Galway County Council

Site Specific Flood Risk Assessment

Proposed Burial Ground Development, Cregboy, Claregalway, Co. Galway

October 2022

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

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Client: Galway County Council

Location: Proposed Burial Ground development, Cregboy, Claregalway, Co. Galway

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1. Introduction

IE Consulting was commissioned by Galway County Council to undertake a Site Specific Flood Risk Assessment (SSFRA) in support of a planning application for a proposed burial ground development at Cregboy, Claregalway, Co. Galway.

The purpose of this SSFRA is to assess the potential flood risk to the site of the proposed burial ground development and to assess the impact that the development as proposed may or may not have on the hydrological regime of the area.

Quoted ground levels or estimated flood levels relate to Ordnance Datum (Malin) unless stated otherwise.

This flood risk assessment study has been undertaken in consideration of the following guidance document:

'The Planning System and Flood Risk Management – Guidelines for Planning Authorities' DOEHLG 2009.

2. Proposed Site Description

2.1. General

The site of the proposed burial ground development is located at Cregboy, Claregalway, Co. Galway. The site is bounded to the north-west by the N83 Road, to the north-east by an existing residential property, to the south-west and east by agricultural grazing lands and to the south by an existing access road. The total area of the site of the proposed burial ground development is approximately 0.51 hectares.

The location of the site of the proposed burial ground development is illustrated on *Figure 1* below and is shown on *Drawing Number IE2628-001-A, Appendix A*.

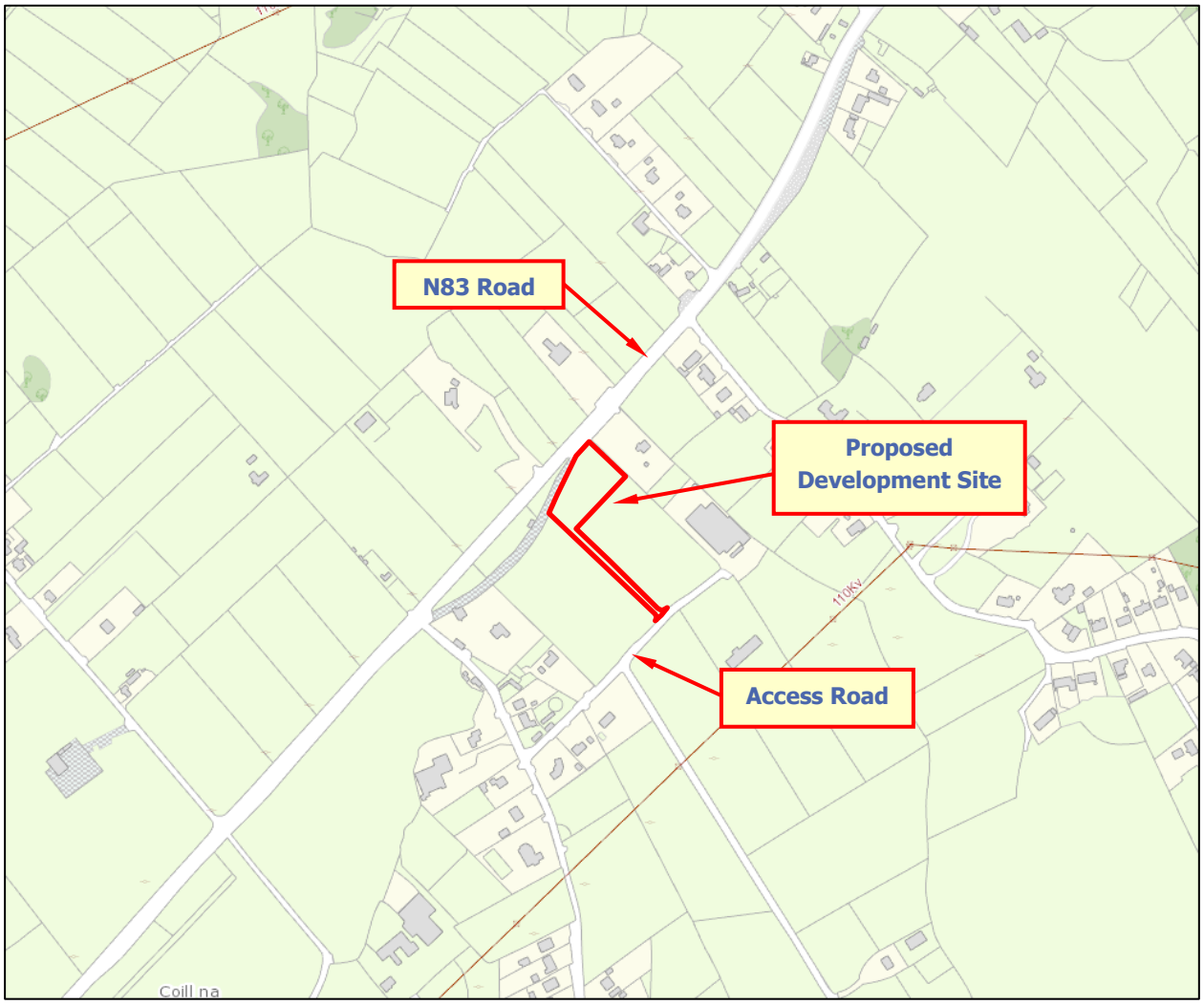


Figure 1 – Site Location

2.2. Existing Topography Levels at Site

The site of the proposed burial ground development slopes moderately from the north-eastern boundary of the site to the south-western boundary of the site at an approximate gradient of 1.912%.

Existing ground elevations range from approximately 20.152m OD (Malin) at the north-western boundary of the site to 18.115m OD (Malin) at the south-western boundary of the site.

2.3. Local Hydrology, Landuse & Existing Drainage

There are no significant hydrological features mapped within or in the general vicinity of the site of the proposed burial ground development.

At present the site of the proposed development is utilised as agricultural grazing lands.

3. Initial Flood Risk Assessment

The flood risk assessment for the proposed burial ground development site is undertaken in three principal stages, these being 'Step 1 – Screening', 'Step 2 – Scoping' and 'Step 3 – Assessing'.

3.1. Possible Flooding Mechanisms

Table 1 below summarises the possible flooding mechanisms in consideration of the site:

Source/Pathway	Significant?	Comment/Reason
Tidal/Coastal	No	The site is not located within a coastal or tidally influenced region.
Fluvial	No	There are no major hydrological features mapped within or in the general vicinity of the site.
Pluvial (urban drainage)	No	There is no major or significant drainage or water supply infrastructure located in the immediate vicinity of the site.
Pluvial (overland flow)	Possible	The site is not surrounded by significantly elevated lands and does not provide an important surface water discharge point to adjacent lands. Limited areas adjacent to the site exhibit low topographical elevations in comparison to the site elevation – these areas may result in ponding of surface water runoff.
Blockage	No	There are no significant or restrictive hydraulic structures located within or adjacent to the boundary of the site.
Groundwater	No	There are no significant springs or groundwater discharges mapped or recorded in the immediate vicinity of the site

Table 1: Flooding Mechanisms

The primary potential flood risk to the proposed burial ground development site can be attributed to potential pluvial flooding due to potential surface water runoff ponding in areas adjacent to the site.

In accordance with 'The Planning System and Flood Risk Management – Guidelines for Planning Authorities - DOEHLG 2009' the potential flood risk to the proposed burial ground development site is analysed in the subsequent 'Screening Assessment' and ''Scoping Assessment'' section of this study report.

4. Screening Assessment

The purpose of the screening assessment is to establish the level of flooding risk that may or may not exist for a particular site and to collate and assess existing current or historical information and data which may indicate the level or extent of any flood risk.

If there is a potential flood risk issue then the flood risk assessment procedure should move to 'Step 2 – Scoping Assessment' or if no potential flood risk is identified from the screening stage then the overall flood risk assessment can end at 'Step 1'.

The following information and data was collated as part of the flood risk screening assessment for the site of the proposed burial ground development.

4.1. OPW/EPA/Local Authority Hydrometric Data

Existing sources of OPW, EPA and local authority hydrometric data were investigated. As illustrated in *Figure 2* below, this assessment has determined that there are no hydrometric gauging stations located in the general vicinity of the site of the proposed burial ground development.

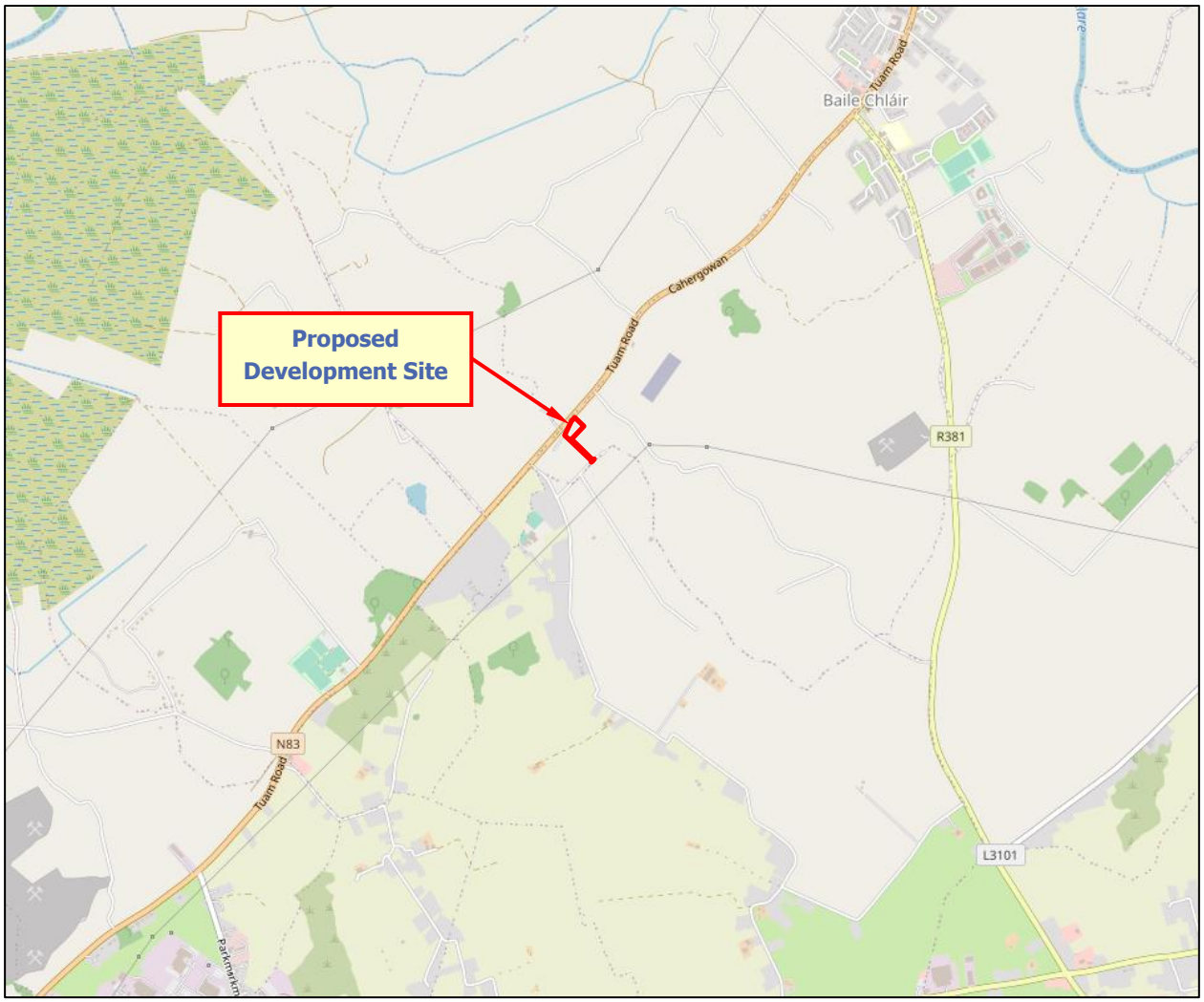


Figure 2 - Hydrometric Gauging Stations

4.2. OPW PFRA Indicative Flood Mapping

Preliminary Flood Risk Assessment (PFRA) Mapping for Ireland was produced by the OPW in 2011. OPW PFRA flood map number 2019/MAP/227/A illustrates indicative flood zones within this area of County Galway.

Figure 3 below illustrates an extract from the above indicative flood map in the vicinity of the site of the proposed burial ground development.

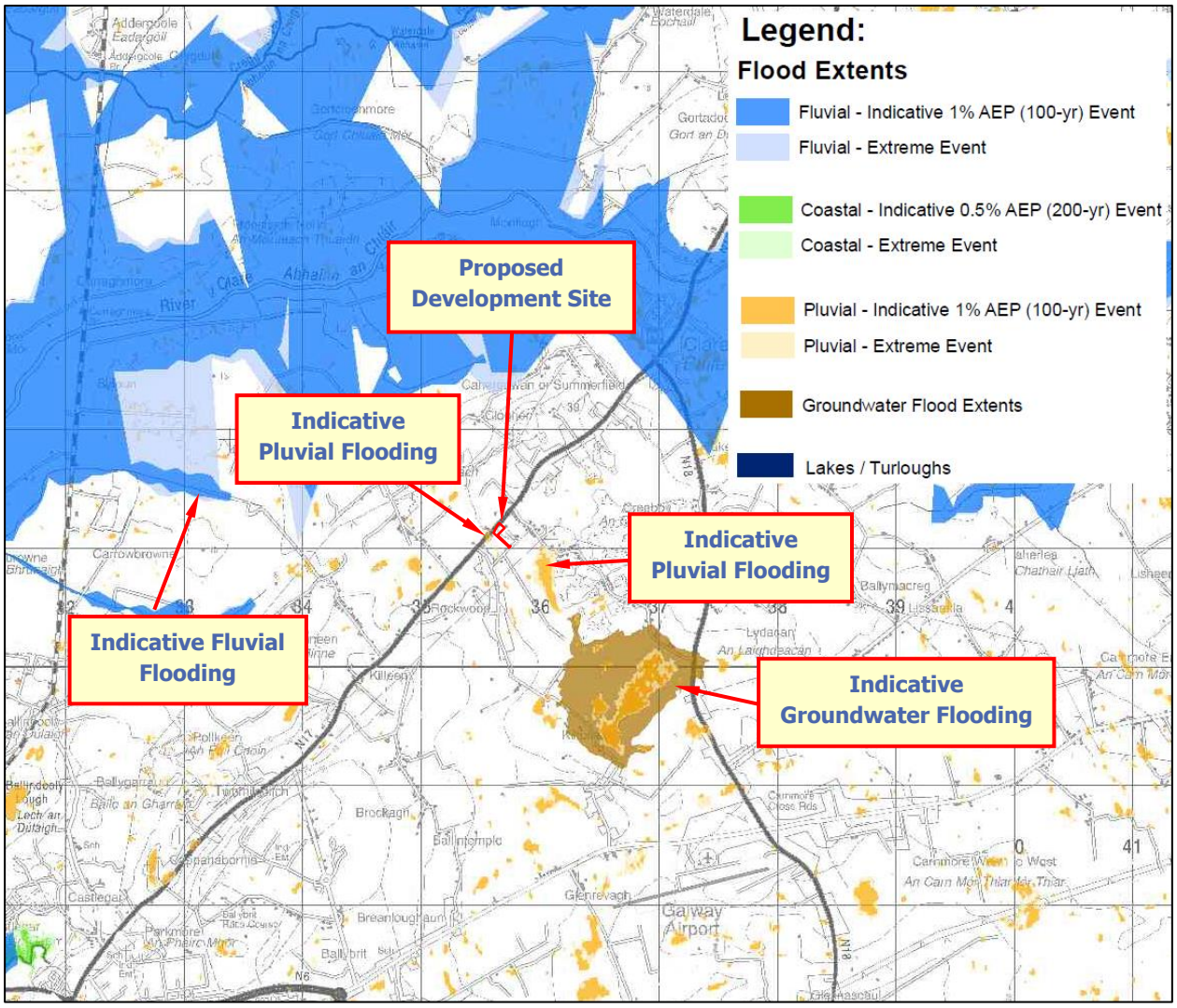


Figure 3 - OPW PFRA Mapping

The PFRA flood mapping indicates that the site of the proposed burial ground development does not fall within an indicative fluvial, pluvial or groundwater flood zone. Two areas of indicative extreme pluvial flooding are mapped adjacent/close to the eastern boundary of the site.

It should be noted that the extent of flooding illustrated on these maps was developed using a low resolution digital terrain model (DTM) and illustrated flood extents are intended to be indicative only. The flood extents mapped on the PFRA maps are not intended to be used on a site specific basis.

4.3. OPW Flood Info Past Flood Events

The OPW Flood Info Website (www.floodinfo.ie) was consulted in relation to available historical or anecdotal information on any flooding incidences or occurrences recorded in the vicinity of the site of the proposed burial ground development. *Figure 4* below illustrates mapping from the Flood Info website in the vicinity of the site.

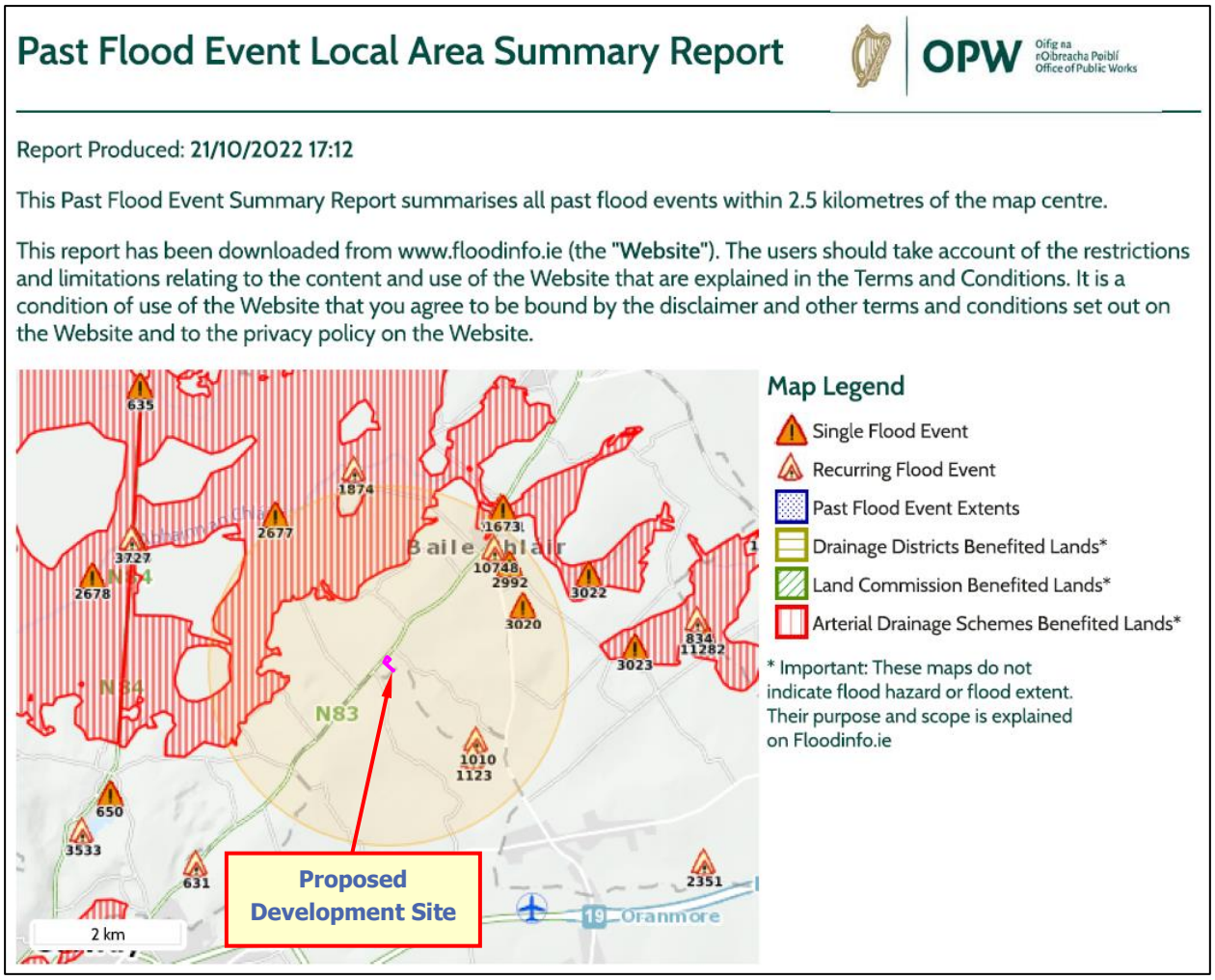


Figure 4 - OPW Flood Info Records

Figure 4 above indicates that there are no recorded or anecdotal instances of flooding at or in the immediate vicinity of the site of the proposed burial ground development.

4.4. Ordnance Survey Historic Mapping

Available historic mapping for the area was consulted, as this can provide evidence of historical flooding incidences or occurrences. The maps that were consulted were the historical 6-inch maps (pre-1900), and the historic 25-inch map series.

Figure 5 and *Figure 6* below illustrate the historic mapping for the area of the site of the proposed burial ground development.

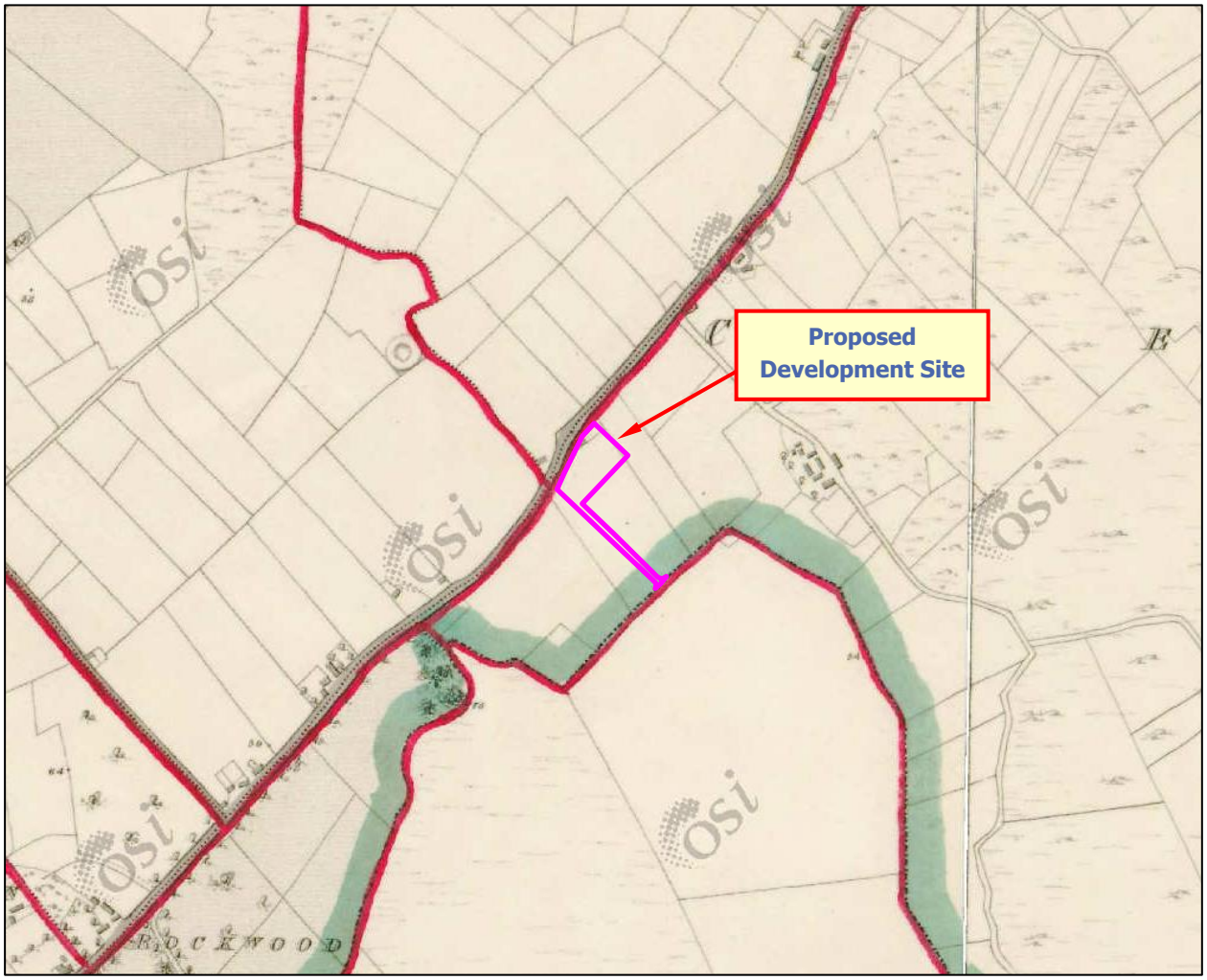


Figure 5 - Historic 6 Inch Mapping

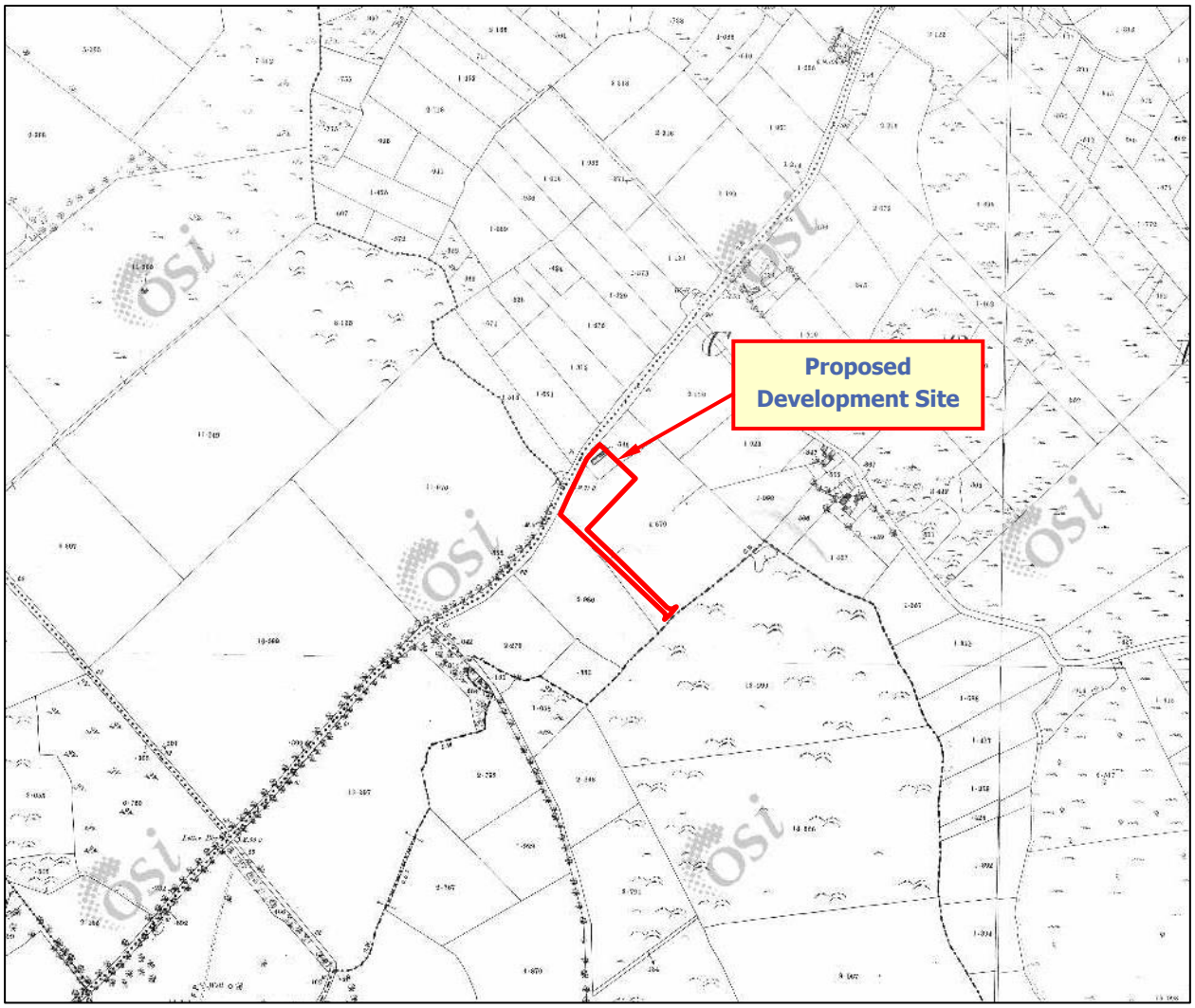


Figure 6 - Historic 25 Inch Mapping

The historic 6 inch and 25 inch mapping does not indicate any historical or anecdotal instances of flooding within or adjacent to the boundary of the site of the proposed burial ground development.

4.5. Geological Survey of Ireland Mapping

The alluvial deposit maps of the Geological Survey of Ireland (GSI) were consulted to assess the extent of any alluvial deposits in the vicinity of the site of the proposed burial ground development. Alluvial deposits can be an indicator of areas that have been subject to flooding in the recent geological past. *Figure 7* below illustrates the sub-soils mapping for the general area of the site.

Figure 7 - GSI Subsoil Mapping

Figure 7 above indicates that the entirety of the site is underlain by Carboniferous Limestone Till. Alluvium deposits are not mapped within or in the vicinity of the site.

4.6. Geological Survey of Ireland Groundwater Flood Mapping

Historic and Predictive Groundwater Mapping for Ireland was prepared by the GSi Department of Communication, Climate Action and Environment in collaboration with Trinity College Dublin and the Institute of Technology Carlow.

Figure 8 below illustrates an extract from the above groundwater flood mapping in the vicinity of the site of the proposed burial ground development.

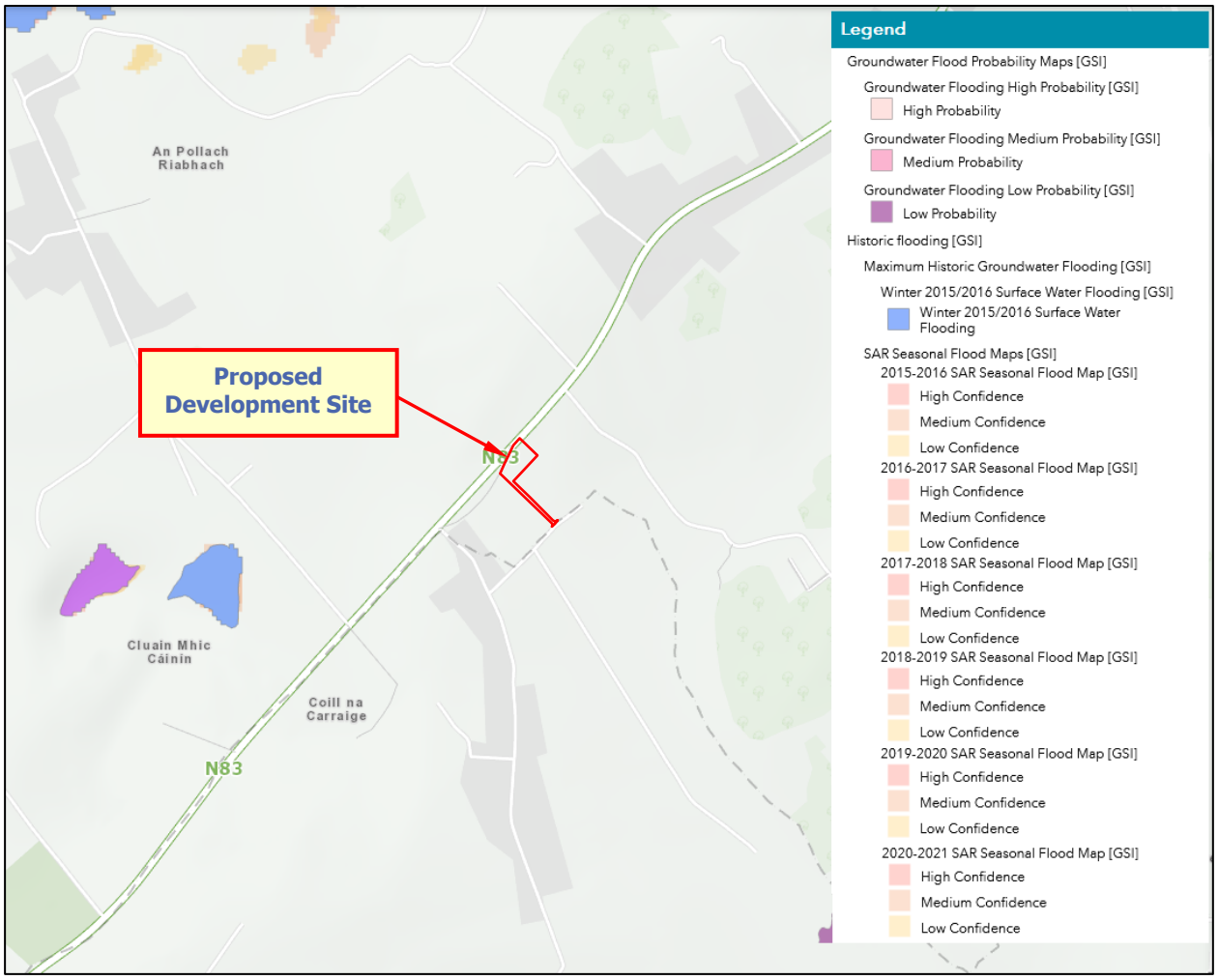


Figure 8 - GSI Groundwater Flood Mapping

The above GSi Groundwater Mapping indicates no areas of predictive or historical groundwater or surface water flooding located in the vicinity of the site.

5. Scoping Assessment

The purpose of the scoping stage is to identify possible flood risks and to implement the necessary level of detail and assessment to assess these possible risks, and to ensure these can be adequately addressed in the flood risk assessment. The scoping exercise should also identify that sufficient quantitative information is already available to complete a flood risk assessment appropriate to the scale and nature of the development proposed.

The above screening assessment indicates that the primary flood risk to the site of the proposed burial ground development can be attributed to extreme pluvial flood event. Indicative pluvial flood zones are not mapped within the boundary of the site but are mapped just beyond the eastern boundary of the site.

Although the OPW PFRA maps for the area illustrate an indicative fluvial flood zone mapped close to the eastern boundary of the site, it should be noted that the PFRA maps were developed using a low resolution digital terrain model (DTM) and are intended to be indicative only. The OPW produced PFRA Main Report states….*'it should be stressed that the PFRA flood maps are indicative. They have been developed using simple and cost-effective methods that are suitable for the PFRA. They should not be used for local decision making or any other purpose without verification…..'.*

In consideration of the information collated as part of the screening exercise, and the availability of other information and data specific to the area of the site of the proposed burial ground development, it is considered that sufficient quantitative information to complete an appropriate flood risk assessment for the site of the proposed burial ground development cannot fully be derived from the information collated as part of the screening exercise alone. In particular a more detailed assessment and analysis of the potential impact to and from the proposed burial grounds due to extreme pluvial flood events needs to be quantified.

In this regard it is required to undertake a more robust analysis and assessment of the potential pluvial flood regime at the location of the proposed burial grounds development site and to provide a more accurate determination of potential pluvial flood extents.

The specific flood risk to and from the application site is assessed in the subsequent 'Assessing Flood Risk' stage of this study report.

6. Assessment of Pluvial Flood Risk

The following sections present an analysis and assessment of the potential pluvial flood risk to the site of the proposed burial ground development.

6.1. Derived Digital Terrain Model (DTM)

In order to assist in the assessment of potential pluvial flooding in the general area of the site, a detailed Digital Terrain Model (DTM) and contour mapping was developed to encompass the area of the site of the proposed burial ground development and surrounding lands. The DTM and contour mapping was developed using topographical survey data of the site and LiDAR data of the surrounding area. The contour mapping and DTM developed for the area are illustrated in *Figure 9* and *Figure 10* below.

Figure 9 - Contour Mapping

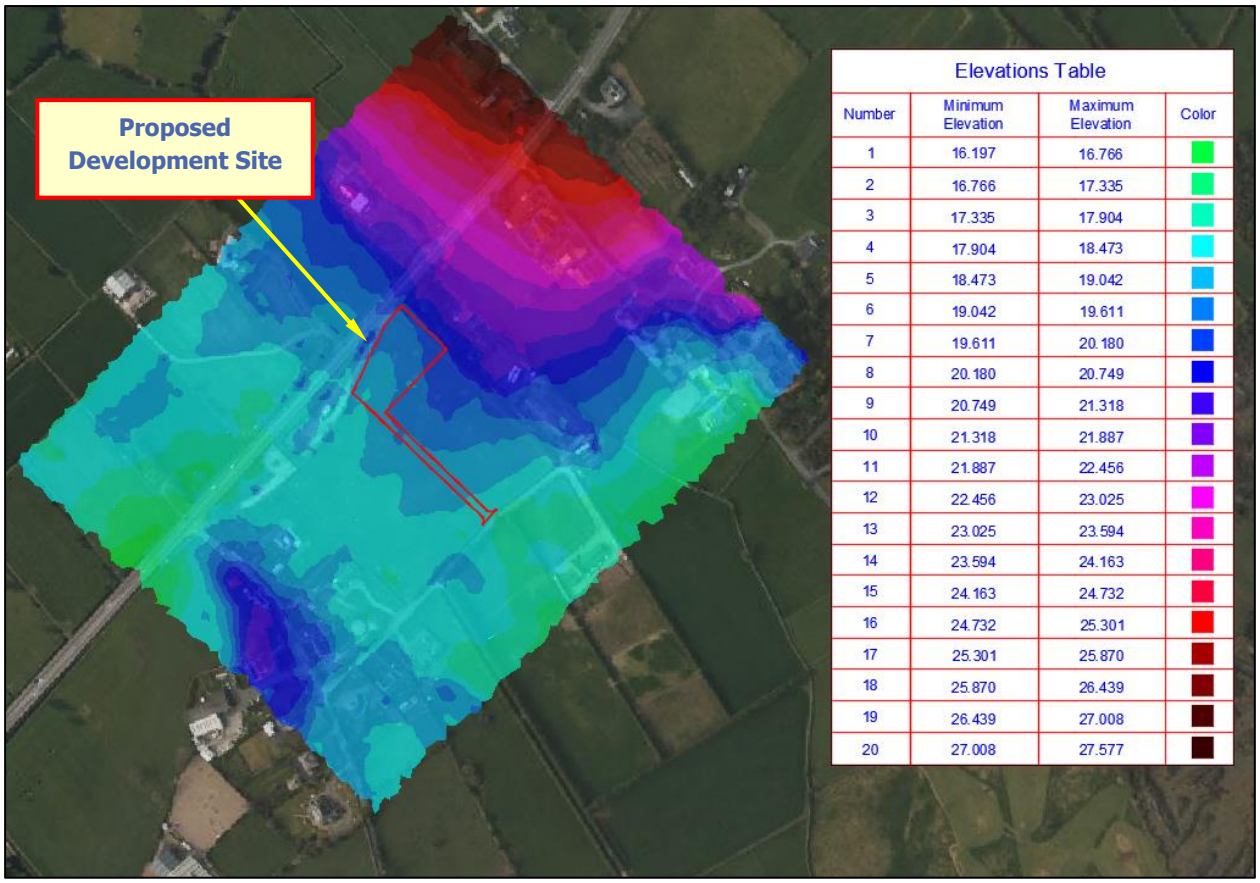


Figure 10 - Constructed DTM Elevations

6.2 Overland Flow Path Routing Analysis

In order to ascertain the level of any potential pluvial flood risk to the site of the proposed burial ground development an overland routing analysis was undertaken, for the area of the site and surrounding lands, utilising the derived DTM and a specialist computer software package employed by IE Consulting. The software estimates the overland flow conveyance and direction of surface water runoff from the areas of lands within the DTM.

Figure 11 below illustrates the mapped overland pluvial flow routing for the area of the proposed site and surrounding lands.

The arrows illustrated in Figure 11 below represent the general conveyance route of surface water runoff.

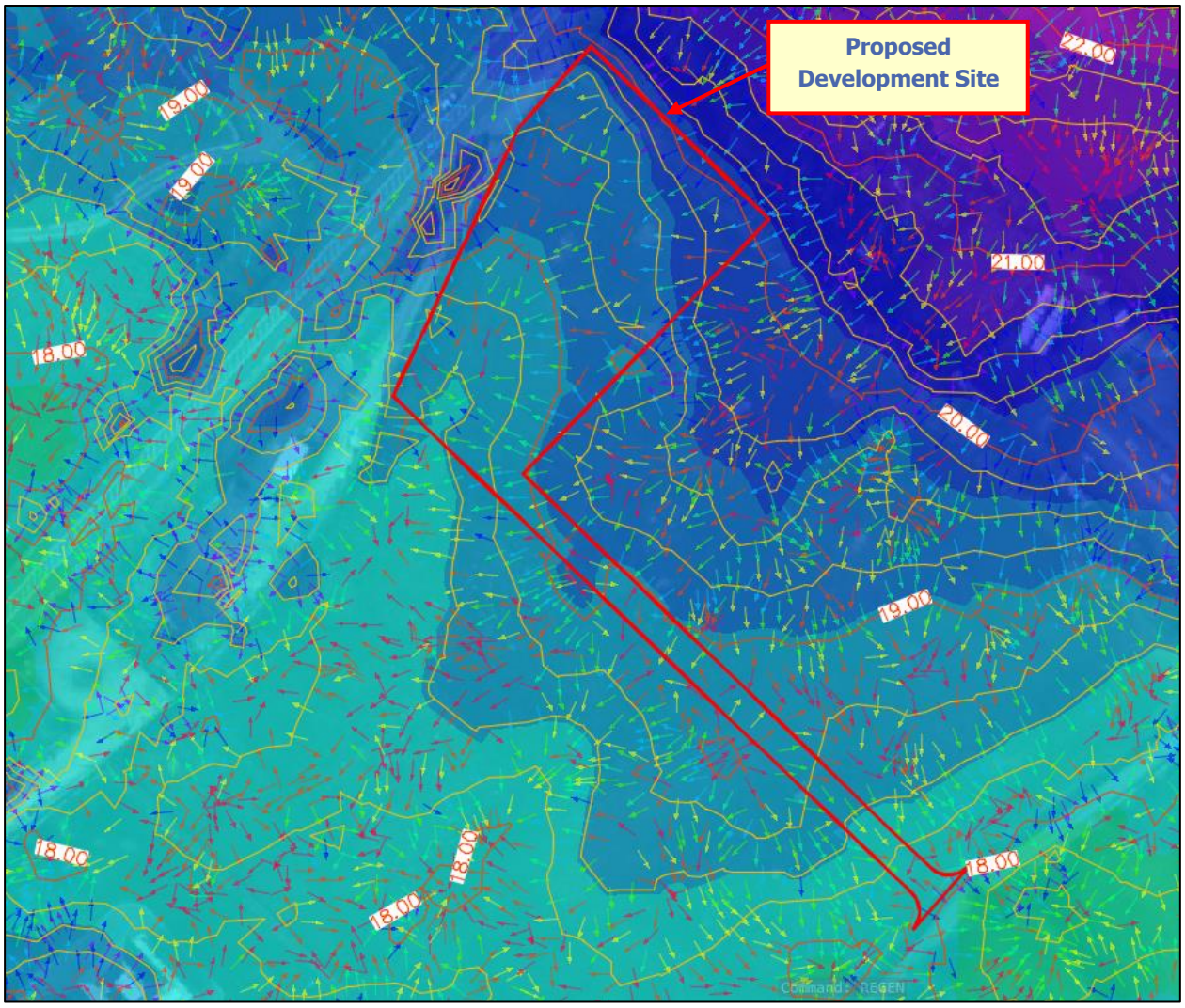


Figure 11 – Overland Pluvial Flow Routing

As illustrated in *Figure 11* above, no significant depressions or areas of low lying land have been identified within the area of the site of the proposed burial ground development. In this regard surface water runoff from surround lands is not predicted to collect or significantly pond within the boundary of the site.

2 No. minor depression areas have been identified adjacent to the western boundary of the site as illustrated in *Figure 12* below.

Any pluvial ponding that may occur within these minor depression areas is not expected to directly impact the area of the site of the proposed burial ground.

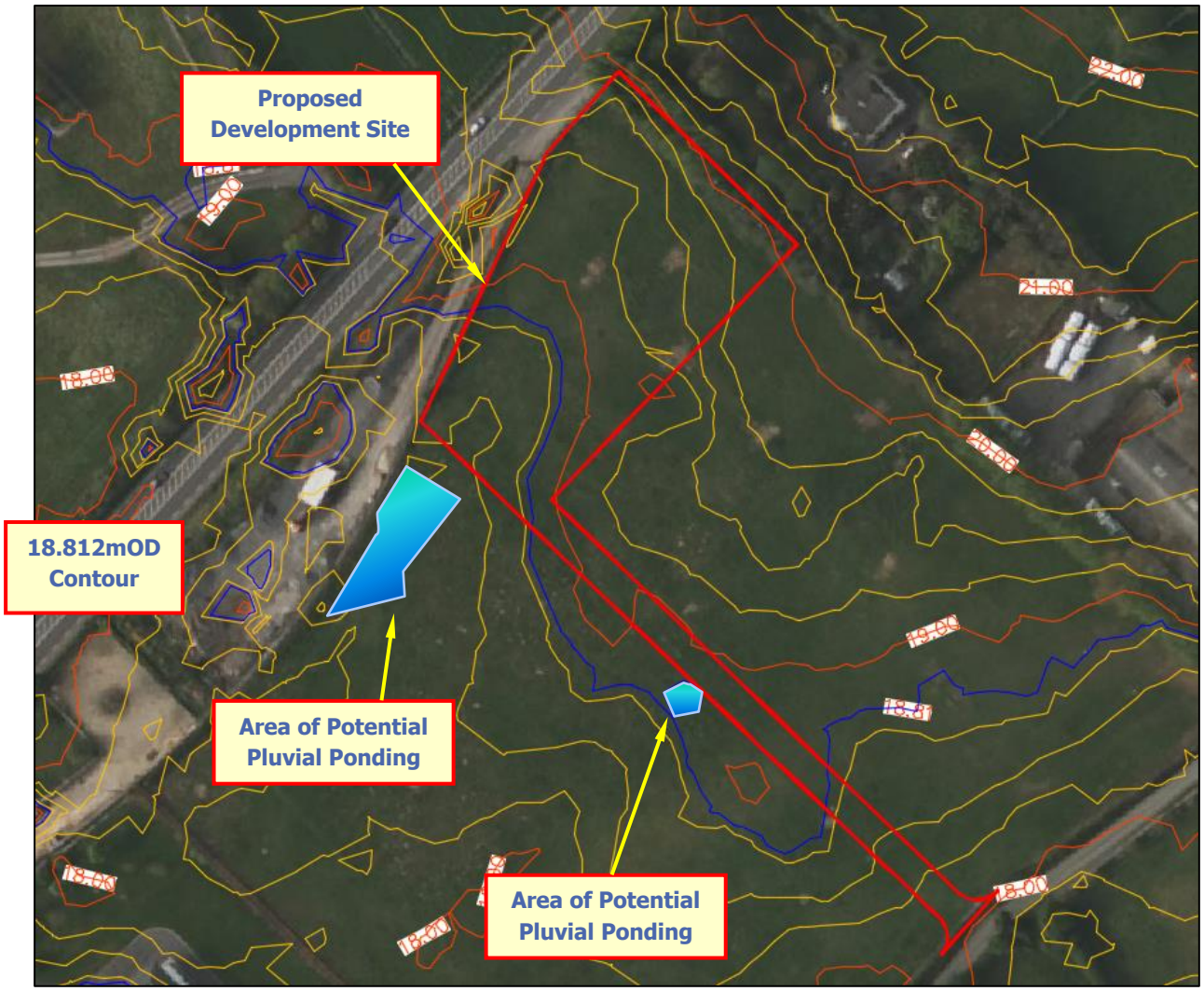


Figure 12 - Constructed DTM Elevations

In summary, the assessment and analysis presented above does not indicate a potential pluvial flood risk to the site of the proposed burial ground development.

7. Development in the Context of the Guidelines

In the context of the 'Planning System and Flood Risk Management Guidelines, DOEHLG, 2009' three flood zones are designated in consideration of flood risk to a particular development site.

Flood Zone 'A' – where the probability of flooding from rivers and watercourses is the highest (greater than 1% or 1 in 100 year for river and watercourse flooding and 0.5% or 1 on 200 for coastal or tidal flooding).

Flood Zone 'B' – where the probability of flooding from rivers and watercourses is moderate (between 0.1% or 1 in 1000 year for river and watercourse flooding and 0.5% or 1 on 200 for coastal or tidal flooding).

Flood Zone 'C' – where the probability of flooding from rivers and watercourses is low or negligible (less than 0.1% of 1 in 1000 year for both river and watercourse and coastal flooding). Flood Zone 'C' covers all areas that are not in Zones 'A' or 'B'.

The 'Planning System and Flood Risk Management Guidelines' list the planning implications for each flood zone, as summarised below:

Zone A – High Probability of Flooding. Most types of development would not be considered in this zone. Development in this zone should be only be 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 'Planning System and Flood Risk Management Guidelines' justification test has been applied. Only water-compatible development, such as docks and marinas, dockside activities that require a waterside location, amenity open space and 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, strategic transport and essential 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 and recreational facilities 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 the development can be adequately managed and that development in this zone will not adversely affect adjacent lands and properties.

Zone C – Low to Negligible Probability of Flooding. Development in this zone is appropriate from a flood risk perspective. Developments in this zone are generally not considered at risk of fluvial flooding and would not adversely affect adjacent lands and properties from a flood risk perspective.

In the context of the 'Planning System and Flood Risk Management Guidelines, DOEHLG, 2009' the assessment and analysis undertaken as part of this Site Specific Flood Risk Assessment indicates that the site of the proposed burial ground development does not fall within a predictive, indicative or strategic fluvial flood zone.

The site of the proposed burial ground development therefore falls within Flood Zone 'C'.

In accordance with the 'Planning System & Flood Risk Management Guidelines, DOEGLG, 2009' the development as proposed is not subject to the requirements of the Justification Test.

8. Summary Conclusions

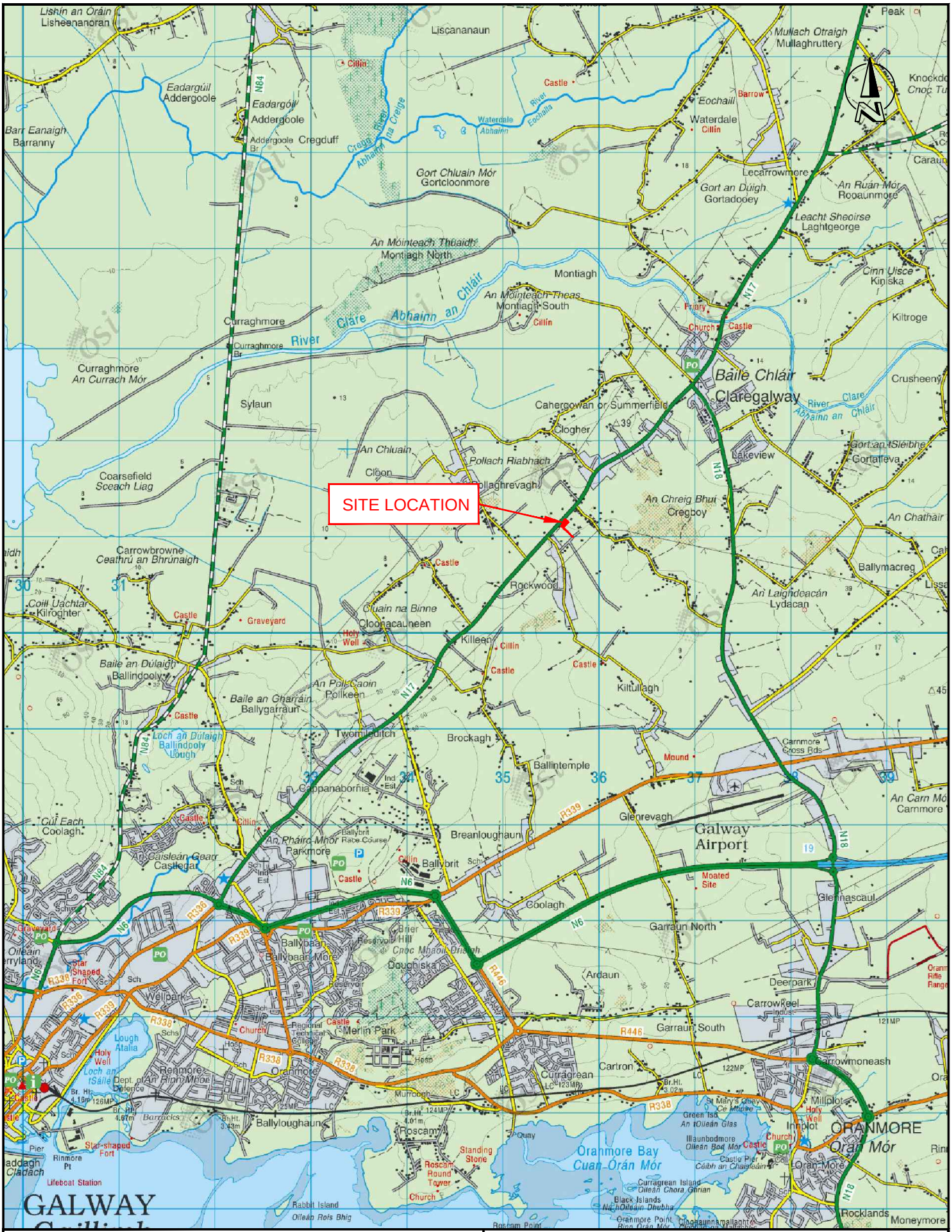
In consideration of the findings of this Site Specific Flood Risk Assessment and analysis the following conclusions are made in respect of the site of the proposed burial ground development:

- *A Site Specific Flood Risk (SSFRA) assessment, appropriate to the type and scale of development proposed, and in accordance with 'The Planning System and Flood Risk Management Guidelines – DoEHLG-2009' has been undertaken.*
- *The site of the proposed burial ground development has been screened, scoped and assessed for flood risk in accordance with the above guidelines.*
- *The assessment and analysis undertaken as part of this Site Specific Flood Risk Assessment indicates that the site of the proposed burial ground development is not susceptible to predictive, indicative, historic or anecdotal fluvial, pluvial or groundwater flooding.*
- *Two minor areas of indicative extreme pluvial flood zones are mapped adjacent to the site.*
- *An overland flow routing analysis indicates that the site is not at significant risk of pluvial flooding.*
- *The site of the proposed burial ground development falls within Flood Zone 'C'.*
- *The development as proposed is not expected to result in an adverse impact to the existing hydrological regime of the area or increase flood risk elsewhere.*
- *In consideration of the findings of this Site Specific Flood Risk Assessment it is considered that the development as proposed is appropriate from a flood risk perspective.*

Appendices

Appendix A. Drawings

IE2628-001-A Site Location



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Project Title:	FLOOD RISK ASSESSMENT
Project Address:	CREGBOY, CLAREGALWAY, CO. GALWAY
Client:	GALWAY COUNTY COUNCIL
Drg. Title:	SITE LOCATION MAP

Dwg.Scale:	Date:	Dwg.No:	Job No:	Revision:	Dwg.By:
1:50,000	21/10/22	IE2628-001	IE2628	A	LMc