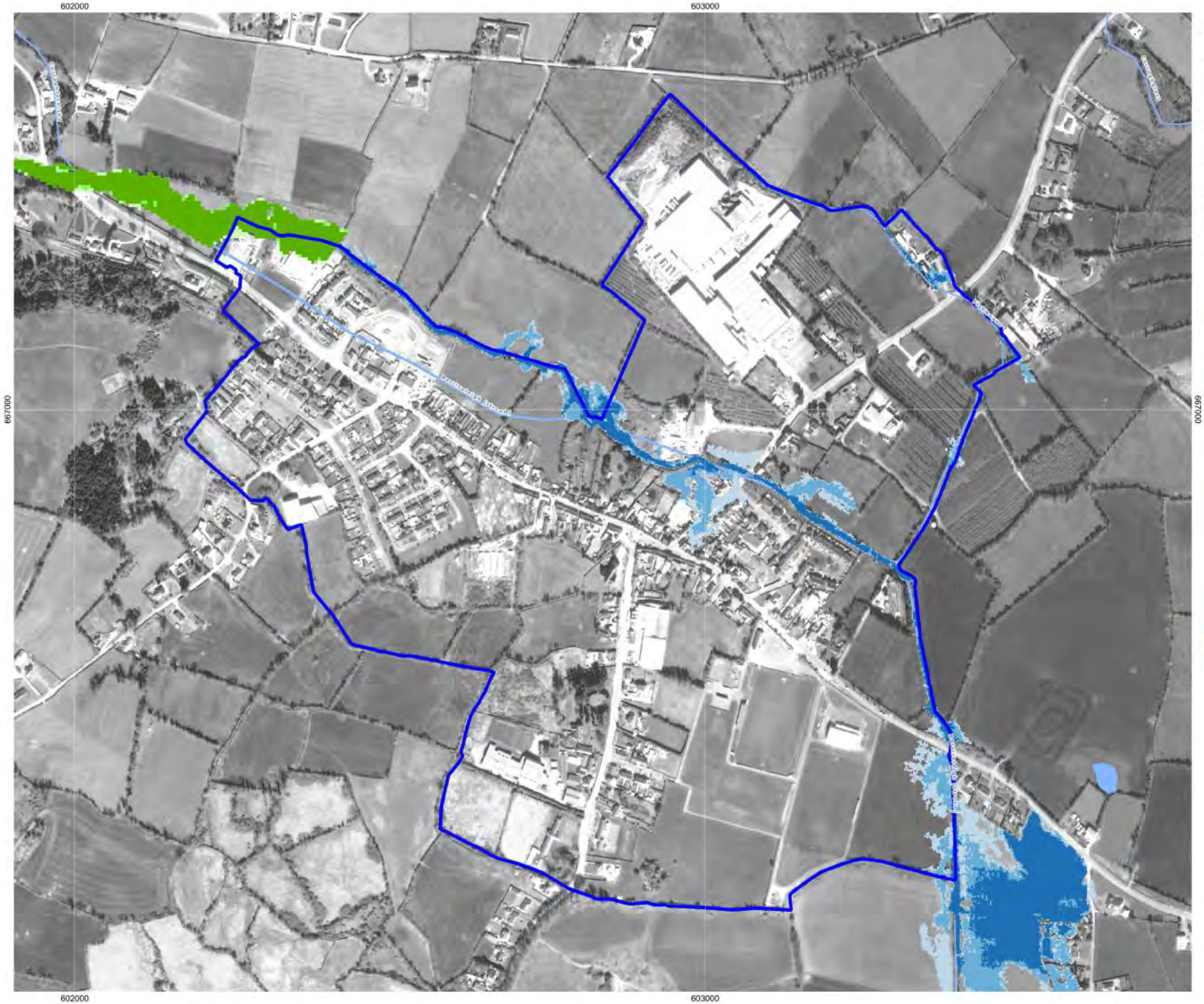

County Tipperary Development Plan 2022-2028

Borrisoleigh
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
High-End Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial High-End Future Scenario
- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM High-End Future Scenario
- 5% AEP
- 1% AEP
- 0.1% AEP

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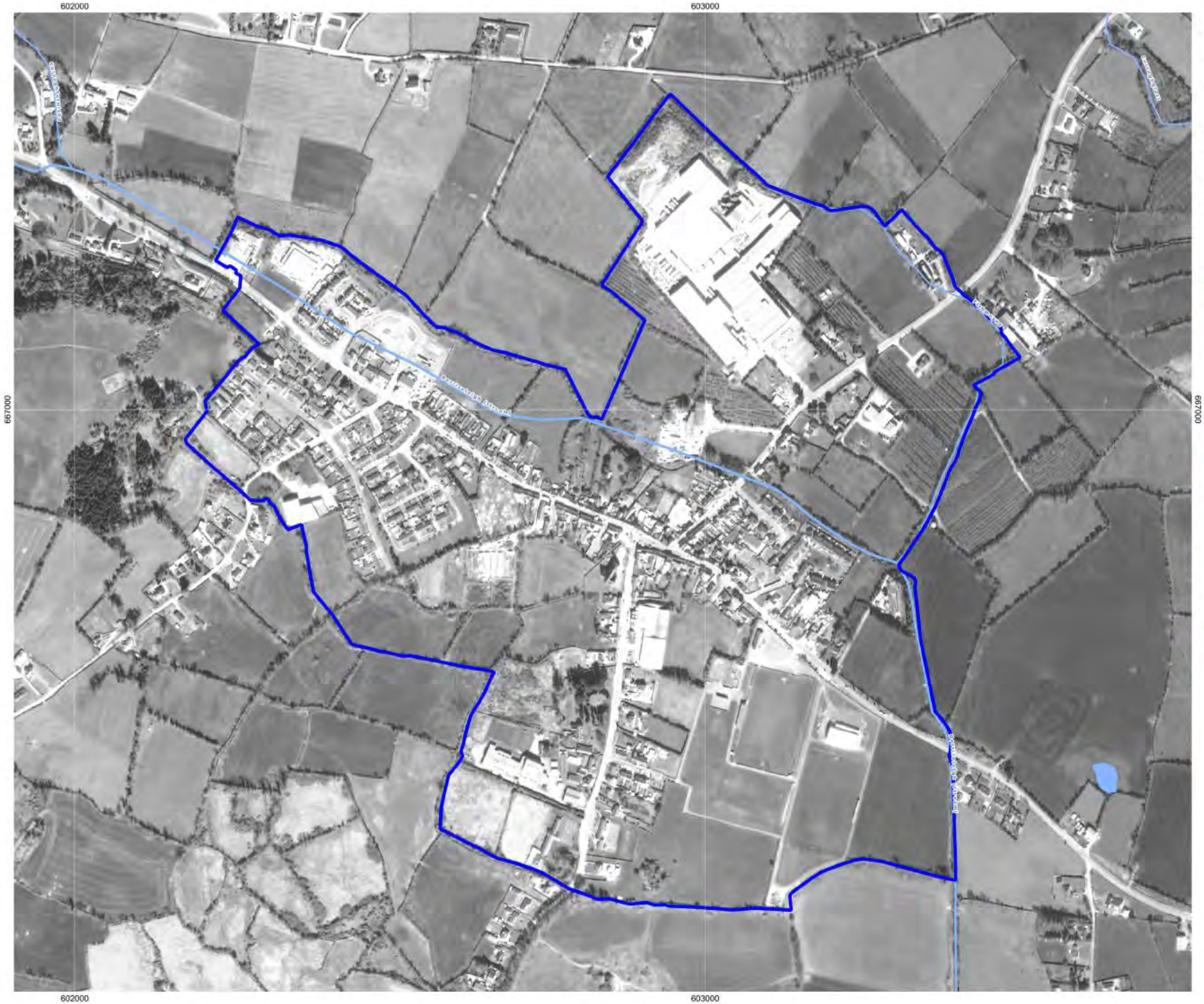

County Tipperary Development Plan 2022-2028

Borrisoleigh Rural Service Centre GSI Historical Flood Data and Groundwater Predictive Modeling

- Plan Boundary
- County Boundary
- Water
- River or Stream

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

Surface Water Flooding

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

Comhairle Contae Thiobraid Árann
Tipperary County Council

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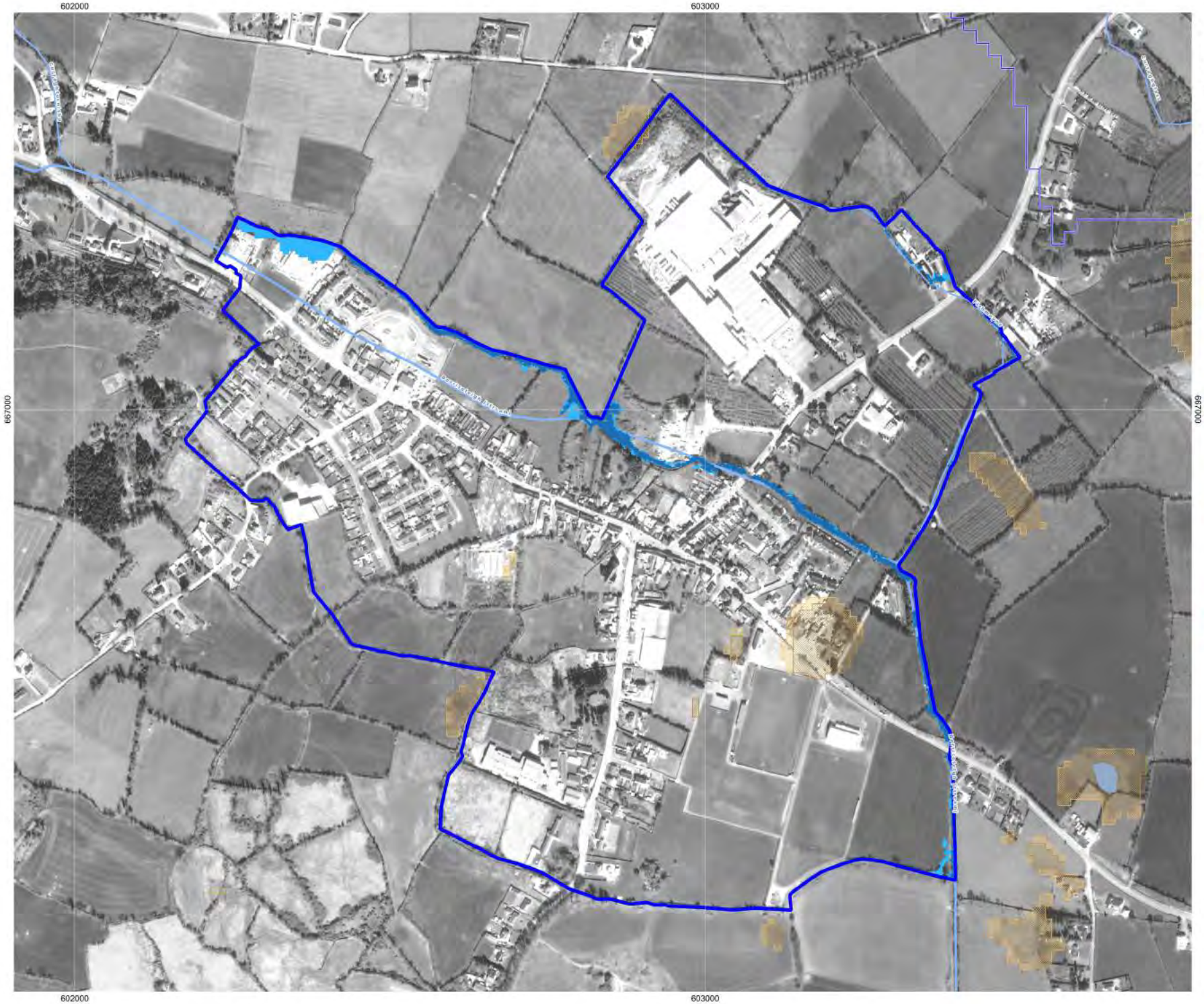

County Tipperary Development Plan 2022-2028

Borrisoleigh Rural Service Centre Indicative Flood Zones

- PlanBoundary
- County Boundary
- WFD River Sub-Basins
- Water
- River or Stream

Indicative Flood Zones

- Flood Zone A
- Flood Zone B

PFRA Pluvial

- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

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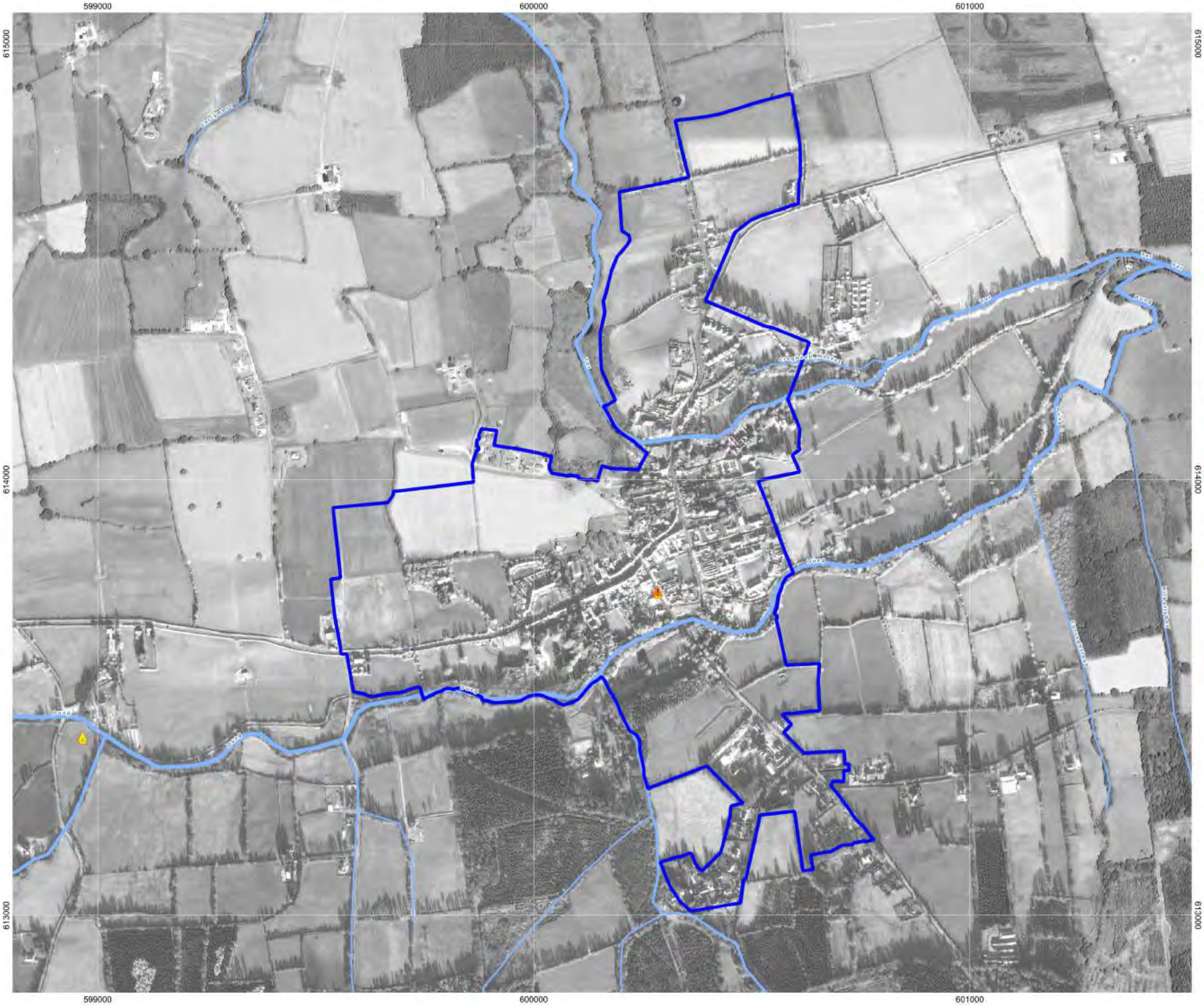

County Tipperary Development Plan 2022-2028

Clogheen Rural Service Centre OPW Historical Flood Data

- Plan Boundary
- County Boundary
- Water
- River or Stream

OPW Past Flood Events

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

Land Commission

- Benefited Lands

Drainage District

- Channel
- Embankment
- Benefited Lands

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Lands

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Tipperary County Council

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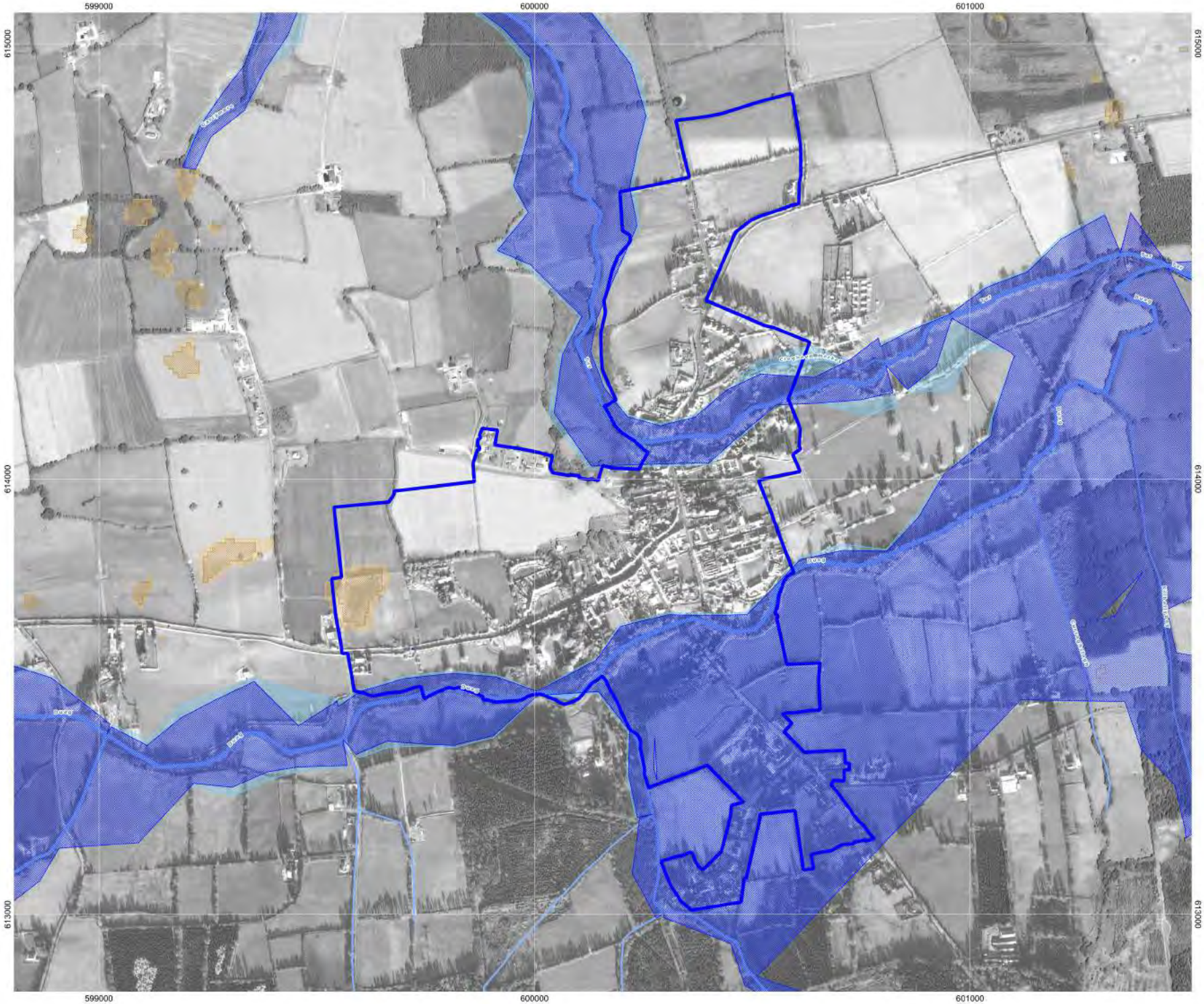

County Tipperary Development Plan 2022-2028

Clogheen Rural Service Centre OPW Preliminary Flood Risk Assessment (PFRA)

- Plan Boundary
- County Boundary
- Water
- River or Stream

PFRA

- Fluvial 1% AEP
- Fluvial 0.1% AEP
- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

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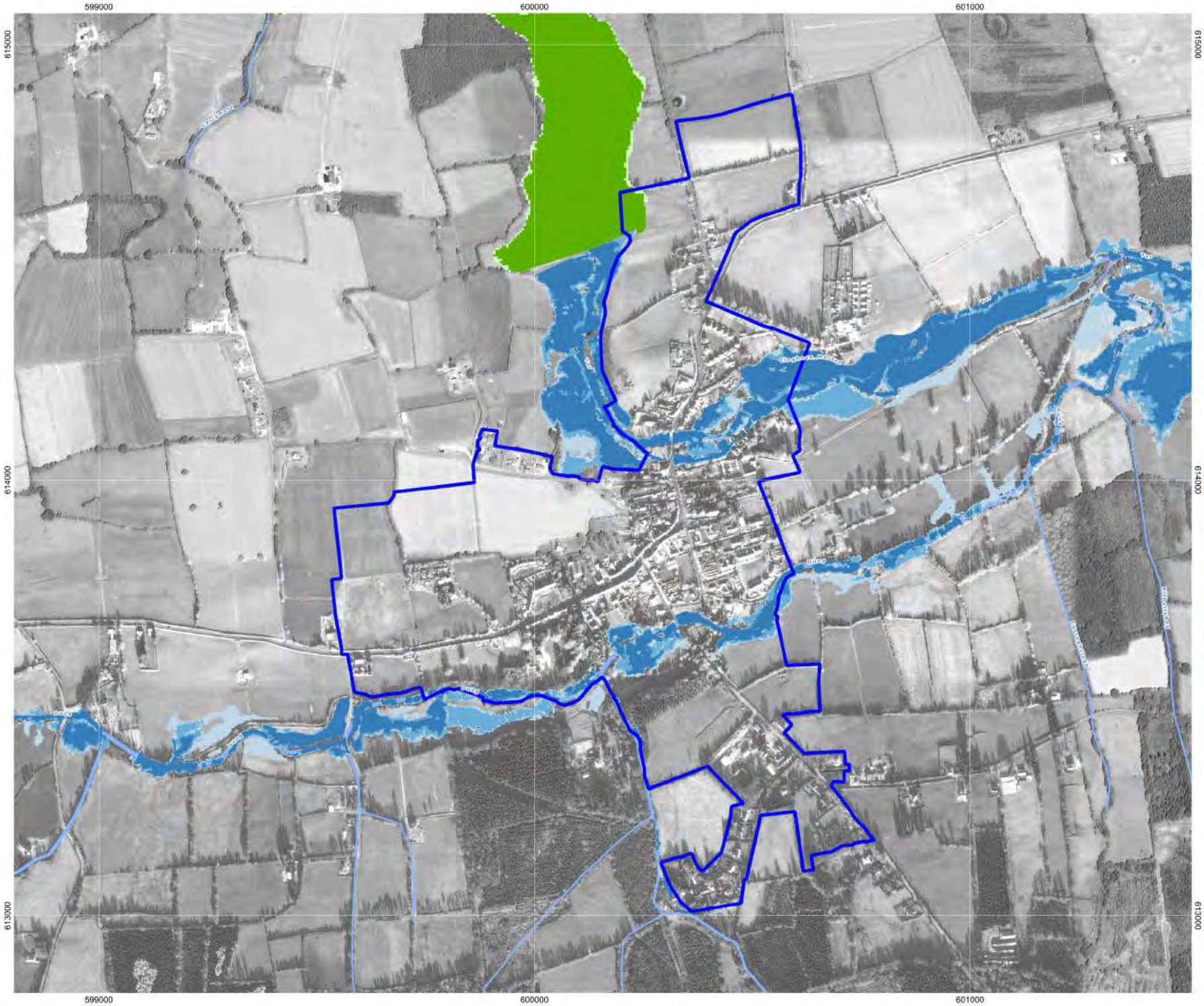

County Tipperary Development Plan 2022-2028

Clogheen
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM) Present Day Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Present Day Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Present Day Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

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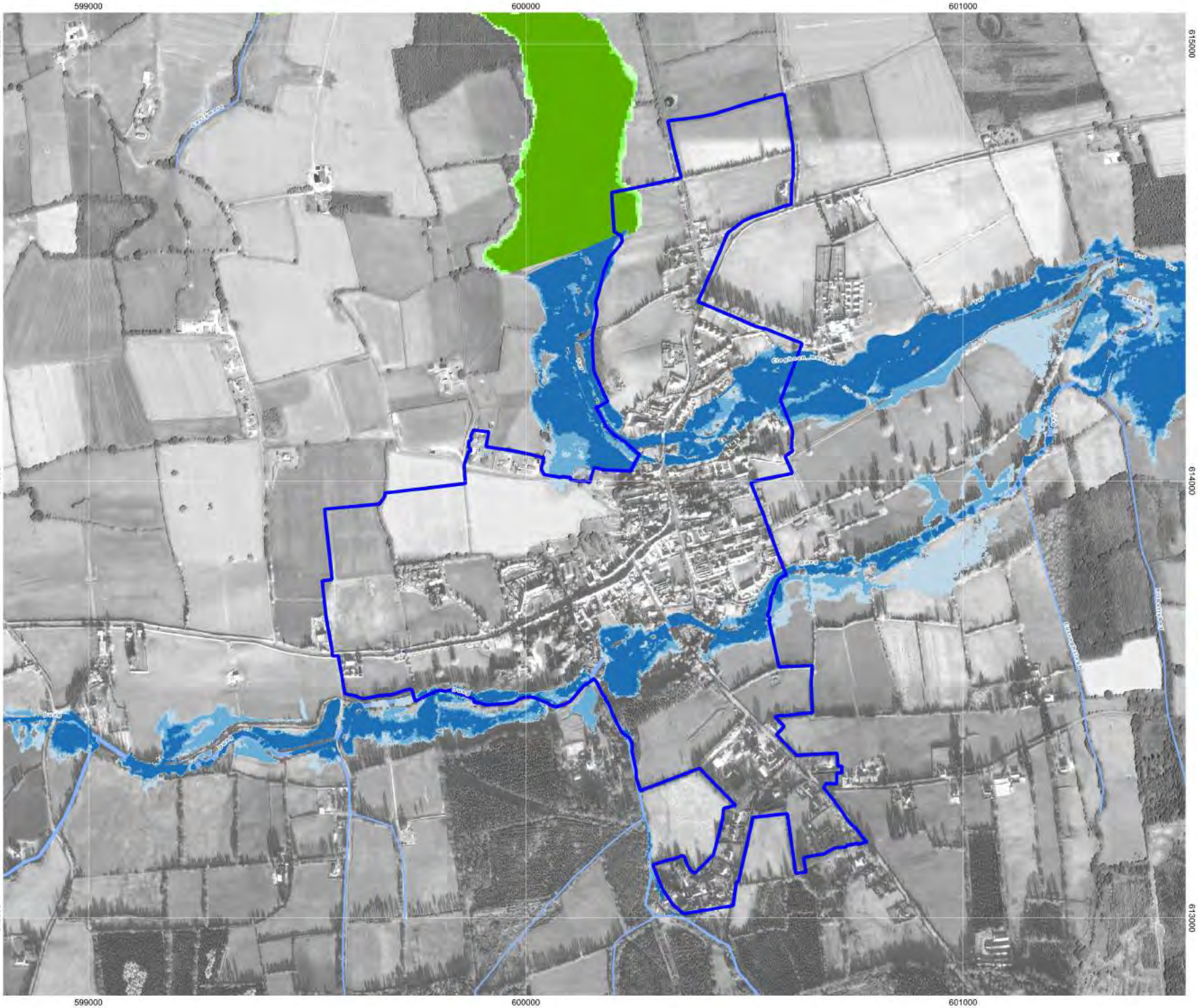

County Tipperary Development Plan 2022-2028

Clogheen
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
Mid-Range Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Mid-Range Future Scenario
- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Mid-Range Future Scenario
- 5% AEP
- 1% AEP
- 0.1% AEP

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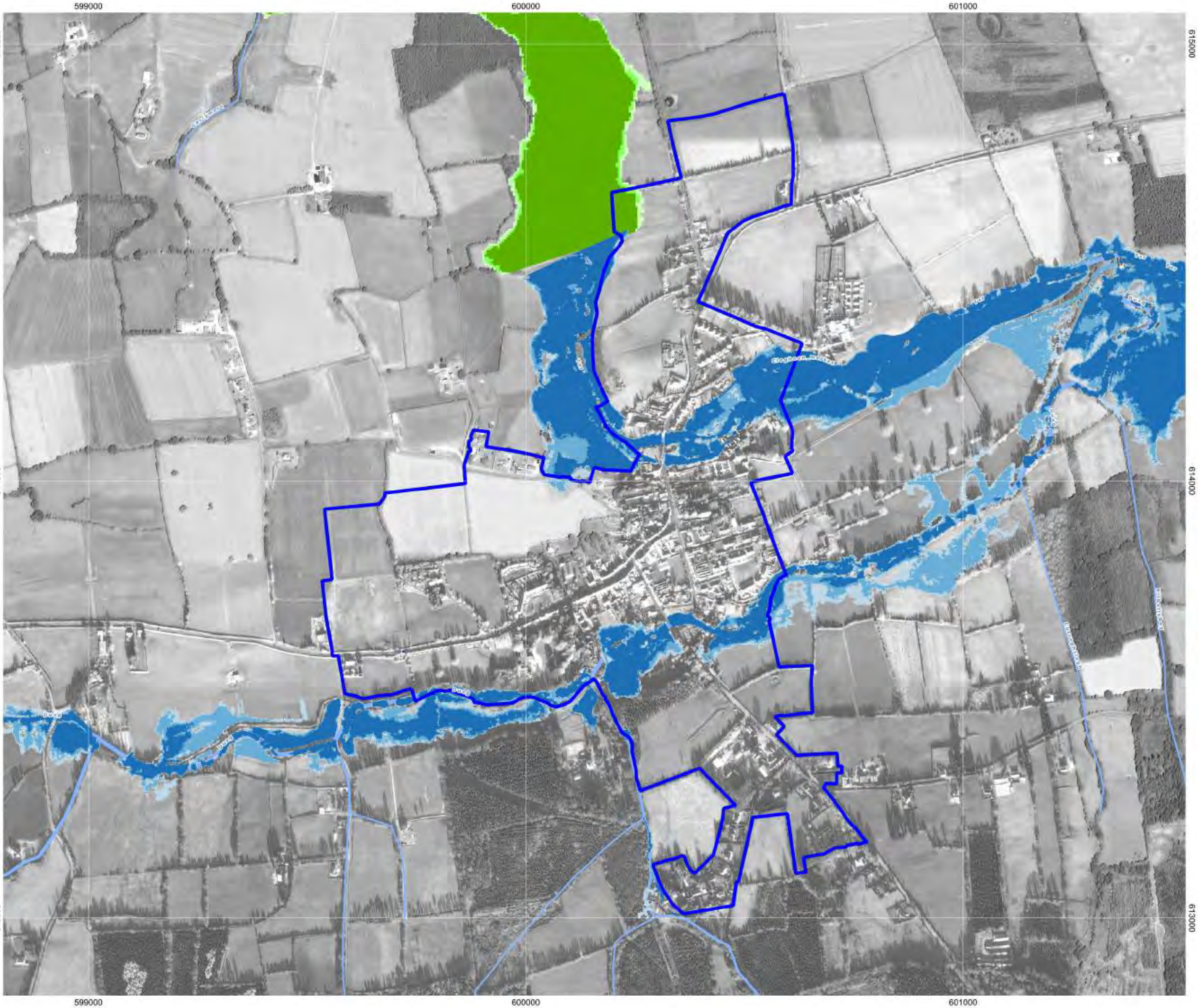

County Tipperary Development Plan 2022-2028

Clogheen
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
High-End Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial High-End Future Scenario
- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM High-End Future Scenario
- 5% AEP
- 1% AEP
- 0.1% AEP

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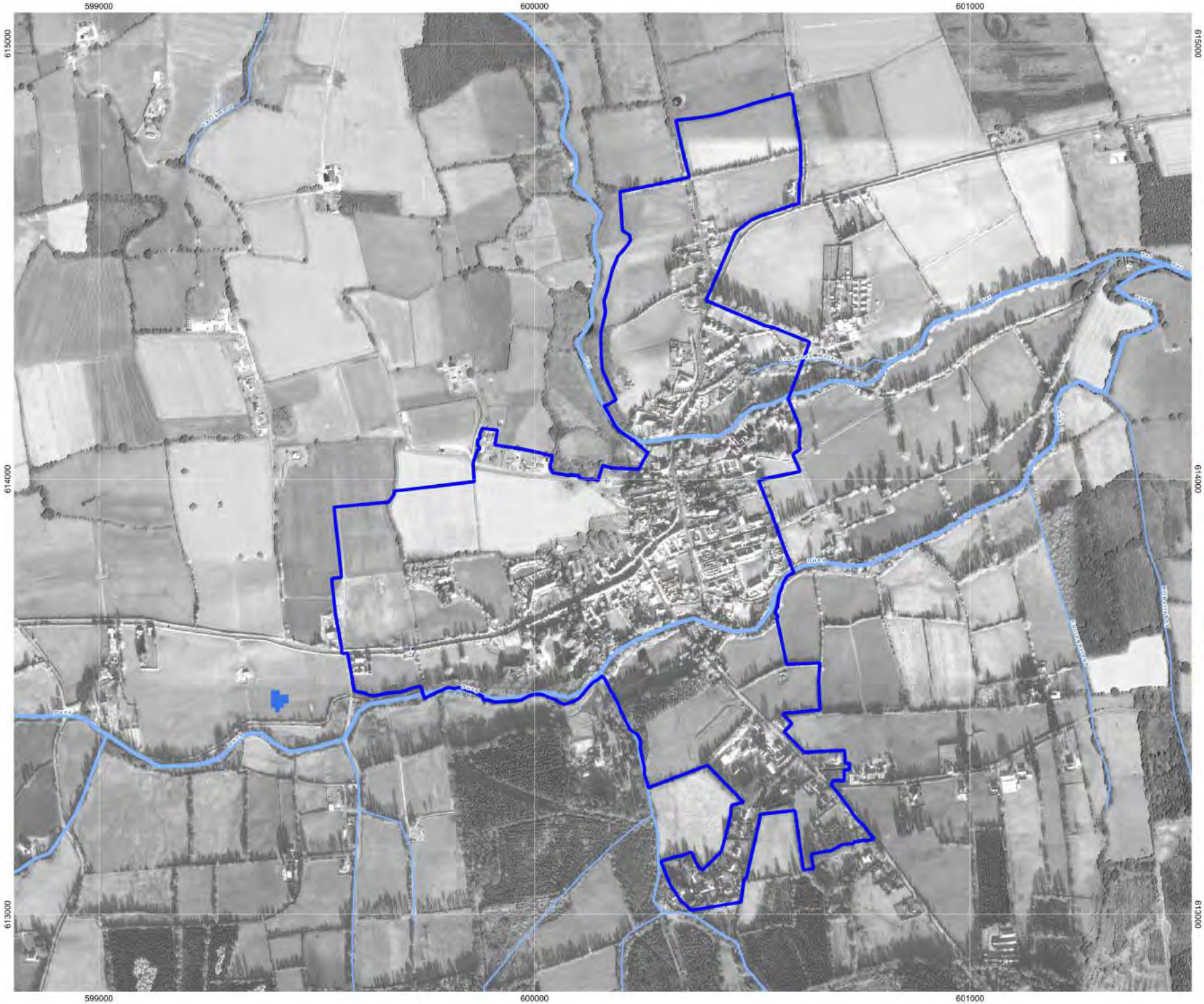

County Tipperary Development Plan 2022-2028

Clogheen Rural Service Centre GSI Historical Flood Data and Groundwater Predictive Modeling

- Plan Boundary
- County Boundary
- Water
- River or Stream

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

Surface Water Flooding

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

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Tipperary County Council

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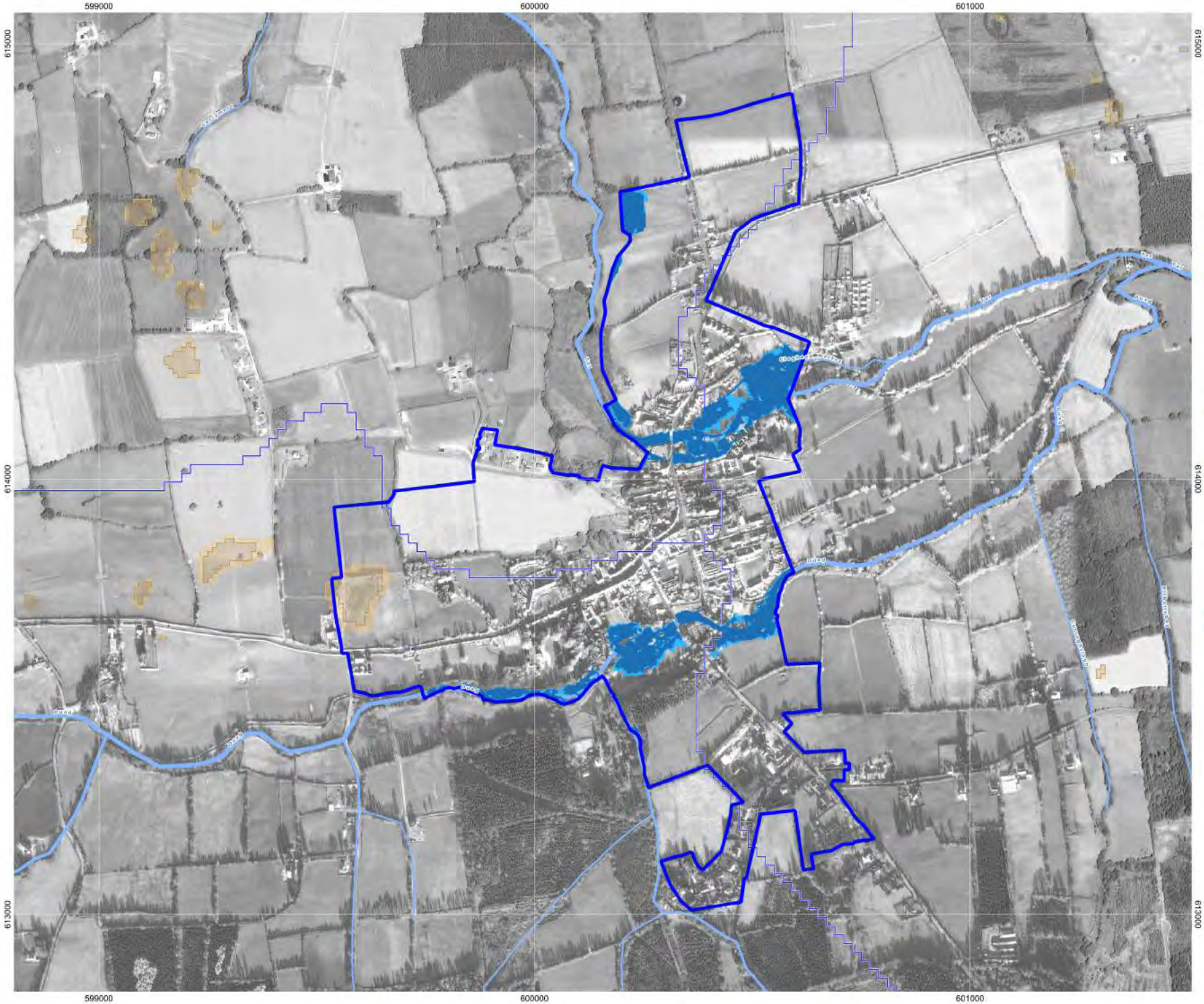

County Tipperary Development Plan 2022-2028

Clogheen Rural Service Centre Indicative Flood Zones

- PlanBoundary
- County Boundary
- WFD River Sub-Basins
- Water
- River or Stream

Indicative Flood Zones

- Flood Zone A
- Flood Zone B

PFRA Pluvial

- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

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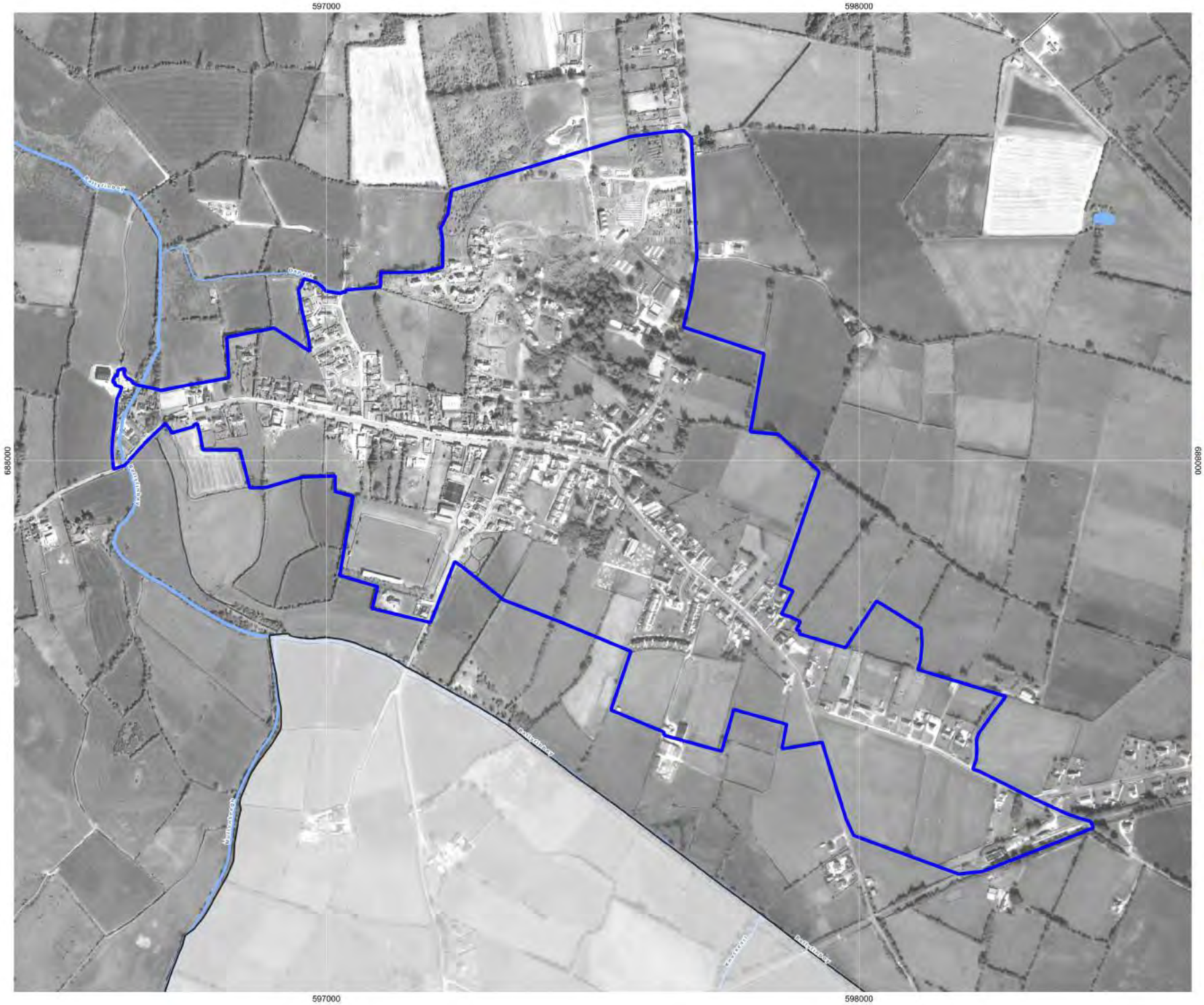

County Tipperary Development Plan 2022-2028

Cloughjordan Rural Service Centre OPW Historical Flood Data

- Plan Boundary
- County Boundary
- Water
- River or Stream

OPW Past Flood Events

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

Land Commission

- Benefited Lands

Drainage District

- Channel
- Embankment
- Benefited Lands

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Lands

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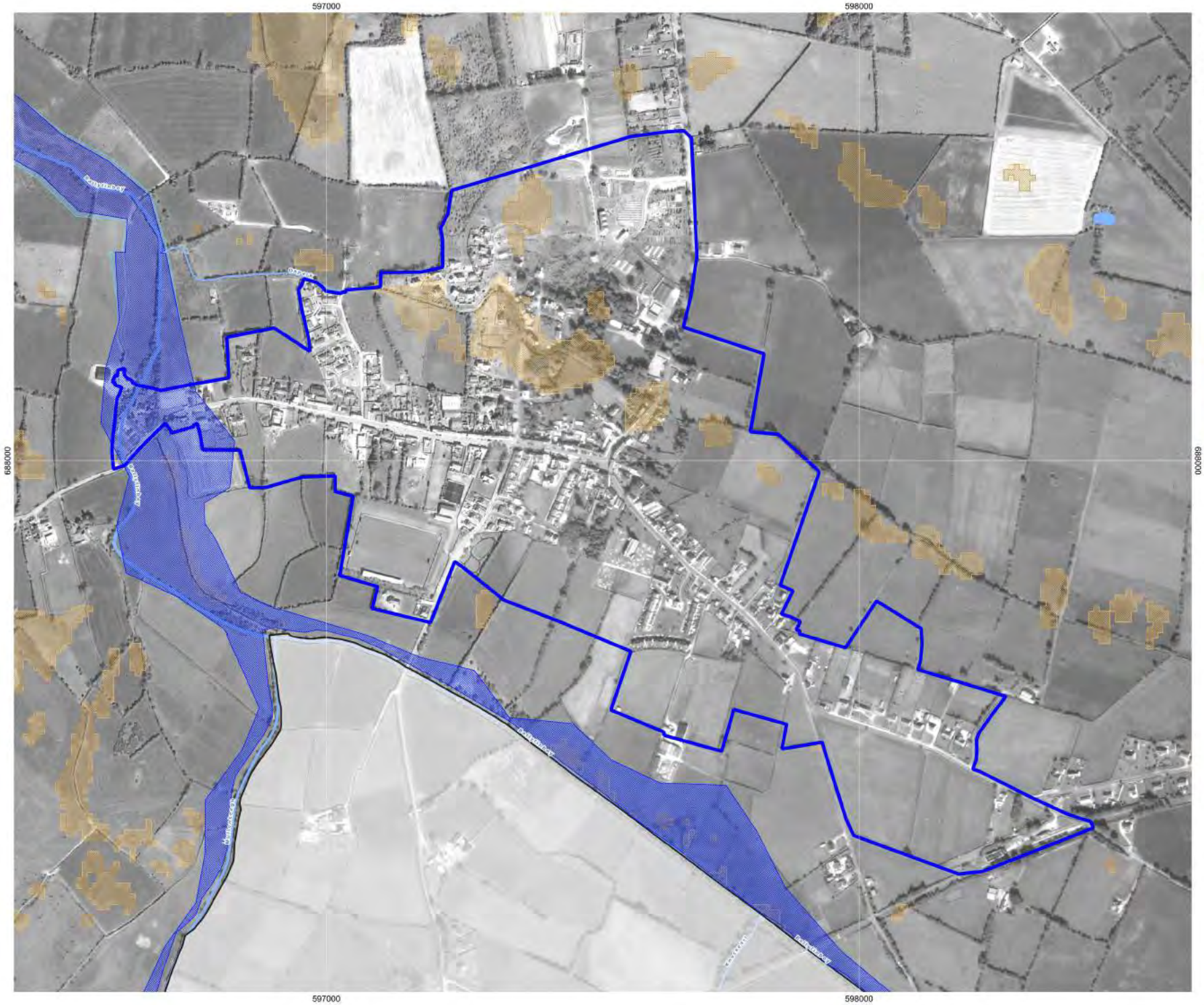

County Tipperary Development Plan 2022-2028

Cloughjordan Rural Service Centre OPW Preliminary Flood Risk Assessment (PFRA)

- Plan Boundary
- County Boundary
- Water
- River or Stream

PFRA

- Fluvial 1% AEP
- Fluvial 0.1% AEP
- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

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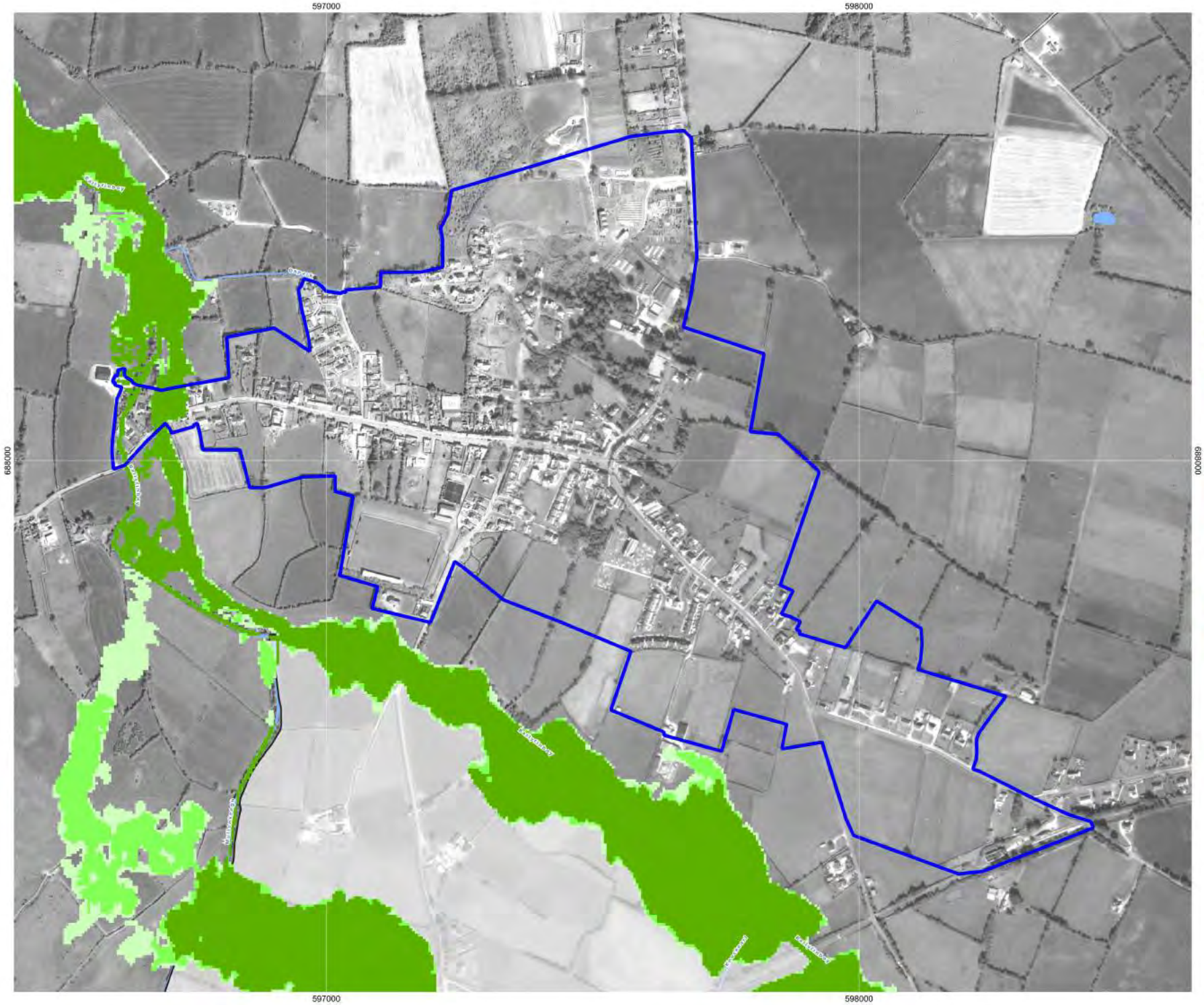

County Tipperary Development Plan 2022-2028

Cloughjordan
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM) Present Day Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Present Day Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Present Day Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

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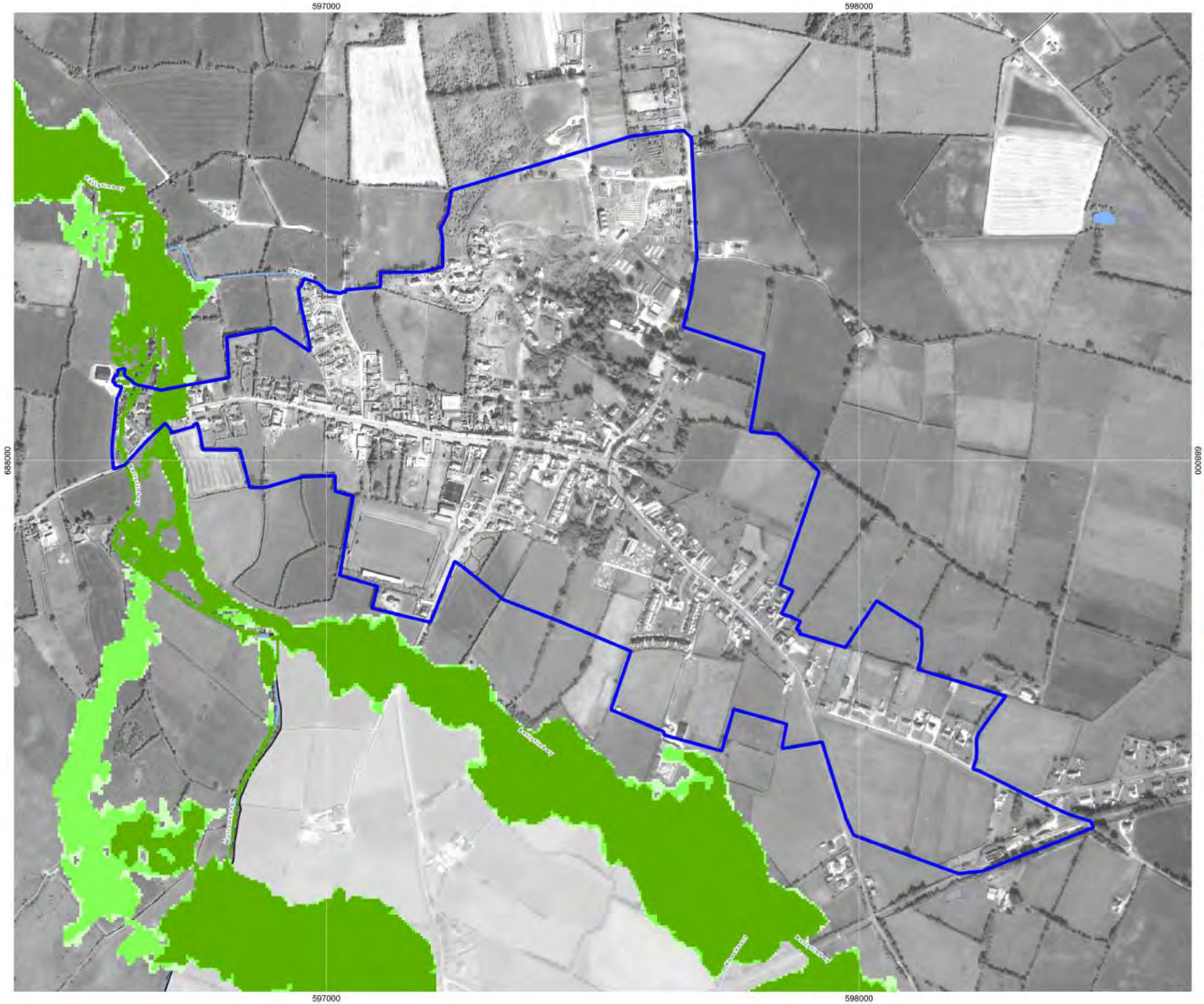

County Tipperary Development Plan 2022-2028

Cloughjordan
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
Mid-Range Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Mid-Range Future Scenario
- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Mid-Range Future Scenario
- 5% AEP
- 1% AEP
- 0.1% AEP

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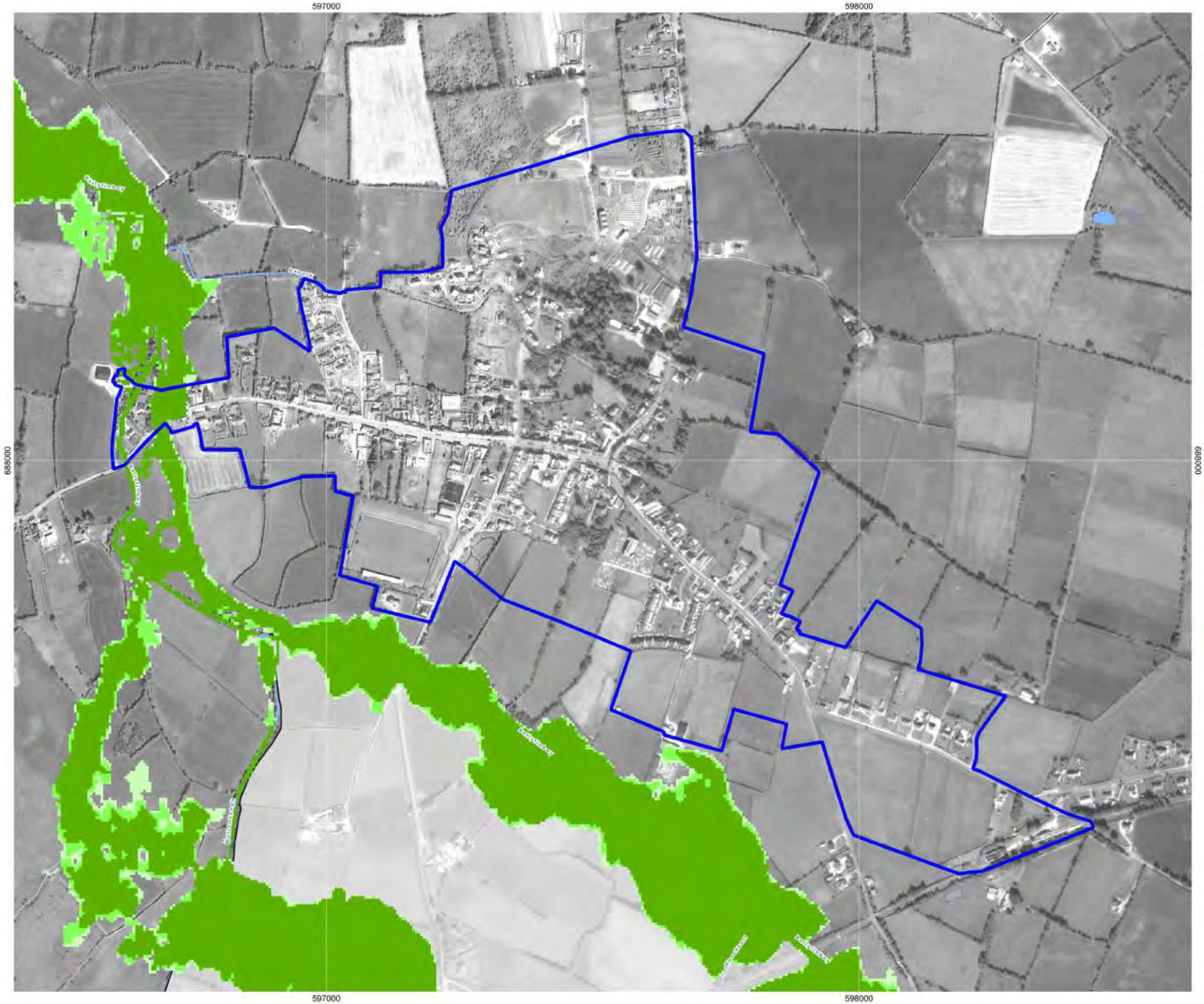

County Tipperary Development Plan 2022-2028

Cloughjordan
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
High-End Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial High-End Future Scenario
- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM High-End Future Scenario
- 5% AEP
- 1% AEP
- 0.1% AEP

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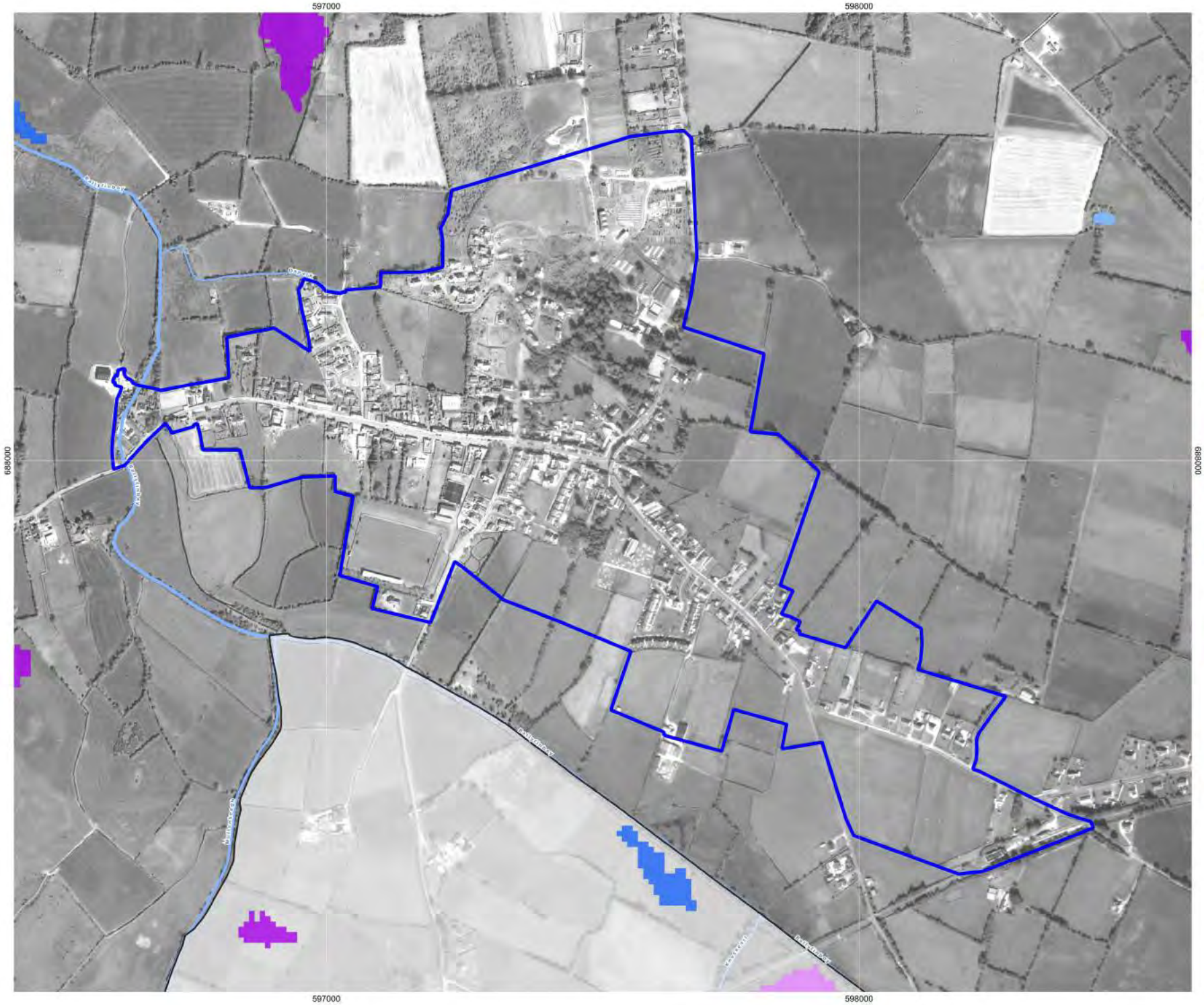

County Tipperary Development Plan 2022-2028

Cloughjordan Rural Service Centre GSI Historical Flood Data and Groundwater Predictive Modeling

- Plan Boundary
- County Boundary
- Water
- River or Stream

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

Surface Water Flooding

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

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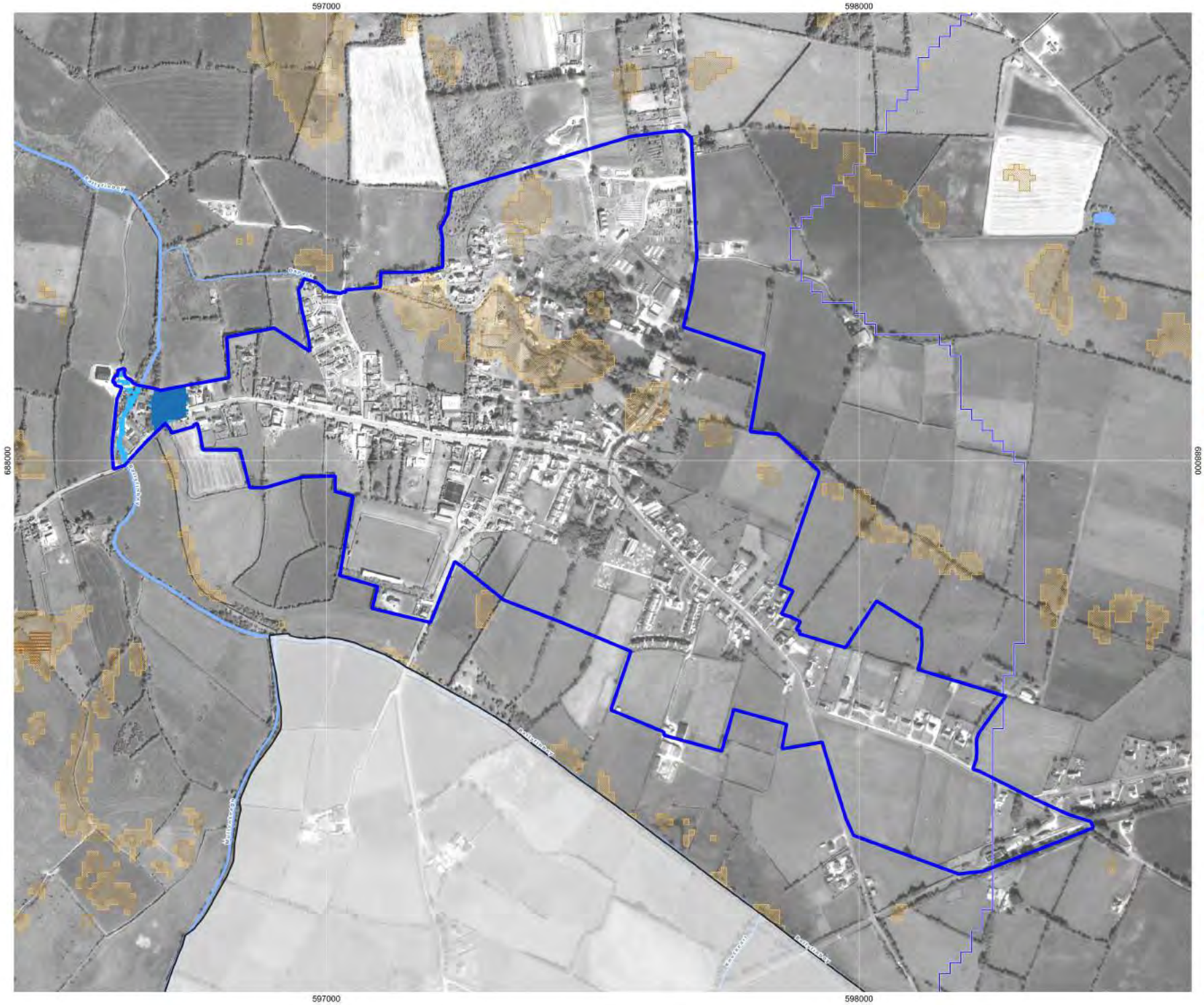

County Tipperary Development Plan 2022-2028

Cloughjordan Rural Service Centre Indicative Flood Zones

- PlanBoundary
- County Boundary
- WFD River Sub-Basins
- Water
- River or Stream

Indicative Flood Zones

- Flood Zone A
- Flood Zone B

PFRA Pluvial

- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

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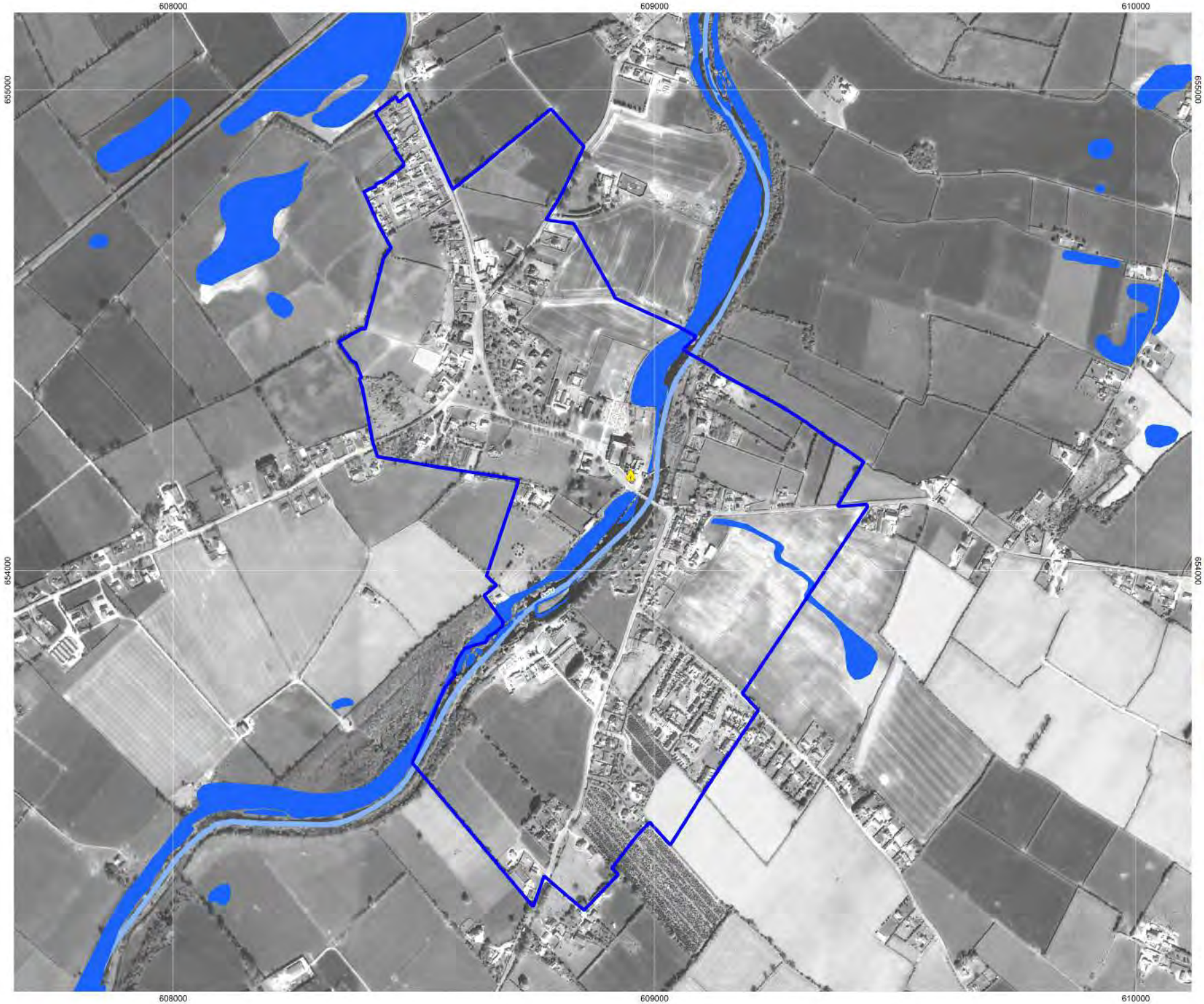

County Tipperary Development Plan 2022-2028

Hollycross
Rural Service Centre
OPW Historical Flood Data

- Plan Boundary
- County Boundary
- Water
- River or Stream

OPW Past Flood Events

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

Land Commission

- Benefited Lands

Drainage District

- Channel
- Embankment
- Benefited Lands

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Lands

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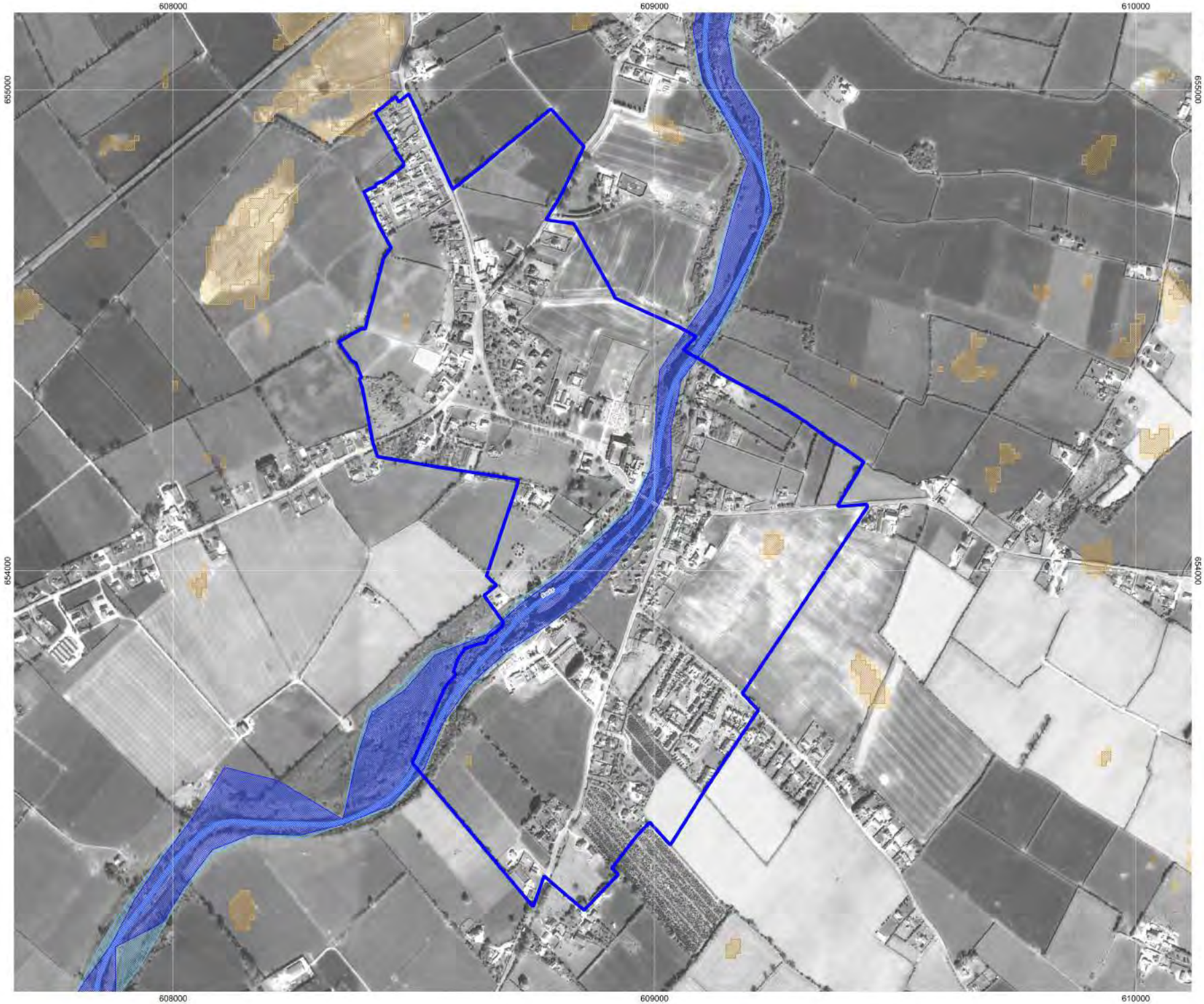

County Tipperary Development Plan 2022-2028

Hollycross
Rural Service Centre
OPW Preliminary Flood Risk Assessment (PFRA)

- Plan Boundary
- County Boundary
- Water
- River or Stream

PFRA

- Fluvial 1% AEP
- Fluvial 0.1% AEP
- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

Comhairle Contae Thiobraid Árann
Tipperary County Council

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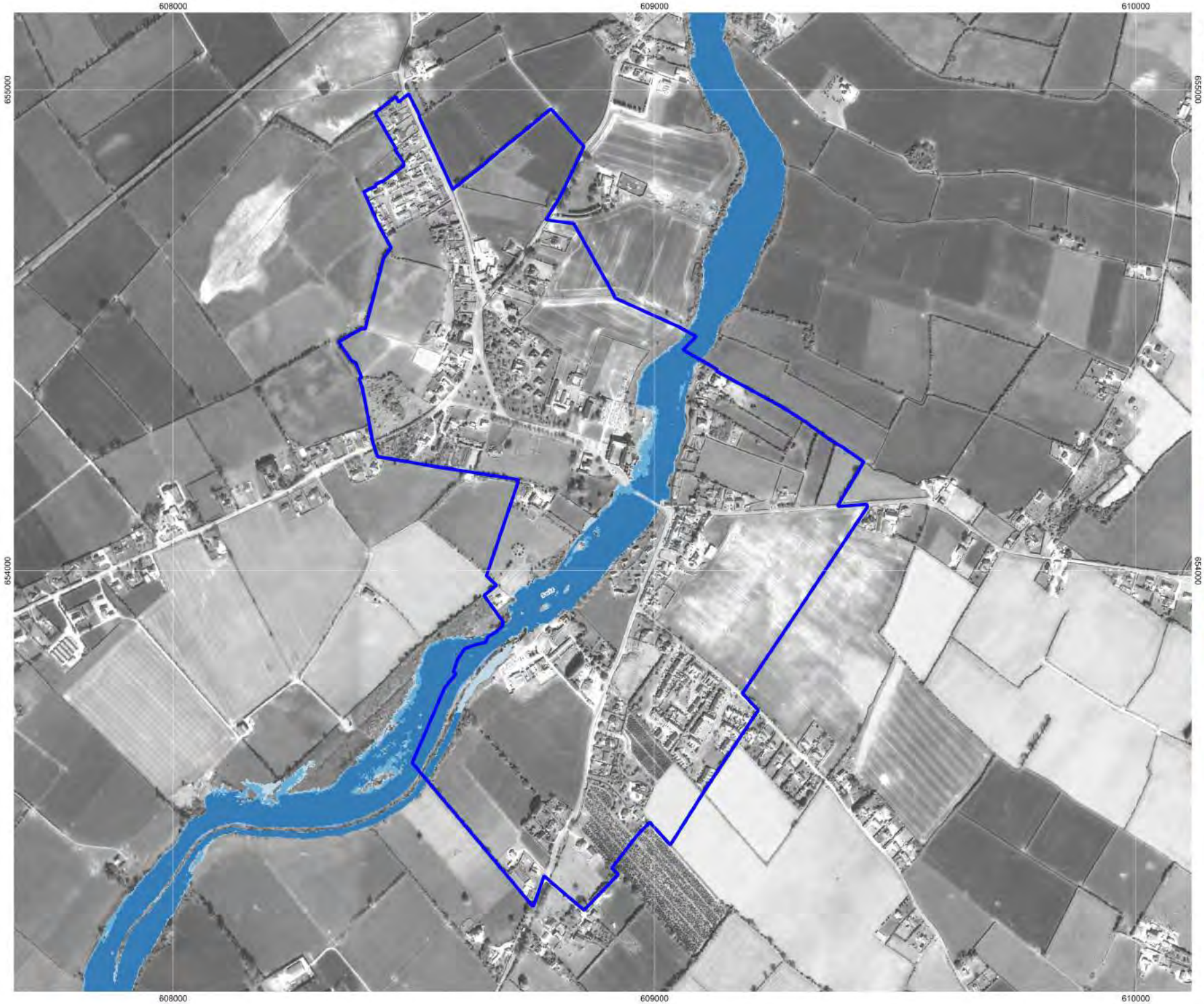

County Tipperary Development Plan 2022-2028

Hollycross Rural Service Centre OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM) Present Day Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Present Day Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Present Day Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

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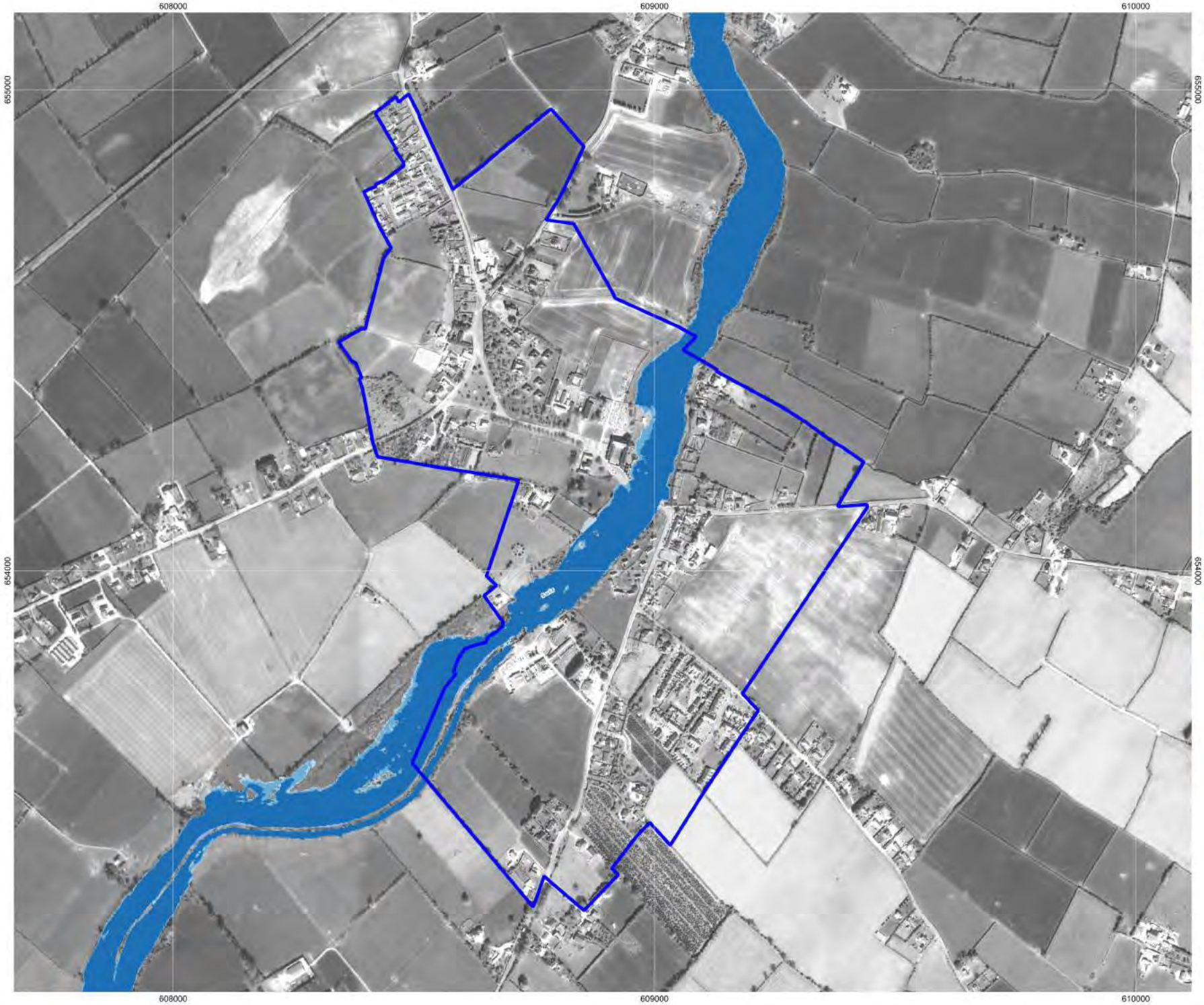

County Tipperary Development Plan 2022-2028

Hollycross
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
Mid-Range Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Mid-Range Future Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Mid-Range Future Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

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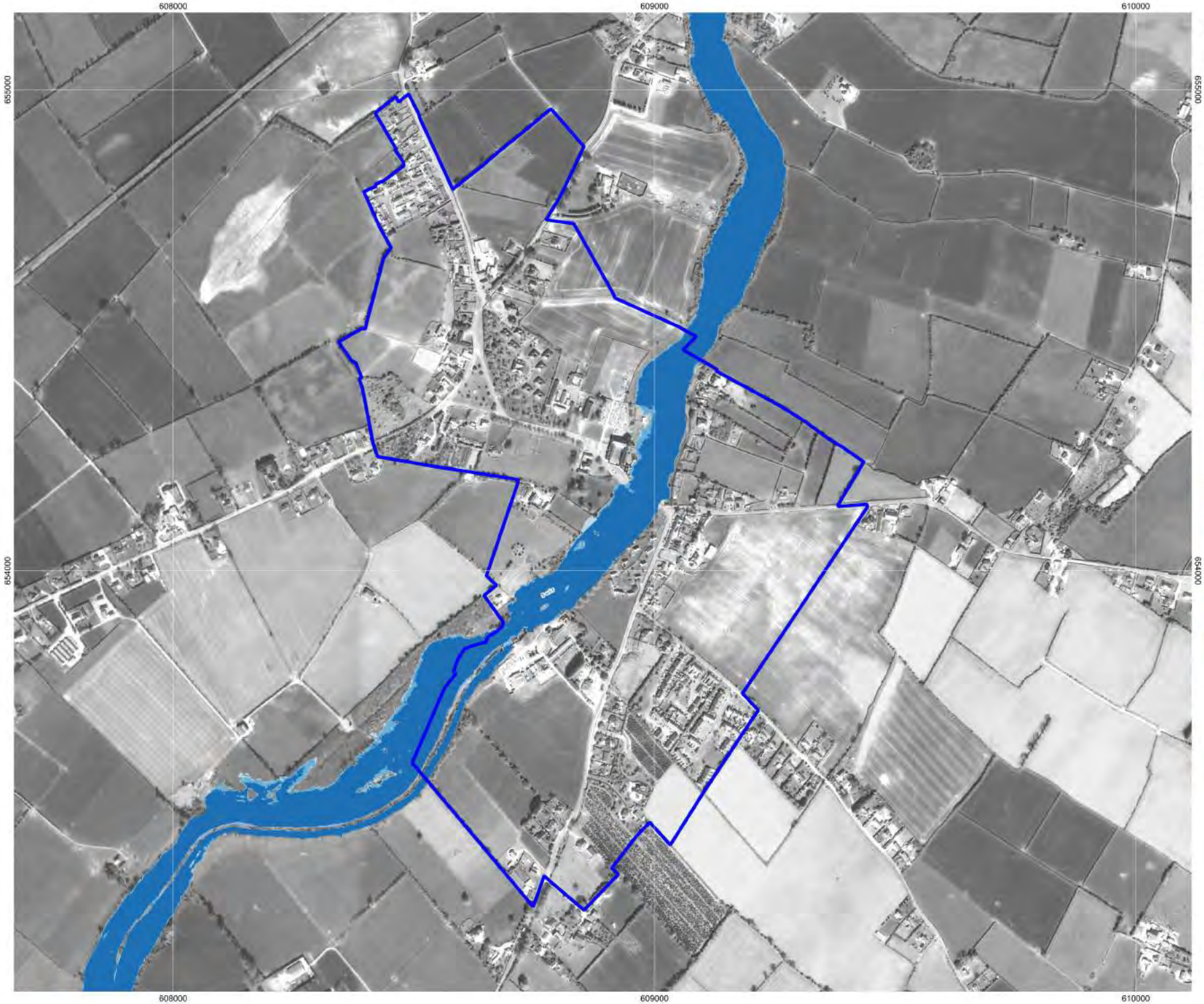

County Tipperary Development Plan 2022-2028

Hollycross
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
High-End Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial High-End Future Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM High-End Future Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

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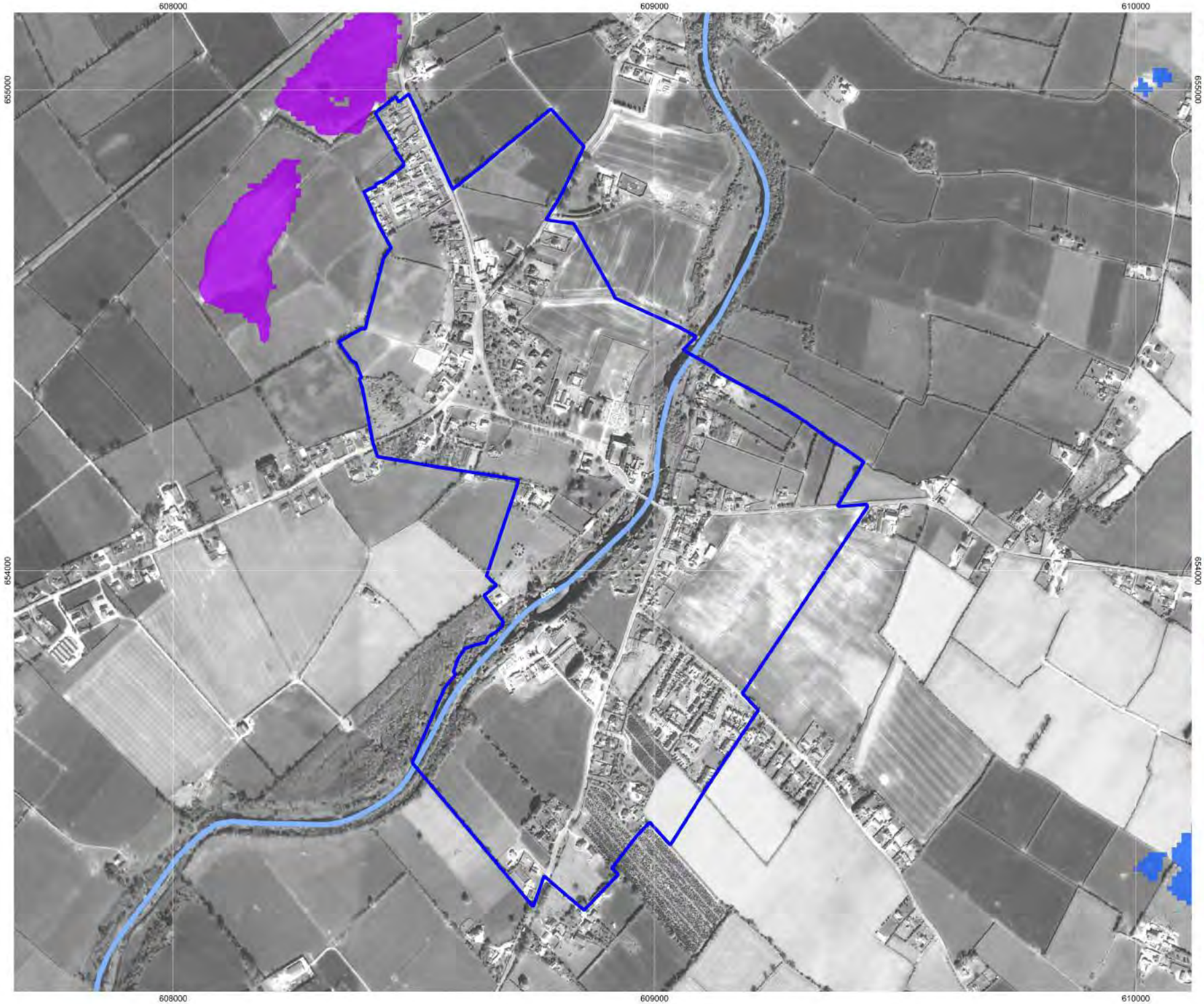

County Tipperary Development Plan 2022-2028

Hollycross
Rural Service Centre
GSI Historical Flood Data and Groundwater Predictive Modeling

- Plan Boundary
- County Boundary
- Water
- River or Stream

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

Surface Water Flooding

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

Comhairle Contae Thiobraid Árann
Tipperary County Council

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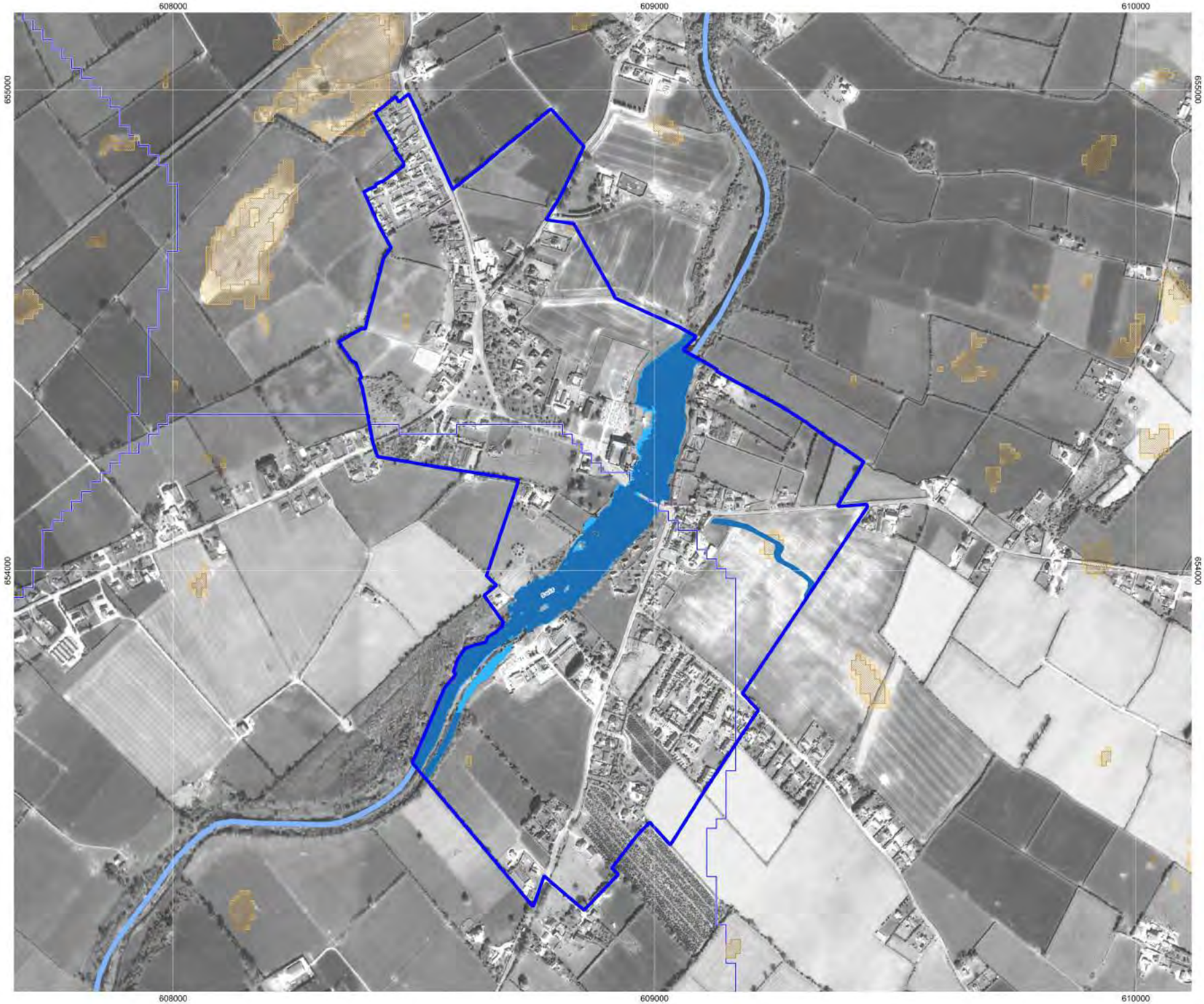

County Tipperary Development Plan 2022-2028

Hollycross
Rural Service Centre
Indicative Flood Zones

- PlanBoundary
- County Boundary
- WFD River Sub-Basins
- Water
- River or Stream

Indicative Flood Zones

- Flood Zone A
- Flood Zone B

PFRA Pluvial

- Pluvial 1% AEP
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- Groundwater

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

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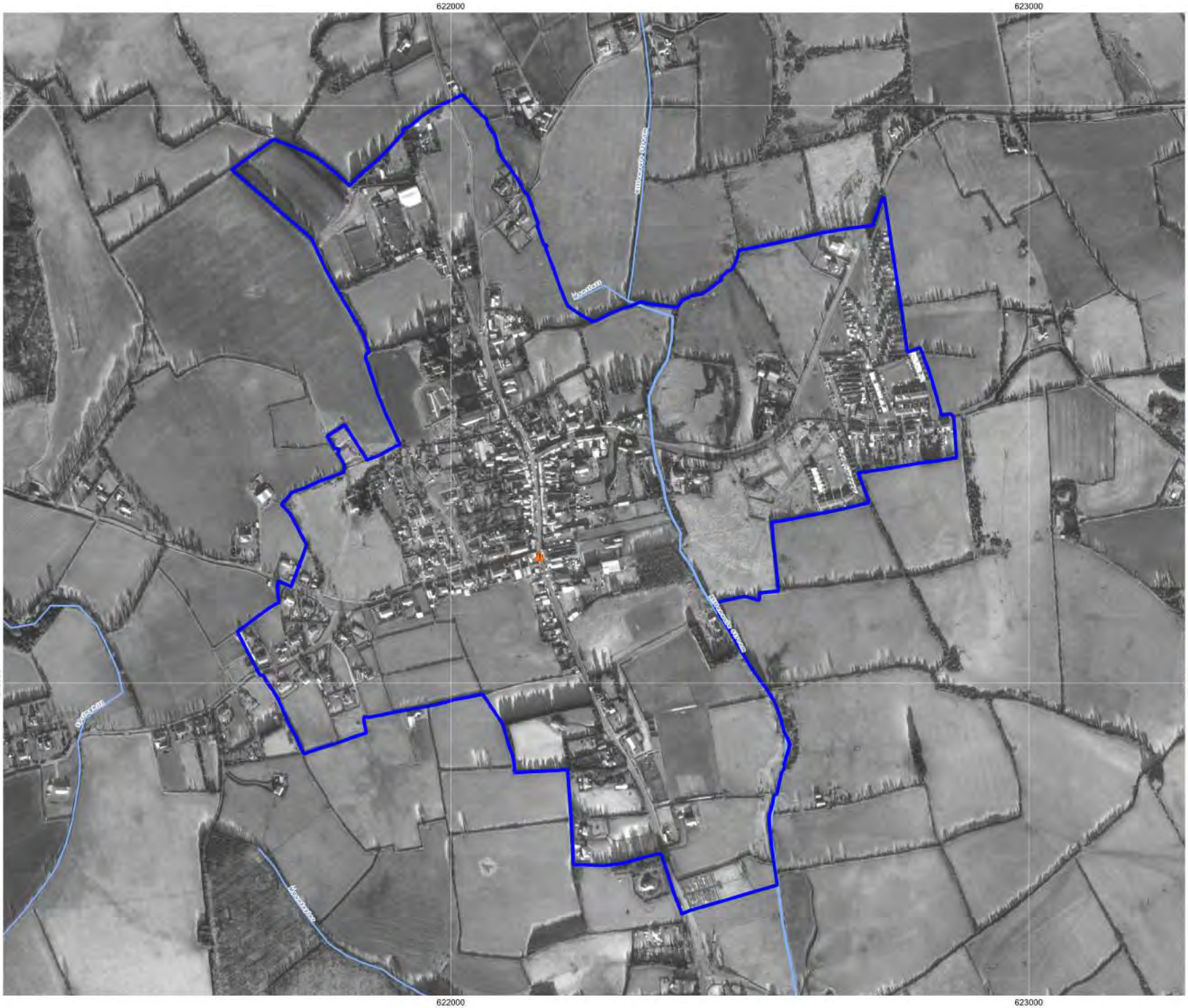

County Tipperary Development Plan 2022-2028

Kilenaule
Rural Service Centre
OPW Historical Flood Data

- Plan Boundary
- County Boundary
- Water
- River or Stream

OPW Past Flood Events

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

Land Commission

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- Channel
- Embankment
- Benefited Lands

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Lands

Comhairle Contae Thiobraid Árann
Tipperary County Council

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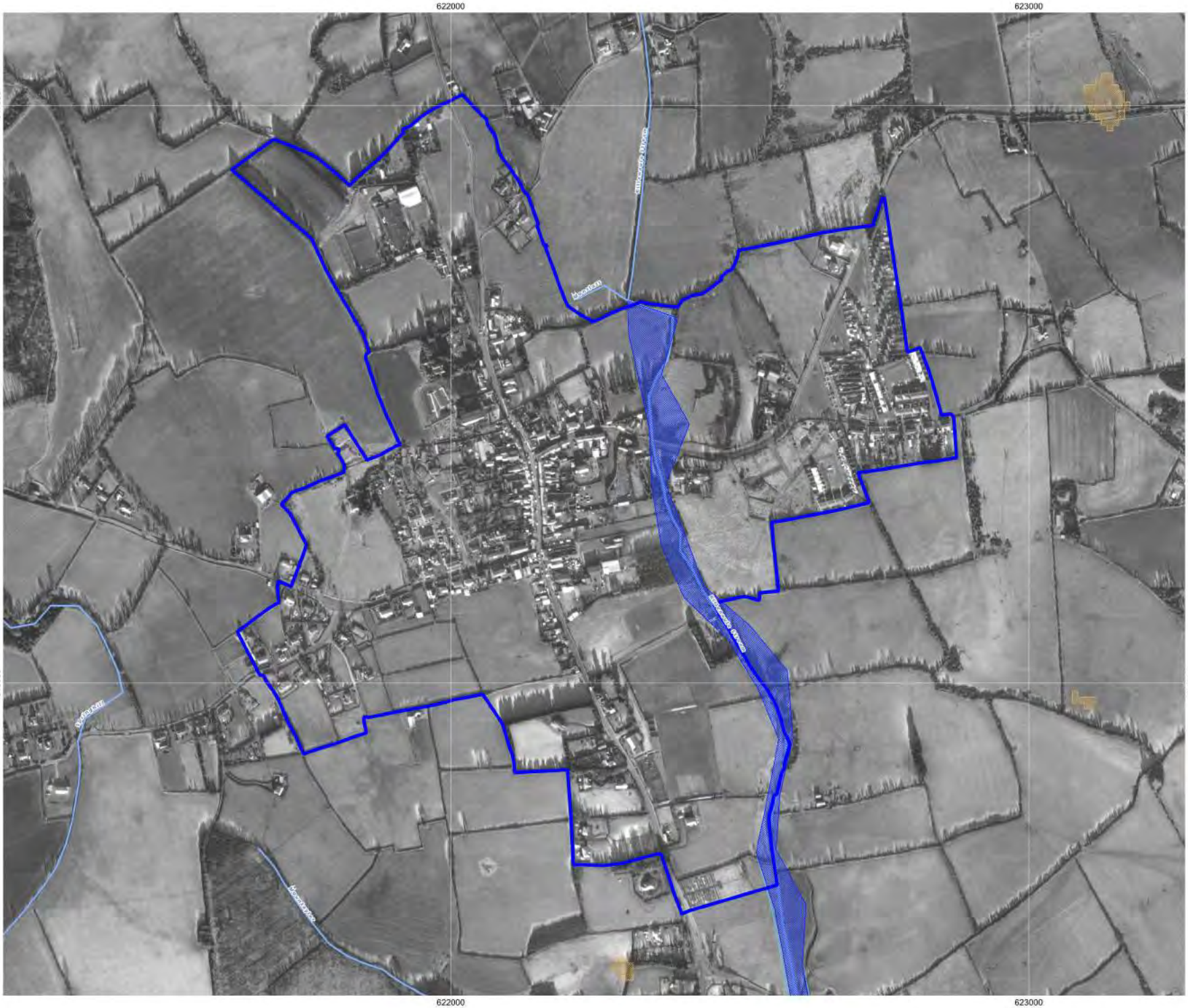

County Tipperary Development Plan 2022-2028

Kilenaule
Rural Service Centre
OPW Preliminary Flood Risk Assessment (PFRA)

- Plan Boundary
- County Boundary
- Water
- River or Stream

PFRA

- Fluvial 1% AEP
- Fluvial 0.1% AEP
- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

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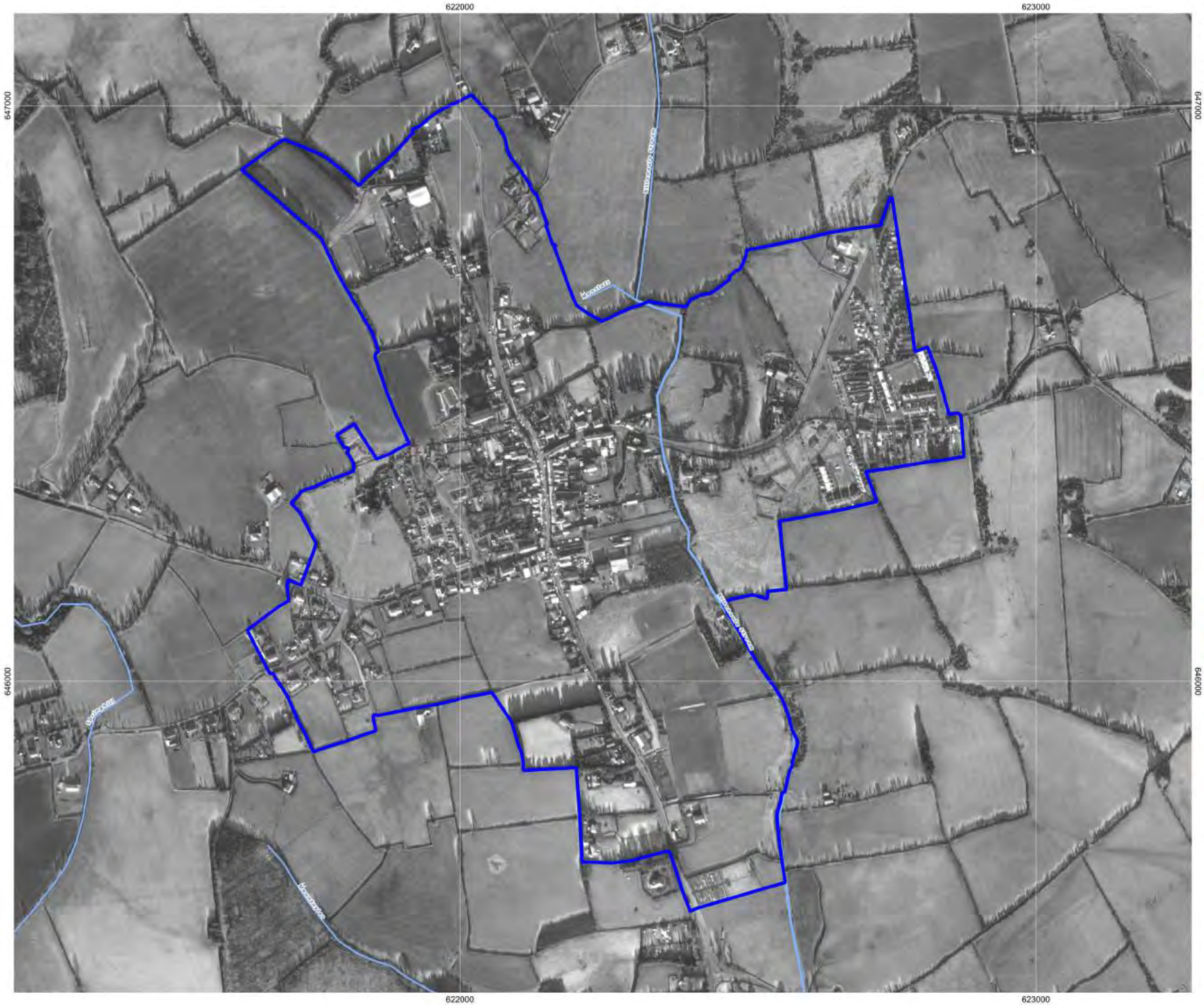

County Tipperary Development Plan 2022-2028

Kilenaule
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM) Present Day Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Present Day Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Present Day Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

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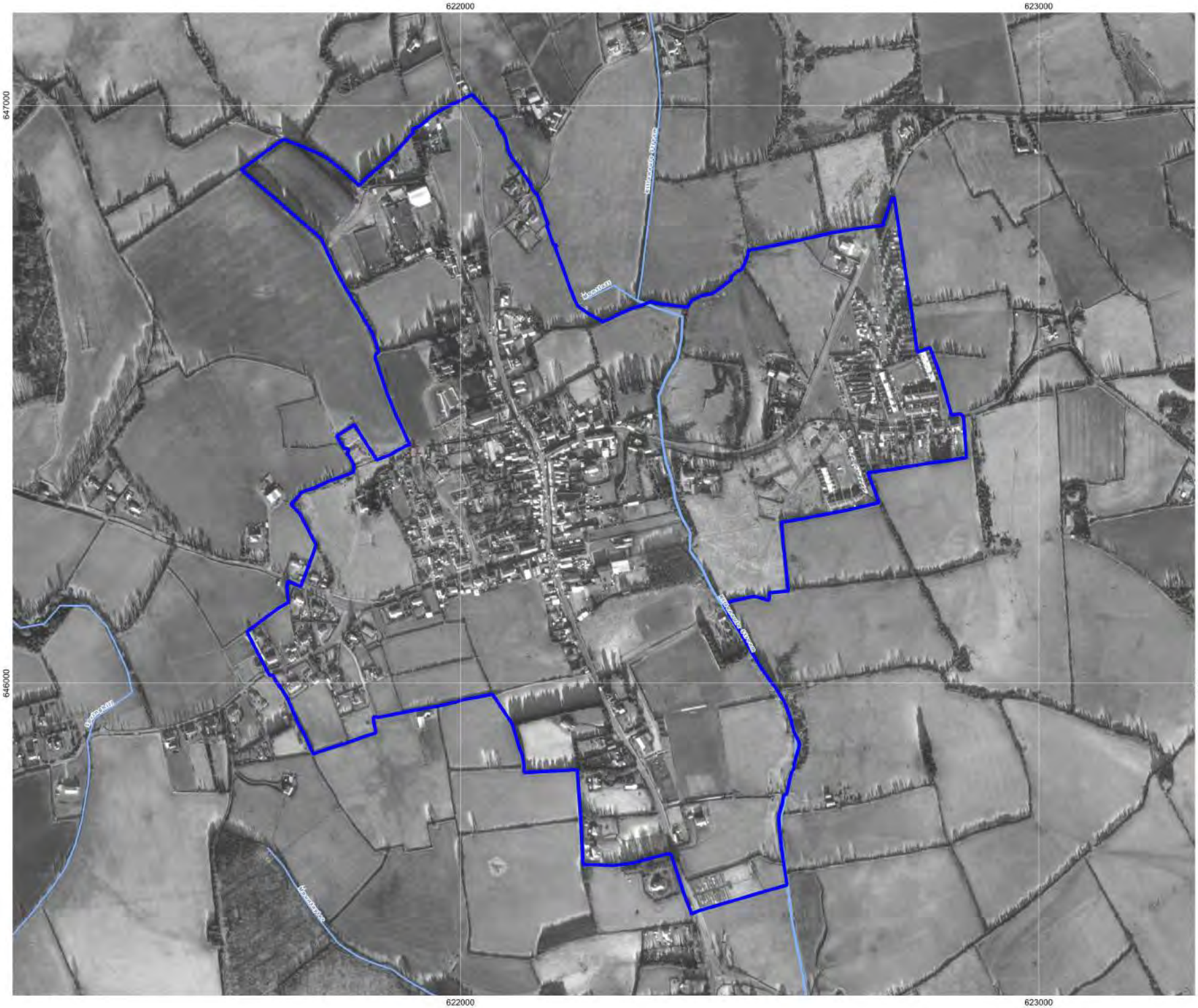

County Tipperary Development Plan 2022-2028

Kilenaule
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
Mid-Range Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Mid-Range Future Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Mid-Range Future Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

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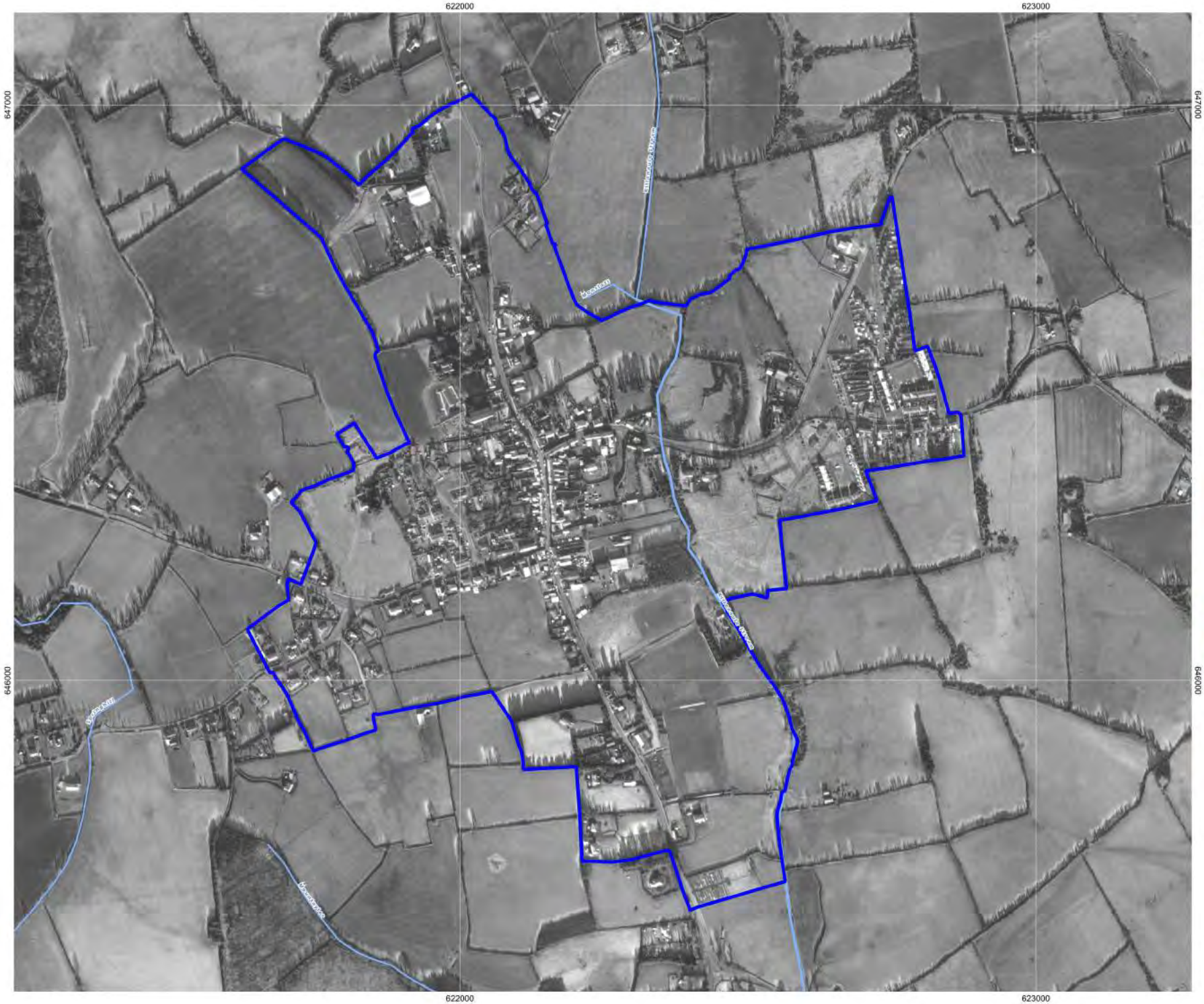

County Tipperary Development Plan 2022-2028

Kilenaule
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
High-End Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial High-End Future Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM High-End Future Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

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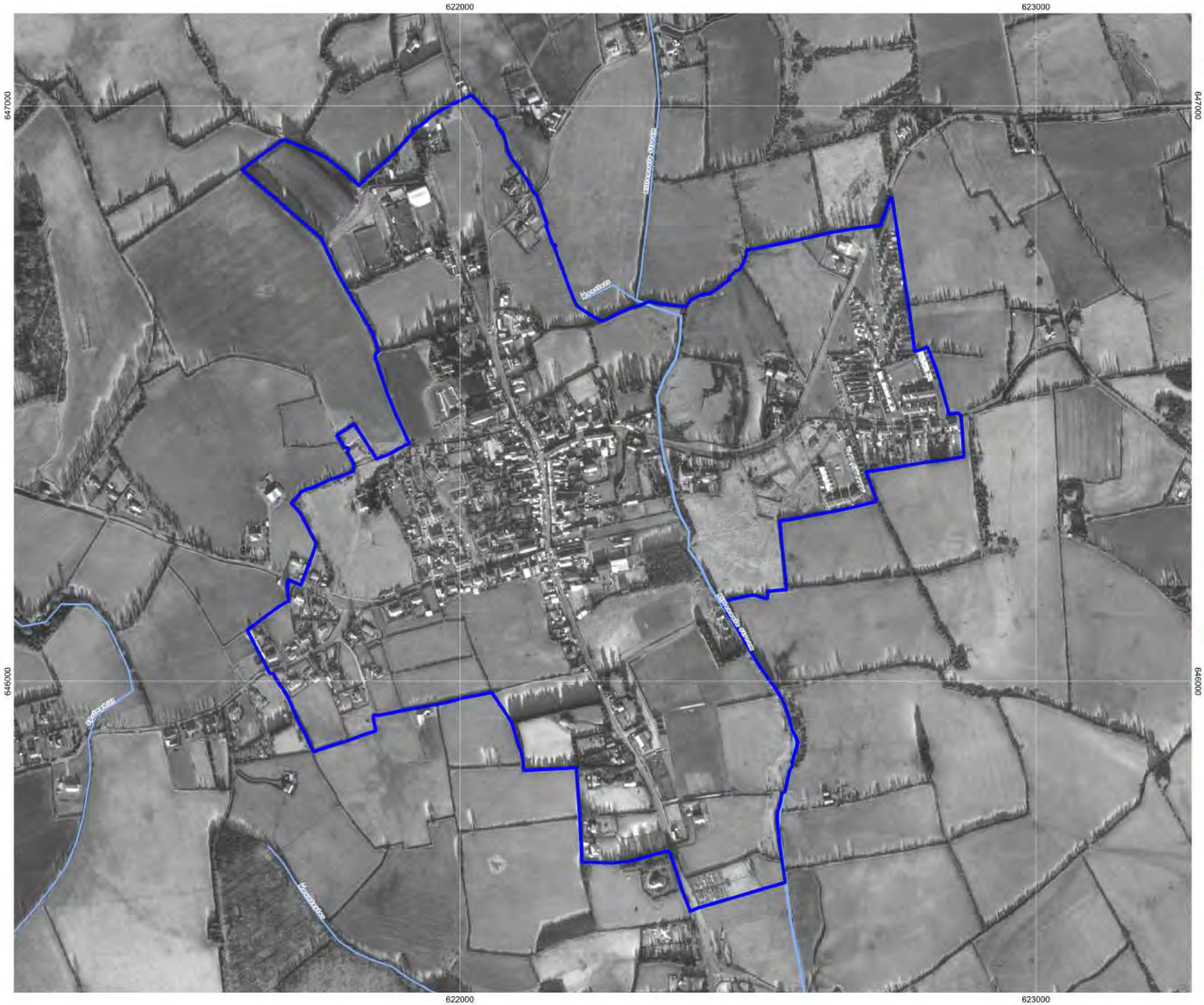

County Tipperary Development Plan 2022-2028

Kilenaule
Rural Service Centre
GSI Historical Flood Data and Groundwater Predictive Modeling

- Plan Boundary
- County Boundary
- Water
- River or Stream

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

Surface Water Flooding

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

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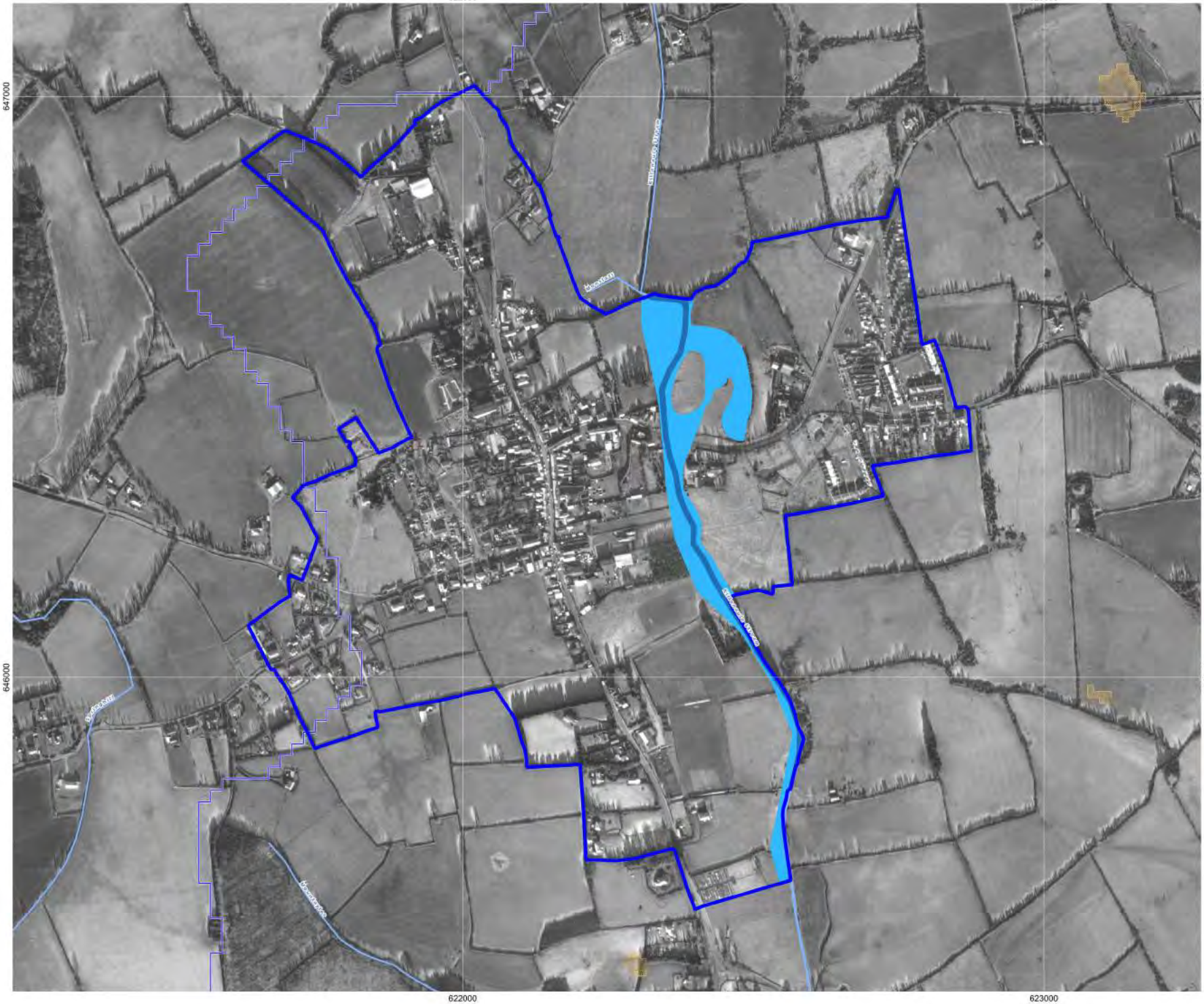

County Tipperary Development Plan 2022-2028

Kilenaule
Rural Service Centre
Indicative Flood Zones

- PlanBoundary
- County Boundary
- WFD River Sub-Basins
- Water
- River or Stream

Indicative Flood Zones

- Flood Zone A
- Flood Zone B

PFRA Pluvial

- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

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Tipperary County Council

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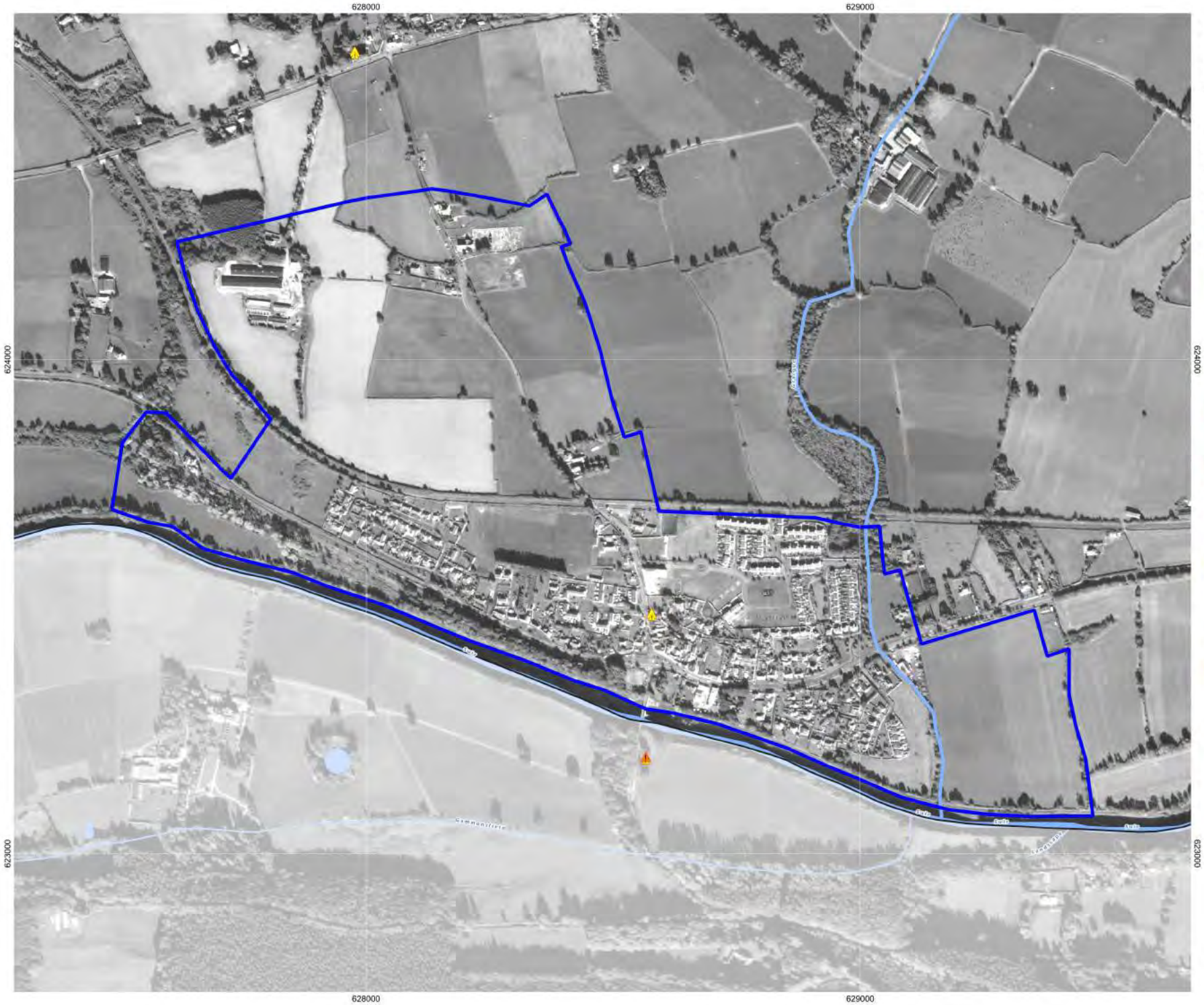

County Tipperary Development Plan 2022-2028

Killsheelan Rural Service Centre OPW Historical Flood Data

- Plan Boundary
- County Boundary
- Water
- River or Stream

OPW Past Flood Events

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

Land Commission

- Benefited Lands

Drainage District

- Channel
- Embankment
- Benefited Lands

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Lands

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County Tipperary Development Plan 2022-2028

Killsheelan
Rural Service Centre
OPW Preliminary Flood Risk Assessment (PFRA)

- Plan Boundary
- County Boundary
- Water
- River or Stream

PFRA

- Fluvial 1% AEP
- Fluvial 0.1% AEP
- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

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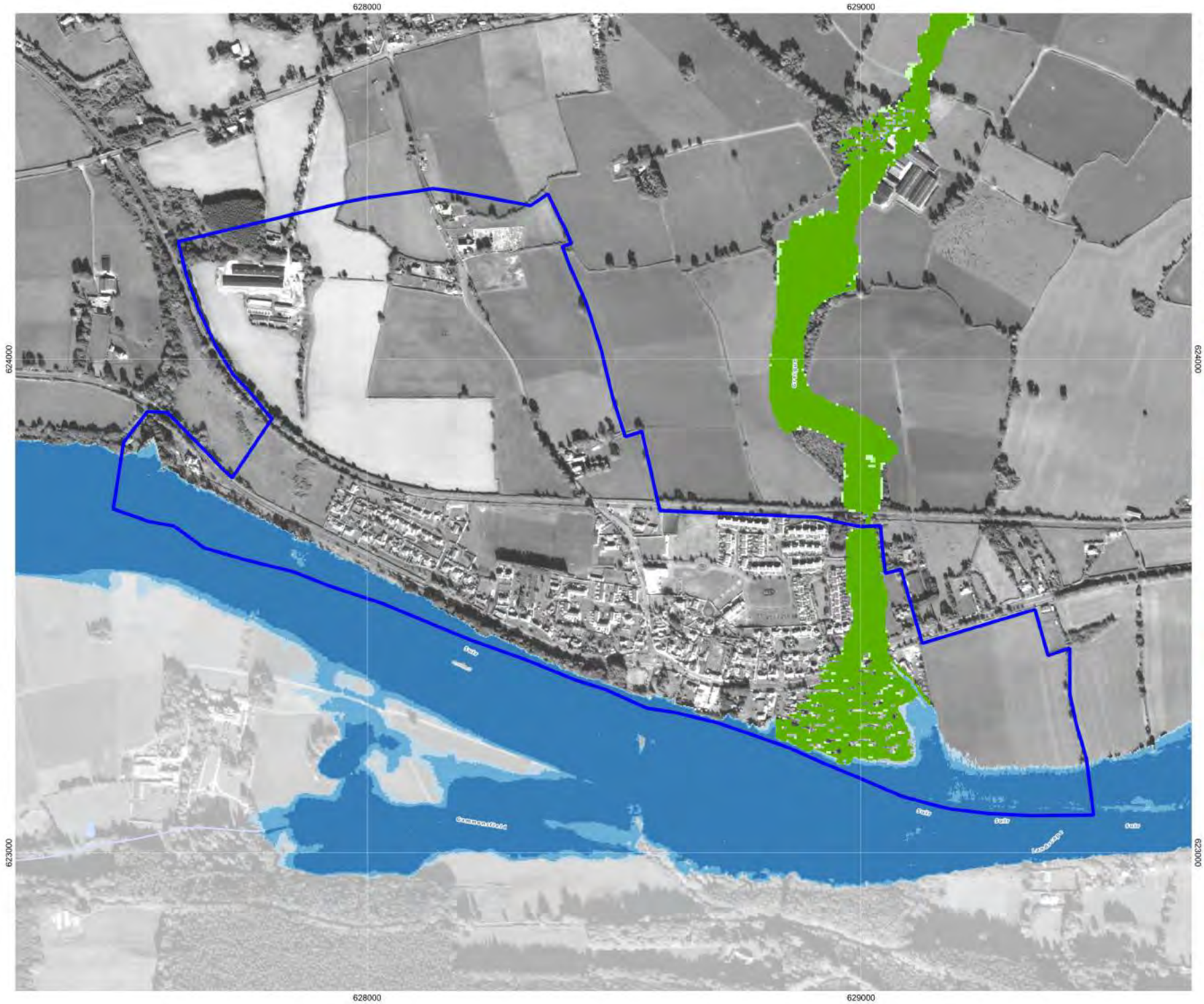

County Tipperary Development Plan 2022-2028

Killsheelan
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM) Present Day Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Present Day Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Present Day Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

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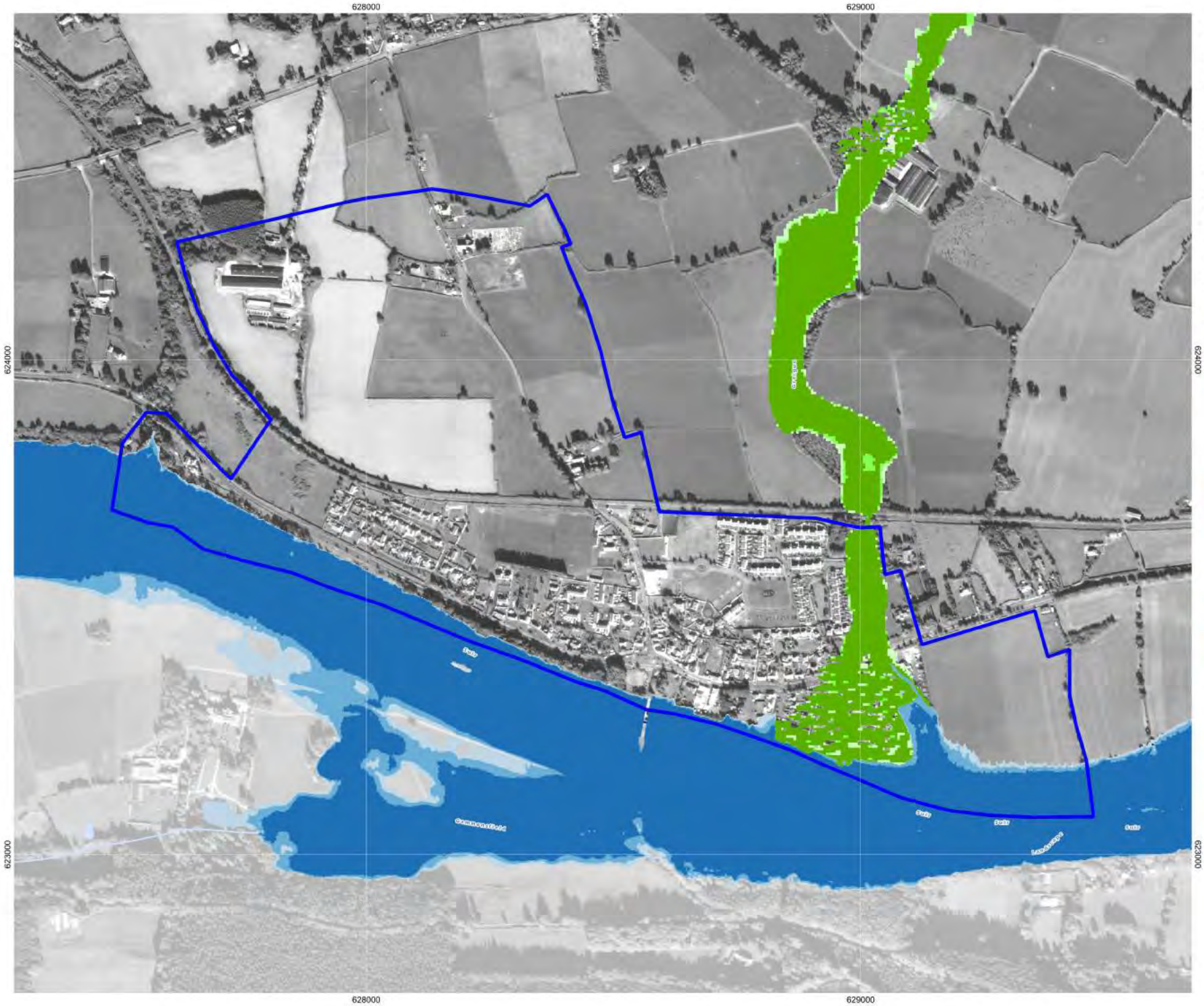

County Tipperary Development Plan 2022-2028

Killsheelan
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
Mid-Range Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Mid-Range Future Scenario
- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Mid-Range Future Scenario
- 5% AEP
- 1% AEP
- 0.1% AEP

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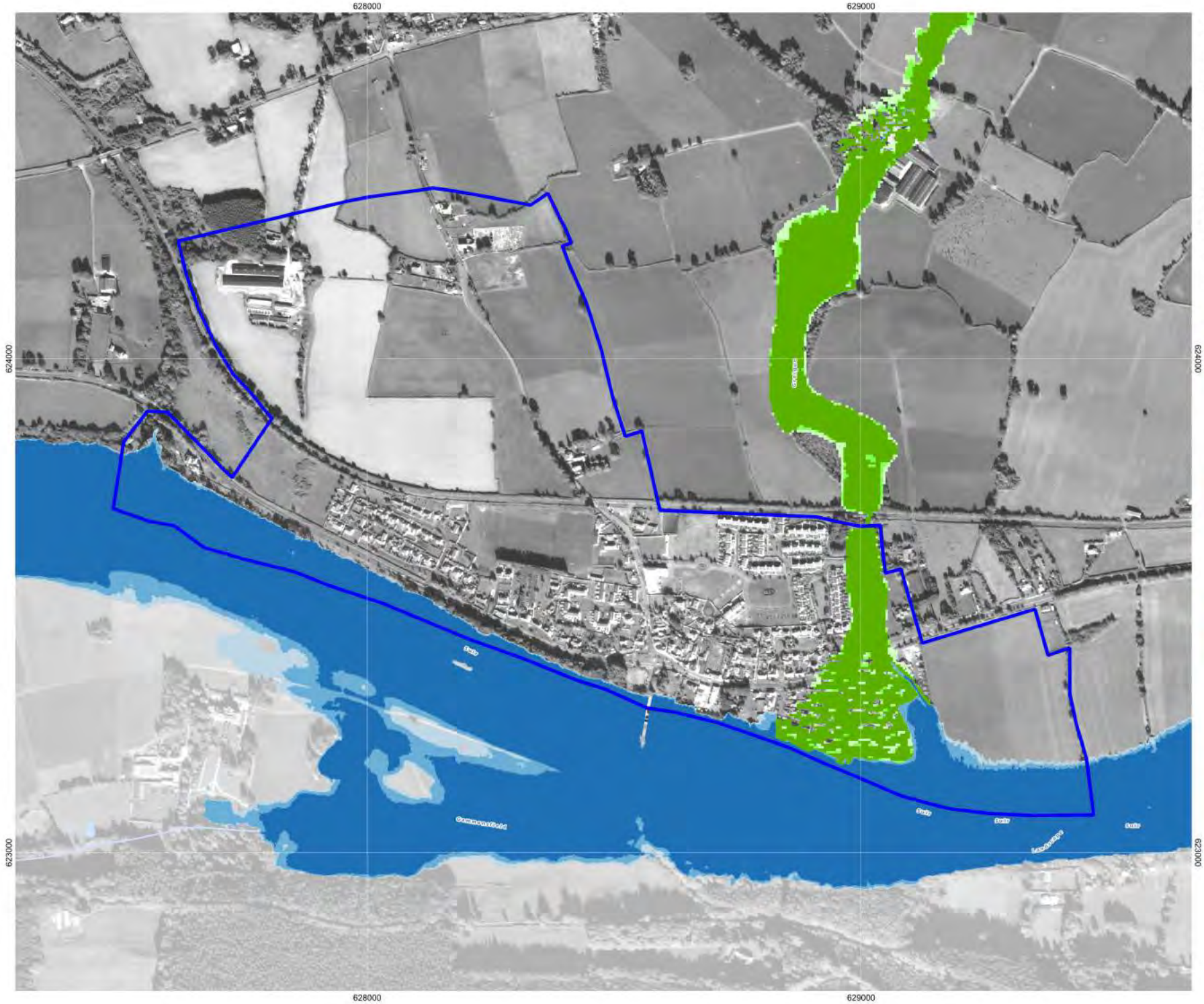

County Tipperary Development Plan 2022-2028

Killsheelan
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
High-End Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial High-End Future Scenario
- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM High-End Future Scenario
- 5% AEP
- 1% AEP
- 0.1% AEP

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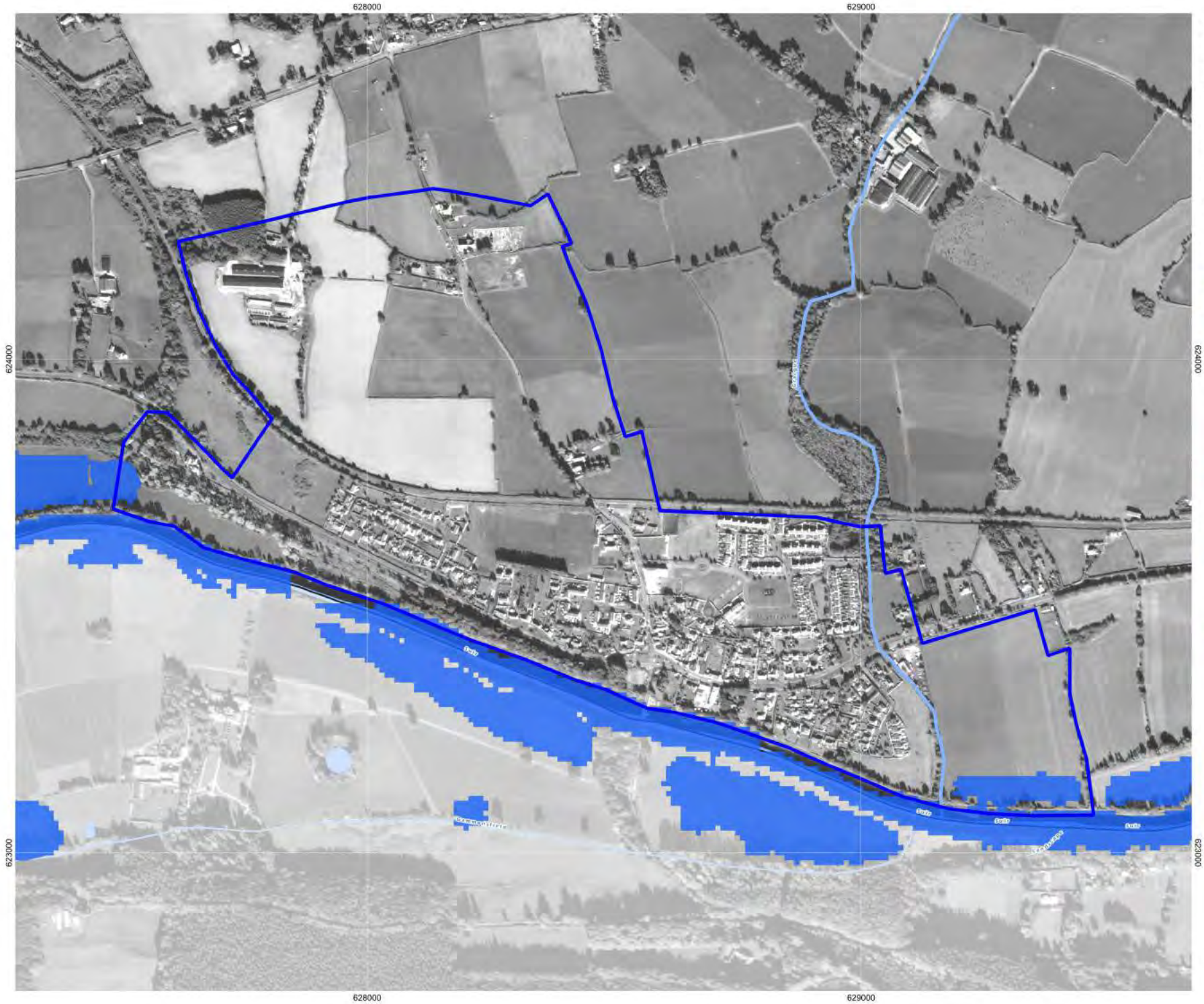

County Tipperary Development Plan 2022-2028

Killsheelan Rural Service Centre GSI Historical Flood Data and Groundwater Predictive Modeling

- Plan Boundary
- County Boundary
- Water
- River or Stream

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

Surface Water Flooding

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

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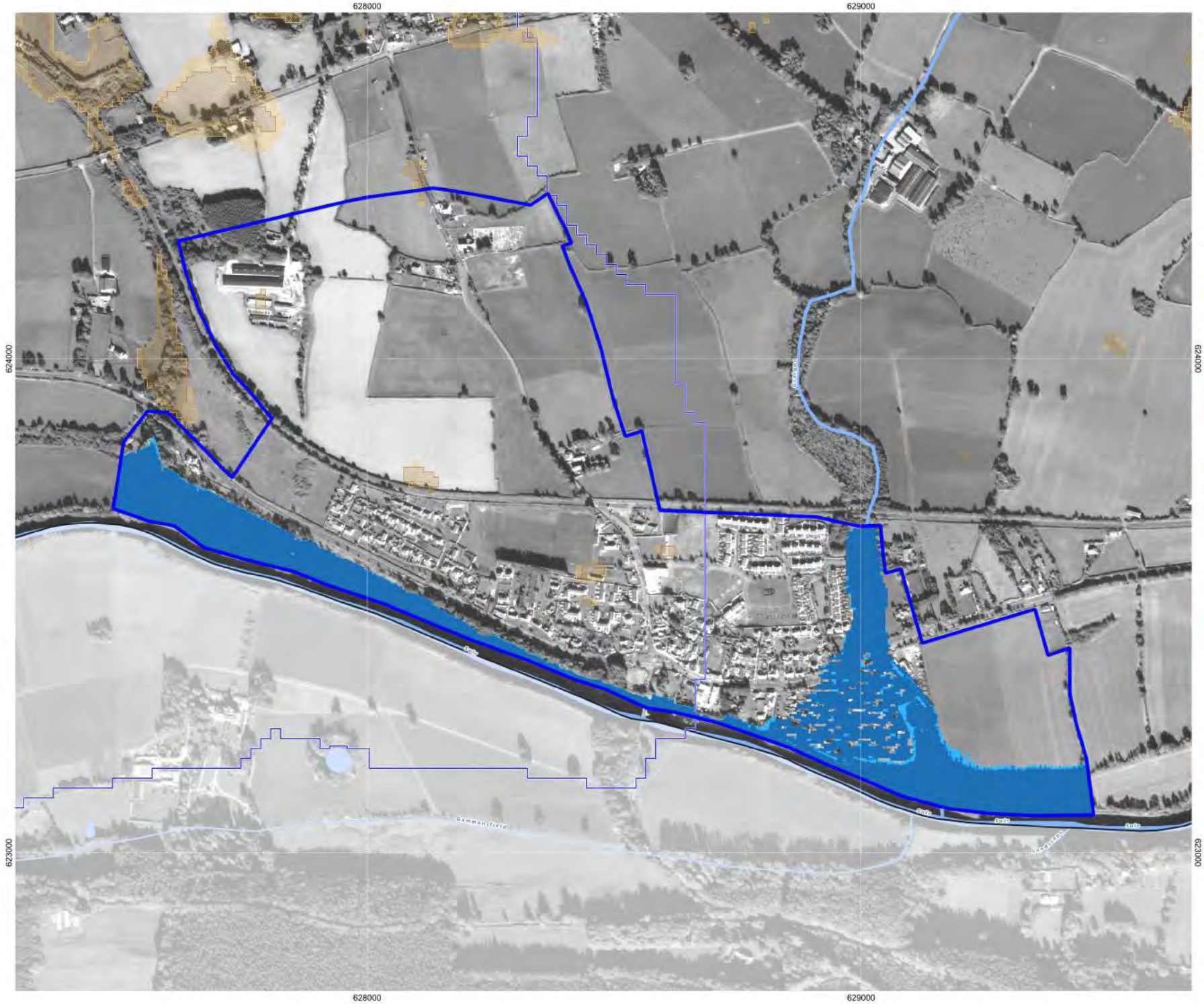

County Tipperary Development Plan 2022-2028

Killsheelan Rural Service Centre Indicative Flood Zones

- PlanBoundary
- County Boundary
- WFD River Sub-Basins
- Water
- River or Stream

Indicative Flood Zones

- Flood Zone A
- Flood Zone B

PFRA Pluvial

- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

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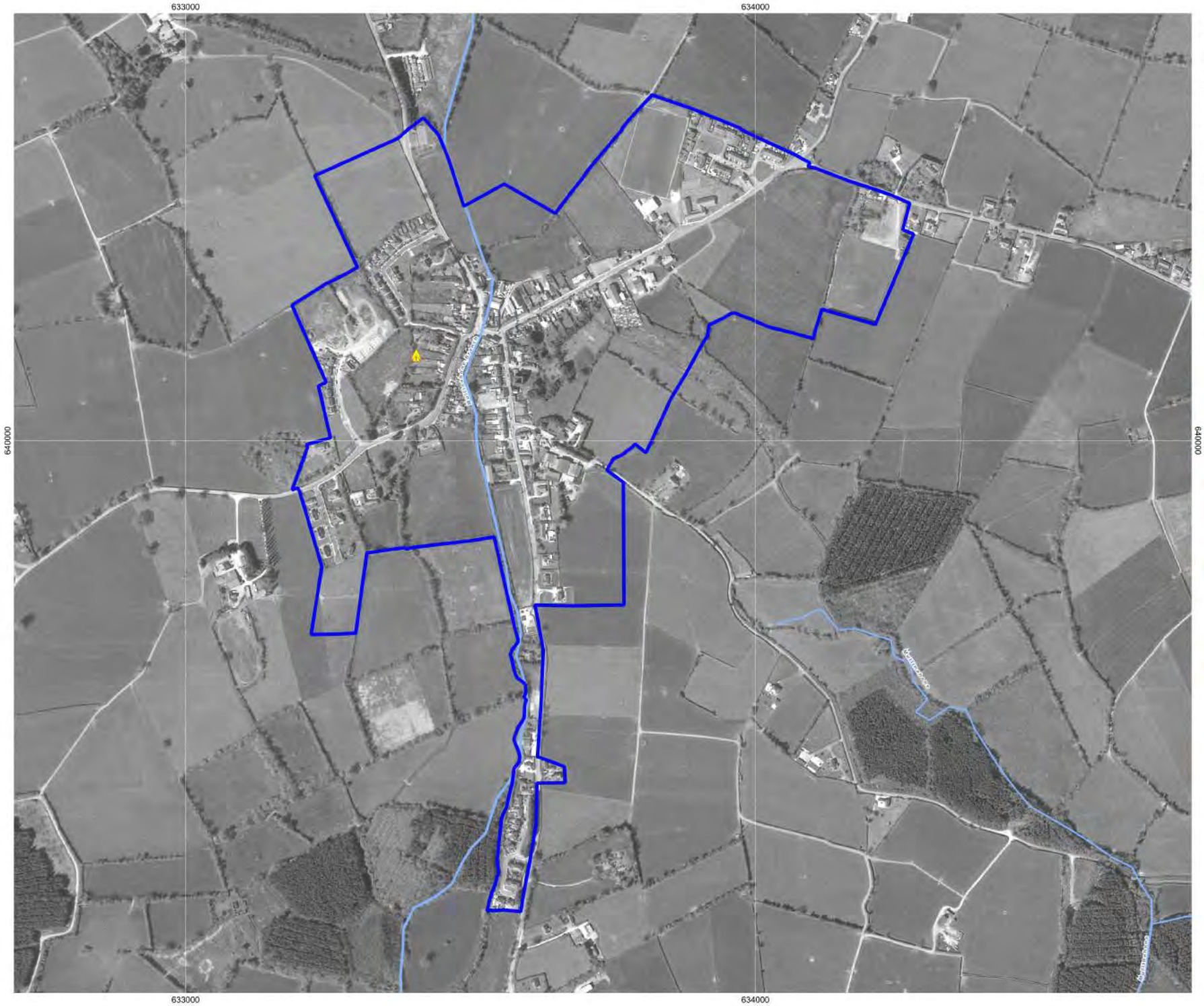

County Tipperary Development Plan 2022-2028

Mullinahone Rural Service Centre OPW Historical Flood Data

- Plan Boundary
- County Boundary
- Water
- River or Stream

OPW Past Flood Events

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

Land Commission

- Benefited Lands

Drainage District

- Channel
- Embankment
- Benefited Lands

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Lands

Comhairle Contae Thiobraid Árann
Tipperary County Council

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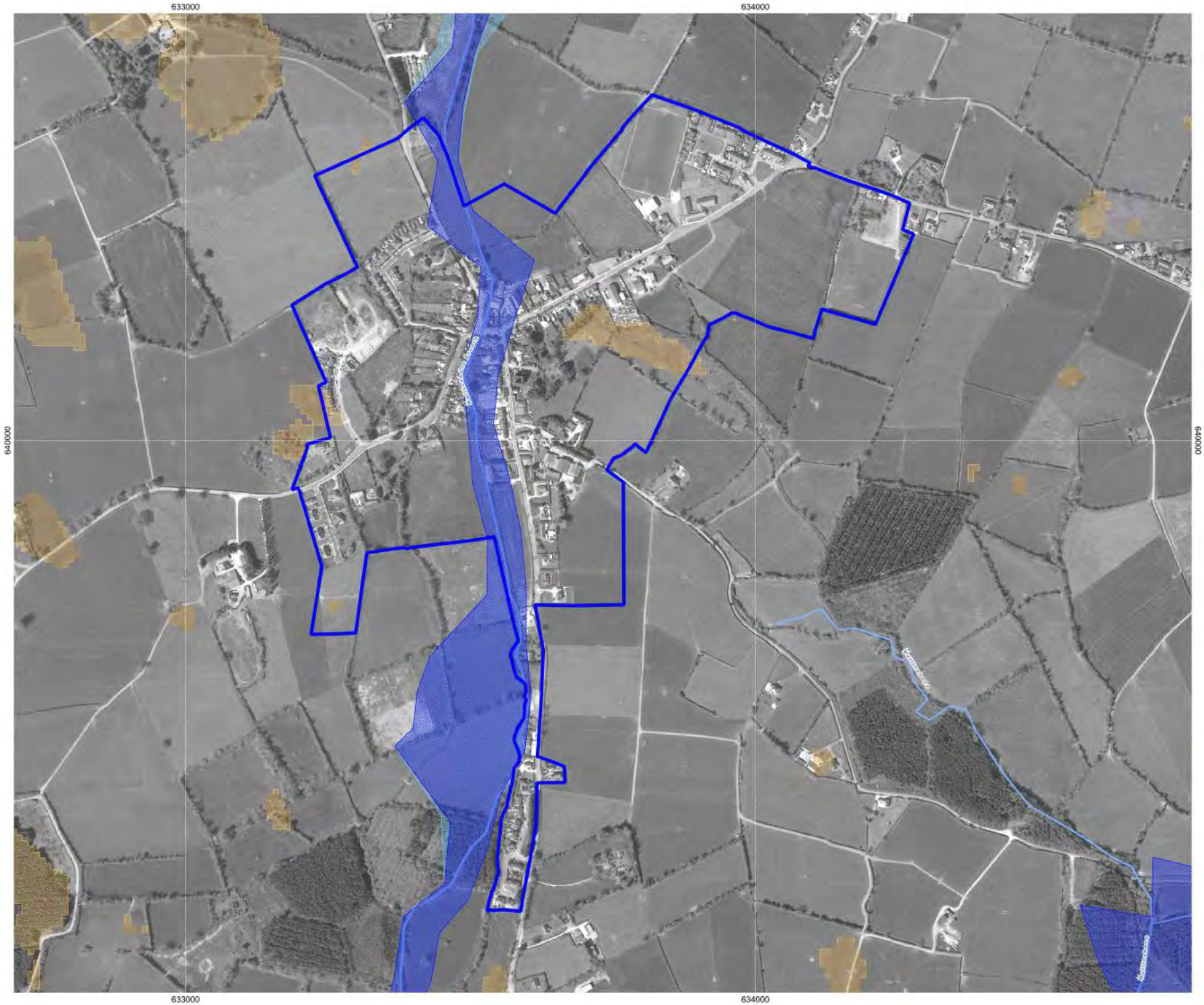

County Tipperary Development Plan 2022-2028

Mullinahone Rural Service Centre OPW Preliminary Flood Risk Assessment (PFRA)

- Plan Boundary
- County Boundary
- Water
- River or Stream

PFRA

- Fluvial 1% AEP
- Fluvial 0.1% AEP
- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

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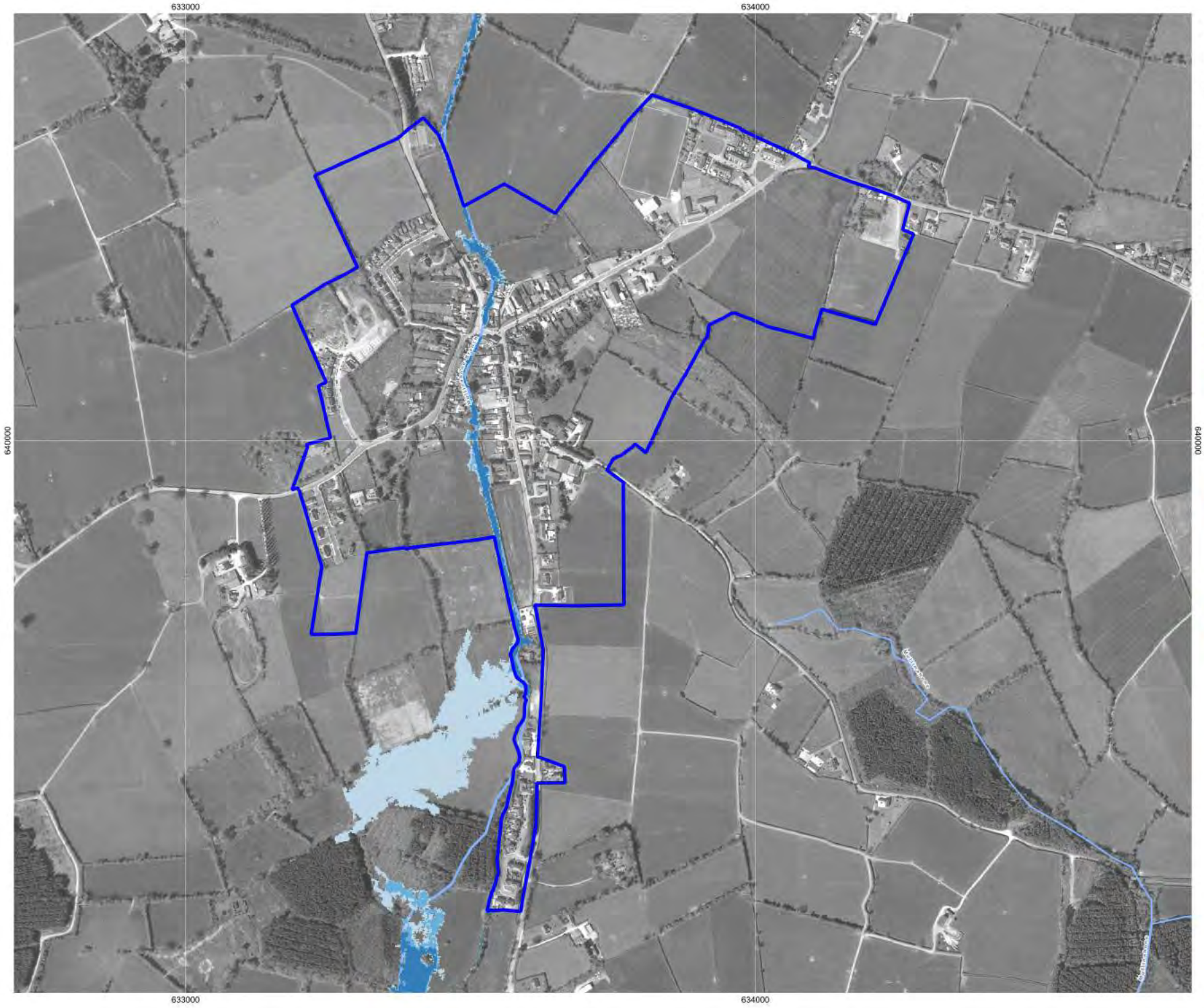

County Tipperary Development Plan 2022-2028

Mullinahone Rural Service Centre OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM) Present Day Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Present Day Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Present Day Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

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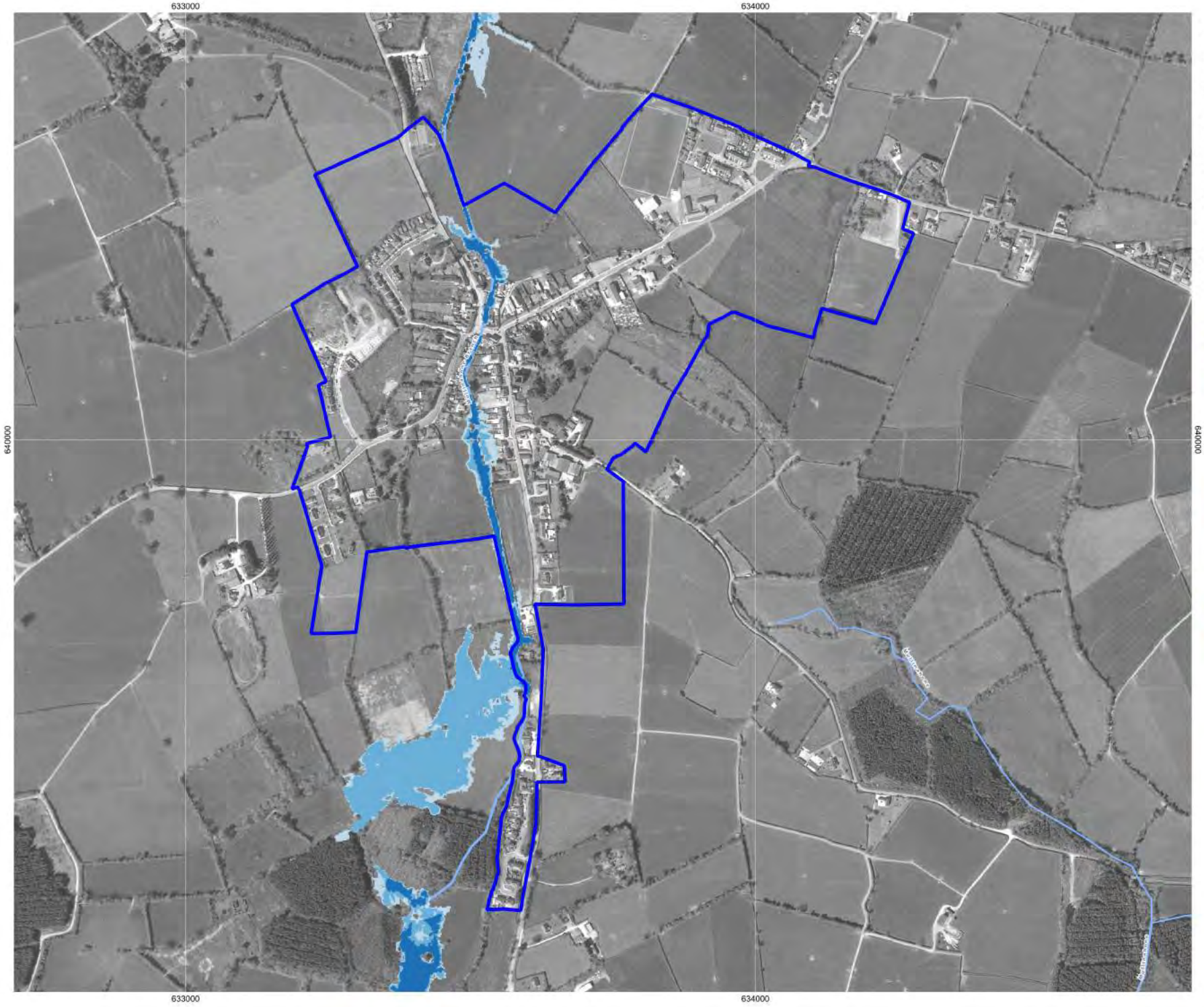

County Tipperary Development Plan 2022-2028

Mullinahone
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
Mid-Range Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Mid-Range Future Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Mid-Range Future Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

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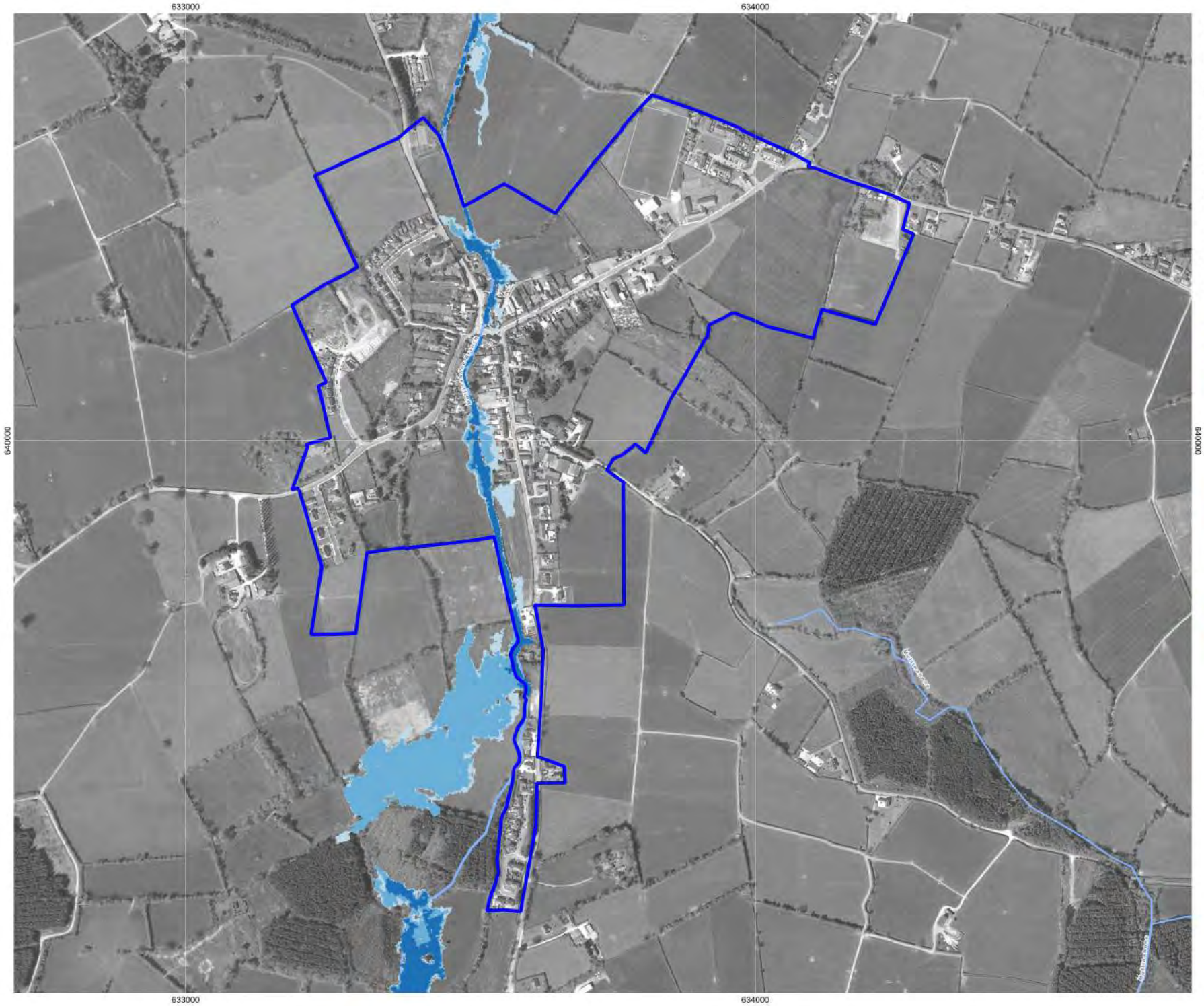

County Tipperary Development Plan 2022-2028

Mullinahone
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
High-End Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial High-End Future Scenario
- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM High-End Future Scenario
- 5% AEP
- 1% AEP
- 0.1% AEP

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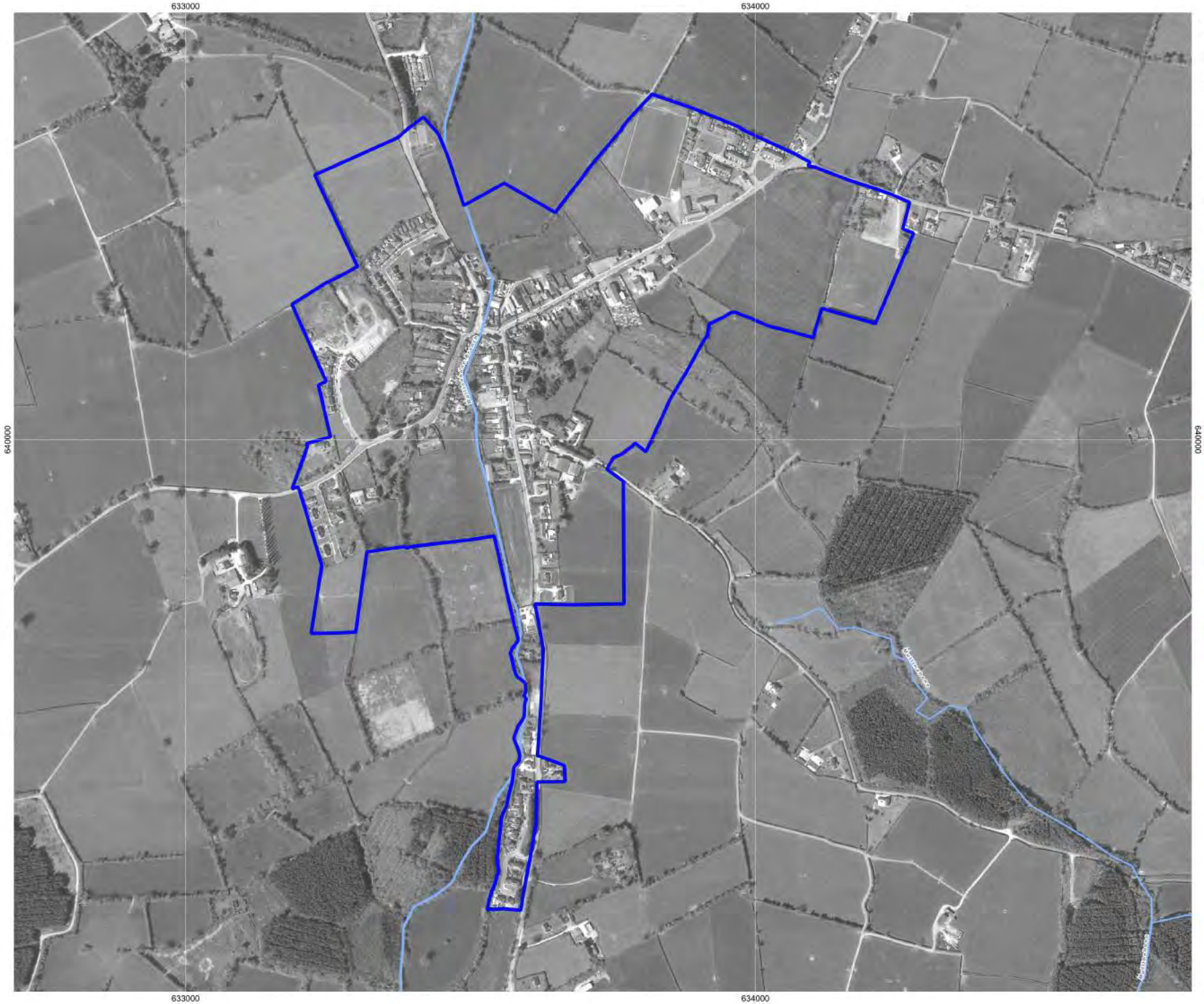

County Tipperary Development Plan 2022-2028

Mullinahone Rural Service Centre GSI Historical Flood Data and Groundwater Predictive Modeling

- Plan Boundary
- County Boundary
- Water
- River or Stream

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

Surface Water Flooding

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

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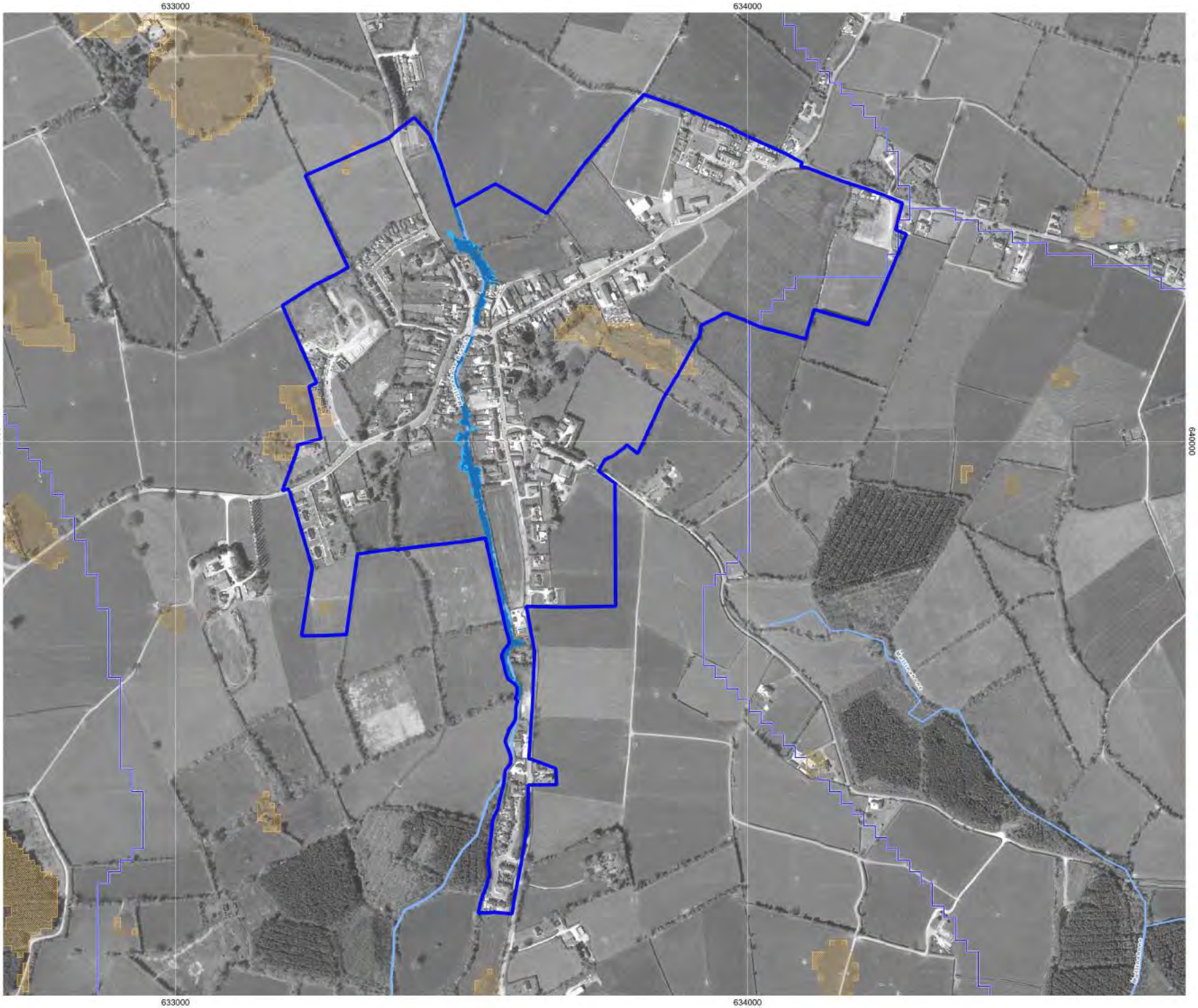

County Tipperary Development Plan 2022-2028

Mullinahone Rural Service Centre Indicative Flood Zones

PlanBoundary
County Boundary
WFD River Sub-Basins
Water
River or Stream

Indicative Flood Zones
Flood Zone A
Flood Zone B

PFRA Pluvial
Pluvial 1% AEP
Pluvial 0.1% AEP
Groundwater

GSI Groundwater Flooding Predicitive Model
High Probability
Medium Probability
Low Probability

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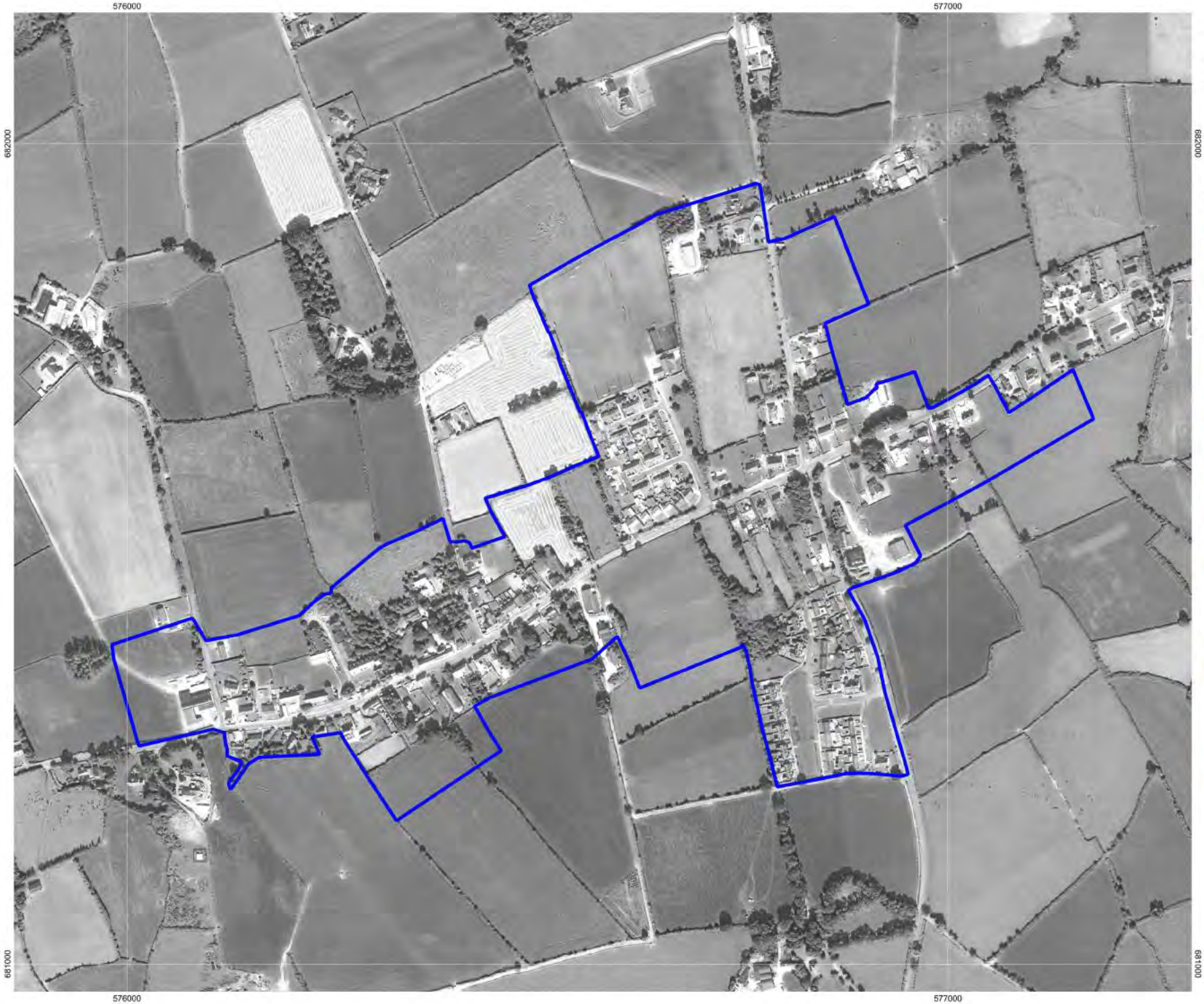

County Tipperary Development Plan 2022-2028

Portroe
Rural Service Centre
OPW Historical Flood Data

- Plan Boundary
- County Boundary
- Water
- River or Stream

OPW Past Flood Events

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

Land Commission

- Benefited Lands

Drainage District

- Channel
- Embankment
- Benefited Lands

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Lands

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Portroe
Rural Service Centre
OPW Preliminary Flood Risk Assessment (PFRA)

- Plan Boundary
- County Boundary
- Water
- River or Stream

PFRA

- Fluvial 1% AEP
- Fluvial 0.1% AEP
- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

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County Tipperary Development Plan 2022-2028

Portroe
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM) Present Day Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Present Day Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Present Day Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

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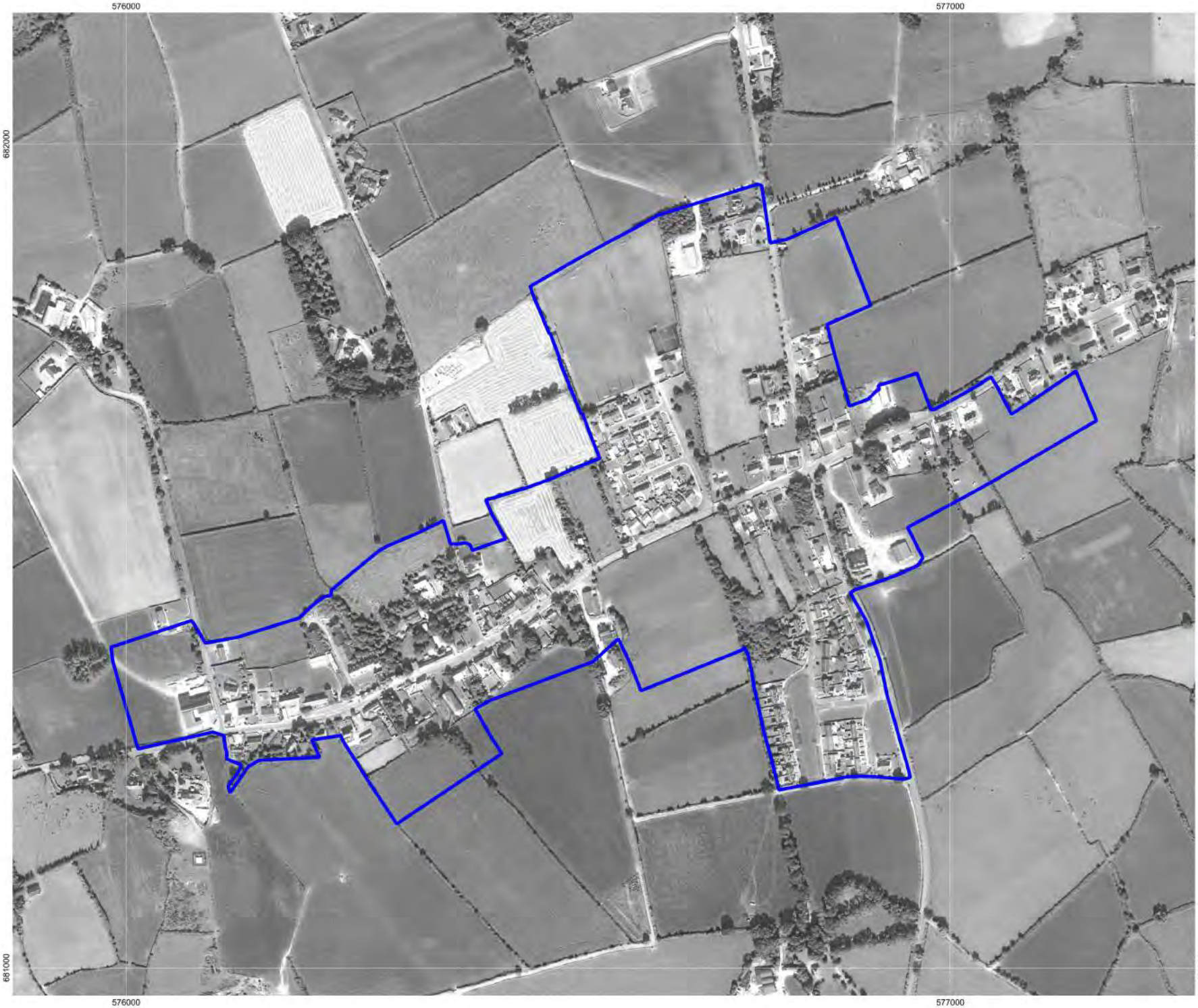

County Tipperary Development Plan 2022-2028

Portroe
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
Mid-Range Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Mid-Range Future Scenario
- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Mid-Range Future Scenario
- 5% AEP
- 1% AEP
- 0.1% AEP

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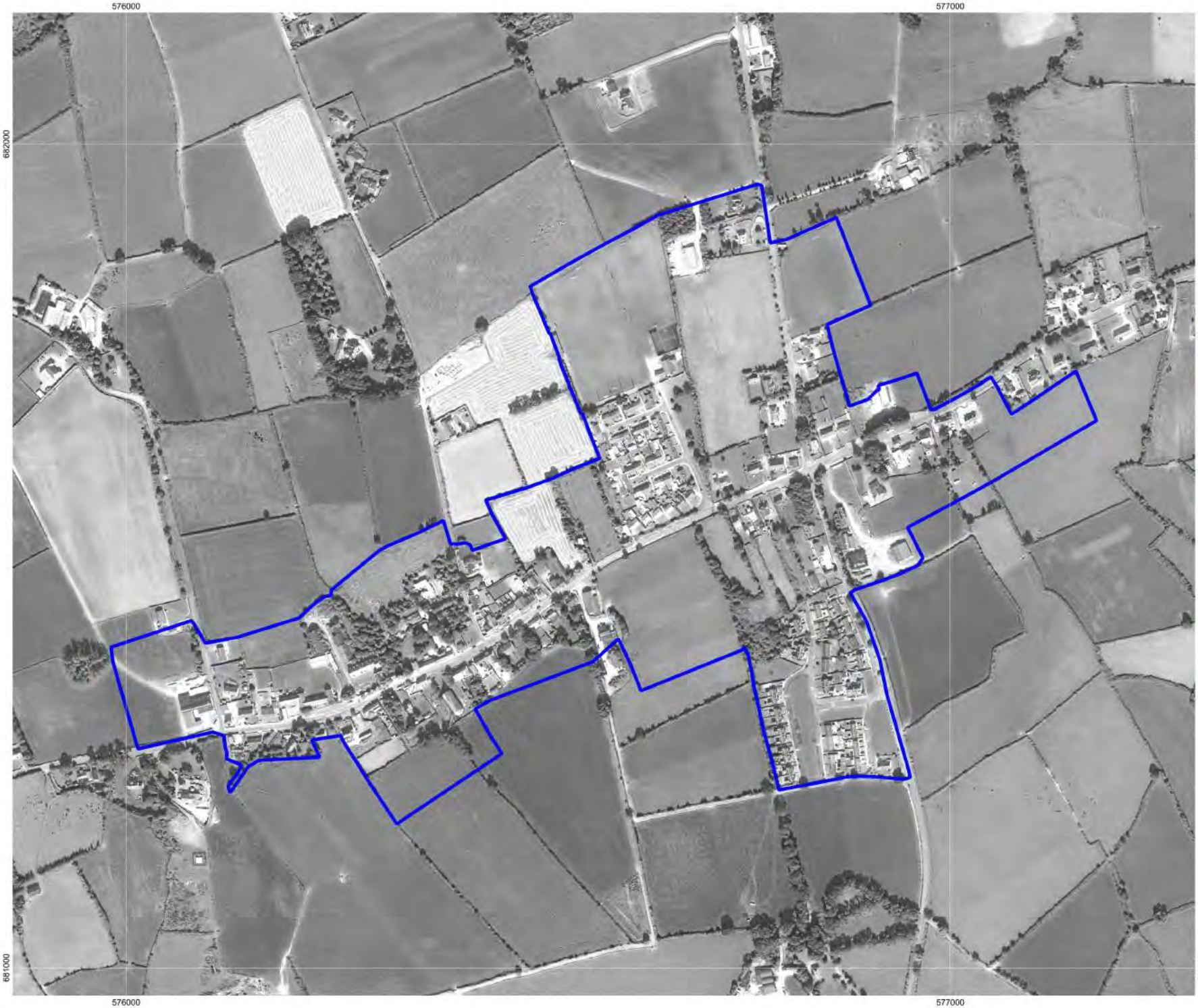

County Tipperary Development Plan 2022-2028

Portroe
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
High-End Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial High-End Future Scenario
- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM High-End Future Scenario
- 5% AEP
- 1% AEP
- 0.1% AEP

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County Tipperary Development Plan 2022-2028

Portroe
Rural Service Centre
GSI Historical Flood Data and Groundwater Predictive Modeling

- Plan Boundary
- County Boundary
- Water
- River or Stream

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

GSI Historical Flood Data

Surface Water Flooding

- Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding

- Groundwater
- Groundwater/Surface water

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County Tipperary Development Plan 2022-2028

Portroe
Rural Service Centre
Indicative Flood Zones

- PlanBoundary
- County Boundary
- WFD River Sub-Basins
- Water
- River or Stream

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GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

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Tipperary County Council

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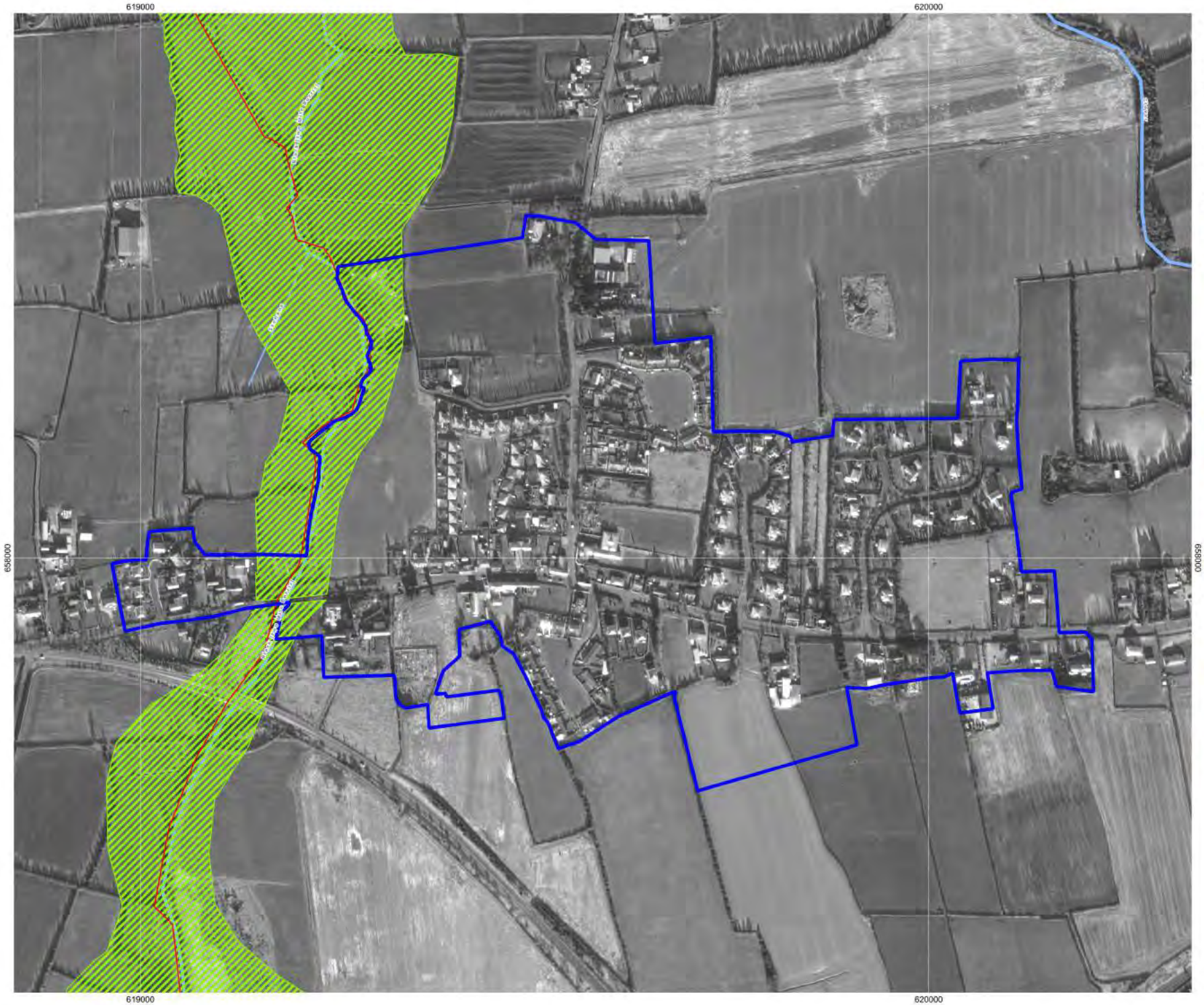

County Tipperary Development Plan 2022-2028

Twomileborris Rural Service Centre OPW Historical Flood Data

- Plan Boundary
- County Boundary
- Water
- River or Stream

OPW Past Flood Events

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

Land Commission

- Benefited Lands

Drainage District

- Channel
- Embankment
- Benefited Lands

Arterial Drainage Scheme

- Channel
- Embankment
- Benefited Lands

Comhairle Contae Thiobraid Árann
Tipperary County Council

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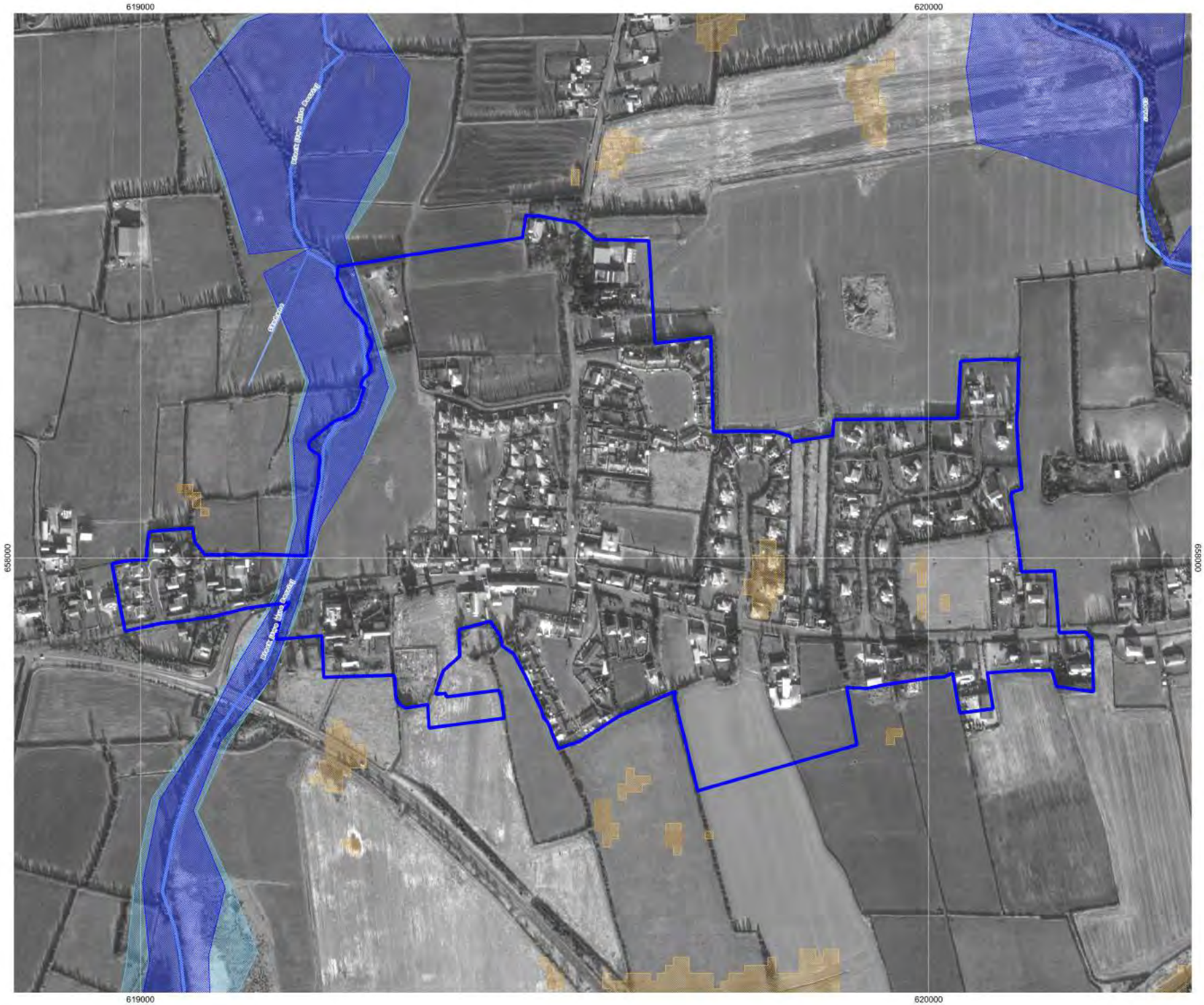

County Tipperary Development Plan 2022-2028

Twomileborris Rural Service Centre OPW Preliminary Flood Risk Assessment (PFRA)

- Plan Boundary
- County Boundary
- Water
- River or Stream

PFRA

- Fluvial 1% AEP
- Fluvial 0.1% AEP
- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

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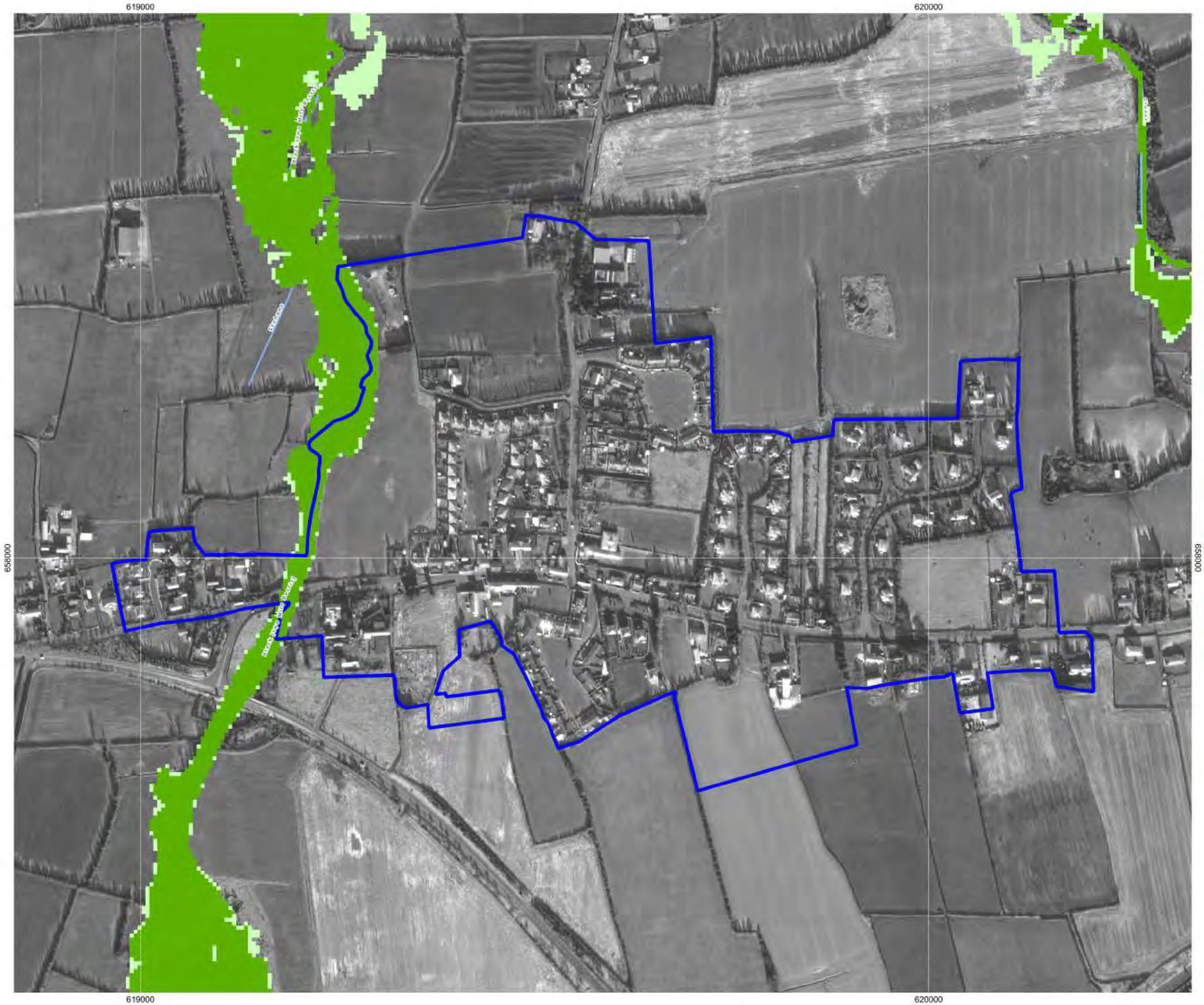

County Tipperary Development Plan 2022-2028

Twomileborris
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM) Present Day Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Present Day Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Present Day Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

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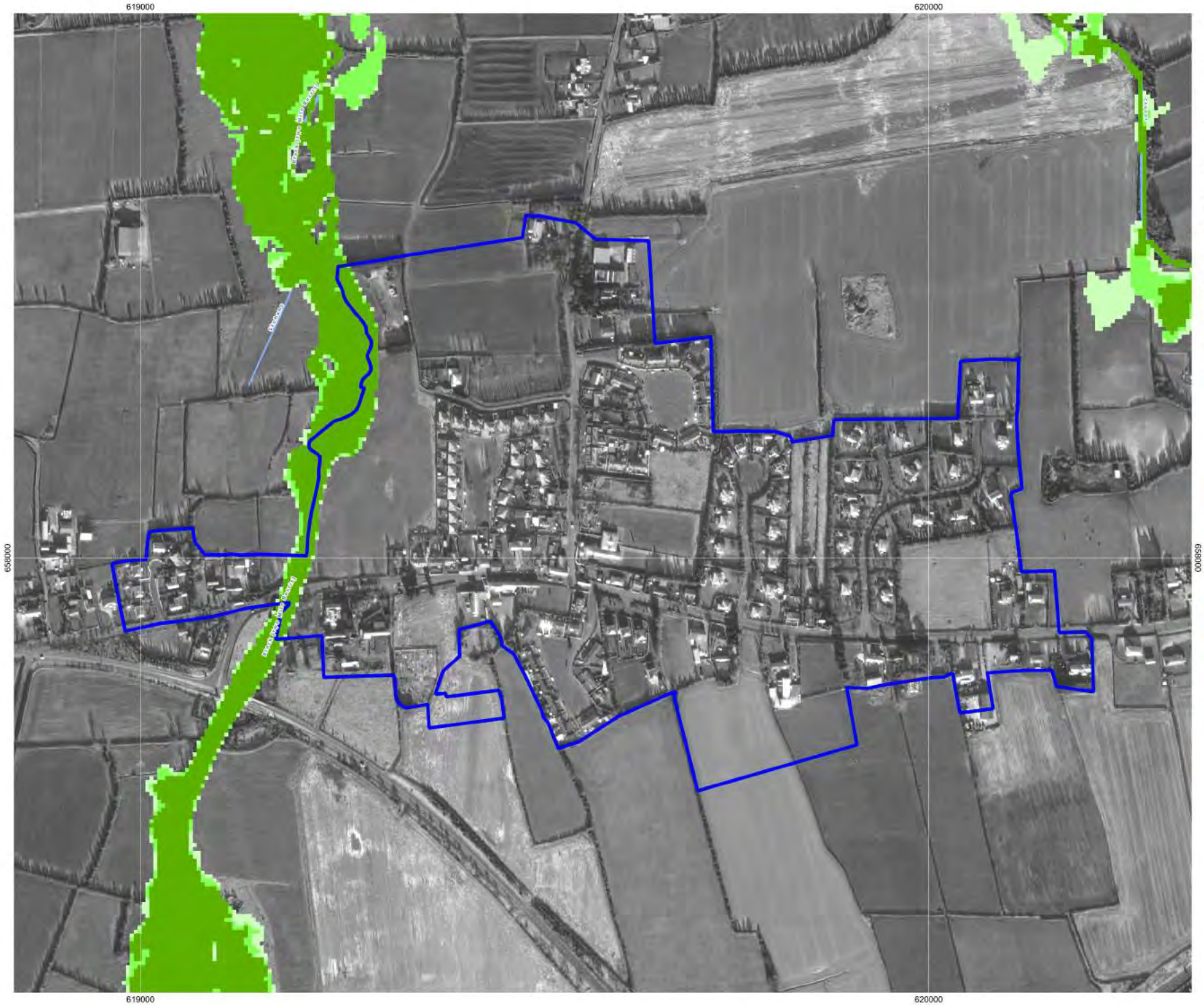

County Tipperary Development Plan 2022-2028

Twomileborris
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
Mid-Range Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial Mid-Range Future Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM Mid-Range Future Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

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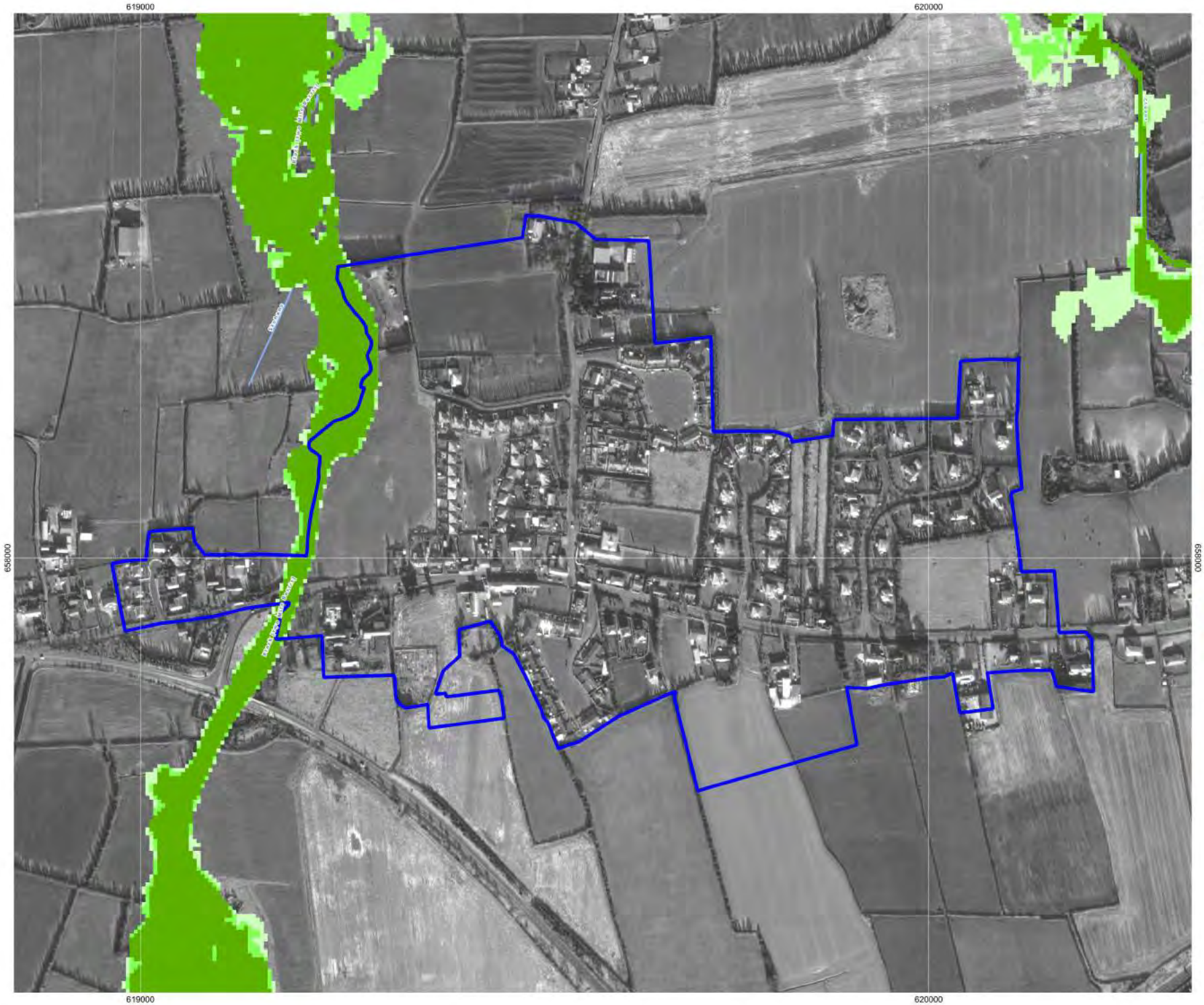

County Tipperary Development Plan 2022-2028

Twomileborris
Rural Service Centre
OPW Catchment Flood Risk Assessment & Management (CFRAM) & National Indicative Fluvial Mapping (NIFM)
High-End Future Scenario

- Plan Boundary
- County Boundary
- Water
- River or Stream

CFRAM Fluvial High-End Future Scenario

- 10% AEP
- 1% AEP
- 0.1% AEP

NIFM High-End Future Scenario

- 5% AEP
- 1% AEP
- 0.1% AEP

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Tipperary County Council

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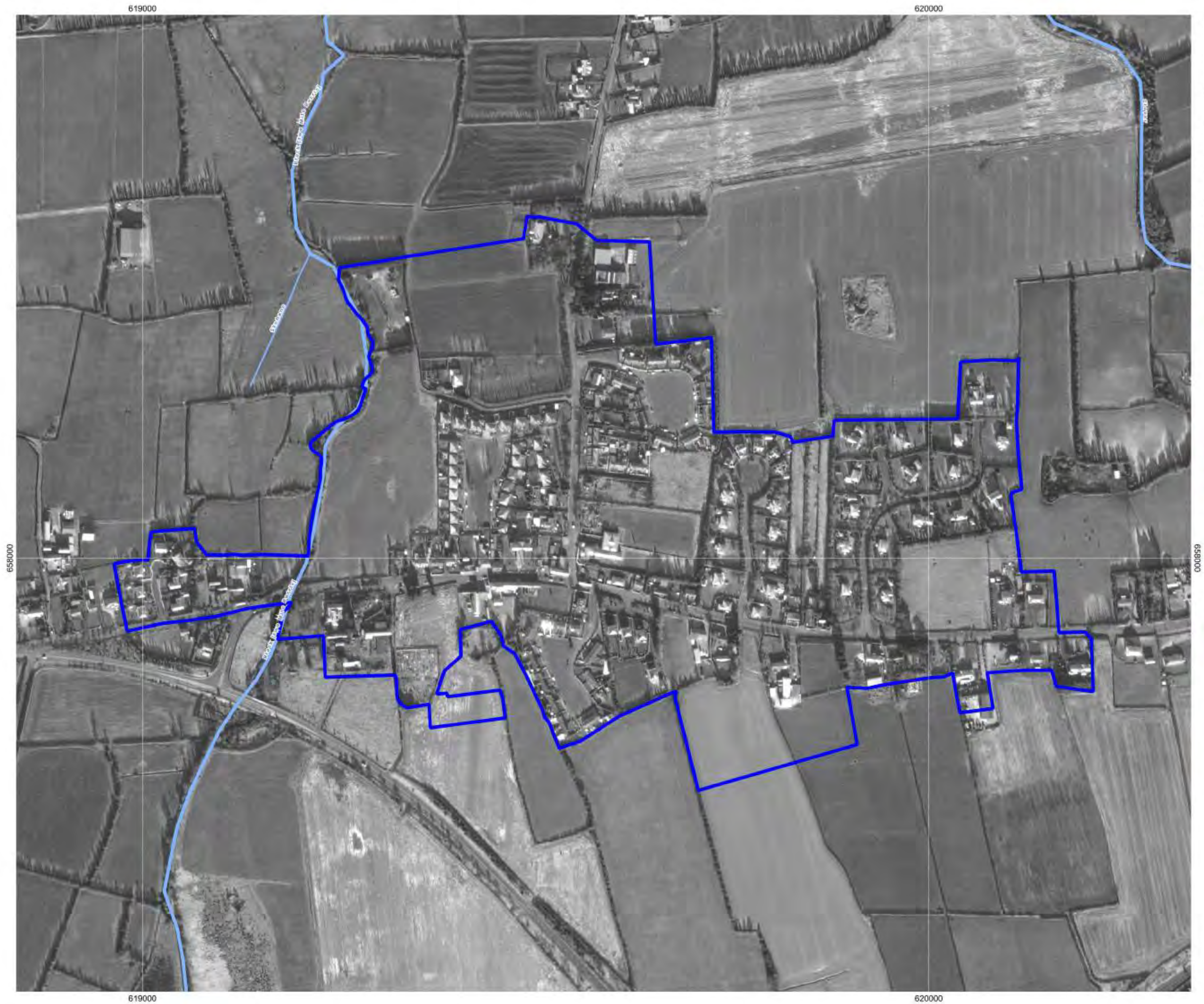

County Tipperary Development Plan 2022-2028

Twomileborris
Rural Service Centre
GSI Historical Flood Data
and Groundwater
Predictive Modeling

Plan Boundary
County Boundary
Water
River or Stream

GSI Groundwater Flooding Predicitive Model
High Probability
Medium Probability
Low Probability

GSI Historical Flood Data

Surface Water Flooding
Winter 2015-2016 Surface Water Flooding

Maximum Historic Groundwater Flooding
Groundwater
Groundwater/Surface water

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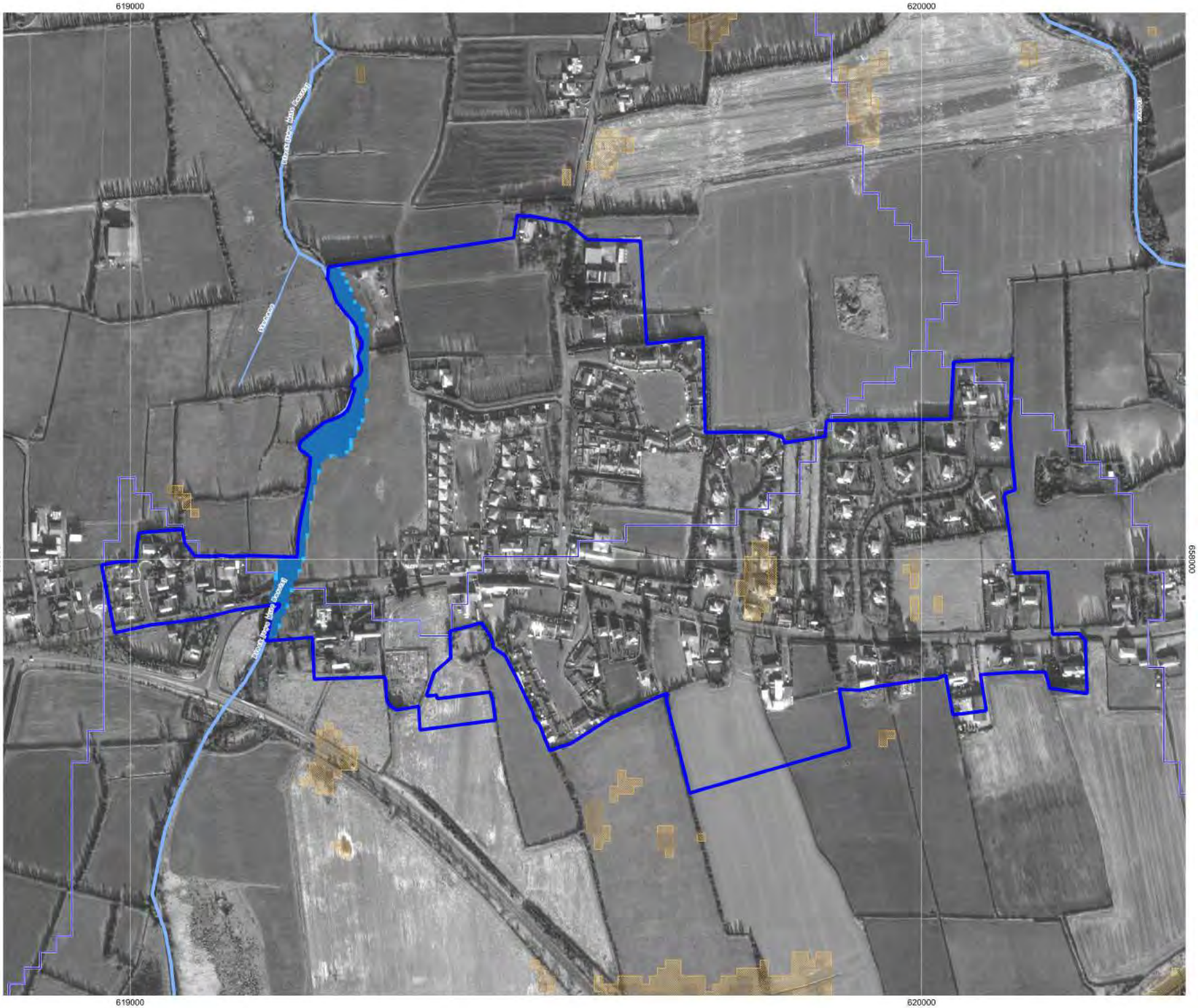

County Tipperary Development Plan 2022-2028

Twomileborris Rural Service Centre Indicative Flood Zones

- PlanBoundary
- County Boundary
- WFD River Sub-Basins
- Water
- River or Stream

Indicative Flood Zones

- Flood Zone A
- Flood Zone B

PFRA Pluvial

- Pluvial 1% AEP
- Pluvial 0.1% AEP
- Groundwater

GSI Groundwater Flooding Predicitive Model

- High Probability
- Medium Probability
- Low Probability

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QGIS

Tipperary Development Plan 2022-2028

Strategic Flood Risk Assessment

Appendix III - Smaller Settlements

10/05/2022

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Table of Contents

Settlement Flood Risk Indicators

600800 601000 601200 601400

619800 619600 619400 619200

Tipperary Development Plan 2022-2028

Ballylooby Settlement Node Historic Flood Indicators

River or Stream

Land Use Zoning

S5 - Social & Public

OPW Past Flood Events

Single Flood Event

Recurring Flood Event

OPW Past Flood Extent & Winter 2015-2016 Surface Water Flooding

GSI Maximum Historic Groundwater Flooding

Groundwater

Groundwater/Surface water

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600800 601000 601200 601400

619800 619600 619400 619200

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Ballylooby Settlement Node OPW & GSI Predictive Modelling - Present Day

River or Stream

Land Use Zoning
- S5 - Social & Public

OPW Predicitive Modelling

Preliminary Flood Risk Assessment (PFRA)
- Fluvial 1% AEP
- Fluvial 0.1% AEP

Catchment Flood Risk Assessment & Management (CFRAM) Present Day Scenario
- Fluvial 10% AEP
- Fluvial 1% AEP
- Fluvial 0.1% AEP

National Indicative Fluvial Mapping (NIFM) Present Day Scenario
- Fluvial 5% AEP
- Fluvial 1% AEP
- Fluvial 0.1% AEP

GSI Predictive Modelling

Groundwater Flooding
- High Probability
- Medium Probability
- Low Probability

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Coordinates in ITM

600800 601000 601200 601400

619800 619600 619400 619200

Tipperary Development Plan 2022-2028

Ballylooby Settlement Node OPW Predictive Modelling - Mid-Range Future Scenario

River or Stream

Land Use Zoning
S5 - Social & Public

OPW Predicitive Modelling

Catchment Flood Risk Assessment & Management (CFRAM) Mid-Range Future Scenario
Fluvial 10% AEP
Fluvial 1% AEP
Fluvial 0.1% AEP

National Indicative Fluvial Mapping (NIFM) Mid-Range Future Scenario
Fluvial 5% AEP
Fluvial 1% AEP
Fluvial 0.1% AEP

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619800 619600 619400 619200

Tipperary Development Plan 2022-2028

Ballylooby Settlement Node OPW Predictive Modelling - High-End Future Scenario

River or Stream

Land Use Zoning
S5 - Social & Public

OPW Predicitive Modelling

Catchment Flood Risk Assessment & Management (CFRAM) High-End Future Scenario
Fluvial 10% AEP
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Fluvial 0.1% AEP

National Indicative Fluvial Mapping (NIFM) High-End Future Scenario
Fluvial 5% AEP
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Fluvial 0.1% AEP

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600800 601000 601200 601400

619800 619600 619400 619200

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Ballylooby Settlement Node Indicative Flood Zones

Plan Boundary

River or Stream

Land Use Zoning

S5 - Social & Public

Indicative Flood Zones

Flood Zone A

Flood Zone B

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592800 593000 593200 593400 593600 593800

613600 613400 613200 613000 612800

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Ballyporeen Service Centre Historic Flood Indicators

River or Stream

Land Use Zoning

S5 - Social & Public

OPW Past Flood Events

Single Flood Event

Recurring Flood Event

OPW Past Flood Extent & Winter 2015-2016 Surface Water Flooding

GSI Maximum Historic Groundwater Flooding

Groundwater

Groundwater/Surface water

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592800 593000 593200 593400 593600 593800

613600 613400 613200 613000 612800

Tipperary Development Plan 2022-2028

Ballyporeen Service Centre OPW & GSI Predictive Modelling - Present Day

River or Stream

Land Use Zoning

S5 - Social & Public

OPW Predicitive Modelling

Preliminary Flood Risk Assessment (PFRA)

Fluvial 1% AEP

Fluvial 0.1% AEP

Catchment Flood Risk Assessment & Management (CFRAM) Present Day Scenario

Fluvial 10% AEP

Fluvial 1% AEP

Fluvial 0.1% AEP

National Indicative Fluvial Mapping (NIFM) Present Day Scenario

Fluvial 5% AEP

Fluvial 1% AEP

Fluvial 0.1% AEP

GSI Predictive Modelling

Groundwater Flooding

High Probability

Medium Probability

Low Probability

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Ballyporeen Service Centre OPW Predictive Modelling - Mid-Range Future Scenario

592800 593000 593200 593400 593600 593800

613600 613400 613200 613000 612800

River or Stream

Land Use Zoning

S5 - Social & Public

OPW Predicitive Modelling

Catchment Flood Risk Assessment & Management (CFRAM) Mid-Range Future Scenario

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- Fluvial 0.1% AEP

National Indicative Fluvial Mapping (NIFM) Mid-Range Future Scenario

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- Fluvial 0.1% AEP

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Tipperary Development Plan 2022-2028

Ballyporeen Service Centre OPW Predictive Modelling - High-End Future Scenario

592800 593000 593200 593400 593600 593800

613600 613400 613200 613000 612800

River or Stream

Land Use Zoning

S5 - Social & Public

OPW Predicitive Modelling

Catchment Flood Risk Assessment & Management (CFRAM) High-End Future Scenario

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National Indicative Fluvial Mapping (NIFM) High-End Future Scenario

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- Fluvial 1% AEP
- Fluvial 0.1% AEP

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592800 593000 593200 593400 593600 593800

613600 613400 613200 613000 612800

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Ballyporeen Service Centre Indicative Flood Zones

Plan Boundary

River or Stream

Land Use Zoning

S5 - Social & Public

Indicative Flood Zones

Flood Zone A

Flood Zone B

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Tipperary Development Plan 2022-2028

Bansha Service Centre Historic Flood Indicators

River or Stream

Land Use Zoning

S5 - Social & Public

OPW Past Flood Events

Single Flood Event

Recurring Flood Event

OPW Past Flood Extent & Winter 2015-2016 Surface Water Flooding

GSI Maximum Historic Groundwater Flooding

Groundwater

Groundwater/Surface water

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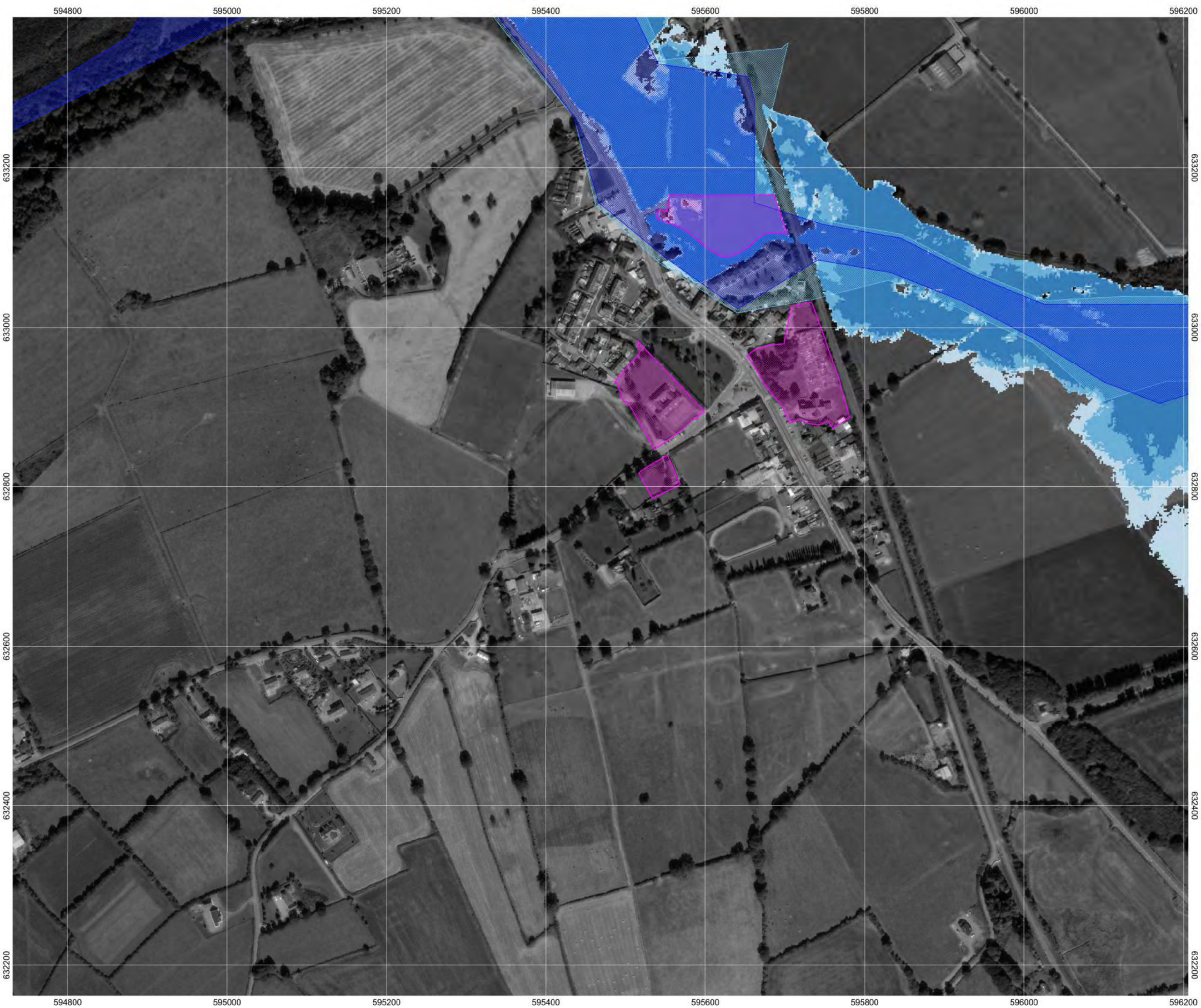

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Bansha
Service Centre
OPW & GSI Predictive Modelling - Present Day

River or Stream

Land Use Zoning
S5 - Social & Public

OPW Predicitive Modelling

Preliminary Flood Risk Assessment (PFRA)
- Fluvial 1% AEP
- Fluvial 0.1% AEP

Catchment Flood Risk Assessment & Management (CFRAM) Present Day Scenario
- Fluvial 10% AEP
- Fluvial 1% AEP
- Fluvial 0.1% AEP

National Indicative Fluvial Mapping (NIFM) Present Day Scenario
- Fluvial 5% AEP
- Fluvial 1% AEP
- Fluvial 0.1% AEP

GSI Predictive Modelling

Groundwater Flooding
- High Probability
- Medium Probability
- Low Probability

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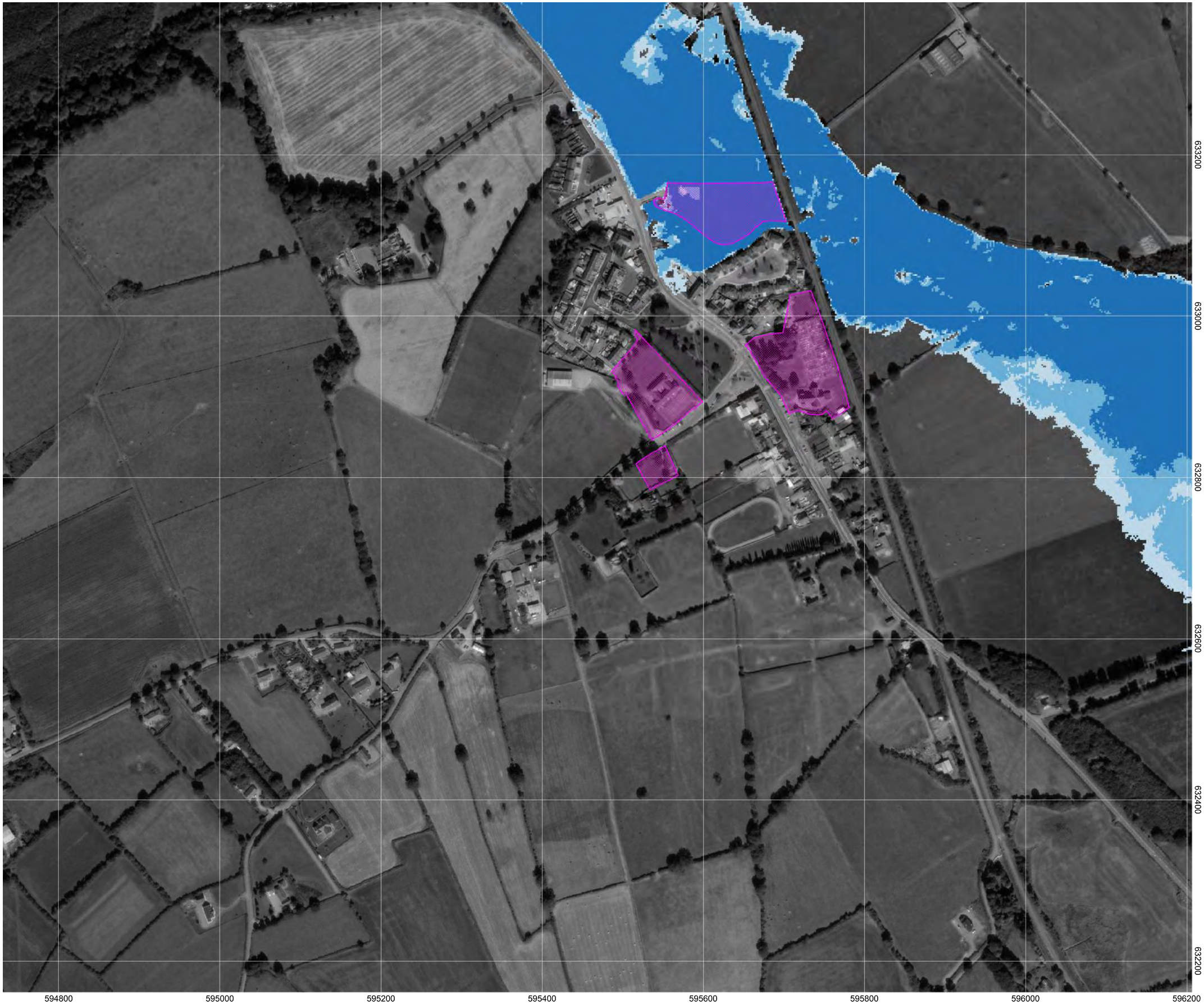

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Bansha
Service Centre
OPW Predictive Modelling - Mid-Range Future Scenario

River or Stream

Land Use Zoning
S5 - Social & Public

OPW Predicitive Modelling

Catchment Flood Risk Assessment & Management (CFRAM) Mid-Range Future Scenario
Fluvial 10% AEP
Fluvial 1% AEP
Fluvial 0.1% AEP

National Indicative Fluvial Mapping (NIFM) Mid-Range Future Scenario
Fluvial 5% AEP
Fluvial 1% AEP
Fluvial 0.1% AEP

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Bansha
Service Centre
OPW Predictive Modelling - High-End Future Scenario

River or Stream

Land Use Zoning
S5 - Social & Public

OPW Predicitive Modelling

Catchment Flood Risk Assessment & Management (CFRAM) High-End Future Scenario
Fluvial 10% AEP
Fluvial 1% AEP
Fluvial 0.1% AEP

National Indicative Fluvial Mapping (NIFM) High-End Future Scenario
Fluvial 5% AEP
Fluvial 1% AEP
Fluvial 0.1% AEP

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Tipperary Development Plan 2022-2028

Bansha Service Centre Indicative Flood Zones

Plan Boundary

River or Stream

Land Use Zoning

S5 - Social & Public

Indicative Flood Zones

Flood Zone A

Flood Zone B

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Castleleiney
Settlement Node
Historic Flood Indicators

River or Stream

Land Use Zoning

S5 - Social & Public

OPW Past Flood Events

Single Flood Event

Recurring Flood Event

OPW Past Flood Extent & Winter 2015-2016 Surface Water Flooding

GSI Maximum Historic Groundwater Flooding

Groundwater

Groundwater/Surface water

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Castleleiney Settlement Node OPW & GSI Predictive Modelling - Present Day

River or Stream

Land Use Zoning

S5 - Social & Public

OPW Predicitive Modelling

Preliminary Flood Risk Assessment (PFRA)

Fluvial 1% AEP

Fluvial 0.1% AEP

Catchment Flood Risk Assessment & Management (CFRAM) Present Day Scenario

Fluvial 10% AEP

Fluvial 1% AEP

Fluvial 0.1% AEP

National Indicative Fluvial Mapping (NIFM) Present Day Scenario

Fluvial 5% AEP

Fluvial 1% AEP

Fluvial 0.1% AEP

GSI Predictive Modelling

Groundwater Flooding

High Probability

Medium Probability

Low Probability

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Tipperary Development Plan 2022-2028

Castleleiney Settlement Node OPW Predictive Modelling - Mid-Range Future Scenario

River or Stream

Land Use Zoning
S5 - Social & Public

OPW Predicitive Modelling

Catchment Flood Risk Assessment & Management (CFRAM) Mid-Range Future Scenario
Fluvial 10% AEP
Fluvial 1% AEP
Fluvial 0.1% AEP

National Indicative Fluvial Mapping (NIFM) Mid-Range Future Scenario
Fluvial 5% AEP
Fluvial 1% AEP
Fluvial 0.1% AEP

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Coordinates in ITM

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Tipperary Development Plan 2022-2028

Castleleiney Settlement Node OPW Predictive Modelling - High-End Future Scenario

River or Stream

Land Use Zoning
S5 - Social & Public

OPW Predicitive Modelling

Catchment Flood Risk Assessment & Management (CFRAM) High-End Future Scenario
Fluvial 10% AEP
Fluvial 1% AEP
Fluvial 0.1% AEP

National Indicative Fluvial Mapping (NIFM) High-End Future Scenario
Fluvial 5% AEP
Fluvial 1% AEP
Fluvial 0.1% AEP

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670400

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Castleleiney Settlement Node Indicative Flood Zones

Plan Boundary
River or Stream

Land Use Zoning

S5 - Social & Public

Indicative Flood Zones

Flood Zone A
Flood Zone B

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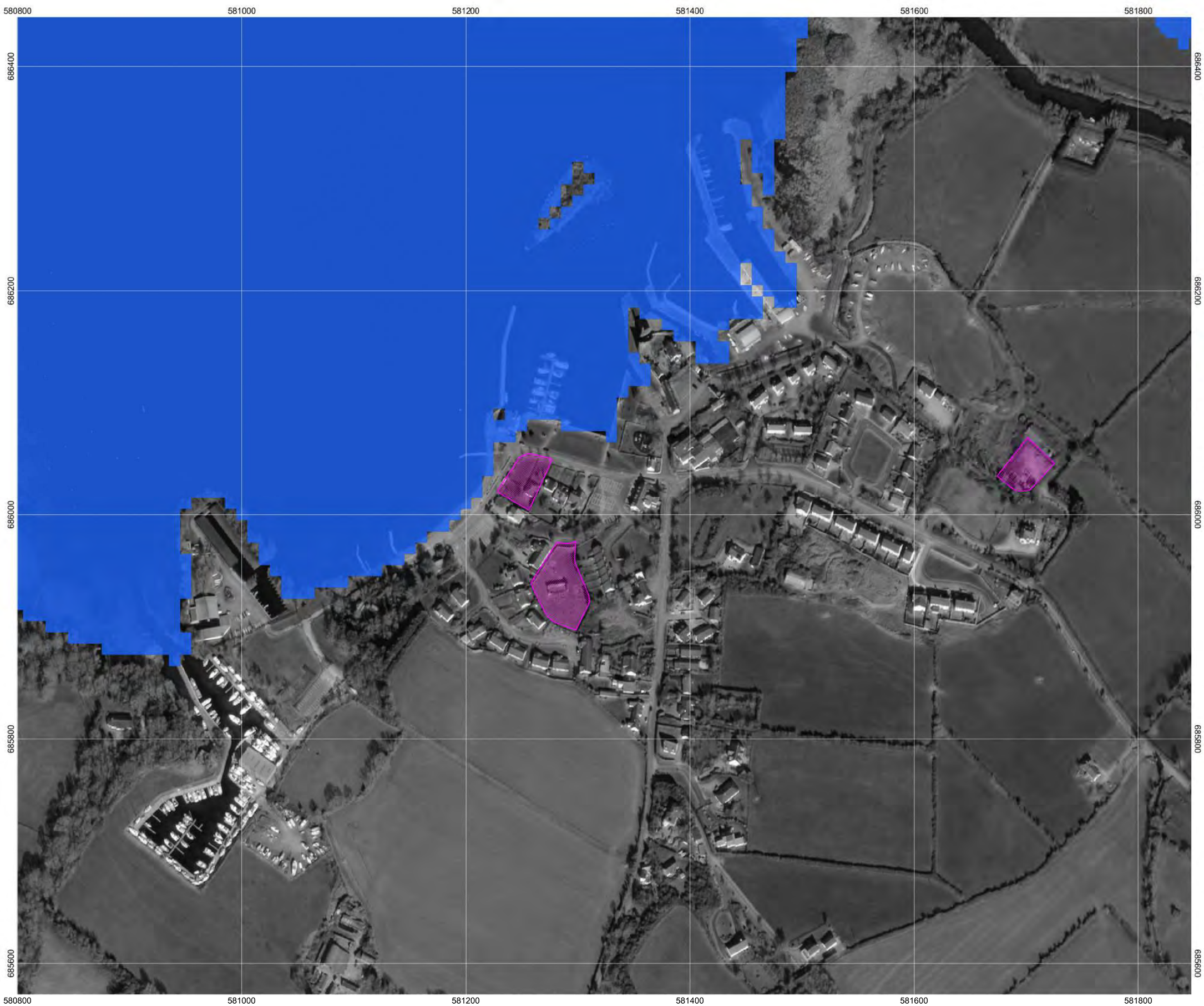

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Dromineer
Local Service Centre
Historic Flood Indicators

River or Stream

Land Use Zoning

S5 - Social & Public

OPW Past Flood Events

Single Flood Event

Recurring Flood Event

OPW Past Flood Extent & Winter 2015-2016 Surface Water Flooding

GSI Maximum Historic Groundwater Flooding

Groundwater

Groundwater/Surface water

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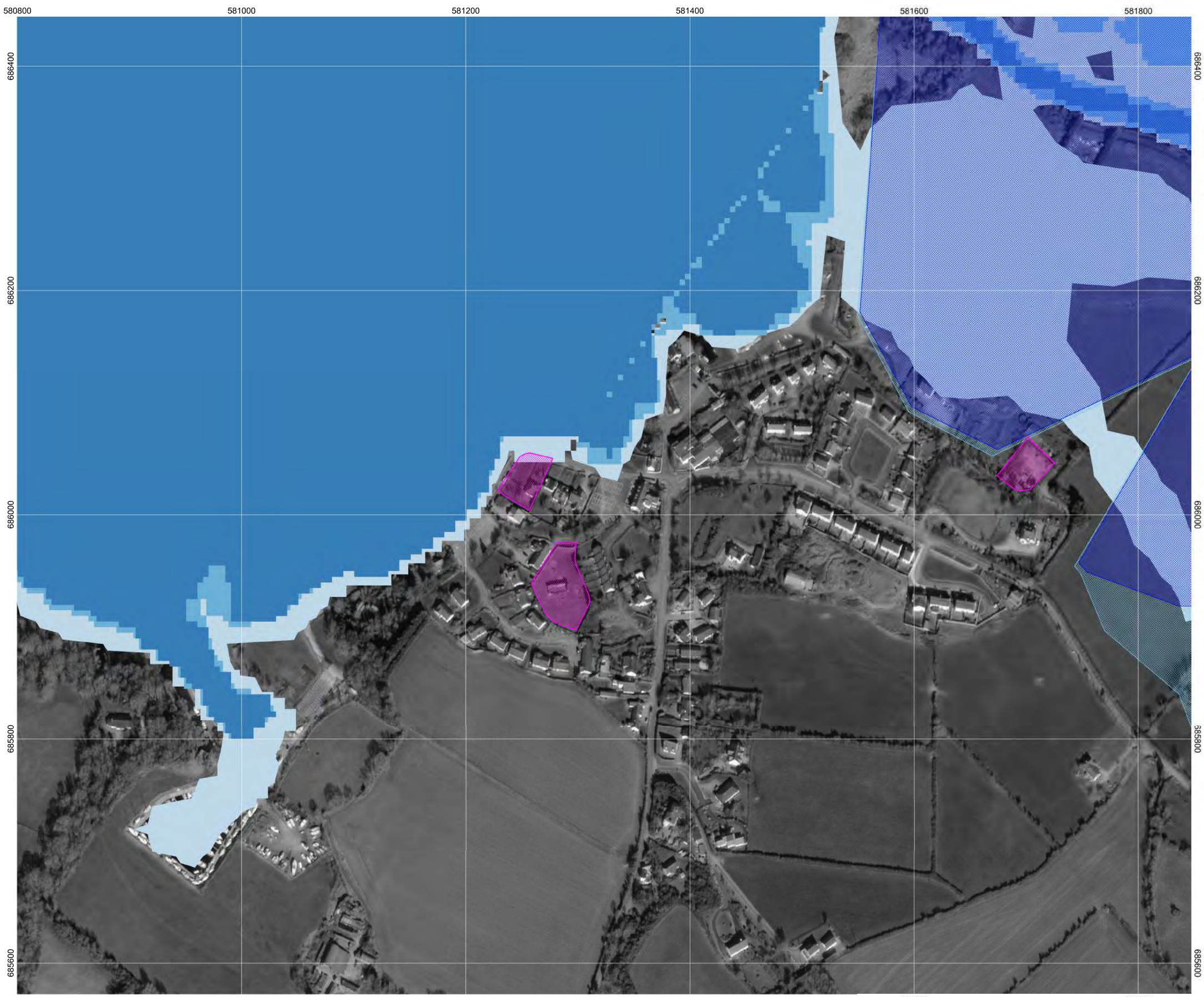

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Dromineer
Local Service Centre
OPW & GSI Predictive Modelling - Present Day

River or Stream

Land Use Zoning
S5 - Social & Public

OPW Predicitive Modelling

Preliminary Flood Risk Assessment (PFRA)
Fluvial 1% AEP
Fluvial 0.1% AEP

Catchment Flood Risk Assessment & Management (CFRAM) Present Day Scenario
Fluvial 10% AEP
Fluvial 1% AEP
Fluvial 0.1% AEP

National Indicative Fluvial Mapping (NIFM) Present Day Scenario
Fluvial 5% AEP
Fluvial 1% AEP
Fluvial 0.1% AEP

GSI Predictive Modelling

Groundwater Flooding
High Probability
Medium Probability
Low Probability

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Coordinates in ITM

Tipperary Development Plan 2022-2028

Dromineer
Local Service Centre
OPW Predictive Modelling - Mid-Range Future Scenario

River or Stream

Land Use Zoning
S5 - Social & Public

OPW Predicitive Modelling

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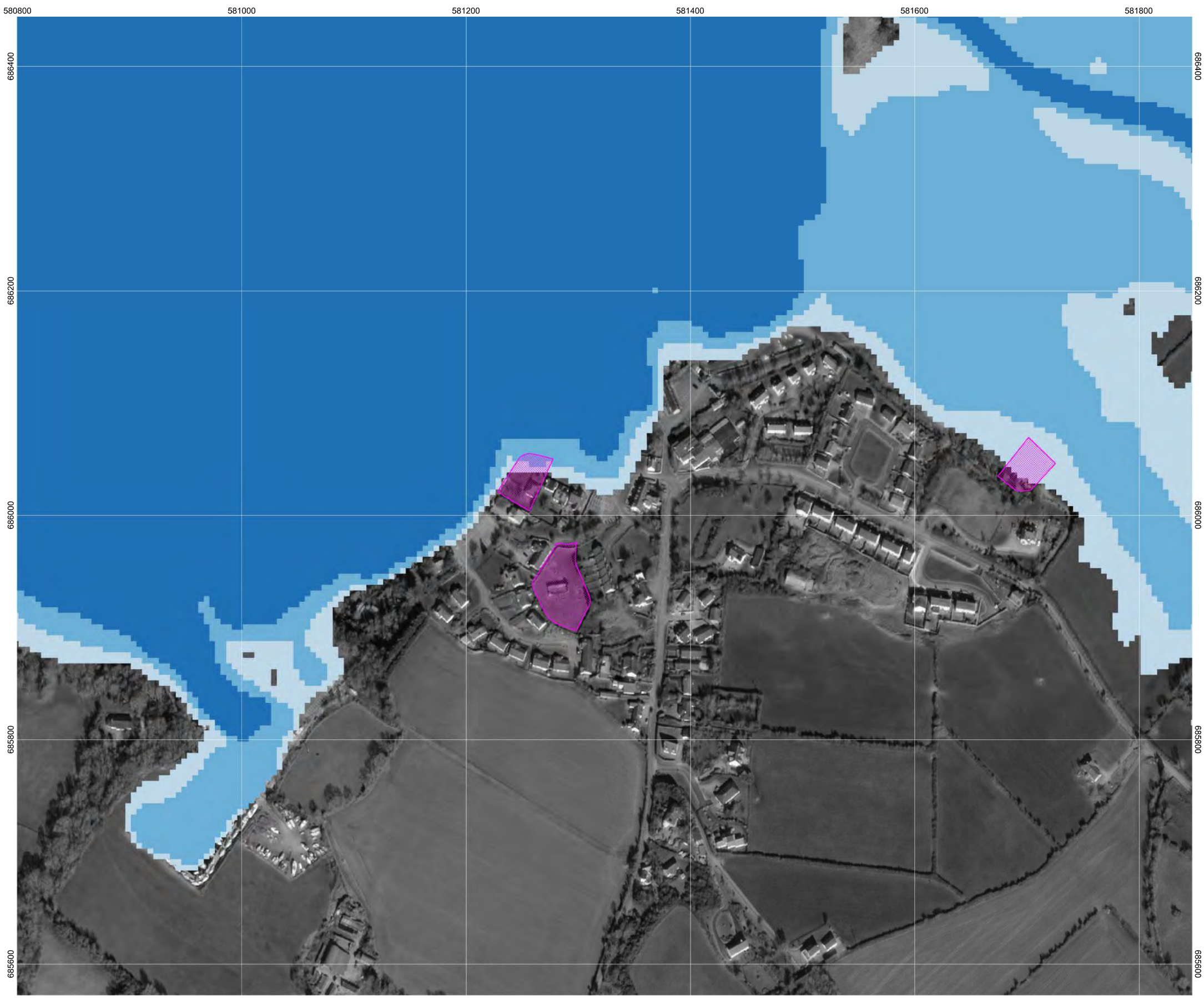

Tipperary Development Plan 2022-2028

Dromineer
Local Service Centre
OPW Predictive Modelling - High-End Future Scenario

River or Stream

Land Use Zoning
S5 - Social & Public

OPW Predicitive Modelling

Catchment Flood Risk Assessment & Management (CFRAM) High-End Future Scenario
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Fluvial 0.1% AEP

National Indicative Fluvial Mapping (NIFM) High-End Future Scenario
Fluvial 5% AEP
Fluvial 1% AEP
Fluvial 0.1% AEP

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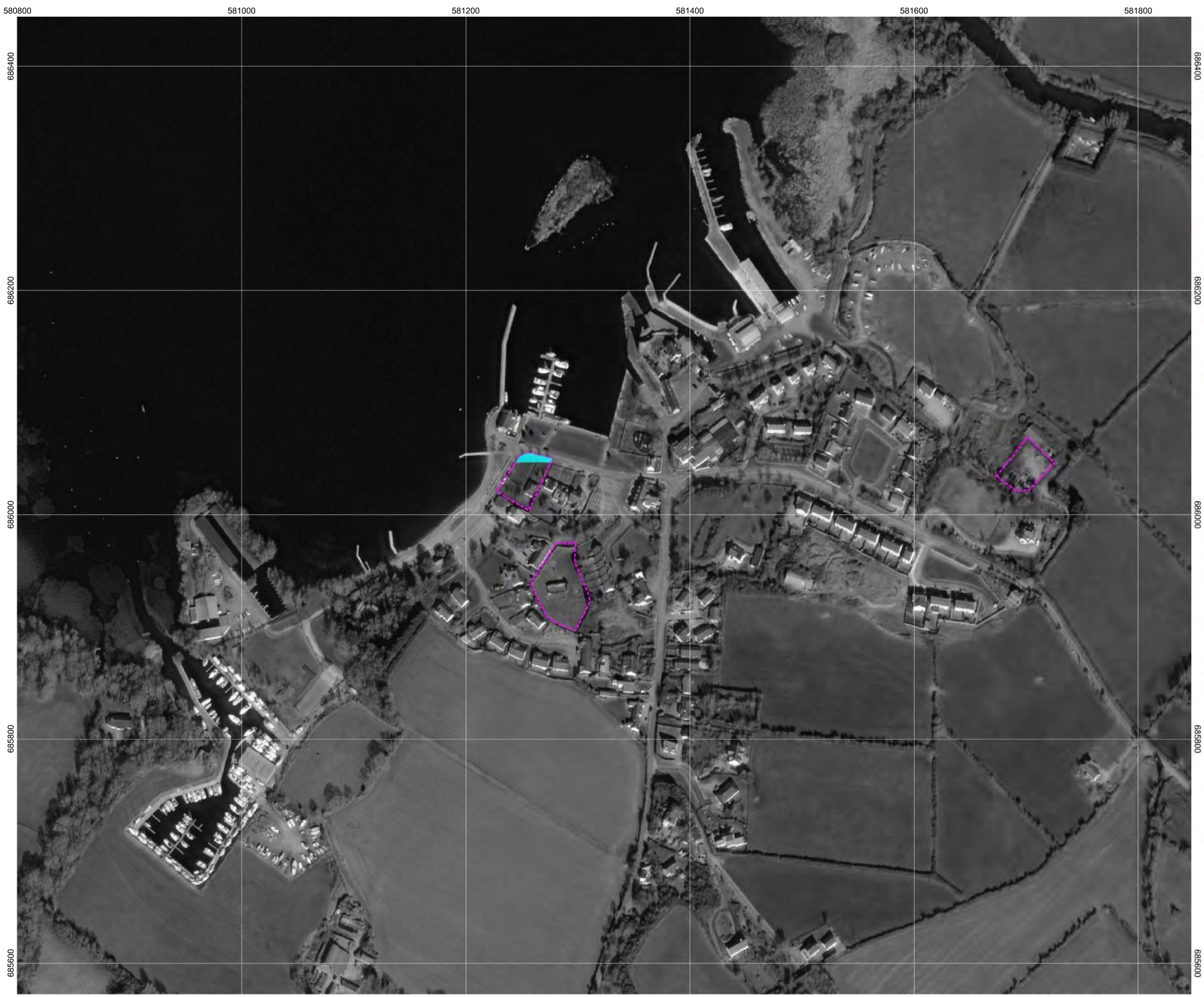

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Dromineer
Local Service Centre
Indicative Flood Zones

- Plan Boundary
- River or Stream

Land Use Zoning

- S5 - Social & Public

Indicative Flood Zones

- Flood Zone A
- Flood Zone B

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Hollyford
Service Centre
Historic Flood Indicators

591400 591600 591800 592000 592200 592400 592600 592800

654000 653800 653600 653400 653200 653000 652800

River or Stream

Land Use Zoning

S5 - Social & Public

OPW Past Flood Events

Single Flood Event

Recurring Flood Event

OPW Past Flood Extent & Winter 2015-2016 Surface Water Flooding

GSI Maximum Historic Groundwater Flooding

Groundwater

Groundwater/Surface water

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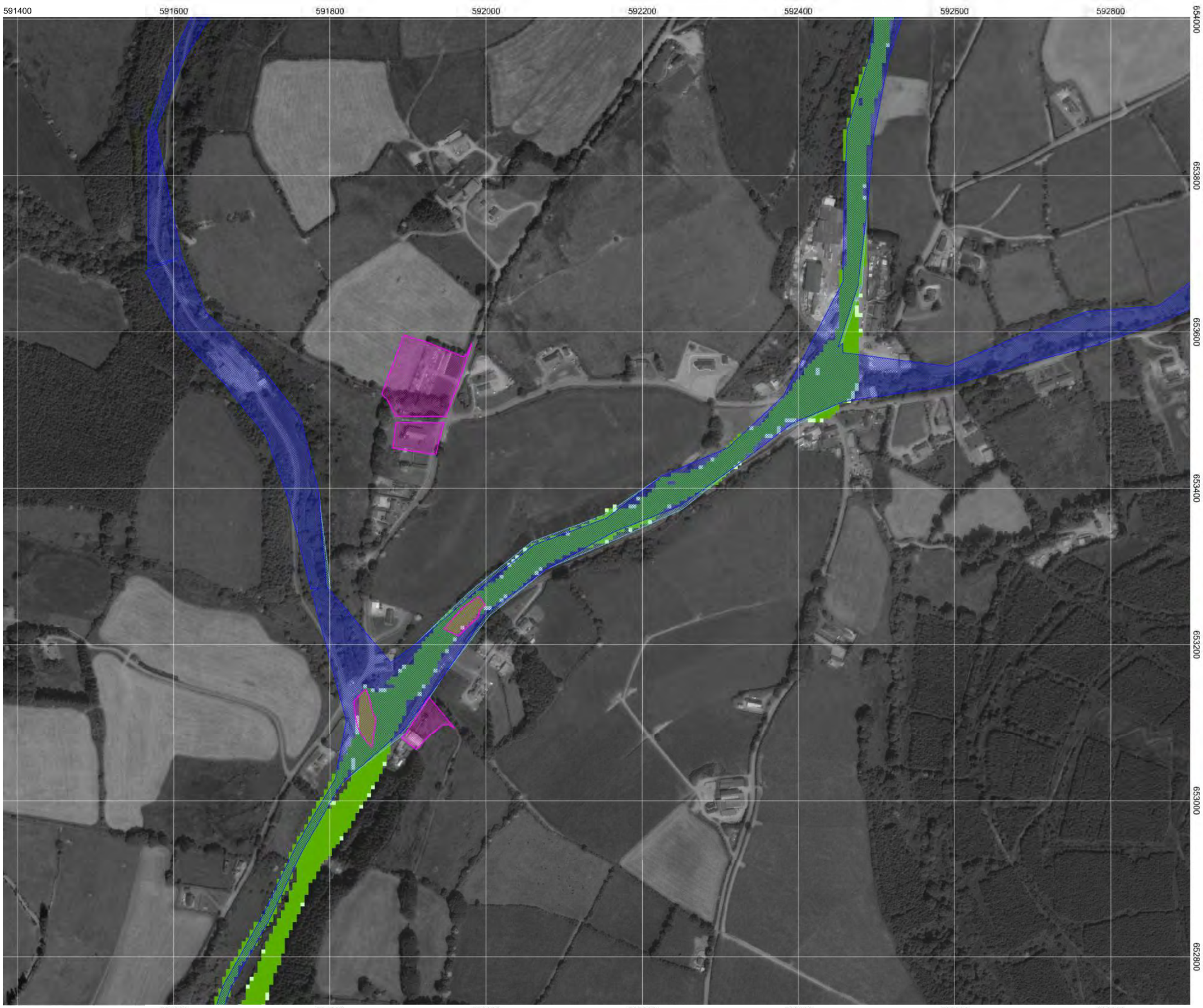

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Hollyford Service Centre OPW & GSI Predictive Modelling - Present Day

River or Stream

Land Use Zoning

S5 - Social & Public

OPW Predicitive Modelling

Preliminary Flood Risk Assessment (PFRA)

Fluvial 1% AEP

Fluvial 0.1% AEP

Catchment Flood Risk Assessment & Management (CFRAM) Present Day Scenario

Fluvial 10% AEP

Fluvial 1% AEP

Fluvial 0.1% AEP

National Indicative Fluvial Mapping (NIFM) Present Day Scenario

Fluvial 5% AEP

Fluvial 1% AEP

Fluvial 0.1% AEP

GSI Predictive Modelling

Groundwater Flooding

High Probability

Medium Probability

Low Probability

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Tipperary Development Plan 2022-2028

Hollyford
Service Centre
OPW Predictive Modelling - Mid-Range Future Scenario

River or Stream

Land Use Zoning
S5 - Social & Public

OPW Predicitive Modelling

Catchment Flood Risk Assessment & Management (CFRAM) Mid-Range Future Scenario
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Fluvial 1% AEP
Fluvial 0.1% AEP

National Indicative Fluvial Mapping (NIFM) Mid-Range Future Scenario
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Fluvial 1% AEP
Fluvial 0.1% AEP

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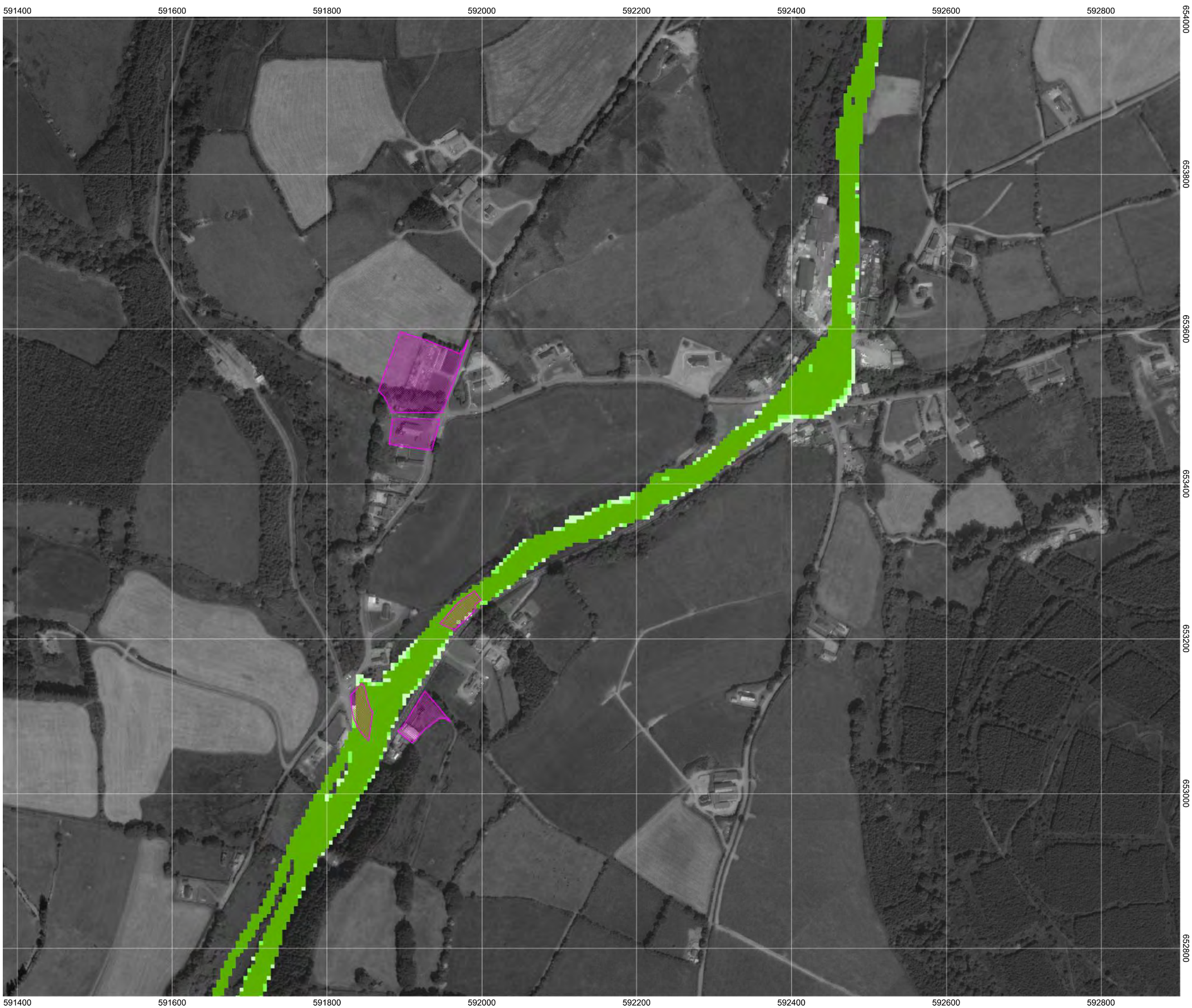

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Hollyford Service Centre OPW Predictive Modelling - High-End Future Scenario

River or Stream

Land Use Zoning
- S5 - Social & Public

OPW Predicitive Modelling

Catchment Flood Risk Assessment & Management (CFRAM) High-End Future Scenario
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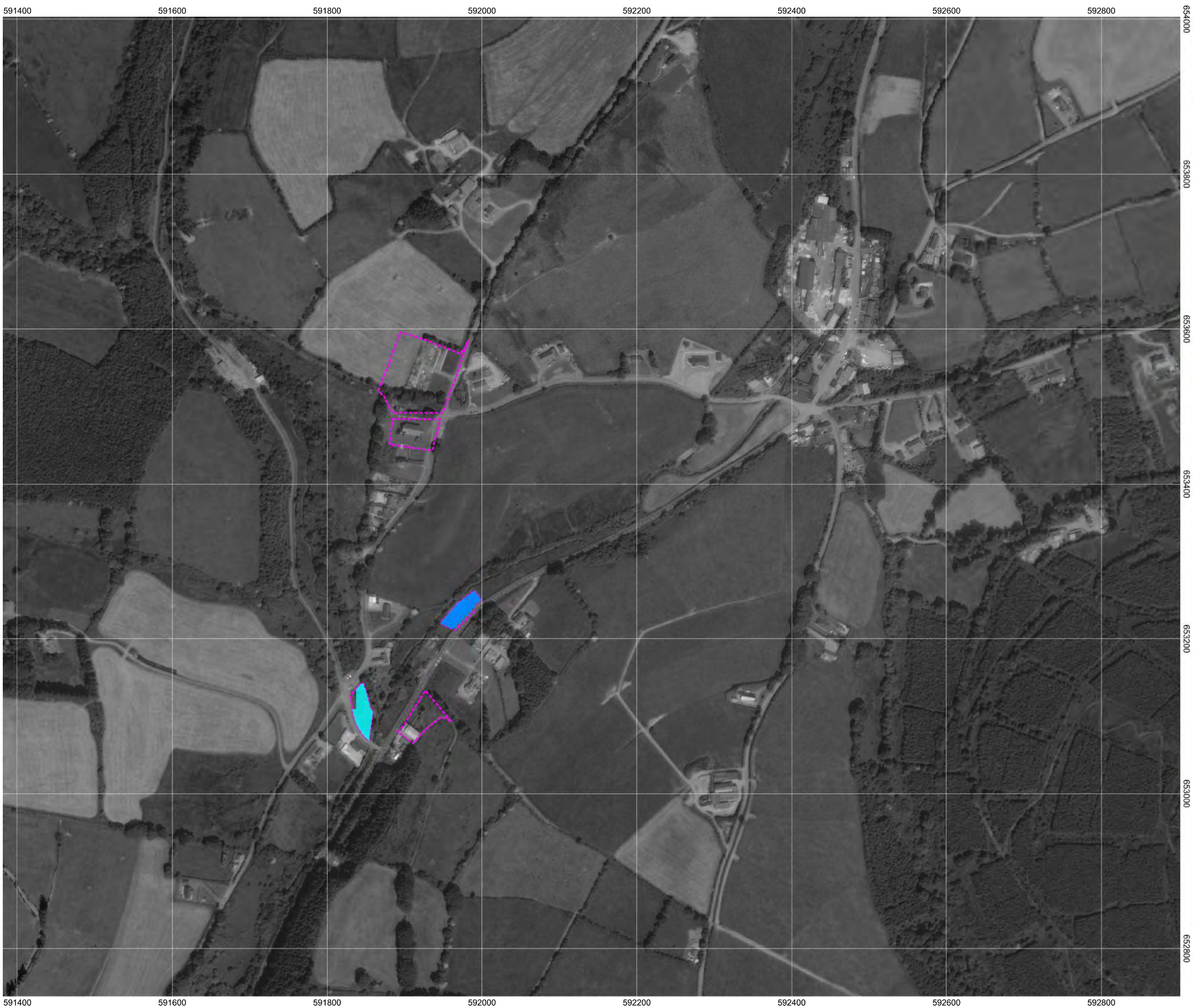
Tipperary Development Plan 2022-2028

Hollyford Service Centre Indicative Flood Zones



Plan Boundary

River or Stream

Land Use Zoning

S5 - Social & Public

Indicative Flood Zones

Flood Zone A

Flood Zone B

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Tipperary Development Plan 2022-2028

Lisvarrinane
Local Service Centre
Historic Flood Indicators

River or Stream

Land Use Zoning

S5 - Social & Public

OPW Past Flood Events

Single Flood Event

Recurring Flood Event

OPW Past Flood Extent & Winter 2015-2016 Surface Water Flooding

GSI Maximum Historic Groundwater Flooding

Groundwater

Groundwater/Surface water

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Lisvarrinane Local Service Centre OPW & GSI Predictive Modelling - Present Day

River or Stream

Land Use Zoning

S5 - Social & Public

OPW Predicitive Modelling

Preliminary Flood Risk Assessment (PFRA)

Fluvial 1% AEP

Fluvial 0.1% AEP

Catchment Flood Risk Assessment & Management (CFRAM) Present Day Scenario

Fluvial 10% AEP

Fluvial 1% AEP

Fluvial 0.1% AEP

National Indicative Fluvial Mapping (NIFM) Present Day Scenario

Fluvial 5% AEP

Fluvial 1% AEP

Fluvial 0.1% AEP

GSI Predictive Modelling

Groundwater Flooding

High Probability

Medium Probability

Low Probability

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Tipperary Development Plan 2022-2028

Lisvarrinane Local Service Centre OPW Predictive Modelling - Mid-Range Future Scenario

River or Stream

Land Use Zoning
S5 - Social & Public

OPW Predicitive Modelling

Catchment Flood Risk Assessment & Management (CFRAM) Mid-Range Future Scenario
Fluvial 10% AEP
Fluvial 1% AEP
Fluvial 0.1% AEP

National Indicative Fluvial Mapping (NIFM) Mid-Range Future Scenario
Fluvial 5% AEP
Fluvial 1% AEP
Fluvial 0.1% AEP

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Lisvarrinane Local Service Centre OPW Predictive Modelling - High-End Future Scenario

River or Stream

Land Use Zoning
S5 - Social & Public

OPW Predicitive Modelling

Catchment Flood Risk Assessment & Management (CFRAM) High-End Future Scenario
Fluvial 10% AEP
Fluvial 1% AEP
Fluvial 0.1% AEP

National Indicative Fluvial Mapping (NIFM) High-End Future Scenario
Fluvial 5% AEP
Fluvial 1% AEP
Fluvial 0.1% AEP

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Lisvarrinane
Local Service Centre
Indicative Flood Zones

Plan Boundary

River or Stream

Land Use Zoning

S5 - Social & Public

Indicative Flood Zones

Flood Zone A

Flood Zone B

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Littleton Service Centre Historic Flood Indicators

River or Stream

Land Use Zoning

S5 - Social & Public

OPW Past Flood Events

Single Flood Event

Recurring Flood Event

OPW Past Flood Extent & Winter 2015-2016 Surface Water Flooding

GSI Maximum Historic Groundwater Flooding

Groundwater

Groundwater/Surface water

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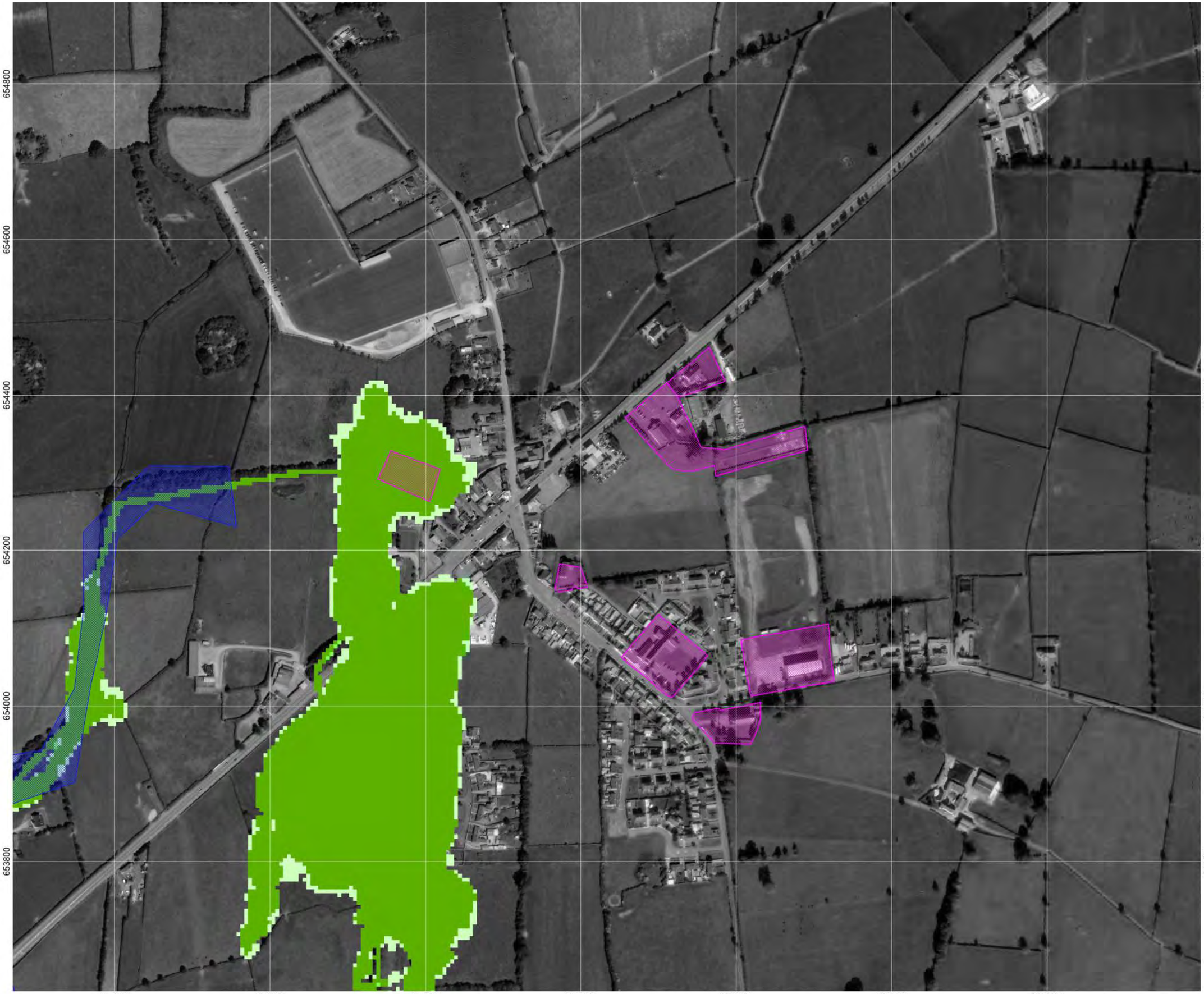

Tipperary Development Plan 2022-2028

Littleton
Service Centre
OPW & GSI Predictive Modelling - Present Day

River or Stream

Land Use Zoning
S5 - Social & Public

OPW Predicitive Modelling

Preliminary Flood Risk Assessment (PFRA)
Fluvial 1% AEP
Fluvial 0.1% AEP

Catchment Flood Risk Assessment & Management (CFRAM) Present Day Scenario
Fluvial 10% AEP
Fluvial 1% AEP
Fluvial 0.1% AEP

National Indicative Fluvial Mapping (NIFM) Present Day Scenario
Fluvial 5% AEP
Fluvial 1% AEP
Fluvial 0.1% AEP

GSI Predictive Modelling

Groundwater Flooding
High Probability
Medium Probability
Low Probability

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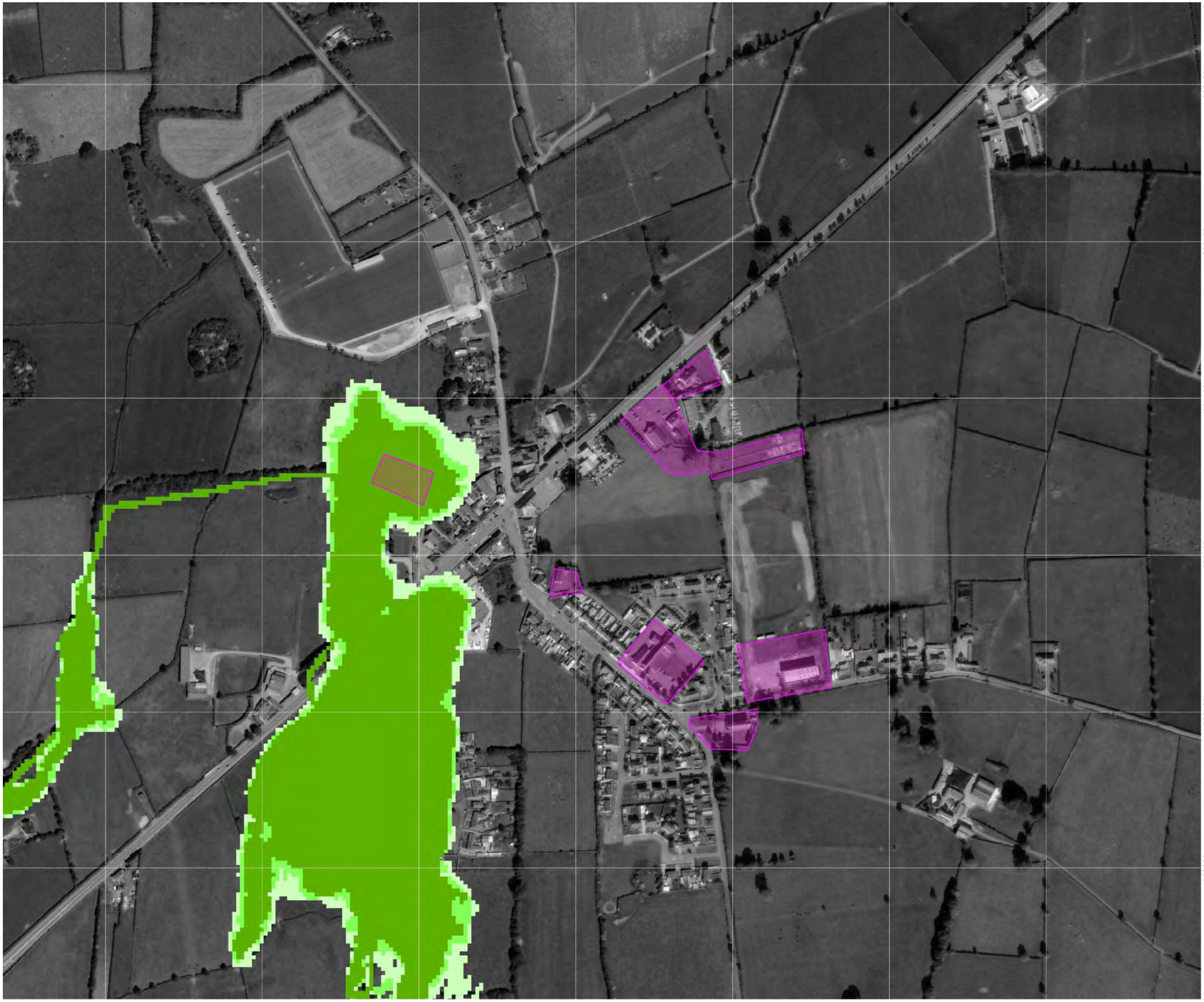

Tipperary Development Plan 2022-2028

Littleton Service Centre OPW Predictive Modelling - Mid-Range Future Scenario

River or Stream

Land Use Zoning
S5 - Social & Public

OPW Predicitive Modelling

Catchment Flood Risk Assessment & Management (CFRAM) Mid-Range Future Scenario
- Fluvial 10% AEP
- Fluvial 1% AEP
- Fluvial 0.1% AEP

National Indicative Fluvial Mapping (NIFM) Mid-Range Future Scenario
- Fluvial 5% AEP
- Fluvial 1% AEP
- Fluvial 0.1% AEP

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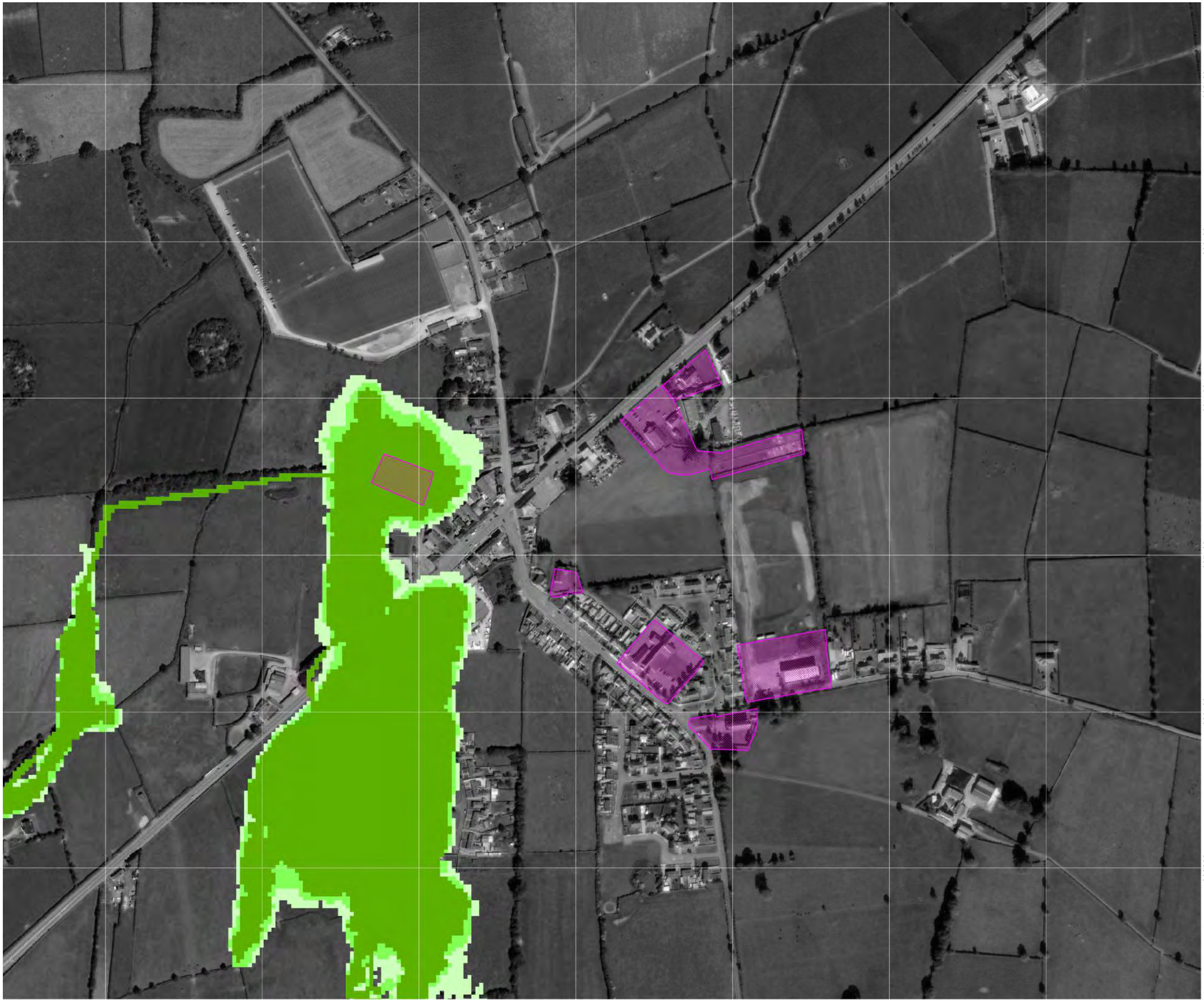

Tipperary Development Plan 2022-2028

Littleton Service Centre OPW Predictive Modelling - High-End Future Scenario

River or Stream

Land Use Zoning
S5 - Social & Public

OPW Predicitive Modelling

Catchment Flood Risk Assessment & Management (CFRAM) High-End Future Scenario
Fluvial 10% AEP
Fluvial 1% AEP
Fluvial 0.1% AEP

National Indicative Fluvial Mapping (NIFM) High-End Future Scenario
Fluvial 5% AEP
Fluvial 1% AEP
Fluvial 0.1% AEP

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Tipperary Development Plan 2022-2028

Littleton Service Centre Indicative Flood Zones

Plan Boundary

River or Stream

Land Use Zoning

S5 - Social & Public

Indicative Flood Zones

Flood Zone A

Flood Zone B

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Tipperary Development Plan 2022-2028

Lorrha
Local Service Centre
Historic Flood Indicators

River or Stream

Land Use Zoning

S5 - Social & Public

OPW Past Flood Events

Single Flood Event

Recurring Flood Event

OPW Past Flood Extent & Winter 2015-2016 Surface Water Flooding

GSI Maximum Historic Groundwater Flooding

Groundwater

Groundwater/Surface water

Comhairle Contae Thiobraid Árann
Tipperary County Council

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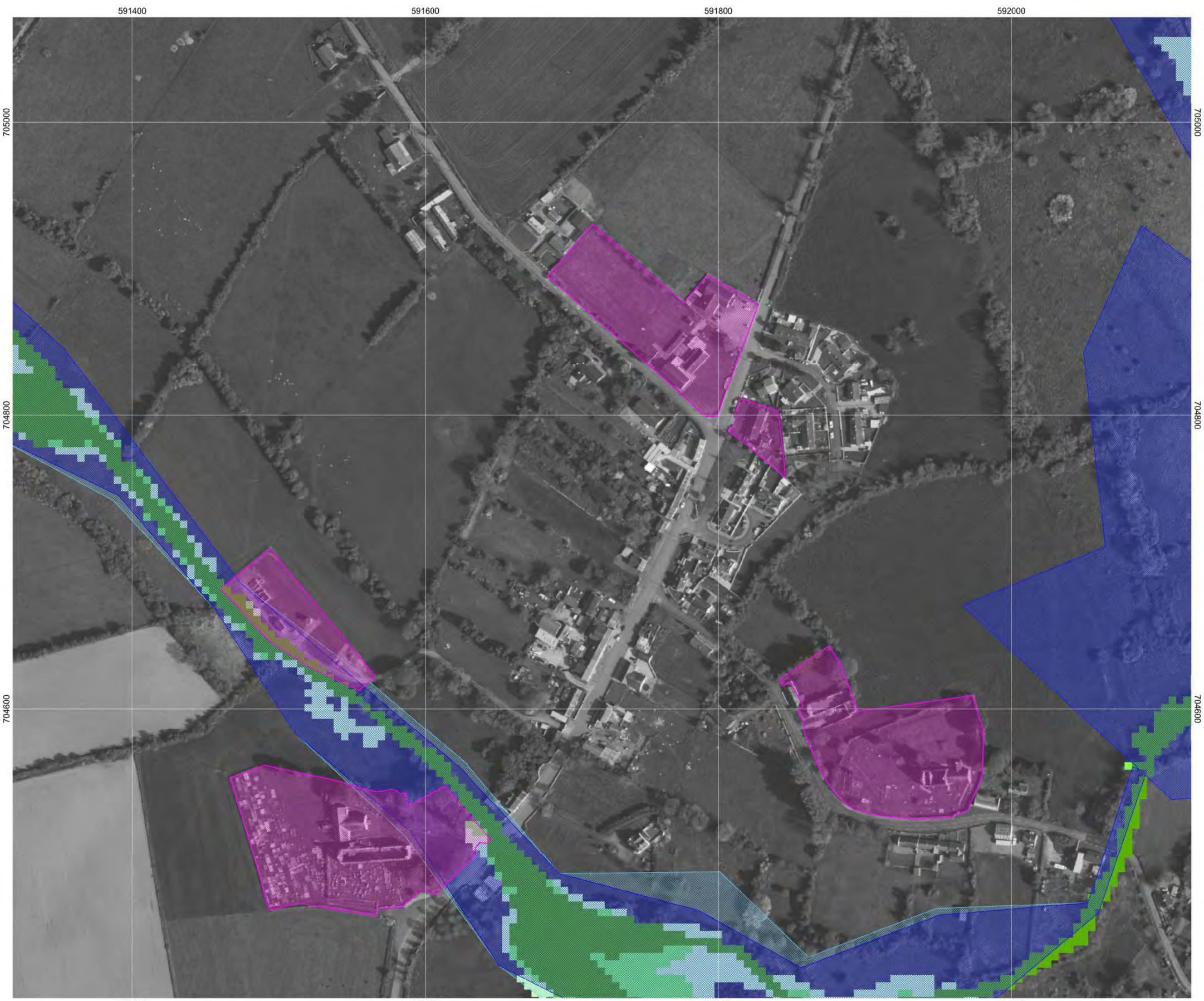

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Lorrha
Local Service Centre
OPW & GSI Predictive Modelling - Present Day

River or Stream

Land Use Zoning
S5 - Social & Public

OPW Predicitive Modelling

Preliminary Flood Risk Assessment (PFRA)
Fluvial 1% AEP
Fluvial 0.1% AEP

Catchment Flood Risk Assessment & Management (CFRAM) Present Day Scenario
Fluvial 10% AEP
Fluvial 1% AEP
Fluvial 0.1% AEP

National Indicative Fluvial Mapping (NIFM) Present Day Scenario
Fluvial 5% AEP
Fluvial 1% AEP
Fluvial 0.1% AEP

GSI Predictive Modelling

Groundwater Flooding
High Probability
Medium Probability
Low Probability

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Tipperary Development Plan 2022-2028

Lorrha
Local Service Centre
OPW Predictive Modelling - Mid-Range Future Scenario

River or Stream

Land Use Zoning
S5 - Social & Public

OPW Predicitive Modelling

Catchment Flood Risk Assessment & Management (CFRAM) Mid-Range Future Scenario
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Tipperary Development Plan 2022-2028

Lorrha
Local Service Centre
OPW Predictive Modelling - High-End Future Scenario

River or Stream

Land Use Zoning
S5 - Social & Public

OPW Predicitive Modelling

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Tipperary Development Plan 2022-2028

Lorrha
Local Service Centre
Indicative Flood Zones

Plan Boundary

River or Stream

Land Use Zoning

S5 - Social & Public

Indicative Flood Zones

Flood Zone A

Flood Zone B

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Tipperary Development Plan 2022-2028

Newcastle Service Centre Historic Flood Indicators

River or Stream

Land Use Zoning

S5 - Social & Public

OPW Past Flood Events

Single Flood Event

Recurring Flood Event

OPW Past Flood Extent & Winter 2015-2016 Surface Water Flooding

GSI Maximum Historic Groundwater Flooding

Groundwater

Groundwater/Surface water

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Tipperary Development Plan 2022-2028

Newcastle
Service Centre
OPW & GSI Predictive Modelling - Present Day

River or Stream

Land Use Zoning
S5 - Social & Public

OPW Predicitive Modelling

Preliminary Flood Risk Assessment (PFRA)
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Fluvial 0.1% AEP

Catchment Flood Risk Assessment & Management (CFRAM) Present Day Scenario
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Fluvial 0.1% AEP

National Indicative Fluvial Mapping (NIFM) Present Day Scenario
Fluvial 5% AEP
Fluvial 1% AEP
Fluvial 0.1% AEP

GSI Predictive Modelling

Groundwater Flooding
High Probability
Medium Probability
Low Probability

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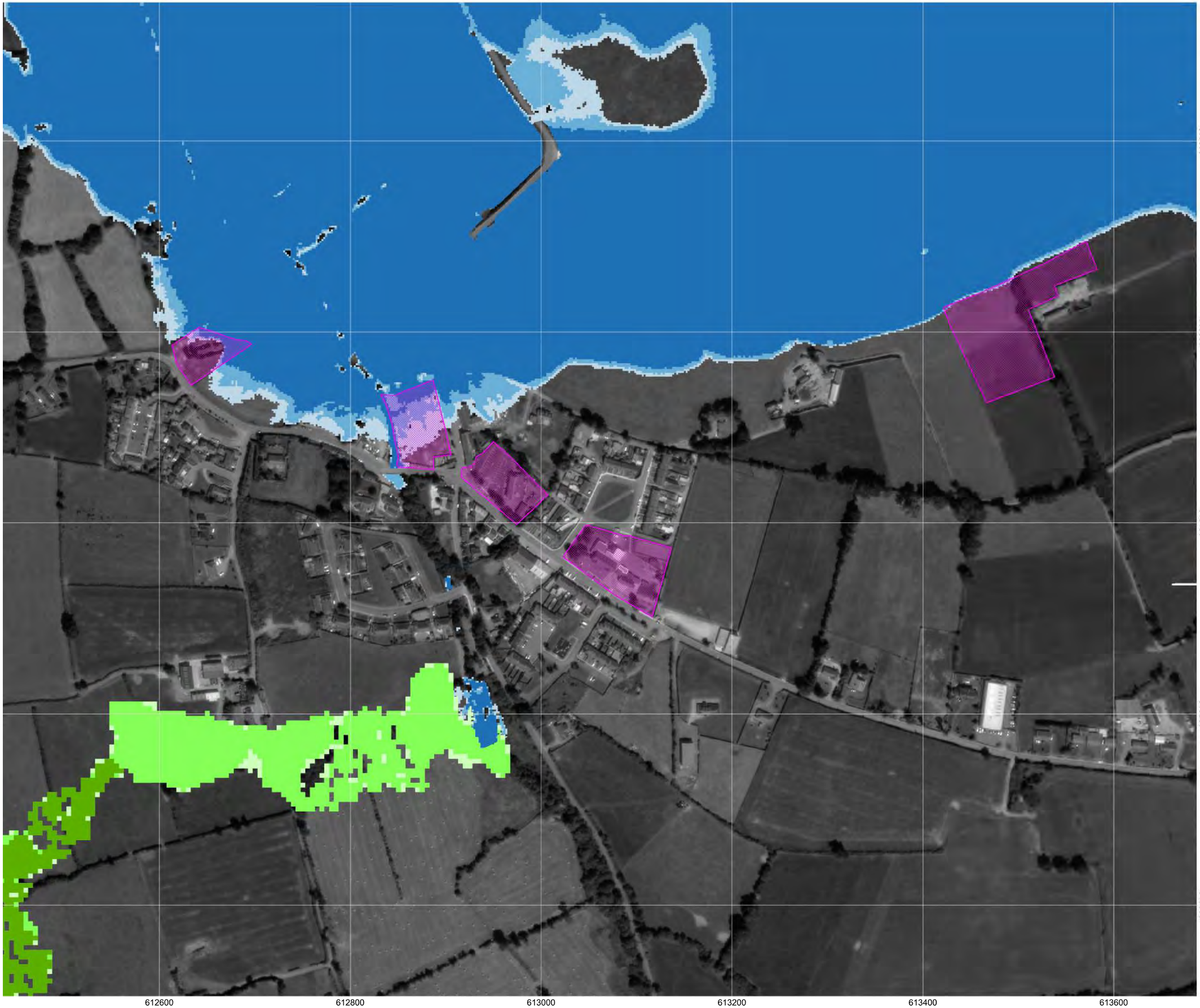

Tipperary Development Plan 2022-2028

Newcastle
Service Centre
OPW Predictive Modelling - Mid-Range Future Scenario

River or Stream

Land Use Zoning
S5 - Social & Public

OPW Predicitive Modelling

Catchment Flood Risk Assessment & Management (CFRAM) Mid-Range Future Scenario
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National Indicative Fluvial Mapping (NIFM) Mid-Range Future Scenario
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Fluvial 0.1% AEP

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Newcastle Service Centre OPW Predictive Modelling - High-End Future Scenario

River or Stream

Land Use Zoning
S5 - Social & Public

OPW Predicitive Modelling

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Fluvial 0.1% AEP

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Fluvial 1% AEP
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Newcastle Service Centre Indicative Flood Zones

Plan Boundary

River or Stream

Land Use Zoning

S5 - Social & Public

Indicative Flood Zones

Flood Zone A

Flood Zone B

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