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PROPOSED MULTI-USE GAMES AREA, DUNGARVAN CO. WATERFORD

STAGE I FLOOD RISK ASSESSMENT

FINAL REPORT

Prepared for:
Waterford City & County Council

Prepared by:
Hydro-Environmental Services

DOCUMENT INFORMATION

Document Title:	**PROPOSED MULTI-USE GAMES AREA, DUNGARVAN, CO. WATERFORD** **STAGE I FLOOD RISK ASSESSMENT**
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1. INTRODUCTION

1.1 BACKGROUND

Hydro-Environmental Services (HES) were requested by Waterford City & County Council to undertake a Flood Risk Assessment (FRA) for the proposed Multi-Use Games Area (MUGA) at Ringnasilloge, Dungarvan, Co. Waterford. The Proposed Development Site is located in a coastal setting in the south of Dungarvan town. A site location map is shown below as **Figure A.**

This FRA is carried out in accordance with 'The Planning System and Flood Risk Management Guidelines for Planning Authorities' (DoEHLG, 2009).

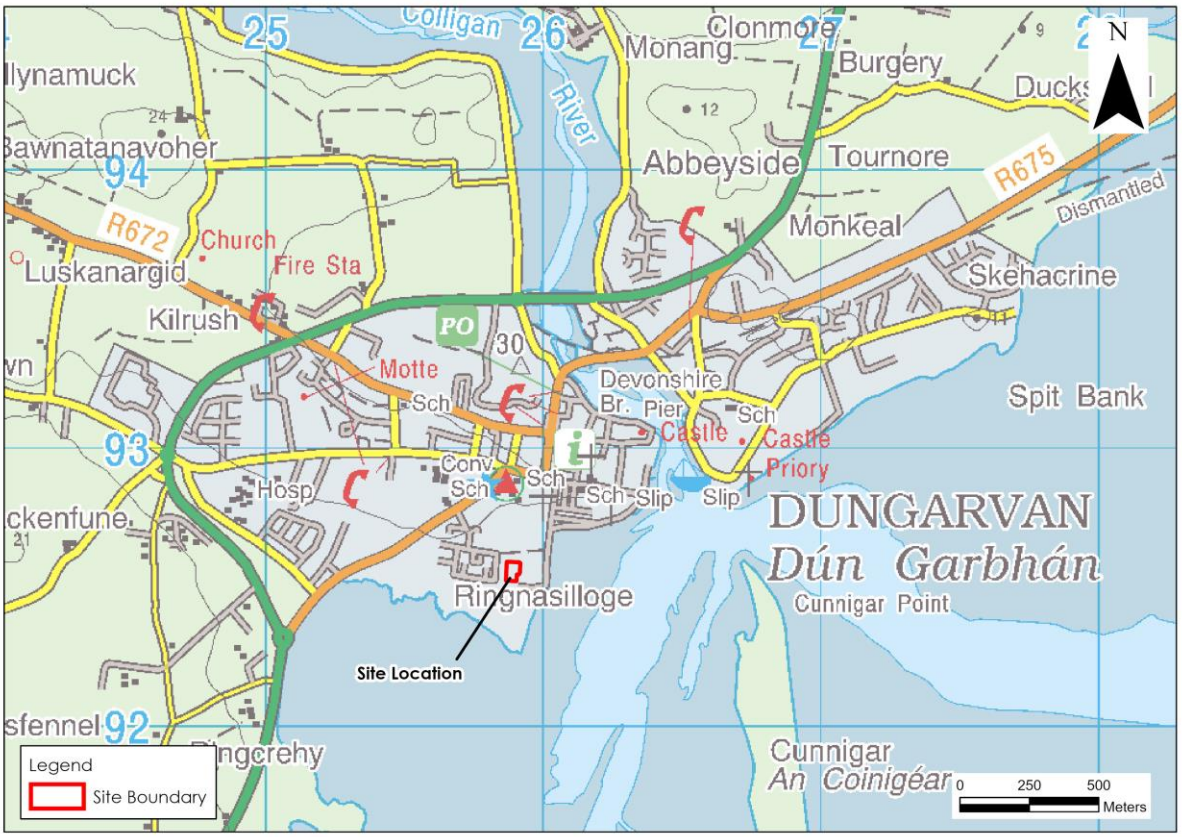

Figure A: Site Location Map

1.2 STATEMENT OF EXPERIENCE

Hydro-Environmental Services ("HES") are a specialist geological, hydrological, hydrogeological and environmental practice which delivers a range of water and environmental management consultancy services to the private and public sectors across Ireland and Northern Ireland. HES was established in 2005, and our office is located in Dungarvan, County Waterford.

Our core area of expertise and experience is hydrology and hydrogeology, including flooding assessment and surface water modelling. We routinely work on surface water monitoring and modelling, and prepare flood risk assessment reports.

Michael Gill (BA, BAI, Dip Geol., MSc, MIEI) is an Environmental Engineer and Hydrogeologist with over 22 years' environmental consultancy experience in Ireland. Michael has completed numerous hydrological and hydrogeological impact assessments of wind farms, housing

developments, and renewable projects in Ireland, as well as accompanying Flood Risk Assessments. He has substantial experience in surface water drainage design and SUDs design, surface water/groundwater interactions and flood risk assessment.

Jenny Law (BSc, MSc) is an environmental geoscientist holding a first honours degree in applied environmental geosciences from the University College Cork. Jenny has assisted in the preparation of the land, soils and geology and hydrology chapters for various environmental impact assessment reports, hydrological impact assessments, Water Framework Directive Assessment reports and Flood Risk Assessment reports for a variety of projects including wind farm developments and strategic housing developments.

1.3 REPORT LAYOUT & METHODOLOGY

This FRA report is structured as follows:

- Section 2 describes the Proposed Development Site setting and details of the Proposed Development;
- Section 3 outlines the hydrological and geological characteristics of the local surface water catchment in the vicinity of the Proposed Development Site;
- Section 4 deals with a site-specific FRA undertaken for the proposed development which was carried out in accordance with the above-mentioned guidelines; and,
- Section 5 presents the FRA conclusions.

As stated above, this FRA is carried out in accordance with 'The Planning System and Flood Risk Management Guidelines for Planning Authorities' (DoEHLG, 2009). The assessment methodology involves researching and collating flood related information from the following data sources:

- OPW Flood Studies Update (FSU) Web Portal;
- Geological Survey of Ireland (GSI) maps on superficial deposits;
- EPA hydrology maps;
- OPW Catchment Flood Risk Assessment & Management and National Indicative Fluvial Mapping; and,
- Waterford County Development Plan 2022 – 2028.

2. BACKGROUND INFORMATION

2.1 INTRODUCTION

This section provides details on the topographical setting of the Proposed Development Site along with a description of the proposed MUGA development.

2.2 SITE LOCATION AND TOPOGRAPHY

The proposed MUGA site is located in a grassed coastal setting, behind Dungarvan Sports centre and beside Dungarvan Youth and Community Centre, in the townland of Ringnasilloge. The Proposed Development Site spans across approximately 0.15 hectares in total and is located ~140m to the west of Dungarvan Harbour, and the mouth of the Colligan Estuary.

Current land cover within the Proposed Development Site, based on the available Environmental Protection Agency (EPA) CORINE land cover maps the area as part of the discontinuous urban fabric associated with Dungarvan town centre. This area is regularly used for informal football matches and other recreational activities. In the Waterford City and County Development Plan 2022-2028, the area is zoned as "Open Space and Recreation" with a stated objective to preserve and provide for open space and recreational amenities, which includes community facilities and playing fields. The Proposed Development Site is accessed by the 'cois tra' coastal road.

The Proposed Development Site is within a very low-lying coastal area with elevations ranging from 4 – 6.2m OD. Topography slopes to the east and south towards Dungarvan Bay.

A site location map is shown as **Figure A** above.

2.3 PROPOSED DEVELOPMENT DETAILS

The Multi-Use Games Area (MUGA) site is to include associated drainage, lighting, fencing and civil works. The proposal includes preparation and provision of pitch area, boundary treatments and all other associated site development works and services.

The proposal includes the following ancillary infrastructure:

- 2.5m high mesh fencing around the facility with 2.5m high ballstop netting and a single gate for access;
- Four column floodlighting system;
- 2m wide walking/running track surround;
- Surface lining to accommodate a variety of sports;
- Basketball hoops, nets and goals as required.

The proposed MUGA layout assessed in this FRA is shown as **Figure B** below.

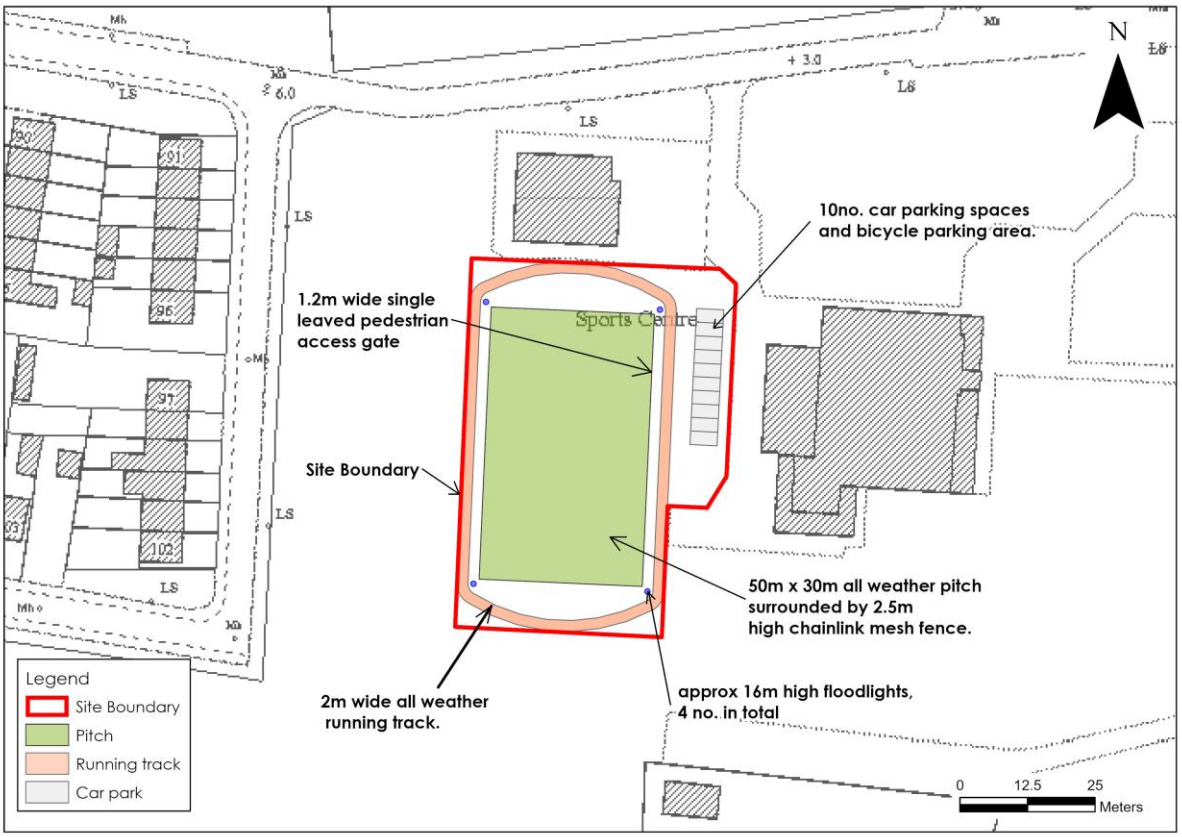

Figure B: Proposed MUGA Layout Map

3. EXISTING ENVIRONMENT AND CATCHMENT CHARACTERISTICS

3.1 INTRODUCTION

This section gives an overview of the hydrological and geological characteristics in the area of the Proposed Development Site.

3.2 BASELINE HYDROLOGY

3.2.1 Regional and Local Hydrology

Regionally, the proposed MUGA site is located in the Colligan-Mahon WFD catchment in Hydrometric Area 17 and the Colligan_SC_010 WFD sub-catchment of the South Eastern River Basin District (SERBD).

Locally, the entire Proposed Development Site lies within the Colligan_040 WFD river sub basin. The Colligan River originates from the western flanks of the Comeragh Mountains approximately 17km north from the Proposed Development Site (as the crow flies). The Colligan River discharges into the Colligan Estuary approximately 2.8km northwest of the MUGA site. As the Proposed Development Site is situated near the coastline, Colligan Estuary is mapped within 140m to the east of the MUGA site boundary (Refer to **Figure C** below).

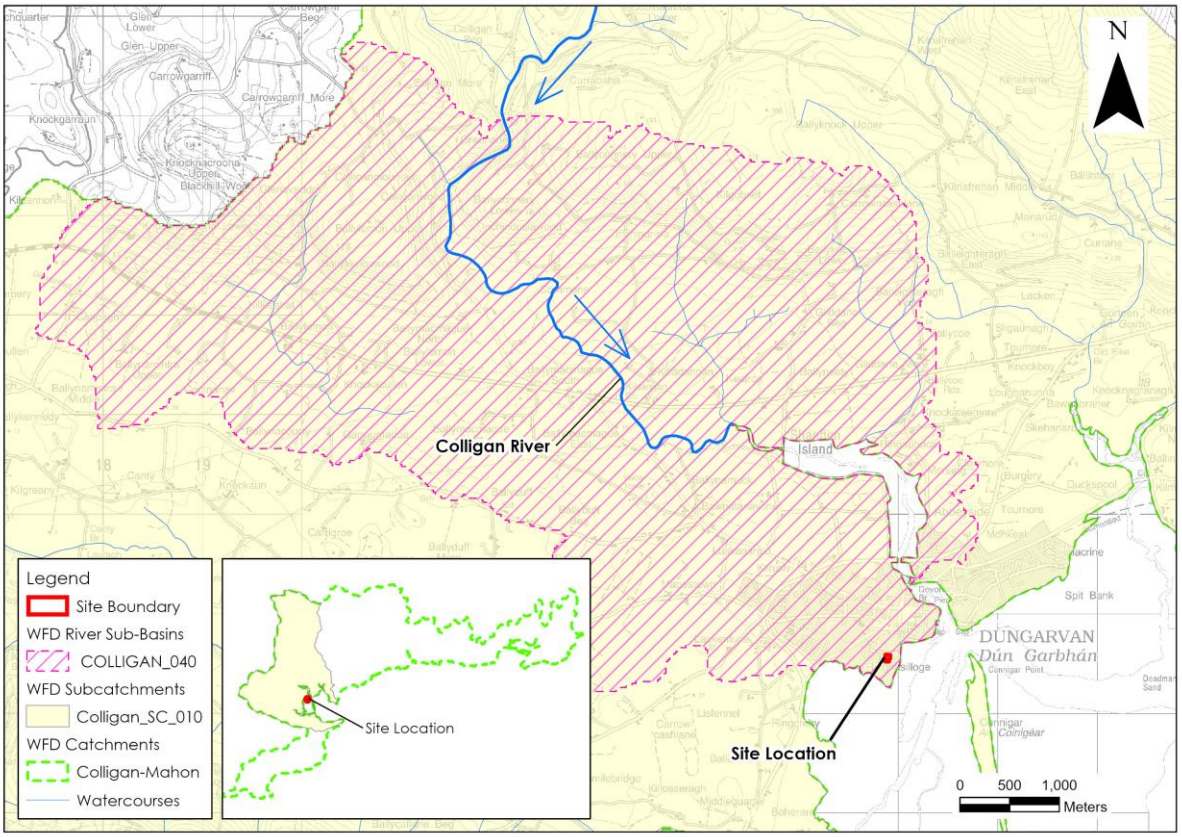

Figure C: Local Hydrology Map

3.2.2 Rainfall and Evaporation

The SAAR (Standard Average Annual Rainfall) recorded at Dungarvan (AGR.RES.STN) Rainfall Station, approximately 2.5km west of the Proposed Development Site, is 1,126mm. Average potential evapotranspiration (PE) is recorded at Cork, approximately 60km southwest of the MUGA site is 513.2m/year (www.met.ie). The actual evapotranspiration ("AE") is calculated to be 487.6mm (95% PE). Using the above figures, the effective rainfall ("ER")[1] for the area is calculated to be (ER = SAAR – AE) 638.4mm/year.

The proposed site has a recharge rate coefficient predominantly of 60% based on the groundwater recharge coefficient estimates from the GSI (www.gsi.ie). An estimate of 464mm/year average annual recharge is given for the area. Overall, the hydrology of the Proposed Development Site is characterised by moderate to high groundwater recharge rates and moderate to low surface water runoff rates. Therefore, conservative annual recharge rates are for the site are 464mm/year, whilst conservative runoff rates for the site are estimated to be 174.4mm/year.

Table A below presents return period rainfall depths for the area of the proposed MUGA site. These data are taken from https://www.met.ie/climate/services/rainfall-return-periods and they provide rainfall depths for various storm durations and sample return periods (1-year, 5-year, 30-year, 100-year).

Table A: Rainfall return period depths for MUGA site

	Return Period (Years)			
Duration	**1**	**5**	**30**	**100**
5 mins	3.9	5.6	8.2	10.4
15 mins	6.4	9.2	13.5	17.1
1 hour	11.6	16.8	24.5	31.1
6 hours	25	36.3	53	67.1
12 hours	33.7	48.9	71.5	90.4
24 hours	45.4	65.8	96.3	121.8
2 days	55.3	78.2	111.6	139.1

3.3 GEOLOGY

The published soil and subsoil map (**www.epa.ie**) for the area shows that the Proposed Development Site is underlain by acid brown earths/ brown podzolics soils that are deep, well drained and mainly acidic mineral soils (AminDW). Made land occupies the areas surrounding the Proposed Development Site towards the north, progressing into Dungarvan town centre. No alluvium soils are mapped within the Proposed Development Site.

The GSI subsoil mapping (www.gsi.ie) shows that subsoils within the Proposed Development Site are mapped as Till derived from Devonian sandstones (TDSs). Urban land is largely mapped around the perimeter of the subsoils within the MUGA site.

Based on the GSI bedrock mapping (www.gsi.ie) the Proposed Development Site and surrounding environs is underlain by Waulsortian Limestones which comprises Massive unbedded lime-mudstone. No bedrock outcrop is mapped within the Proposed Development Site by the GSI. However, two areas of kartsified bedrock outcrop or subcrop are mapped approximately 300m northeast and 350m north of the site respectively.

Heavily faulted areas are mapped by the GSI to the north and south of the Waulsortian limestones that underly the area. The nearest mapped fault is ~2.5km south of the Proposed Development Site. A large synclinal axis is also mapped ~1.18km to the west.

[1] *ER – Effective Rainfall is the excess rainfall after evaporation which produces overland flow and recharge to groundwater.*

3.4 DESIGNATED SITES & HABITATS

Within the Republic of Ireland, designated sites include Natural Heritage Areas (NHAs), Proposed Natural Heritage Areas (pNHAs), candidate Special Areas of Conservation (cSAC), Special Areas of Conservation (SAC) and Special Protection Areas (SPAs).

There are no designated sites mapped within the proposed MUGA development.

The Dungarvan Harbour SPA (Site Code: 004032) and pNHA (000663) is located just off the coastline of Dungarvan ~140m to the east of the Proposed Development Site at its closest.

Drainage and runoff from the proposed development site will likely indirectly drain to Dungarvan Harbour.

4. FLOOD RISK IDENTIFICATION

4.1 INTRODUCTION

The following assessment is carried out in accordance with '*The Planning System and Flood Risk Management Guidelines for Planning Authorities*' (DoEHLG, 2009). The basic objectives of these 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.

A stage 1 assessment of flood risk requires an understanding of where the water comes from (*i.e.* the source), how and where it flows (*i.e.* the pathways) and the people and assets affected by it (*i.e.* the receptors). It is necessary to identify whether there may be any flooding or surface water management issues related to the Proposed Development Site that may warrant further detailed investigation.

As per the guidance (DOEHLG, 2009), the stage 1 of a flood risk assessment comprises:

- *Flood risk identification* – identify whether there are surface water flooding issues at a site; and,
- *Initial flood risk assessment* - confirm sources of flooding that may affect a proposed development.

4.2 FLOOD ZONE MAPPING

Flood zones are geographical areas within which the likelihood of flooding is in a particular range. There are three types or levels of flood zones defined for these purposes according to OPW 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 areas of the plan which are not in zones A or B.

4.3 SOILS MAPS – FLUVIAL MAPS

A review of the soil types in the vicinity of the Proposed Development Site was undertaken as soils can be a good indicator of past flooding in an area. Due to past flooding of rivers deposits of transported silts/clays referred to as alluvium build up within the floodplain and hence the presence of these soils is a good indicator of potentially flood-prone areas.

Based on the EPA/GSI soil map (www.gsi.ie) for the area it appears that there are no areas of mineral alluvium soils mapped within the MUGA site. The closest mapped area of alluvium is situated approximately 680m to the west. Estuarine silts and clays are also mapped within the mouth of the Colligan estuary, approximately 590m north northeast of the Proposed Development Site, and additionally in an area ~760m to the north northwest of the Proposed Development Site.

4.4 HISTORICAL MAPPING

There is no text on local available historical 6" or 25" mapping for the proposed MUGA area that identify areas that are "*prone to flooding*" within the site.

An area approximately 200m to the west, southwest is denoted to be "Covered by Spring Tides" in historical 6" or 25" mapping.

4.5 OPW NATIONAL FLOOD EVENT MAPPING

No recurring flood incidents within the Proposed MUGA site boundary were identified from OPW's Past Flood Event Mapping.

Two single flood events, both recorded on the 3rd February 2014 are mapped by OPW in the vicinity of the Proposed Development Site, to the north and to the northeast respectively. The closest recurring flood event is 650m northeast of the MUGA site on the Colligan River [Flood ID: 3819] at Davitts Quay Lower in Dungarvan. The recurring event caused flooding of the Quay and a number of premises, particularly in October 2004, due to a combination of high tides, rainfall and winds (refer to **Figure D** below).

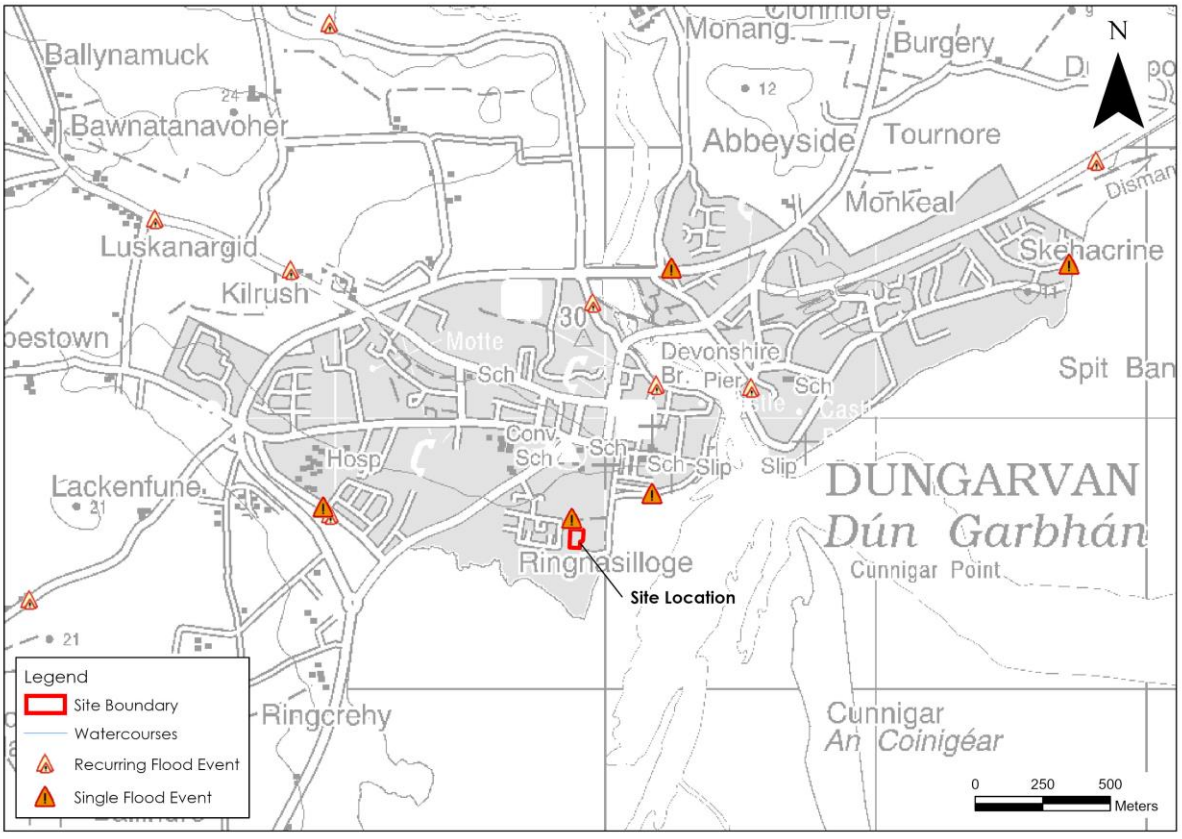

Figure D: OPW National Flood Event Mapping (Source: www.floodinfo.ie)

4.6 CFRAM FLOOD EXTENTS MAPPING – FLUVIAL AND COASTAL FLOODING

Where complete the Catchment Flood Risk Assessment and Management (CFRAM)[2] OPW Flood Risk Assessment Maps are now the primary reference for flood risk planning in Ireland.

The CFRAM River and Coastal Flood Extents for the present day shows the modelled extent of land that might be flooded by rivers and the sea in a moderate flood event. The probability of an area being flooded by rivers in a moderate flood event is divided into 3 no. categories; 'Low', 'Medium' and 'High' as described below:

- Low Probability flood events have an indicative 1-in-a-1000 chance of occurring or being exceeded in any given year. This is also referred to as an Annual Exceedance Probability (AEP) of 0.1%.
- Medium Probability flood events have approximately a 1-in-a-100 chance of occurring or being exceeded in any given year. This is also referred to as an Annual Exceedance Probability (AEP) of 1%.
- High Probability flood events have approximately a 1-in-a-10 chance of occurring or being exceeded in any given year. This is also referred to as an Annual Exceedance Probability (AEP) of 10%.

CFRAM River mapping is completed for the Colligan River in the vicinity of the MUGA site. Based on the CFRAM river mapping, the 10-year, 100-year and 1000-year flood zone of the Colligan River is mapped remotely from the MUGA site, ~670m to the northeast as it enters the Colligan Estuary.

CFRAM Coastal mapping is completed for the Colligan Estuary in the vicinity of the MUGA site. Based on the CFRAM Coastal mapping, the 10-year and 100-year flood zone of the Colligan Estuary is mapped remotely from the MUGA site, ~140m east at the coastline. The 1000-year flood zone of the Colligan Estuary encroaches slightly from the coastline onto lands nearing the Proposed Development Site. However, no 1000-year coastal CFRAM zone extents are mapped within the MUGA site boundary.

The CFRAM river and coastal mapping extents in the vicinity to the MUGA site have no direct hydrological connections with the Proposed Development Site.

CFRAM Flood Extents Mapping (Present Day) for the Proposed Development Site is shown in **Figure E** below.

[2] *CFRAM is Catchment Flood Risk Assessment and Management. The national CFRAM programme commenced in Ireland in 2011,and is managed by the OPW. The CFRAM Programme is central to the medium to long-term strategy for the reduction and management of flood risk in Ireland.*

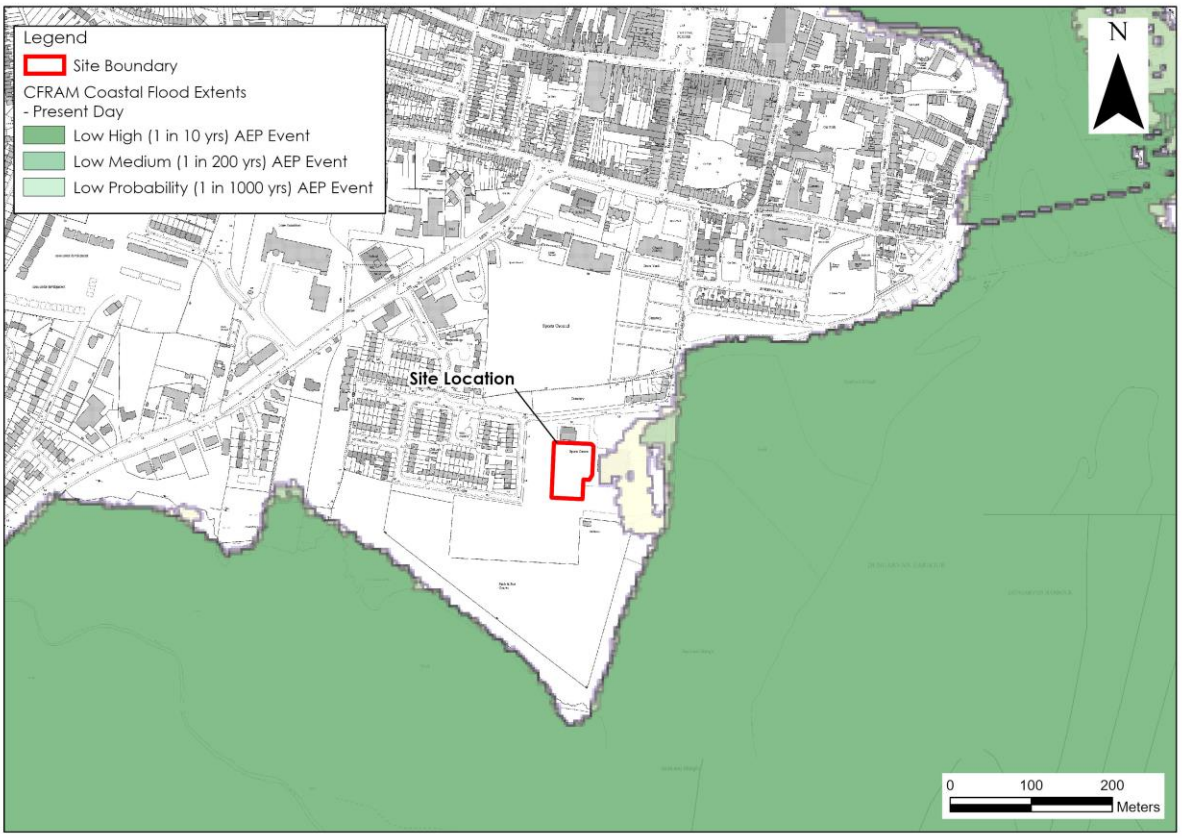

Figure E: CFRAM Present Day Mapping (Source: www.floodinfo.ie)

4.7 NATIONAL INDICATIVE FLUVIAL MAPPING – PRESENT DAY

The National Indicative Fluvial Flood Mapping (NIFM) (www.floodinfo.ie) shows probabilistic fluvial flood zones for catchments greater than 5km^2 for which flood maps were not produced under the CFRAM Programme.

The National Indicative Fluvial Mapping for the present day shows the modelled extent of land that might be flooded by rivers (fluvial flooding) during a theoretical or 'design' flood event with an estimated probability of occurrence, rather than information for actual floods that have occurred in the past.

No National Indicative Fluvial Mapping (NIFM) extents are mapped within or in the vicinity of the Proposed Development Site. The nearest NIFM 100-year and 1000-year flood zones are mapped along the Brickey River, approximately 3km to the southwest.

4.8 MODELLED FLOOD SCENARIOS ASSOCIATED WITH CLIMATE CHANGE

It is likely that climate change will have significant impacts on flooding and flood risk in Ireland due to rising sea levels, increased winter rainfall and more intense rainfall.

The CFRAM Programme has modelled flooding associated with potential future climate change scenarios. These CFRAM flood zones have been modelled for 2 no. potential future climate change scenarios, with the Mid-Range Future Scenario (MRFS)and High-End Future Scenario (HEFS) flood extents generated using an increase in rainfall of 20% and 30% respectively.

CFRAM river modelled flood extents show similar flood zones along the Colligan River to the Present Day Scenario discussed above in **Section 4.6**, with additional zones modelled to

extend extensively westwards from the Colligan River along the N25 within Dungarvan. These modelled zones do not encroach upon the MUGA site as they are ~700m north of the Proposed Development Site. Therefore, CFRAM River flood zones remain unlikely to encroach the Proposed Development Site even in future mid-range and high-range climate change scenarios.

CFRAM Coastal modelled flood extents show similar flood zones along the Colligan Estuary to the Present Day Scenario discussed above in **Section 4.6**, with additional zones modelled to progress even further inland from the coastline. With that being said, the High-end future scenario 1/1000 coastal flood zone does impinge upon the eastern boundary of the MUGA site. Overall, however, less than one third of the Proposed Development Site is located within High end future scenario 1/1000 flood zone. It is anticipated that the facility would be closed during severe weather events (1/1000 flood scenario).

Similarly, NIFM flood zones have been modelled for 2 no. potential future climate change scenarios, with the Mid-Range and High-End Future Scenario flood extents generated using an increase in rainfall of 20% and 30% respectively. These modelled flood extents show similar flood zones, to the southwest of the Proposed Development Site, to the Present Day Scenario discussed above in **Section 4.7**. Therefore, the fluvial flood zones are unlikely to be significantly impacted by future climate change and remain distant from the Proposed Development Site (3km to the southwest).

CFRAM Flood Extents Mapping (High End Future Scenario) is shown in **Figure F** below.

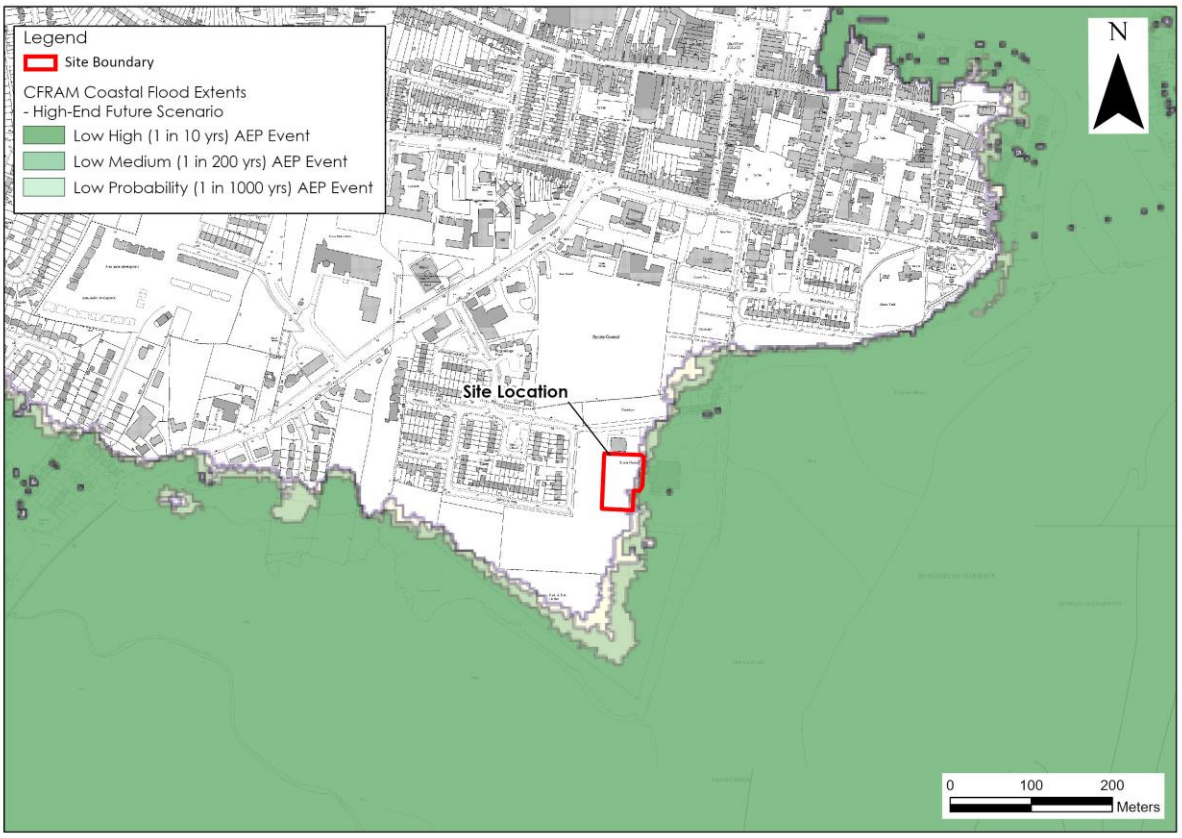

Figure F: CFRAM High End Future Scenario (Source: www.floodinfo.ie)

4.9 WINTER 2015/2016 SURFACE WATER FLOODING

The Winter 2015/2016 Surface Water Flooding map shows fluvial (rivers) and pluvial (rain) floods, excluding urban areas, during the winter 2015/2016 flood event (refer to **Figure G** below).

This map does not record any surface water flooding within the Proposed Development Site or in the surrounding areas. The closest mapped surface water flood zones for this flood event are mapped in a grassland area approximately 2.4km west of the MUGA site.

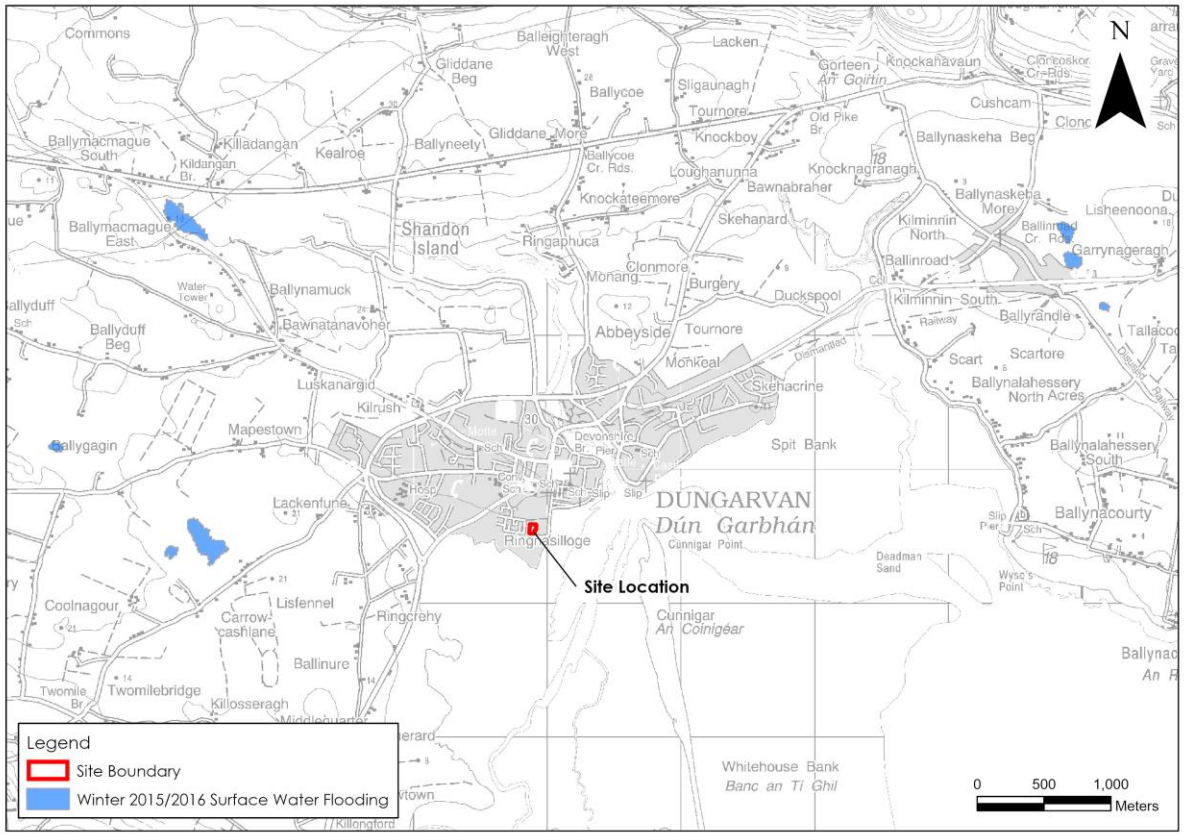

Figure G: GSI Winter 2015/2016 Flooding maps (Source: www.gsi.ie)

4.10 GROUNDWATER FLOODING

The GSI Historical Groundwater flood map and the modelled groundwater flood extents map (www.floodinfo.ie) do not show the occurrence of any groundwater flooding within the Proposed Development Site.

Furthermore, no modelled high, medium, or low probability groundwater flood zones are mapped in the Proposed Development Site or in the surrounding lands.

4.11 SUMMARY – FLOOD RISK IDENTIFICATION

Based on the information gained through the flood identification process, the Proposed Development Site is located outside of Flood Zones A and B. The Proposed Development Site is within 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).

When considering future climate change scenarios, a minor area (less than one third) of the Proposed Development Site is located within the coastal HEFS 1/1000 flood zone. However, it

is anticipated that the facility would be closed during severe weather events (1/1000 flood scenario).

4.12 INITIAL FLOOD RISK ASSESSMENT SURVEY

4.12.1 Hydrological Flood Conceptual Model

Potential flooding in the vicinity of the application site can be described using the Source – Pathway – Receptor Model (S-P-R).

There are no apparent sources of flooding at the MUGA site having considered tidal, fluvial and pluvial sources. Groundwater flooding is also not considered to be an issue at the Proposed Development Site.

The potential for coastal flooding is forecasted through the modelling of future climate change scenarios within a small area of the MUGA site. The primary potential source of flooding in this area, in a future climate change scenario, would be coastal with the combination of high tides, rainfall, wind and storm surge. The potential receptors in the area are infrastructure and land as outlined below.

4.12.2 Summary – Initial Flood Risk Assessment

Based on the information gained through the flood identification process and Initial Flood Risk Assessment process, the sources of flood risk for the proposed MUGA development are outlined and assessed in **Table B**.

Table B: Initial S-P-R Assessment of Flood Sources for the Proposed Development

Source	Pathway	Receptor	Comment
Tidal	High Tides and rising sea levels combined with intense rainfall events and storm surge.	Land and infrastructure.	The proposed site is ~140m from the coast. Based on the CFRAM Present Day flood mapping the MUGA site is located within in a 1000-year flood zone (Flood Zone C) and there is no current risk of coastal flooding. HEFS CFRAM flood zones are predicted in a minor area towards the very eastern portion of the MUGA site. However, it is anticipated that the facility would be closed during severe weather events. Proposed infrastructure consists of an all-weather pitch, running track, fencing etc. These amenities are not considered to be vulnerable to coastal flooding.
Fluvial	Overbank flooding	Land and infrastructure.	CFRAM and NIFM fluvial mapping extents do not encroach the application site boundary. Therefore, the Proposed Development Site is located in Fluvial Flood Zone C.
Pluvial	Ponding of rainwater on the route right of way.	Land and infrastructure.	No pluvial flooding is mapped within the site boundary.
Surface water	Surface ponding/	Land and	Same as above (pluvial).

	Overflow.	infrastructure	
Groundwater	Rising groundwater levels.	Land and infrastructure.	Based on local hydrogeological regime and GSI mapping, there is no apparent risk from groundwater flooding at the site.

4.13 REQUIREMENT FOR A JUSTIFICATION TEST

The matrix of vulnerability versus flood zone to illustrate appropriate development and that required to meet the Justification Test[3] is shown in **Table C** below.

The Proposed Development Site is considered to be 'water compatible' due to the nature of the MUGA infrastructure proposed. The proposed infrastructure, mainly consisting of on all-weather pitch, flood lighting, mesh fencing and a running track will involve minimal construction works. The installation of the above will not have an impact on local flow paths and drainage, as the development will resemble the current existing hydrogeological setting at the site. Furthermore, the placing of the MUGA in this location will not restrict access to nearby coastal flood barriers.

Additionally, the presence of the MUGA at this location will not cause any displacement of flood waters as the entire MUGA Site is located in fluvial Flood Zone C according to present day CFRAM and NIFM mapping.

Therefore, the Proposed Development Site is appropriate, from a flood risk perspective, and a Justification Test is not required.

Table C: Matrix of Vulnerability versus Flood Zone

	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**

Note: Taken from Table 3.2 (DoEHLG, 2009)
***Bold:** Applies to this project.*

[3] *A 'Justification Test' is an assessment process designed to rigorously assess the appropriateness, or otherwise, of particular developments that are being considered in areas of moderate or high flood risk, (DoEHLG, 2009).*

5. REPORT CONCLUSIONS

5.1 CONCLUSIONS

- A flood risk identification study was undertaken to identify existing potential flood risks associated with the proposed MUGA site at Ringnasilloge, Dungarvan, Co. Waterford. From this study:
    - No instances of historical flooding were identified in historic OS maps;
    - No instances of recurring flooding were identified on OPW maps within the Proposed Development Site;
    - The GSI Groundwater Flood Mapping does not record any historic or predictive groundwater flood zones within the Proposed MUGA Site; and,
    - No portion of the Proposed Development Site was identified within the present day NIFM Flood Zones
- The present day CFRAM Coastal Flood mapping indicates that coastal flooding does occur along the Colligan Estuary in the vicinity of the Proposed Development Site, yet no coastal flooding mapped extents are mapped to infringe on the site boundary;
- The High End Future Scenario (HEFS) CFRAM Coastal Flood mapping indicates that coastal flooding is modelled to occur in a minor area towards the very eastern portion of the Proposed Development Site;
- It is anticipated that the facility would be closed during such future severe weather events;
- As the MUGA proposal is largely at existing ground level, it will not result in alterations to drainage existing drainage flow paths, access to flood barriers, nor will it cause any displacement of flood waters; and,
- The overall risk of flooding posed by the development of the MUGA area and associated works within the Proposed Development Site is negligible.

* *

6. REFERENCES

AGMET	1996	Agroclimatic Atlas of Ireland.
Waterford City & County Council	2022	Waterford County Development Plan 2022-2028
DOEHLG	2009	The Planning System and Flood Risk Management.
Met Eireann	1996	Monthly and Annual Averages of Rainfall for Ireland 1961-1990.

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