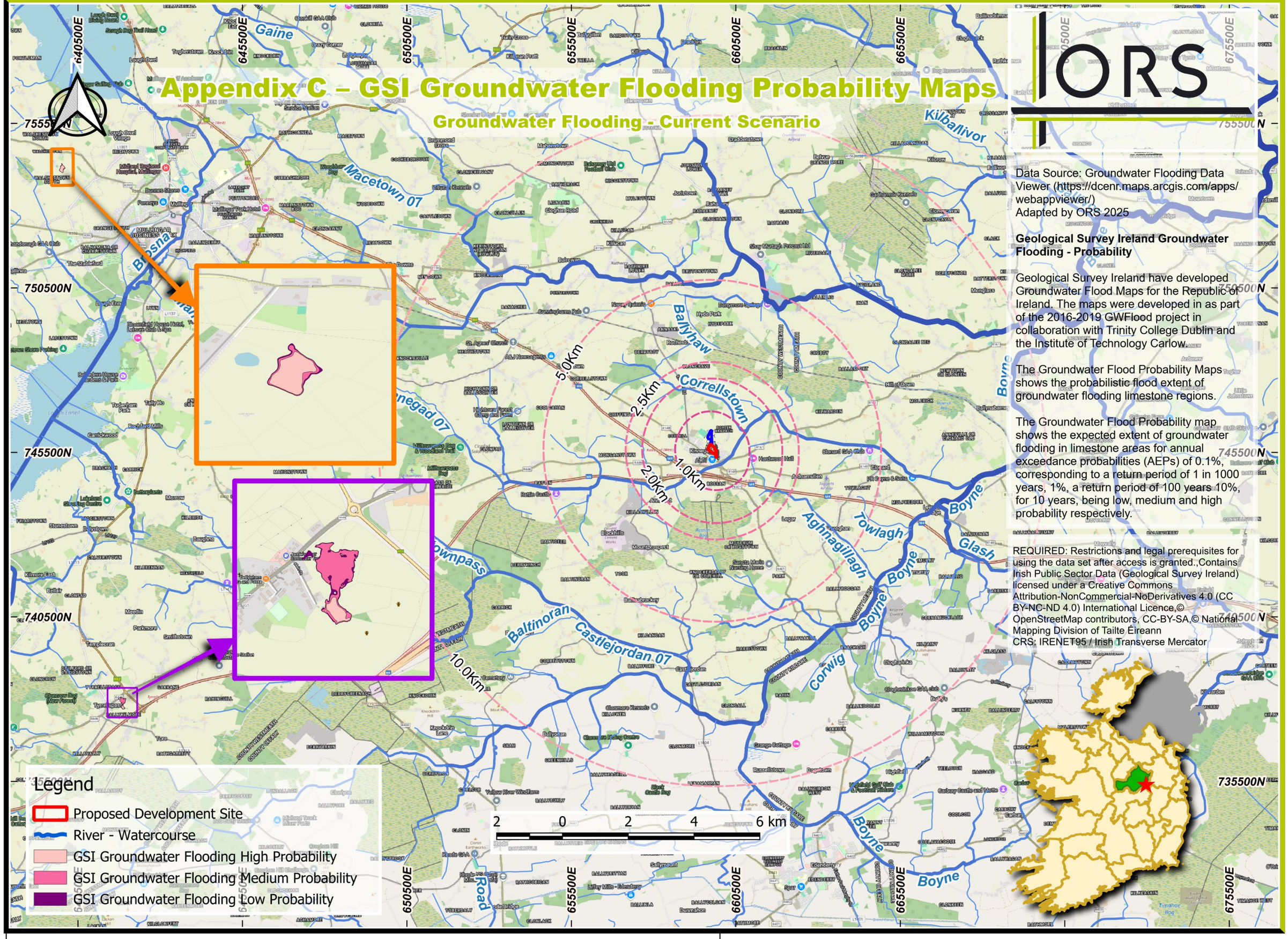
Appendix C – GSI Groundwater Flooding Probability Maps

Appendix C – GSI Groundwater Flooding Probability Maps

Groundwater Flooding - Current Scenario



ORS

Data Source: Groundwater Flooding Data Viewer (https://dcenr.maps.arcgis.com/apps/webappviewer/)
Adapted by ORS 2025

Geological Survey Ireland Groundwater Flooding - Probability

Geological Survey Ireland have developed Groundwater Flood Maps for the Republic of Ireland. The maps were developed in as part of the 2016-2019 GWFlood project in collaboration with Trinity College Dublin and the Institute of Technology Carlow.

The Groundwater Flood Probability Maps shows the probabilistic flood extent of groundwater flooding limestone regions.

The Groundwater Flood Probability map shows the expected extent of groundwater flooding in limestone areas for annual exceedance probabilities (AEPs) of 0.1%, corresponding to a return period of 1 in 1000 years, 1%, a return period of 100 years 10%, for 10 years, being low, medium and high probability respectively.

CRS: IRENET95 / Irish Transverse Mercator

Appendix D – National Indicative Fluvial Mapping

Appendix D - National Indicative Fluvial Mapping

Present Scenario

N

747000N
746500N
746000N
745500N
745000N
744500N

658500E
659000E
659500E
660000E
660500E
661000E

1.0Km
500m
400m
300m
200m
100m

Development Site

Correlstown
Kinnegad 07
Aghnagillagh

WESTMEATH
An Iarmhí

200 0 200 400 600 m

ORS

Legend

- Proposed Development Site
- River - Watercourse

National Indicative Fluvial Mapping
Present Day - River

- High Probability
- Medium Probability
- Low Probability

Data Source: Flood Maps (https://www.floodinfo.ie/map/floodmaps/) Adapted by ORS 2025

National Indicative Fluvial Mapping (NIFM)
River Flood Extents - Present Day

This data shows areas that might be flooded by rivers during a theoretical flood event, based on estimated probabilities rather than actual past floods. The flood event probabilities are labeled as Annual Exceedance Probability (AEP), indicating the chance of a flood of that severity happening in any year. They can also be shown as odds (like 100 to 1) or as return periods (like the 100-year flood).

For example, a 5% AEP corresponds to a 20 Year Return Period or 20:1 odds. A 1% AEP indicates a 100 Year Return Period or 100:1 odds, while a 0. 1% AEP indicates a 1000 Year Return Period or 1000:1 odds.

The Present Day Scenario uses historic flood data, not considering climate change impacts, which have been separately assessed. Other flooding sources are not mapped and areas not shown could still be at risk. The Flood Maps do not identify specific properties at risk or serve as replacements for detailed flood assessments.

CRS: IRENET95 / Irish Transverse Mercator

Appendix D - National Indicative Fluvial Mapping

Mid-Range Future Scenario

ORS

Legend

- Proposed Development Site
- River - Watercourse

National Indicative Fluvial Mapping
Medium Term - River

- High Probability
- Medium Probability
- Low Probability

Data Source: Flood Maps (https://www.floodinfo.ie/map/floodmaps/) Adapted by ORS 2025

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

This data shows areas that might be flooded by rivers during a theoretical flood event, based on estimated probabilities rather than actual past floods. The flood event probabilities are labeled as Annual Exceedance Probability (AEP), indicating the chance of a flood of that severity happening in any year. They can also be shown as odds (like 100 to 1) or as return periods (like the 100-year flood).

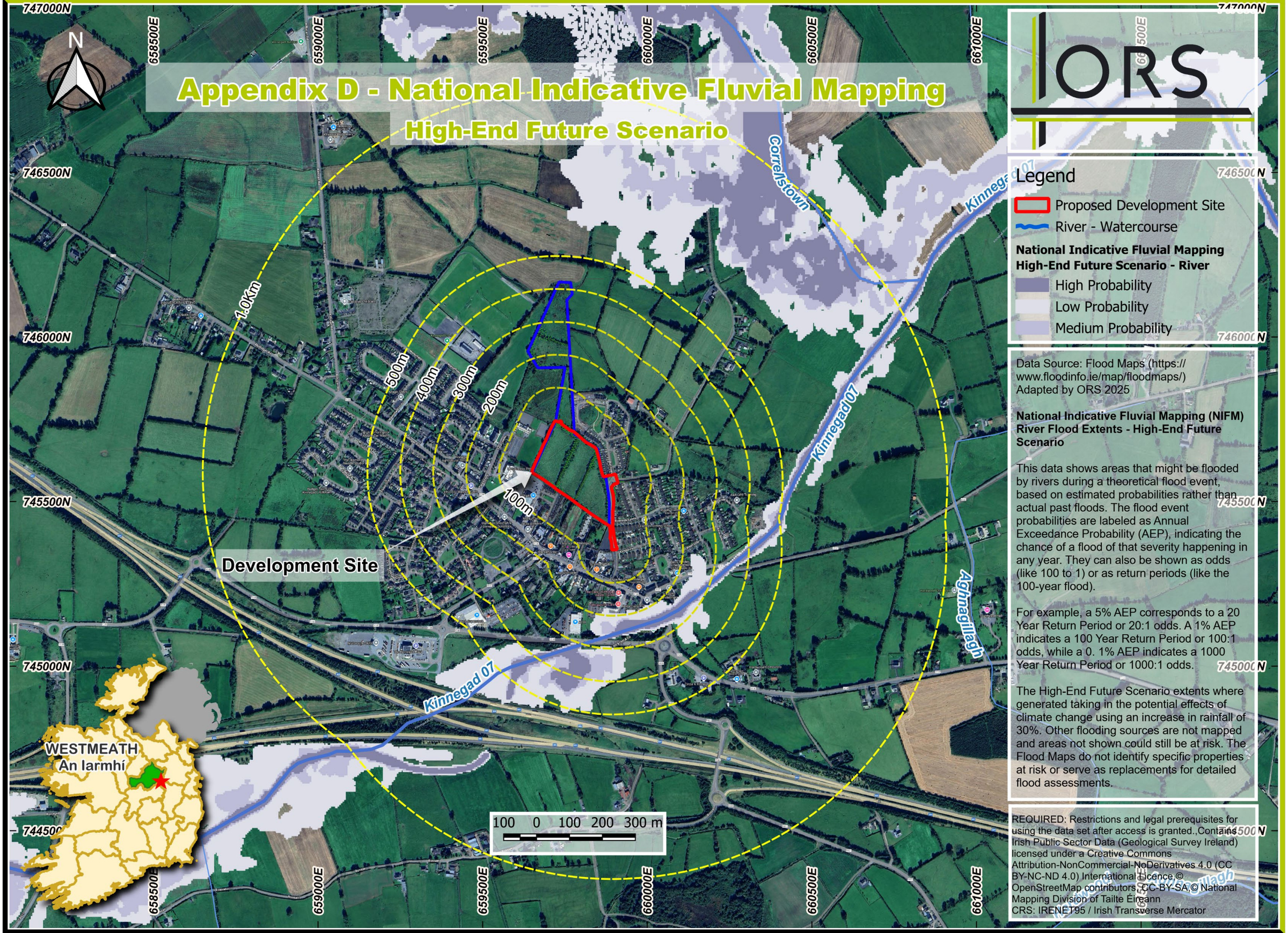
For example, a 5% AEP corresponds to a 20 Year Return Period or 20:1 odds. A 1% AEP indicates a 100 Year Return Period or 100:1 odds, while a 0. 1% AEP indicates a 1000 Year Return Period or 1000:1 odds.

The Mid-Range Future Scenario extents where generated taking in the potential effects of climate change using an increase in rainfall of 20%. Other flooding sources are not mapped and areas not shown could still be at risk. The Flood Maps do not identify specific properties at risk or serve as replacements for detailed flood assessments.

CRS: IRENET95 / Irish Transverse Mercator

Appendix D - National Indicative Fluvial Mapping

High-End Future Scenario



ORS

Legend

- Proposed Development Site
- River - Watercourse

National Indicative Fluvial Mapping
High-End Future Scenario - River

- High Probability
- Low Probability
- Medium Probability

Data Source: Flood Maps (https://www.floodinfo.ie/map/floodmaps/)
Adapted by ORS 2025

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

This data shows areas that might be flooded by rivers during a theoretical flood event, based on estimated probabilities rather than actual past floods. The flood event probabilities are labeled as Annual Exceedance Probability (AEP), indicating the chance of a flood of that severity happening in any year. They can also be shown as odds (like 100 to 1) or as return periods (like the 100-year flood).

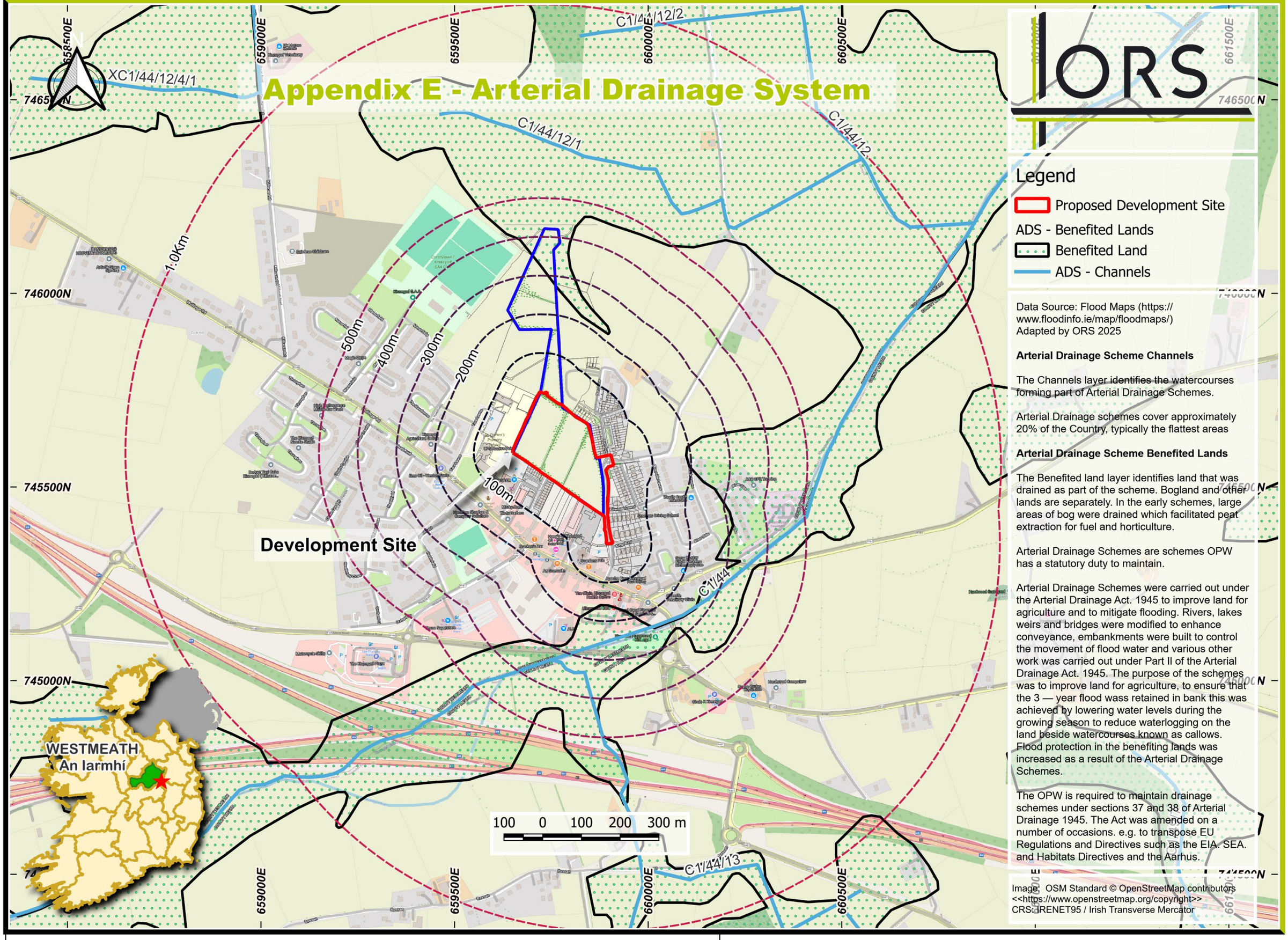
For example, a 5% AEP corresponds to a 20 Year Return Period or 20:1 odds. A 1% AEP indicates a 100 Year Return Period or 100:1 odds, while a 0. 1% AEP indicates a 1000 Year Return Period or 1000:1 odds.

The High-End Future Scenario extents where generated taking in the potential effects of climate change using an increase in rainfall of 30%. Other flooding sources are not mapped and areas not shown could still be at risk. The Flood Maps do not identify specific properties at risk or serve as replacements for detailed flood assessments.

CRS: IRENET95 / Irish Transverse Mercator

Appendix E – Arterial Drainage Map

Appendix E - Arterial Drainage System



Legend

- Proposed Development Site
- ADS - Benefited Lands
- Benefited Land
- ADS - Channels

Data Source: Flood Maps (https://www.floodinfo.ie/map/floodmaps/) Adapted by ORS 2025

Arterial Drainage Scheme Channels

The Channels layer identifies the watercourses forming part of Arterial Drainage Schemes.

Arterial Drainage schemes cover approximately 20% of the Country, typically the flattest areas

Arterial Drainage Scheme Benefited Lands

The Benefited land layer identifies land that was drained as part of the scheme. Bogland and other lands are separately. In the early schemes, large areas of bog were drained which facilitated peat extraction for fuel and horticulture.

Arterial Drainage Schemes are schemes OPW has a statutory duty to maintain.

Arterial Drainage Schemes were carried out under the Arterial Drainage Act. 1945 to improve land for agriculture and to mitigate flooding. Rivers, lakes weirs and bridges were modified to enhance conveyance, embankments were built to control the movement of flood water and various other work was carried out under Part II of the Arterial Drainage Act. 1945. The purpose of the schemes was to improve land for agriculture, to ensure that the 3 — year flood wass retained in bank this was achieved by lowering water levels during the growing season to reduce waterlogging on the land beside watercourses known as callows. Flood protection in the benefiting lands was increased as a result of the Arterial Drainage Schemes.

The OPW is required to maintain drainage schemes under sections 37 and 38 of Arterial Drainage 1945. The Act was amended on a number of occasions. e.g. to transpose EU Regulations and Directives such as the EIA. SEA. and Habitats Directives and the Aarhus.

CRS: IRENET95 / Irish Transverse Mercator

Appendix F – Westmeath County Development Plan Maps

Kinnegad Zoning Map

N

Proposed Development Site

KEY

Settlement Boundary

Land Use Zoning

- Commercial
- Consolidation Site
- Enterprise & Employment
- Established Residential
- Expanded Settlement Centre
- Community, Education & Institutional
- Mixed Use
- Open Space
- Proposed Residential
- Sporting Recreational

Kinnegad WWTP

Kinnegad Bridge

M6-M6 Junction 11-1

0 95 190 380 Meters

Westmeath County Development Plan 2021 - 2027

MAP - 08

Kinnegad Flood Risk Map

N

Proposed Development Site

Kinnegad WWTP

Kinnegad Bridge

M4-M6 Junction 11-1

0 95 190 380 Meters

KEY

- Settlement Boundary
- Benefitting Lands
- CFRAM Flood Zone A
- CFRAM Flood Zone B
- PFRA 1% AEP Fluvial
- PFRA 0.1% AEP Fluvial
- PFRA Pluvial Extreme
- PFRA Pluvial Indicative

Land Use Zoning

- Commercial
- Consolidation Site
- Enterprise & Employment
- Established Residential
- Expanded Settlement Centre
- Community, Education & Institutional
- Mixed Use
- Open Space
- Proposed Residential
- Sporting Recreational

Westmeath County Development Plan 2021 - 2027

WESTMEATH COUNTY COUNCIL

MAP - 09

Kinnegad Objective Map

N

CPO 8.109

CPO 8.101

CPO 8.102

Proposed Development Site

CPO 8.108

CPO 8.110

CPO 8.118

CPO 8.119

CPO 8.120

CPO 8.100

CPO 8.115

CPO 8.90

CPO 8.122

Kinnegad WWTP

Kinnegad Bridge

Clonard River

Kinnegad River

M6-M6 Junction 11-1

0 100 200 400 Meters

KEY

- Protected Structure
- National Monuments
- Opportunity Sites
- Settlement Boundary
- County Policy Objectives
- Site Specific Flood Risk Objectives

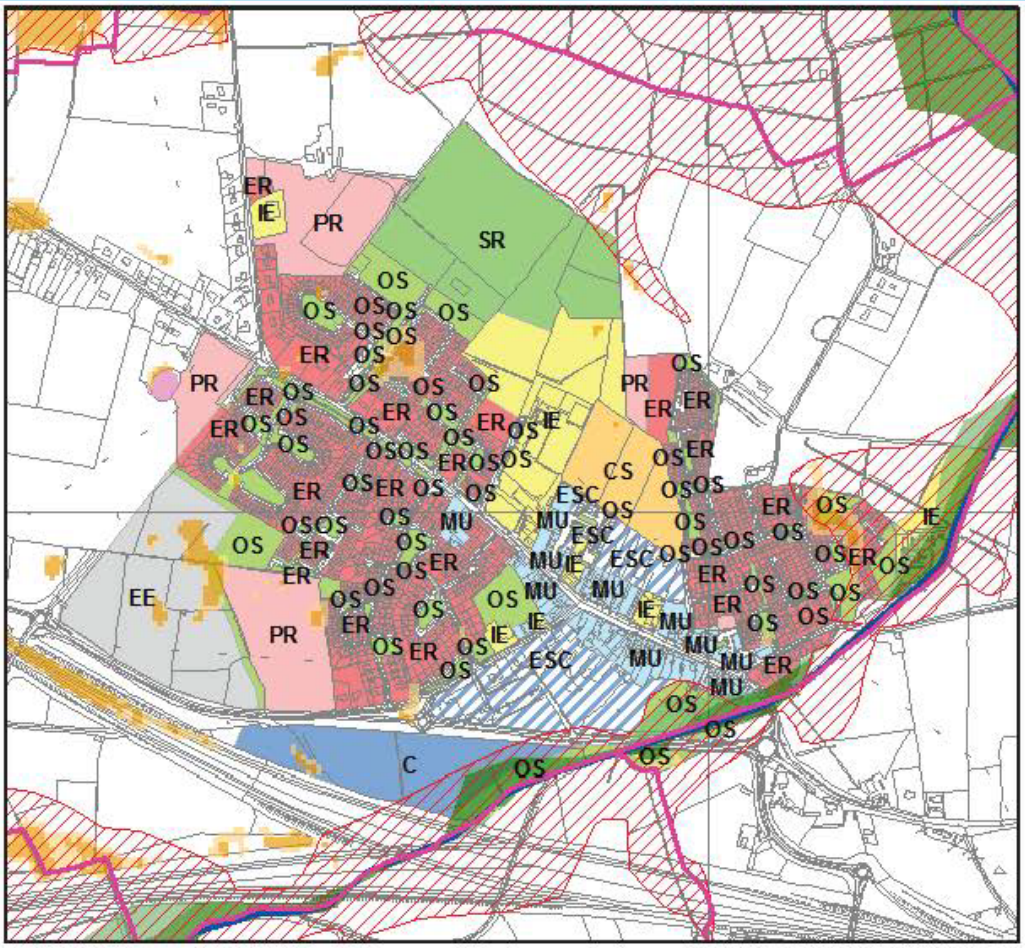
Westmeath County Development Plan 2021 - 2027

MAP - 10

Appendix G – Strategic Flood Risk Assessment WMCDP Maps

8.13 Kinnegad

Hierarchy/Tier	Self-Sustaining Growth Towns Tier 3
Area for Further Assessment under CFRAM programme?	No



The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity. Areas that benefit from defences are annotated separately.

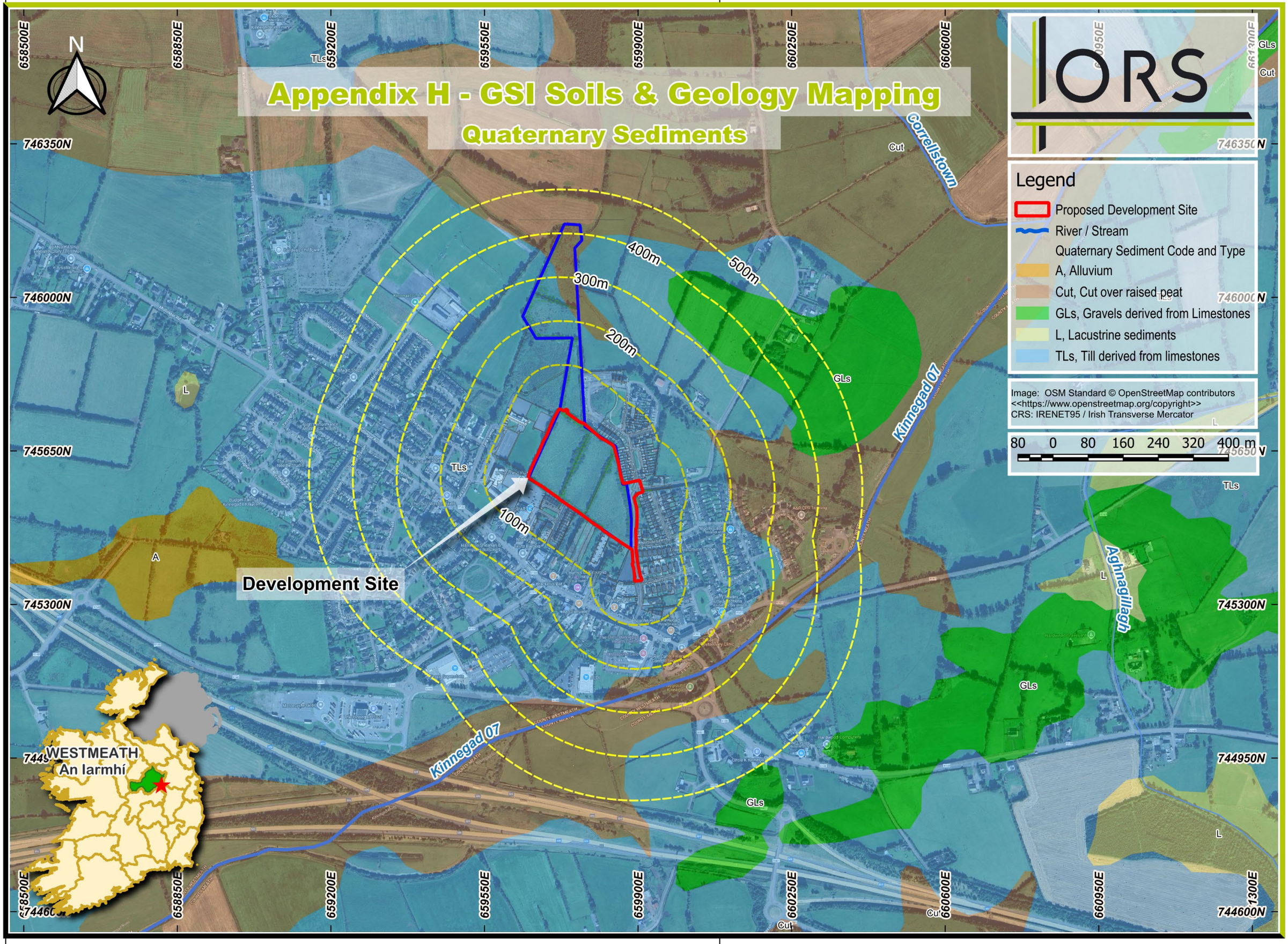
Flood Data	OPW PFRA PLUVIAL & FLUVIAL (best available dataset) BENEFITTING LANDS
Historic Flooding	None recorded
Comment	The principal risk to Kinnegad is from the Kinnegad River, however this is subject to an OPW Arterial Drainage scheme and the channel here is widened and deepened. It is highly likely that the actual flood extents are much less conservative than the Benefitting Lands and to some extent the PFRA extents as well. The undeveloped commercial land north of the Kinnegad River is at potential risk of flooding, as mapped by the PFRA flood extents. Based on the completion of a site based assessment it is highly likely that the actual flood extents are much less conservative than existing mapped flood risk. In other areas, there is minor overlap with existing developed land only and there is no significant undeveloped lands at potential risk. New Proposed Residential zoning next to the disused quarry lake to the north west of the town is not a significant risk to the site, but an appropriately detailed FRA should be submitted at development management stage to screen risk further. A more detailed assessment of flood risk from the Kinnegad River would potentially be able to reduce the Flood Zone extent and release further land zoned OS for future zoning and development.
Climate Change	Sensitivity to pluvial flood events. Moderate to low sensitivity to fluvial events.
Conclusion	The Justification Test has been applied to the undeveloped commercial lands and this is presented in Section 9, a Stage 3 detailed FRA must be undertaken at Development

	Management stage to confirm the extent of Flood Zones A and B. Any proposed development within the site should then apply the Sequential Approach, preferentially avoiding any less vulnerable development within Flood Zone A and setting appropriate development levels within Flood Zone C after having assessed the future impacts of climate change as part of a residual risk analysis. IE lands to the north of the Kinnegad River will also require a detailed FRA but since the land use is of a lower vulnerability the Justification Test does not apply. Any proposed development within the site should then apply the Sequential Approach, preferentially avoiding any less vulnerable development within Flood Zone A and setting appropriate development levels within Flood Zone C. Any FRA should be in accordance with approved WMCDP Policy and the guidance provided within the SFRA section on Development Management & Flood Risk.

Appendix H – GSI Soils & Geology Mapping

Appendix H - GSI Soils & Geology Mapping

Quaternary Sediments



Appendix H - GSI Soils & Geology Mapping

Subsoils

Limestone Till
Category = Till type
Class = Tills (diamictons)
Description = Limestone till (Carboniferous). The subsoil is a till type. Till is sediment deposited by or from glacier ice.

Cut/Peat
Category = Peat type
Class = Tills (diamictons)
Description = Cutover peat. The subsoils are peat.

Man Made

Development Site

500m
400m
300m
200m
100m

Legend
- Proposed Development Site
- River / Stream

Image: Map Data, ©2015 Google
REQUIRED: Restrictions and legal prerequisites for using the data set after access is granted.
CRS: IRENET95 / Irish Transverse Mercator

80 0 80 160 240 320 400 m

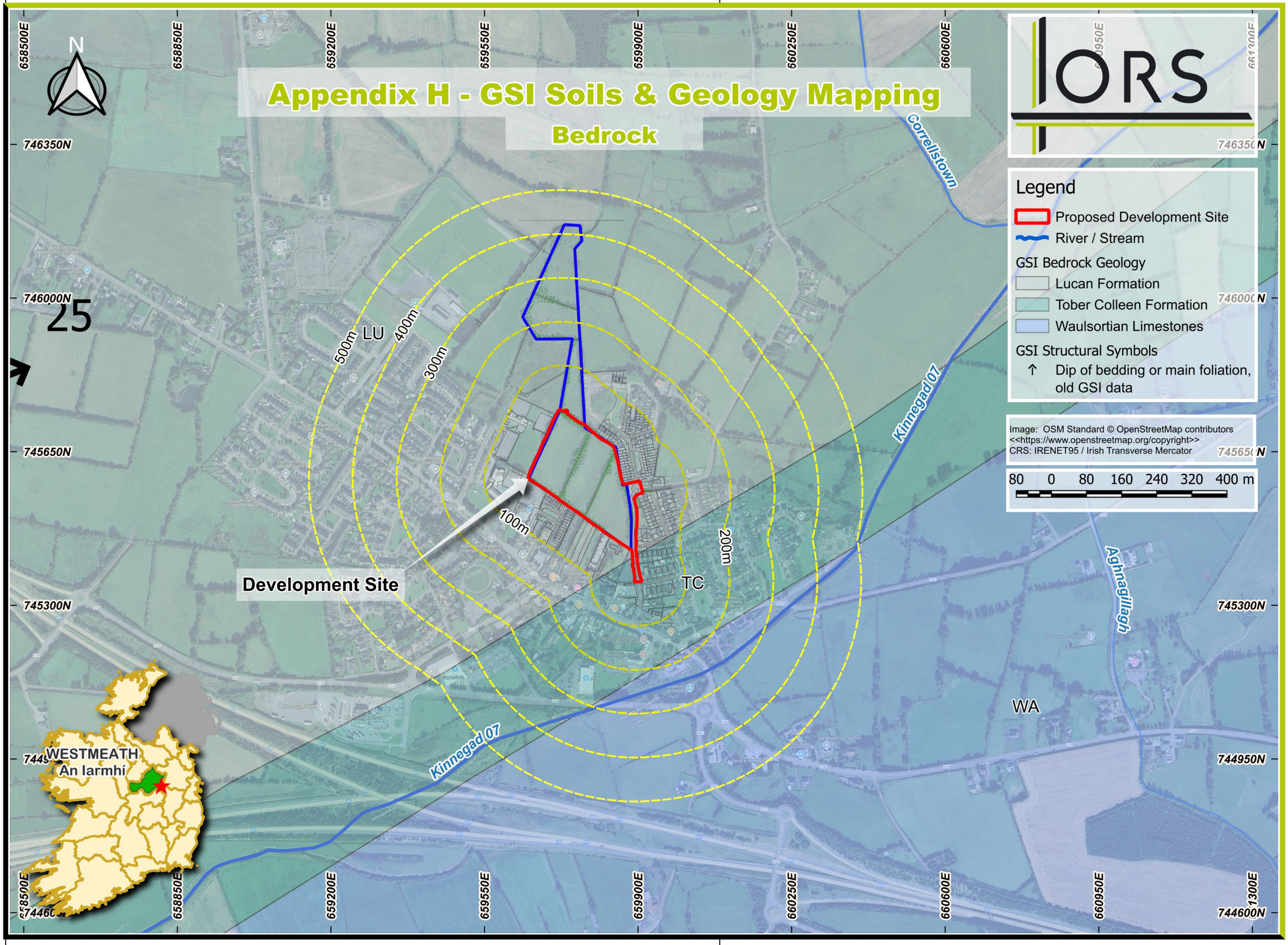
WESTMEATH
An Iarmhí

Kinnegad 07
Correllstown
Aghnagillagh

658500E 658850E 659200E 659550E 659900E 660250E 660600E 660950E
746350N 746000N 745650N 745300N 744950N 744600N

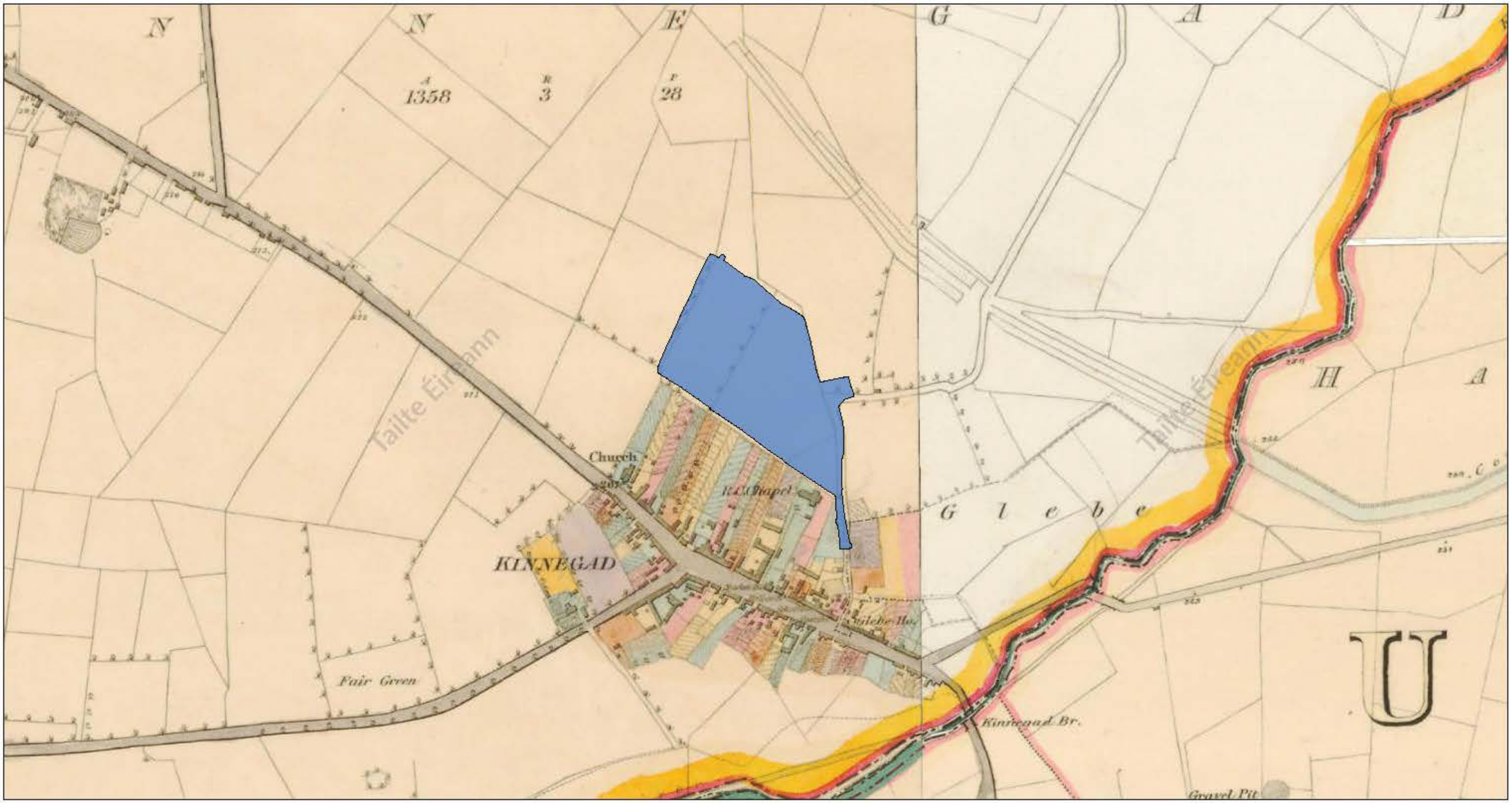
Appendix H - GSI Soils & Geology Mapping

Bedrock



Appendix I – Historic Maps

GeoHive Map - MapGenie 6 Inches First Edition



19/03/2025, 21:07:25

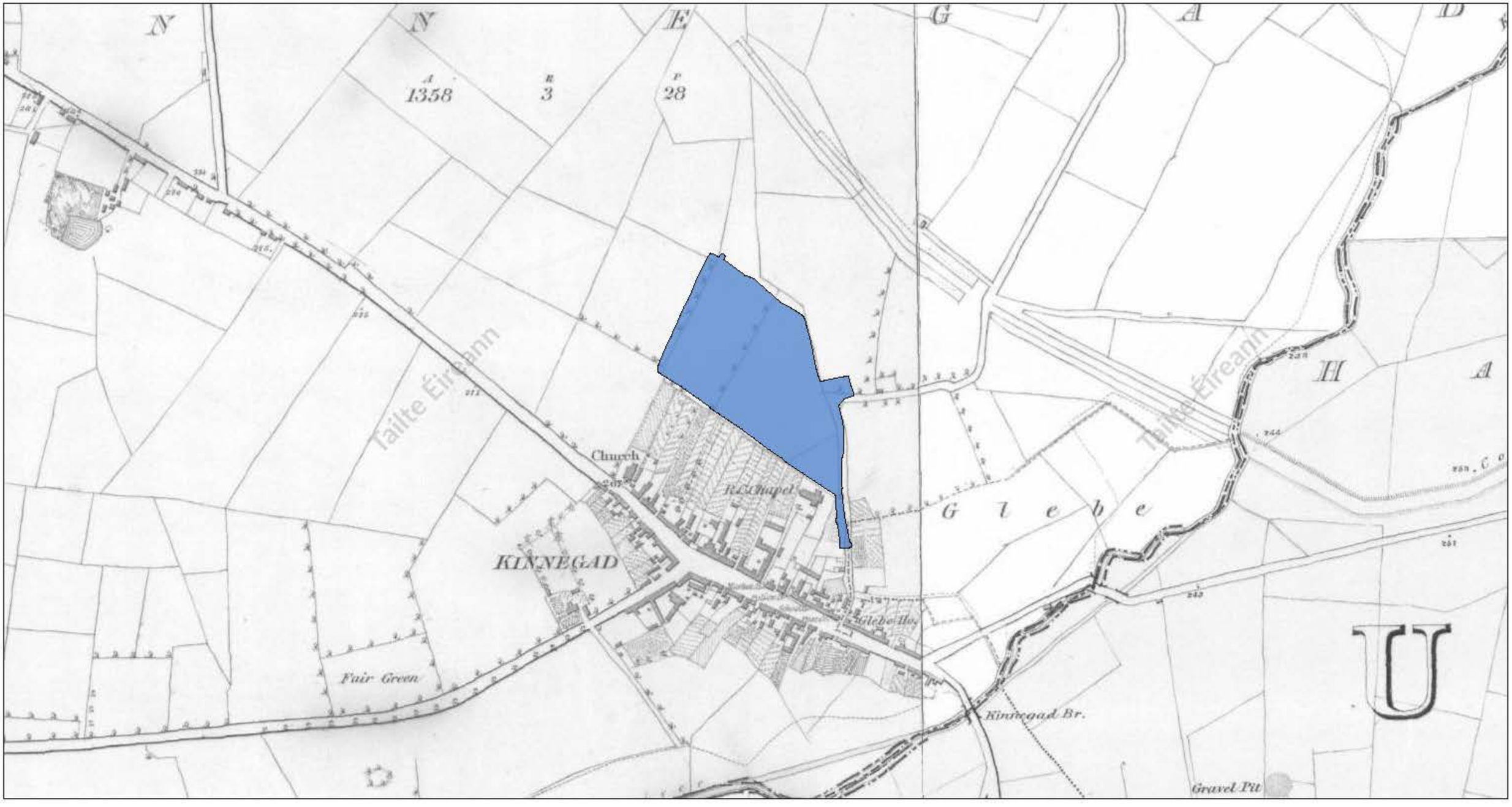
Proposed Development Site

1:5,000

0 0.05 0.1 0.2 mi

0 0.1 0.2 0.4 km

GeoHive Map - MapGenie 6 Inch First Edition Black



19/03/2025, 21:11:35

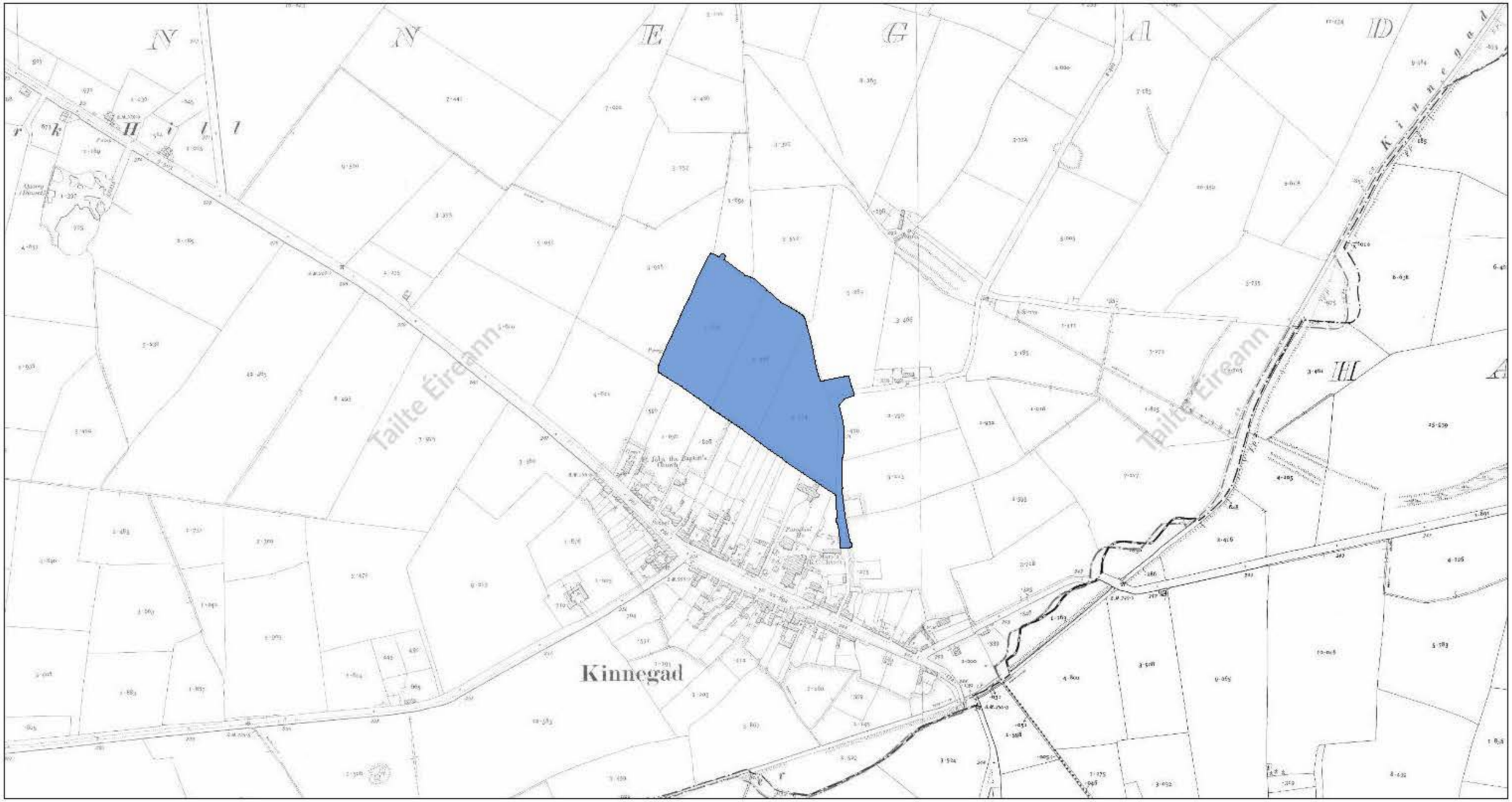
Proposed Development Site

1:5,000

0 0.05 0.1 0.2 mi

0 0.1 0.2 0.4 km

GeoHive Map - MapGenie 25 Inch



19/03/2025, 21:13:58

Proposed Development Site

1:5,000

0 0.05 0.1 0.2 mi

0 0.1 0.2 0.4 km

GeoHive Map - MapGenie Imagery (1995)

19/03/2025, 21:15:50

Proposed Development Site

1:5,000

0 0.05 0.1 0.2 mi

0 0.1 0.2 0.4 km

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