MWP

Flood Risk Assessment

Dunlo Hill, Ballinasloe, Co.Galway

Galway County Council

February 2023

Contents

Tables

Figures

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Glossary of Acronyms and Terms

AEP	Annual Exceedance Probability
API	Antecedent Precipitation Index
CFRAMS	Catchment Flood Risk Assessment and Management Study
DEFRA	Department for Environment, Food and Rural Affairs
DTM	Digital Terrain Model
EPA	Environmental Protection Agency
FFL	Finished Floor Level
FRA	Flood Risk Assessment
FSR	Flood Studies Report
FSU	Flood Studies Update
GDSDS	Greater Dublin Strategic Drainage Study
HEP	Hydrological Estimation Point
HEFS	High End Future Scenario
LAP	Local Area Plan
M aOD	Metres Above Ordnance Datum
MRFS	Mid Range Future Scenario
MWP	Malachy Walsh & Partners
OPW	Office of Public Works
PSFRM	The Planning System and Flood Risk Management Guidelines, November 2009
SAAR	Standard Average Annual Rainfall
SuDS	Sustainable Urban Drainage Systems

1. General

1.1 Introduction

Malachy Walsh and Partners (MWP) Consulting Engineers have been commissioned to carry out a Flood Risk Assessment for a proposed housing development in Dunlo Hill, Ballinasloe, Co. Galway.

1.2 Overview of Existing Site

Dunlo Hill is located c.270m south of Main Street in Ballinasloe, Co. Galway. The proposed site is c.0.15 hectares. The proposed site is already a developed site, with Dooleys Bar and Grocery and derelict residential buildings occupying the unused land presently. The site is surrounded by existing residential developments and retail shops. As outlined in the Draft Ballinasloe Local Area Plan 2022~2028 the zoning objective for the proposed development site is as follows:

C1 – Town Centre: "*To provide for development and improvement of appropriate town centre uses including retail, commercial, office and civil/community uses and to provide "Living over the Shop" scheme Residential accommodation, or other ancillary residential accommodation*".

The main hydrological feature in the area is the River Suck, which is located c.600m north of the site. The site location is highlighted in Figure 1-1.

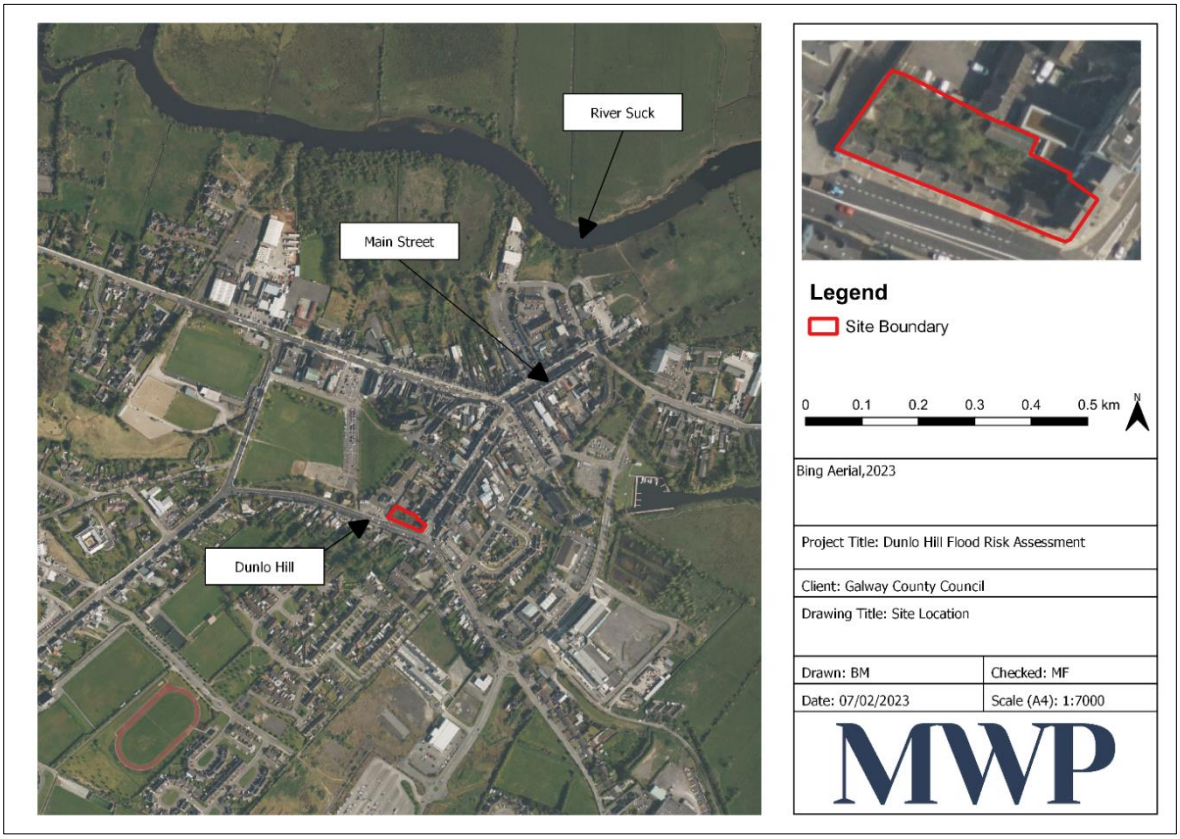

Figure 1-1: Site Location

1.3 Overview of Proposed Development

The proposed site layout is illustrated in Figure 1-2.

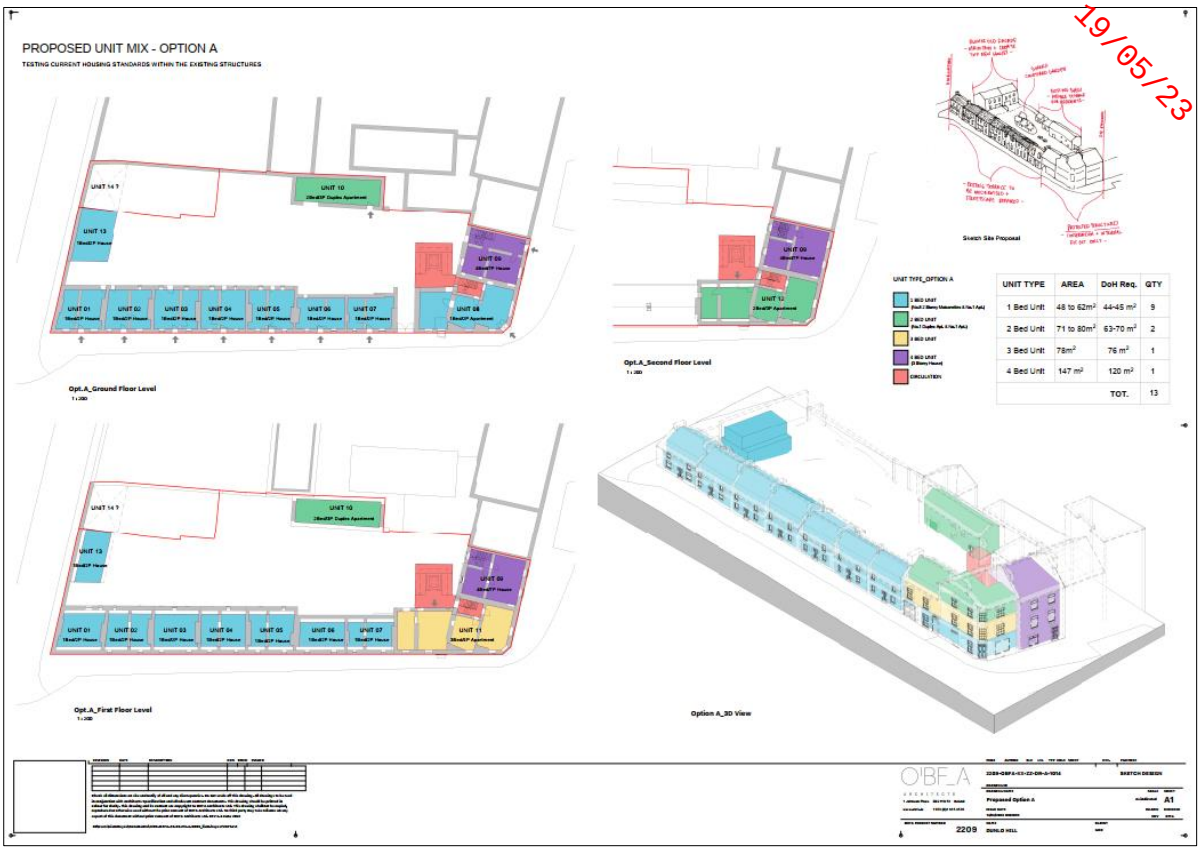

Figure 1-2: Proposed Site Layout

1.4 Objectives

The purpose of the report is to establish the flood risk associated with the proposed development and, if appropriate, to recommend mitigation measures to prevent any increase in flood risk within the site or externally in the wider area.

The report has been prepared in the context of *The Planning System and Flood Risk Management – Guidelines for Planning Authorities, November 2009*, published by the Office of Public Works and the Department of Environment, Heritage and Local Government. Flood Risk Assessments are carried out at different scales by different organisations. The hierarchy of assessment types are Regional (RFRA), Strategic (SFRA) and Site-specific (FRA). This report is site-specific.

1.5 Methodology

The Flood Risk Management Guidelines document outlines three stages in the assessment of flood risk as follows:

Stage 1 Flood risk identification – to identify whether there may be any flooding or surface water management issues related to a plan area or proposed development site that may warrant further investigation;

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 determine what surveys and modelling approach is appropriate to match the spatial resolution required and complexity of the flood risk issues. The

extent of the risk of flooding should be assessed which may involve preparing indicative flood zone maps. Where existing river or coastal models exist, these should be used broadly to assess the extent of the risk of flooding and potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures; and

Stage 3 Detailed 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, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures. This will typically involve use of an existing or construction of a hydraulic model or a river or coastal cell across a wide enough area to appreciate the catchment wide impacts and hydrological processes involved.

This report has been prepared generally in accordance with these stages.

1.6 Flood Risk & Zones

In the Planning System and Flood Risk Management Guidelines document, the likelihood of a flood occurring is established through the identification of Flood Zones which indicate a high, moderate or low risk of flooding from fluvial or tidal sources. Table 1.1 below includes the definition of Flood Zones as well as the implications for planning. The flood zone type is determined based on current water surface levels without allowance for climate change and without the benefit of any flood defences. It is important to note that the Flood Zones do not take other sources of flooding, such as groundwater or pluvial, into account, so an assessment of risk arising from such sources should also be made, where appropriate.

Flood Zone	Description & Summary of Planning Implications
Zone A High probability of flooding	More than 1% probability (1 in 100) for river flooding and more than 0.5% probability (1 in 200) for coastal flooding. Most types of development would be considered inappropriate in this zone.
Zone B Moderate probability of flooding	0.1% to 1% probability (between 1 in 100 and 1 in 1,000) for river flooding and 0.1% to 0.5% probability (between 1 in 200 and 1 in 1,000) for coastal 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.
Zone C Low probability of flooding	This zone defines areas with a low risk of flooding from rivers and the coast (i.e. less than 0.1% probability or less than 1 in 1,000). Development in this zone is appropriate from a flooding perspective (subject to assessment of flood hazard from sources other than rivers and the coast).

Table 1.1: Definition of Flood Zones

The Guidelines have outlined three Vulnerability Classifications for developments based on the proposed land use and type of development. These classifications and particular examples of development types which would be included in each classification are summarised as follows;

- Highly Vulnerable Development: This would include emergency services, hospitals, schools, residential institutions, dwelling houses, essential infrastructure, water & sewage treatment etc.
- Less Vulnerable Development: Retail, leisure, commercial, industrial buildings, local transport infrastructure.

- **Water-compatible development:** Docks, marinas and wharves. Amenity and open space, outdoor sports and recreation and essential facilities such as changing rooms.

The Guidelines include a matrix that determines the appropriateness of different types of development based on their vulnerability classification and the Flood Zones in which they are located. The matrix is reproduced in Table 1.2 below.

Where the matrix indicates that a development is not appropriate it may still be justified based on a procedure described as a Justification Test.

The proposed residential development is classed as a Highly Vulnerable Development and is suitable for Flood Zone A & B provided the Justification Test is applied and passed.

Vulnerability Classification	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

Table 1.2: Vulnerability Matrix

2. Flood Risk Identification (Stage 1)

Possible sources of flood risk were identified by;

- Geology & Soil Mapping
- Flood History - examination of available information on the OPW website (www.floodinfo.ie)
- National Indicative Fluvial Mapping (NIFM)
- Ballinasloe Local Area Plan 2022 - 2028
- Shannon Catchment Flood Risk Assessment and Management
- GSI Winter 2015/2016 Surface Water Flooding
- Topographical Survey Information
- Internet Searches

2.1 Geology & Soil Mapping

The geology and soils at the site have been reviewed using the Geological Survey of Ireland database. The proposed site location is underlain by ***Made Ground*** according to Teagasc soil data. ***AlluMIN – Alluvial (mineral)*** soils can be found east and north of the site. The presence of Alluvium soils can be an initial indicator of an area which has been subject to flooding in the geological past but cannot be used to determine flood risk to an area. The quaternary sediment map indicates that the site is underlain by Gravels derived from Limestones. There is ***Alluvium*** located east and north of the site. The bedrock geology in this area is dominated by Visean Limestones (undifferentiated) which is described as ***Undifferentiated limestone.***

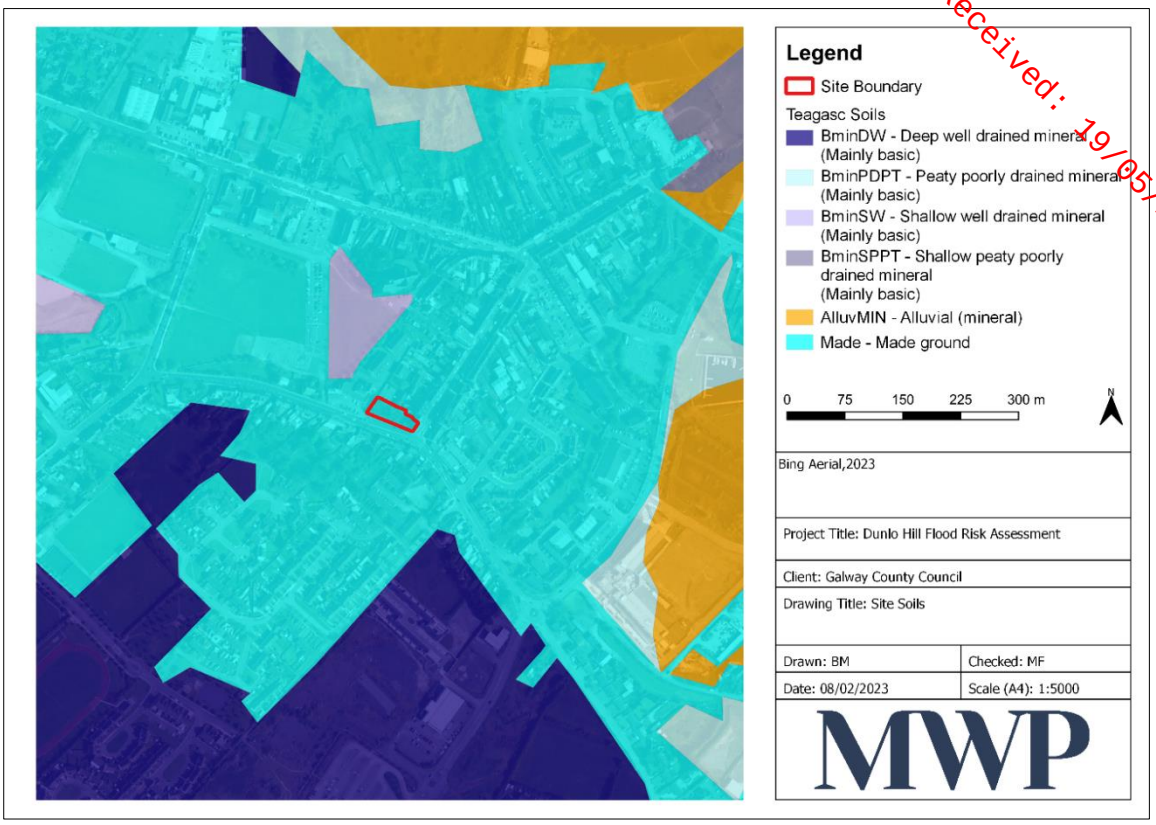

Figure 2-1: Teagasc Soil Map

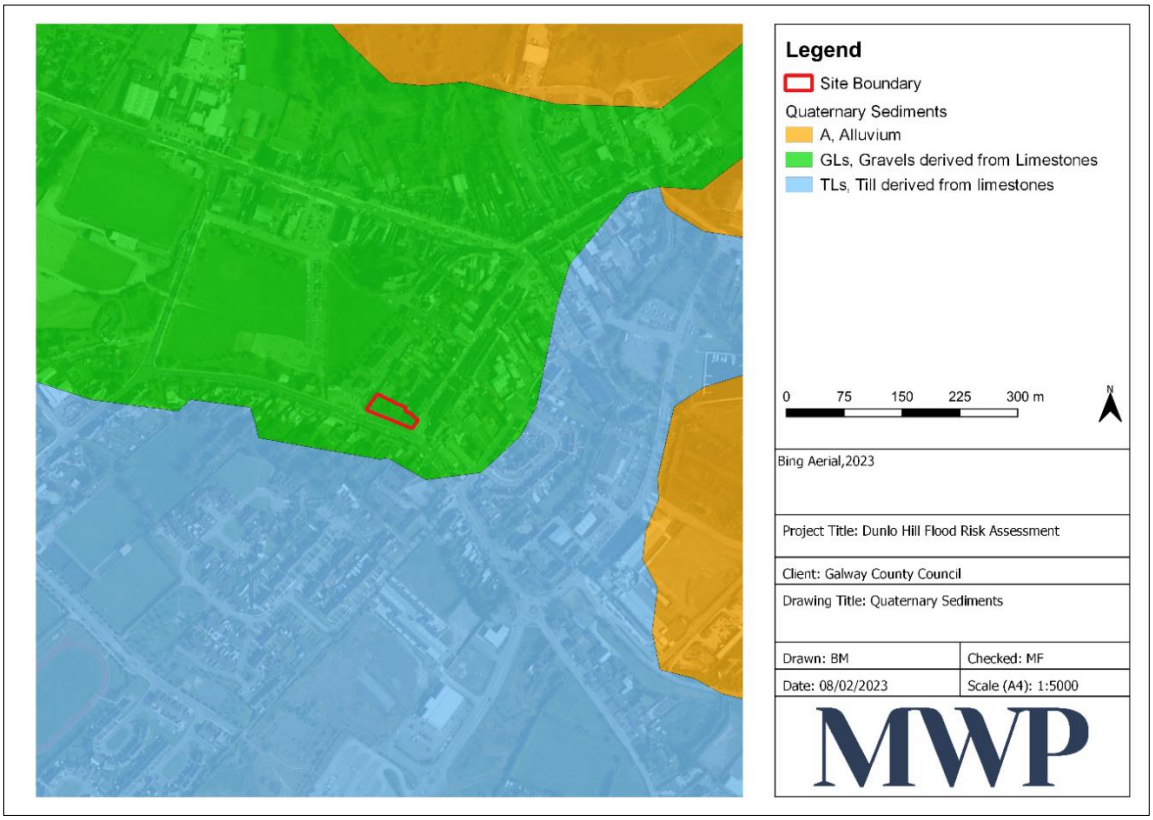

Figure 2-2: Quaternary Sediment Map

2.2 Flood History – OPW Local Area Summary Report

The Past Flood Event Local Area Summary Report which was obtained from the Office of Public Works (OPW) floodinfo.ie website is included on Figure 2-3 below. This report summarises all recorded past flood events within 2.5km of the site. There are several past flood events near the site but no past flood events have been recorded at the site. The flood events have been reported and are summarised as follows;

ID-3: Shannon December 1954

ID-1726: Derrymullan Ashfield Drive, Derrymullan Recurring - The river Deerpark(Derrymullan) overflows its banks every year. Property is affected.

ID-1727: Suck R358 near waterworks, Ballinasloe Recurring - R358 adjacent waterworks, Ballinasloe– The rivers suck and Bunowen (Ahascragh) overflow their banks every year after heavy rain. Large area flooded, flood plain of the rivers.

ID-1728: Portnick Drive, Ballinasloe Recurring - Open drain has been culverted and the culvert cannot taken the volume of water after heavy rain every year. Properties are affected.

ID-2348: Suck Ballinasloe February 2002 -

ID-2349: Suck Ballinasloe December 1999

ID-3262: Suck Bellagill Bridge to Concrete Works Jan 2005

ID-3263: Suck Ballinasloe Jan 2005

ID-3618: Suck Ballinasloe downstream of town Jan 2005

ID-4622: Suck Ballinasloe Feb 1995

ID-10701: Shannon and Ballinasloe flood extents 30th Nov 2009

ID-11149: Flooding Ballinasloe November 2009

Past Flood Event Local Area Summary Report

OPW

Report Produced: 8/2/2023 9:28

This Past Flood Event Summary Report summarises all past flood events within 2.5 kilometres of the map centre.

This report has been downloaded from www.floodinfo.ie (the "Website"). The users should take account of the restrictions and limitations relating to the content and use of the Website that are explained in the Terms and Conditions. It is a condition of use of the Website that you agree to be bound by the disclaimer and other terms and conditions set out on the Website and to the privacy policy on the Website.

Map Legend

- Single Flood Event
- Recurring Flood Event
- Past Flood Event Extents
- Drainage Districts Benefited Lands*
- Land Commission Benefited Lands*
- Arterial Drainage Schemes Benefited Lands*

* Important: These maps do not indicate flood hazard or flood extent. Their purpose and scope is explained on Floodinfo.ie

14 Results

	Name (Flood_ID)	Start Date	Event Location
1.	Flooding Ballinasloe November 2009 (ID-11149)	18/11/2009	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
2.	Suck Ballinasloe February 2002 (ID-2348)	01/02/2002	Approximate Point
	Additional Information: Reports (1) Press Archive (1)		
3.	Suck Ballinasloe December 1999 (ID-2349)	28/12/1999	Approximate Point
	Additional Information: Reports (1) Press Archive (1)		
4.	Suck Bellagill Bridge to Concrete Works Jan 2005 (ID-3262)	08/01/2005	Exact Point
	Additional Information: Reports (9) Press Archive (0)		
5.	Suck Ballinasloe Jan 2005 (ID-3263)	08/01/2005	Exact Point
	Additional Information: Reports (5) Press Archive (0)		
6.	Suck Ballinasloe Feb 1995 (ID-4622)	17/02/1995	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		

	Name (Flood_ID)	Start Date	Event Location
7.	Suck Ballinasloe downstream of town Jan 2005 (ID-3618)	08/01/2005	Exact Point
	Additional Information: Reports (2) Press Archive (0)		
8.	Shannon December 1954 (ID-3)	01/12/1954	Area
	Additional Information: Reports (4) Press Archive (16)		
9.	Derrymullan Ashfield Drive, Derrymullan Recurring (ID-1726)	n/a	Approximate Point
	Additional Information: Reports (5) Press Archive (0)		
10.	Suck R358 near waterworks, Ballinasloe Recurring (ID-1727)	n/a	Approximate Point
	Additional Information: Reports (10) Press Archive (0)		
11.	Portnick Drive, Ballinasloe Recurring (ID-1728)	n/a	Approximate Point
	Additional Information: Reports (2) Press Archive (0)		
12.	Flooding at Ballinasloe (ID-13843)	n/a	Approximate Point
	Additional Information: Reports (0) Press Archive (0)		
13.	Flooding at Ballinasloe on 01/12/2015 (ID-13316)	01/12/2015	Approximate Point
	Additional Information: Reports (0) Press Archive (0)		
14.	Shannon and Ballinasloe flood extents 30th Nov 2009 (ID-10701)	20/11/2009	Approximate Point
	Additional Information: Reports (4) Press Archive (0)		

Figure 2-3: OPW Past Flood Event Local Area Summary Report

2.3 National Indicative Fluvial Mapping (NIFM)

The National Indicative Fluvial Flood Maps have been produced for catchments greater than 5km² in areas for which flood maps were not produced under the National Catchment Flood Risk Assessment and Management Programme (CFRAM). As the River Suck was assessed under the Shannon CFRAM study, no National Indictive Fluvial Flood Maps are available.

2.4 Ballinasloe Local Area Plan 2022 – 2028

The Strategic Flood Risk Assessment for Ballinasloe been prepared in accordance with the requirements of the DoEHLG and OPW Planning Guidelines, The Planning System and Flood Risk Management; these guidelines were issued under the Planning and Development Act 2000 and recognise the significance of proper planning to manage flood risk.

Under the "Planning System and Flood Risk Management" guidelines, the purpose for the FRA is detailed as being "to provide a broad (wide area) assessment of all types of flood risk to inform strategic land use planning decisions. SFRAs enable the LA to undertake the sequential approach, including the Justification Test, allocate appropriate sites for development and identify how flood risk can be reduced as part of the development plan process". The Ballinasloe Local Area Plan 2022-2028 (BLAP) will be the key document for setting out a vision for the development of Galway during the plan period. It is important that the BLAP fulfils the requirements of the document "The Planning System and Flood Risk Management Guidelines for Planning Authorities" (OPW/DoEHLG, 2009) which states that flood risk management should be integrated into spatial planning policies at all levels to enhance certainty and clarity in the overall planning process. In order to ensure that flood risk is integrated into the BLAP, the main requirements of the SFRA are to:

- Update the Flood Zone Mapping produced under the 2015-2021 plan.
- Prepare a Stage 2 - Flood Risk Assessment of Ballinasloe in particular in relation to location and type of zoning and land-use proposals, with a focus on new or changed zoning compared with the current plan.
- Review and update the policy guidance within the SFRA in compliance with OPW/DoEHLG –"The Planning System and Flood Risk Management –Guidelines or Planning Authorities (OPW/DoEHLG, 2009)".
- Take cognizance of the Galway County Council Climate Adaptation Strategy 2019-2024, the National Climate Adaptation Framework and the various environmental and visual designations applicable to Ballinasloe.
- Advise on zonings/land use-proposals and appropriate mitigation measures, assess and report on any submissions received as part of both the preparation and the public consultation stage of the plan, as they relate to flood risk.

The Flood Zone mapping for Ballinasloe is principally derived from the CFRAM where possible. The proposed site has used the Shannon CFRAM for flood mapping. The site is identified as being in Flood Zone C.

2.5 Shannon Catchment Flood Risk and Management Study (Shannon CFRAM)

The Shannon is the largest River Basin District (RBD) in Ireland, covering approximately 17,800km² and more than 20% of the island of Ireland. The RBD includes the entire catchment of the River Shannon and its estuary as well as some catchments in North Kerry and West Clare that discharge directly to the Atlantic. The River Shannon rises in the Cuilcagh Mountains, at a location known as the Shannon Pot in the counties of Cavan and Fermanagh. The river flows in a southerly direction before turning west and discharging through the Shannon Estuary to the Atlantic Ocean between counties Clare and Limerick. Whilst the River Shannon is 260km long from its source to the head of the Shannon Estuary in Limerick City, over its course the river falls less than 200m in elevation.. Significant tributaries of the River Shannon include the Inny, Suck, and Brosna. There are several lakes in the RBD, including Lough Ree, Lough Derg, and Lough Allen. The RBD includes parts of 17 counties: Limerick, Clare, Tipperary, Offaly, Westmeath, Longford, Roscommon, Kerry, Galway, Leitrim, Cavan, Sligo, Mayo, Cork, Laois, Meath, and Fermanagh. While much of the settlement in the RBD is rural there are six significant urban centres within the RBD - Limerick City, Ennis, Tralee, Mullingar, Athlone and Tullamore.

The River Suck was modelled as part of the Shannon CFRAM Study. Flood extent maps have since been produced and are presented in Figure 2-4 below. The flood mapping indicates that the proposed site is not at risk of flooding during the 10%, 1% and 0.1% AEP Fluvial Flood events.

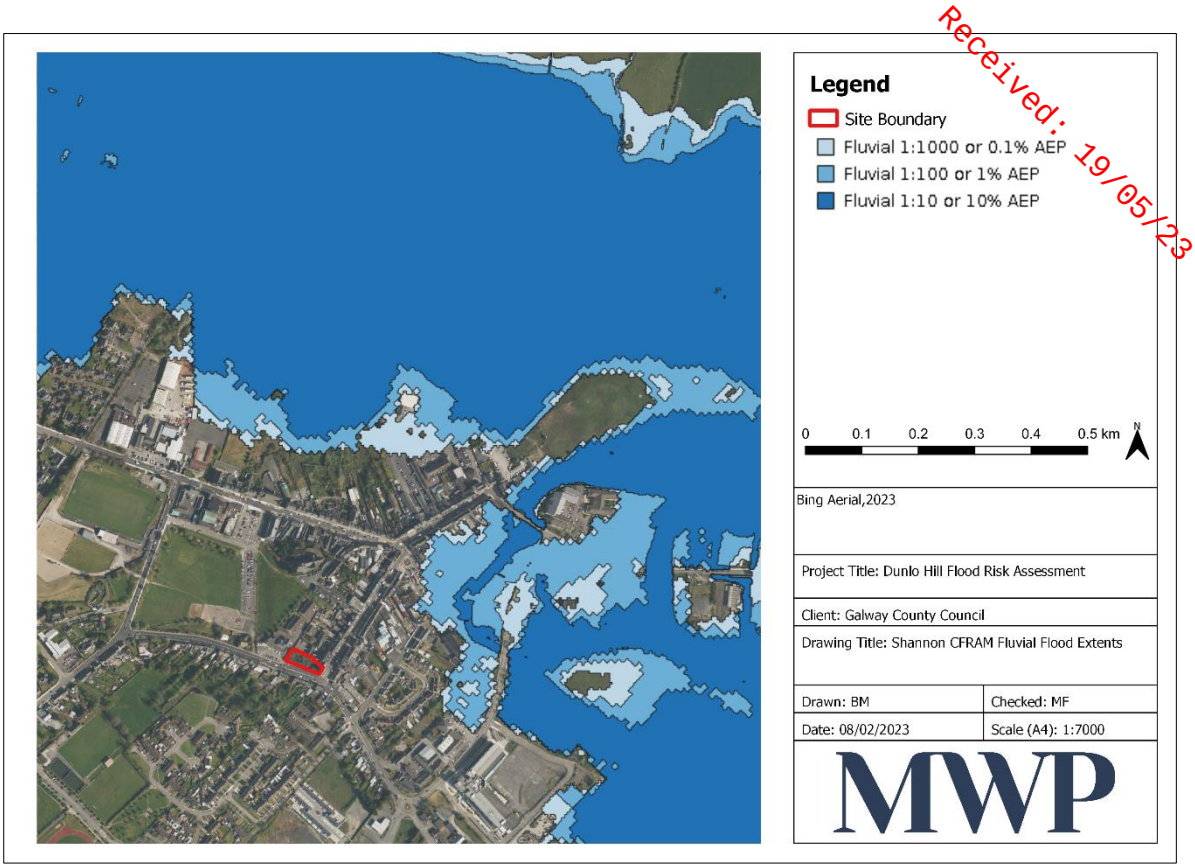

Figure 2-4: Shannon CFRAM 10%, 1% & 0.1% AEP Fluvial Flood Extents

2.6 GSI Winter 2015/2016 Surface Water Flooding

Geological Survey Ireland -in collaboration with Trinity College Dublin and Institute of Technology Carlow -initiated the groundwater flood project GWFlood to address deficits in groundwater flooding and fit-for-purpose flood hazard maps. 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. The historic surface water flood map is displayed within Figure 2-5. The site was not impacted by the GSI Winter 2015/2016 Surface Water Flooding.

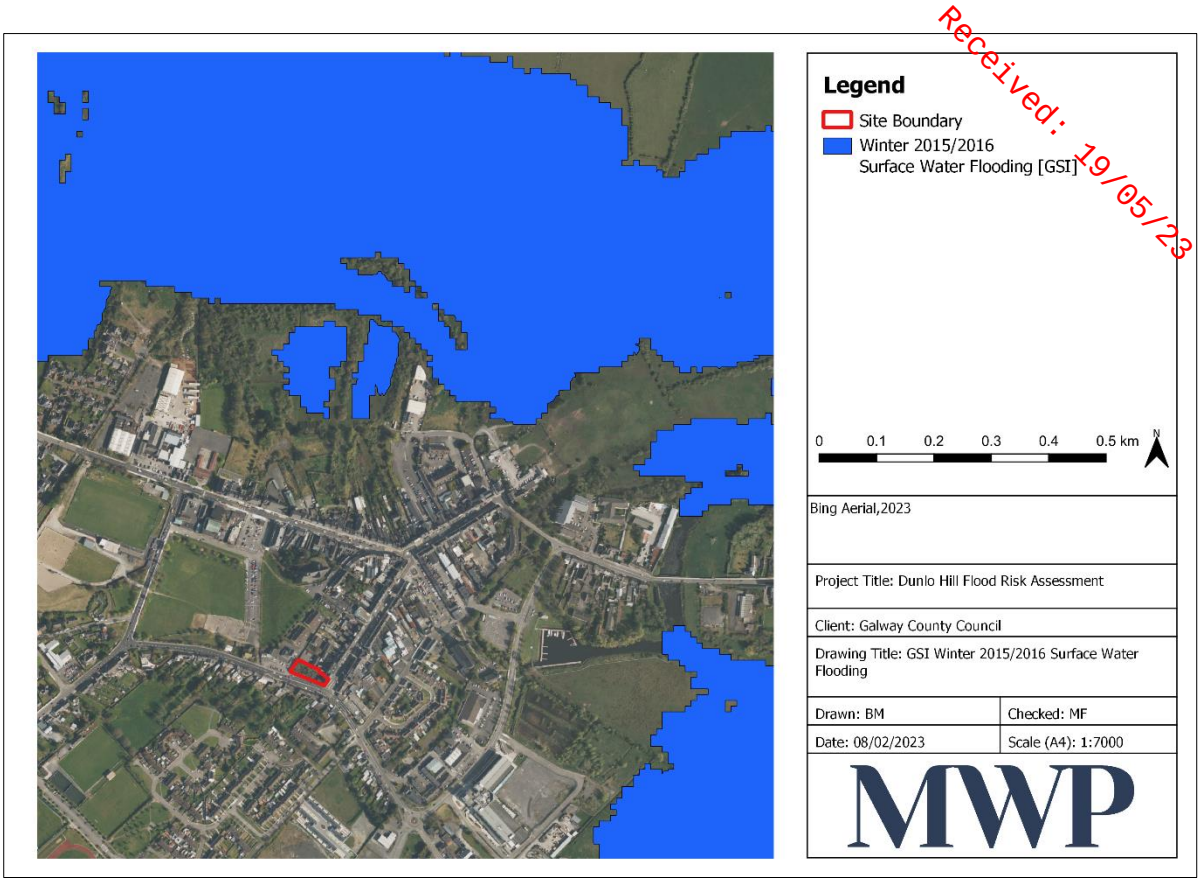

Figure 2-5: Extract of GSI Winter 2015/2016 Surface Water Flooding

2.7 Topographical Survey Information

As indicated in Figure 2-6 the topography within the proposed site consists generally of mild gradients. It slopes from northwest to east from an elevation of approximately 46.15mOD in the northwest corner to an elevation of approximately 43.30mOD along the western boundary. Dunlo Hill slopes from west to east past the site. There are no depressions along Dunlo Hill at the southern boundary of the site where surface water could accumulate. The road along the western boundary of the site slopes from south to north. Dunlo Street, along the eastern boundary of the site also slopes from south to north.

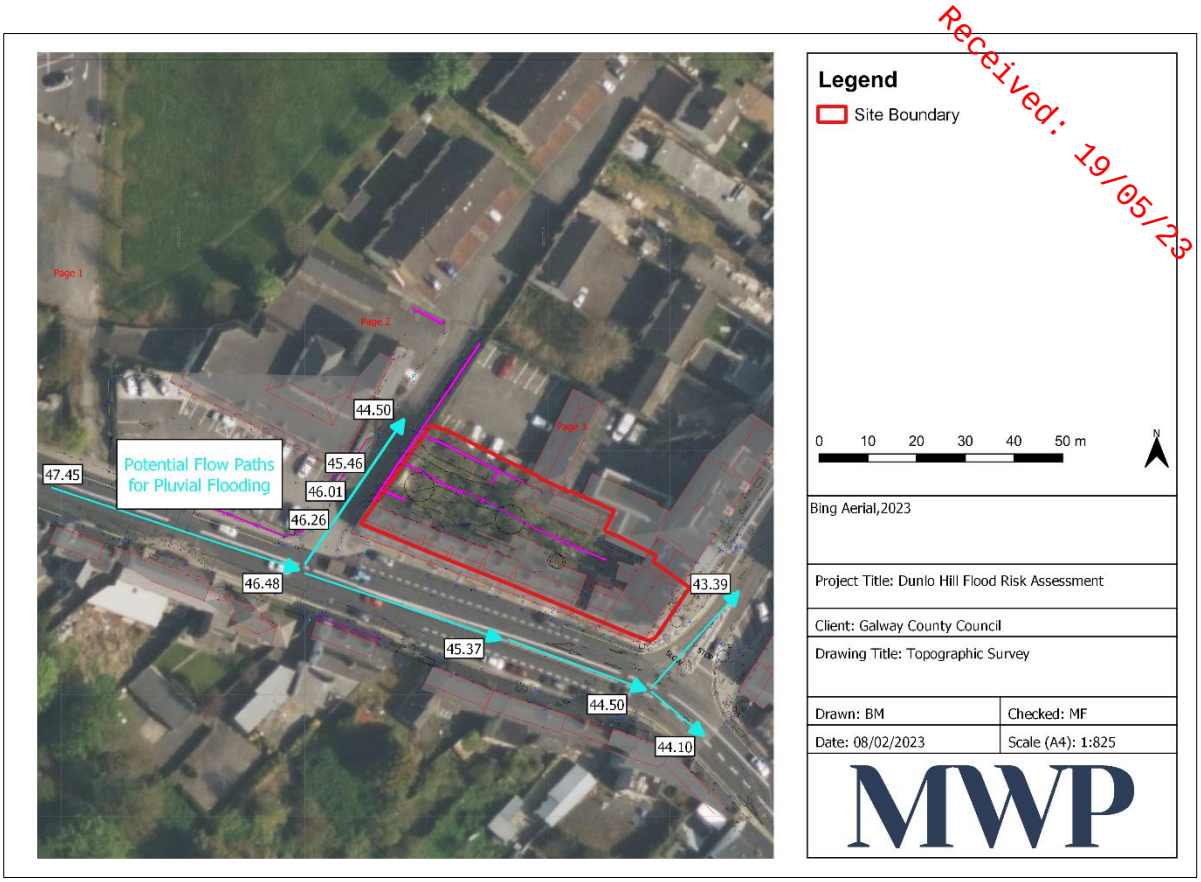

Figure 2-6: Topographic Survey

2.8 Internet Searches

An internet search was conducted to gather information about whether the site was affected by flooding previously. There were no reports of flooding at the site.

2.9 Potential Impact of Development on Flood Risk Elsewhere

The proposed development site is not located within an active floodplain or conveyance route which could result in a loss of flood storage or impede flows. The proposed development site will not obstruct any existing overland flow paths. Consequently, the development will not cause an adverse impact on flood risk elsewhere.

The proposed development involves the redevelopment of a large unused site. To ensure that runoff from the site does not exceed existing greenfield runoff rates, the detailed design of the site drainage system should include appropriate Sustainable Urban Drainage systems, in accordance with Galway County Council requirements.

2.10 Summary of Stage 1 FRA

The information collected during the Stage 1 FRA indicates that the flood risk at this site is low and a Stage 2 Flood Risk Assessment is not required.

Flooding Source	Stage 2 Requirement	Comment
Fluvial	Not Required	Shannon CFRAM fluvial flood mapping indicates that there is no risk of fluvial flooding within the site for the present day, MRFS or HEFS 1% or 0.1% AEP events
Pluvial/Overland Flow	Not Required	The topographical data available for the site indicates that significant pluvial flooding would not occur. Adequate storm water drainage systems will minimise pluvial flood risk.
Estuarial/Coastal	Not Required	The site is located inland. Therefore, this flood risk is not relevant to this site.
Groundwater	Not Required	There is also no known history of such an occurrence in the vicinity and no features associated with groundwater flooding were identified within or in close proximity of the site.

Table 2.1: Stage 2 Requirements Summary

3. Conclusions & Recommendations

1. The flood risk assessment has identified that the site is within Flood Zone C as defined in the Flood Risk Management Guidelines which has a low probability of flooding (less than 0.1% annual exceedance probability or 1 in 1000) and is appropriate for the redevelopment of this unused site.
2. The proposed residential redevelopment will not adversely affect flood risk elsewhere as it is not located within an active floodplain, conveyance route or overland flow paths that could increase the flood risk elsewhere.
3. The redevelopment of the site is appropriate in the context of the Planning System and Flood Risk Management Guidelines and the proposed use of the site is consistent with the land zoning objectives as outlined in the Ballinasloe Local Area Plan 2022-2028.
4. The detailed design of the residential redevelopment should include appropriate SuDS, including limiting the post-development discharge rate from the site to existing greenfield runoff rates, or as required by Galway County Council.

References

- The Planning System and Flood Risk Management – Guidelines for Planning Authorities, Office of Public Works and the Department of Environment, Heritage and Local Government, November 2009.
- Shannon CFRAM Study, Office of Public Works
- Ballinasloe SFRA