222102 – Residential Development, Fortfield Road, Terenure

Site Specific Flood Risk Assessment

222102-PUNCH-XX-XX-RP-C-0003

December 2024

Document Control

Document Number: 222102-PUNCH-XX-XX-RP-C-0003

Status	Rev	Description	Date	Prepared	Checked	Approved
A0	C01	Stage 2 LRD Submission	07/03/2024	C. Shannon	J. Tiernan	P. Casey
A0	C02	Stage 2 LRD Submission	11/03/2024	C. Shannon	J. Tiernan	P. Casey
A0	C03	Stage 3 LRD Submission	02/08/2024	C. Shannon	J. Tiernan	P. Casey
A0	C04	Stage 3 LRD Submission	15/08/2024	C. Shannon	J. Tiernan	P. Casey
A0	C05	Stage 3 LRD Submission	01/11/2024	C. Shannon	J. Tiernan	P. Casey
A0	C06	Stage 3 LRD Submission	25/11/2024	C. Shannon	J. Tiernan	P. Casey
A0	C07	Stage 3 LRD Submission	02/12/2024	C. Shannon	J. Tiernan	P. Casey

Table of Contents

1 Executive Summary

PUNCH Consulting Engineers were appointed to carry out a Site-Specific Flood Risk Assessment (SSFRA) for a proposed development at Fortfield Road, Terenure, Dublin 6W. This SSFRA report evaluates the potential flood risks to the site, ensuring that the development proposals are safe, sustainable, and resilient to flooding. The following document forms part of the planning application to be submitted to Dublin City Council and should be reviewed alongside the planning drawings prepared by Urban Agency Architects.

A flood risk identification exercise was undertaken for the development site as part of this SSFRA which revealed that the pond within the site has not been included in the Catchment Flood Risk Assessment and Management Study (CFRAMS) for the area. Additionally, a review of the Dublin City Development Plan (DP) 2022-2028 Strategic Flood Risk Assessment (SFRA) mapping showed the site to be partially located within Flood Zones A and B.

To adequately assess the flood risk from the pond within the site, a 1D hydraulic model of the water-feature was developed and analysed. The results of the hydraulic modelling indicate that flood waters from the 1%AEP and 0.1%AEP events are retained within the contoured lands around the pond and do not pose a flood risk to the proposed development.

To further investigate the flooding shown on the Dublin City DP SFRA mapping, PUNCH consulted Dublin City Council (DCC) and Nicholas O'Dwyer, their appointed engineers for the Poddle Flood Alleviation Scheme, and confirmed that the flooding is pluvial in nature. Section 2.24 of the OPW's "The Planning System and Flood Risk Management Guidelines" states that *"..flood zones are determined on the basis of the probability of river and coastal flooding only.."*. This point is echoed in Section 1.4.1 of the Dublin DP 2022-2028 SFRA report. As pluvial flooding should not be used in the designation of flood zones, and in the absence of any identifiable fluvial or coastal flood risk to the site, it is concluded that the proposed development site is wholly located in Flood Zone C.

To alleviate concerns relating to pluvial flooding at the site, the associated pluvial flow paths and flood volumes were examined. A proposal has been developed, in direct consultation with DCC, to address the pluvial flooding on Fortfield Road, which includes the provision of a detention basin within the proposed development site boundary. These flood alleviation measures will also remove pluvial flooding from a section of Fortfield Road for storm events up to and including the 1%AEP event, offering a significant reduction in pluvial flood risk to that area over existing conditions. A further exercise was carried out which confirmed that there is sufficient storage available within the site to ensure that the development will not flood even in the extreme 0.1%AEP pluvial event. The redevelopment of the site will not adversely affect pluvial flood levels or extents in the area.

To mitigate against fluvial flood risk to the site, the Finished Floor Levels (FFL) of the ground floor of the proposed buildings will be set at or above 48.0mOD. This level equates to the 0.1%AEP fluvial flood level including a 20% allowance for climate change and 300mm freeboard. The proposed basement will be isolated from the flood zone and the entrance will be set at a level at or above 48.0mOD.

It is asserted that the proposed development site is wholly located in Flood Zone C and therefore a Justification Test is not strictly required as part of this SSFRA report. However, given that the site is shown within Flood Zones A and B on the DP SFRA mapping it was deemed prudent to complete the Justification Test.

The mitigation measures proposed in this SSFRA will ensure that the development is in compliance with the relevant sections of the Dublin City DP as well as in full compliance with the Dublin City DP SFRA and OPW's The Planning System & Flood Risk Management Guidelines.

2 Introduction

2.1 Background

PUNCH Consulting Engineers were appointed to carry out a Site-Specific Flood Risk Assessment for a proposed development at Fortfield Road, Terenure, Dublin 6W.

The assessment is carried out in full compliance with the requirements of "The Planning System & Flood Risk Management Guidelines" published by the Department of the Environment, Heritage and Local Government in November 2009.

The proposed site layout is detailed in a series of planning drawings provided by Urban Agency Architects in the planning documentation.

2.2 Existing Site

The site location is shown in Figure 2-1 below.

The site currently consists of playing fields and an open artificial drainage pond. The site is bounded to the west by Fortfield Road and to the east by Lakelands Park. The site also adjoins Terenure College to the south, Terenure College Rugby Football Club to the northeast and the rear of residential dwellings on Greenlea Road to the north-west.

Figure 2-1: Location of the Proposed development (© Geohive)

2.3 Nature of the Proposed Development

The development will comprise a Large-Scale Residential Development (LRD) on a site at Fortfield Road, Terenure of 284 no. units delivering 19 no. houses and 265 no. apartments made up of studios; 1 beds; 2 beds; 3 beds; and 4 beds. The development will also provide community, cultural and arts space and a creche. Communal internal space for residents will also be delivered. Provision of car, cycle and motorbike parking will be provided throughout the development, including at basement and surface level. Vehicular/pedestrian/cyclist access from Fortfield Road. Proposed upgrade works to the surrounding road network is also included. All associated site development works, open space, services provision, ESB substations, plant areas, waste management areas, landscaping (both public and communal) and boundary treatments.

The proposed works are outlined in a series of architectural drawings prepared by Urban Agency Architects and engineering drawings prepared by PUNCH and supplied as part of the planning documentation.

The proposed site layout is shown in Figure 2-2 below.

It is not proposed to alter the topography of the existing drainage pond in any way.

Figure 2-2: Proposed Site Layout (© Urban Agency Architects)

3 Relevant Guidance

3.1 The Planning System and Flood Risk Management Guidelines

In September 2008, "The Planning System and Flood Risk Management" Guidelines were published by the Department of the Environment, Heritage and Local Government in Draft Format. In November 2009, the adopted version of the document was published.

The Flood Risk Management Guidelines give guidance on flood risk and development. The guidelines recommend a precautionary approach when considering flood risk management in the planning system. The core principle of the guidelines is to adopt a flood risk sequential approach to managing flood risk and to avoid development in areas that are at risk. The sequential approach is based on the identification of flood zones for river and coastal flooding. The guidelines include definitions of Flood Zones A, B and C, as noted in Table 3-1 below. It should be noted that these do not take into account the presence of flood defences, as there remain risks of overtopping and breach of the defences.

Table 3-1: Flood Zone Designation

Flood Zone	Type of Flooding	Annual Exceedance Probability (AEP)
Flood Zone A	Coastal	Less than a 1:200 (0.5% AEP) year event
	Fluvial	Less than a 1:100 (1% AEP) year event
Flood Zone B	Coastal	Greater than a 1:200 (0.5% AEP) and less than a 1:1000 (0.1% AEP) year event
	Fluvial	Greater than a 1:100 (1% AEP) and less than a 1:1000 (0.1% AEP) year event
Flood Zone C	Coastal	Greater than a 1:1000 (0.1% AEP) year event
	Fluvial	Greater than a 1:1000 (0.1% AEP) year event

Once a flood zone has been identified, the guidelines set out the different types of development appropriate to each zone. Exceptions to the restriction of development due to potential flood risks are provided for through the use of the **Justification Test**, where the planning need and the sustainable management of flood risk to an acceptable level must be demonstrated. This recognises that there will be a need for future development in existing towns and urban centres that lie within flood risk zones, and that the avoidance of all future development in these areas would be unsustainable.

A three staged approach to undertaking an FRA is recommended:

Stage 1: Flood Risk Identification – Identification of any issues relating to the site that will require further investigation through a Flood Risk Assessment;

Stage 2: Initial Flood Risk Assessment – Involves establishment of the sources of flooding, the extent of the flood risk, potential impacts of the development and possible mitigation measures;

Stage 3: Detailed Flood Risk Assessment – Assess flood risk issues in sufficient detail to provide quantitative appraisal of potential flood risk of the development, impacts of the flooding elsewhere and the effectiveness of any proposed mitigation measures.

This report addresses the requirements for Stage 3.

3.2 Dublin City Development Plan 2022-2028

The proposed site is located within lands covered by the Dublin City Council Development Plan 2022-2028 which states the following with regard to flood risk:

- SI13 - To minimise the flood risk in Dublin City from all other sources of flooding as far as is practicable, including fluvial, coastal, reservoirs and dams, the piped water system, and potential climate change impacts.
- SI 14 - To implement and comply fully with the recommendations of the Strategic Flood Risk Assessment prepared as part of the Dublin City Development Plan 2022-2028, including all measures to mitigate identified climate change and flood risks, including those recommended under Part 3 (Specific Flood Risk Assessment) of the Justification Tests, and to have regard to the Flood Risk Management Guidelines (2009), as revised by Circular PL 2/2014, when assessing planning applications and in the preparation of statutory and nonstatutory plans.
- SI 15 - All development proposals shall carry out, to an appropriate level of detail, a Site-Specific Flood Risk Assessment (SSFRA) that shall demonstrate compliance with:
    - The Planning System and Flood Risk Management, Guidelines for Planning Authorities, Department of the Environment, Community and Local Government (2009), as revised by Circular PL 2/2014 and any future amendments, and the Strategic Flood Risk Assessment (SFRA) as prepared by this development plan.
    - The application of the sequential approach, with avoidance of highly and less vulnerable development in areas at risk of flooding as a priority and/ or the provision of water compatible development only. Where the Justification Test for Plan Making and Development Management have been passed, the SSFRA will address all potential sources of flood risk and will consider residual risks including climate change and those associated with existing flood defences. The SSFRA will include site specific mitigation measures, flood-resilient design and construction, and any necessary management measures (the SFRA and Appendix B of the above-mentioned national guidelines refer). Attention shall be given in the site-specific flood risk assessment to building design and creating a successful interface with the public realm through good design that addresses flood concerns but also maintains appealing functional streetscapes. Allowances for climate change shall be included in the SSFRA.
    - On lands where the Justification Test for Plan Making has been passed and where a small proportion of the land is at significant risk of flooding, the sequential approach to development will be applied, and development will be limited to Minor Development (Section 5.28 of the Planning System and Flood Risk Management Guidelines 2009) on the portion at significant risk of flooding. There will be a presumption against the granting of permission for highly or less vulnerable development which encroaches onto or results in the loss of the flood plain. Water compatible development only will be considered in such areas at risk of flooding which do not have existing development on them.
- SI 21 - To minimise flood risk arising from pluvial (surface water) flooding in the City by promoting the use of natural or nature-based flood risk management measures as a priority, by requiring the use of sustainable drainage systems (SuDS) to minimise and limit the extent of hard surfacing and paving, and requiring the use of sustainable drainage techniques, where appropriate, for new development or for extensions to existing developments, in order to reduce the potential impact of existing and predicted flooding risk and to deliver wider environmental and biodiversity benefits, and climate adaption.

3.2.1 Strategic Flood Risk Assessment

The Fortfield Road area falls within Area 16A (Poddle: Terenure Road West, Templeogue Road to City Boundary) in Appendix B (Area Assessment and Justification Test Tables) of this document. The SFRA states the following in relation to development in this area:

Residential development (mainly infill) with a small amount of commercial would be a natural extension of existing development in this area.

3.3 Land Zoning

The land on which the development is proposed is currently zoned primarily as "Zone Z15 – Community and Social Infrastructure" with a small portion zoned as "Zone Z1 – Sustainable Residential Neighbourhood". The lake area is zoned as "Zone 11 Waterways Protection" in the Dublin City Council Development Plan 2022-2028.

4 Flood Risk Identification

4.1 Existing Hydrogeological Environment

The existing hydrological environment is characterised primarily by the presence of an open drainage pond located on the site. According to the drainage records the pond is fed from an existing off-take on the River Poddle, known as Lakelands Overflow, which is located at Wainsfort Manor to the west of the subject site. The overflow is piped underground via a 1230mm x 1230mm concrete box culvert for a distance of 1.4km before discharging into the pond. The pond discharges to the River Dodder located to the southeast of the subject site via a 1450mm x 1480mm concrete box culvert. The existing hydrogeological arrangement is shown in Figure 4-1.

Figure 4-1: Existing Hydrogeological Environment.

Figure 4.14.22 from the Eastern CFRAM Study HA09 Hydraulics Report, replicated here as Figure 4-2, shows the approximate route of the Lakelands Overflow.

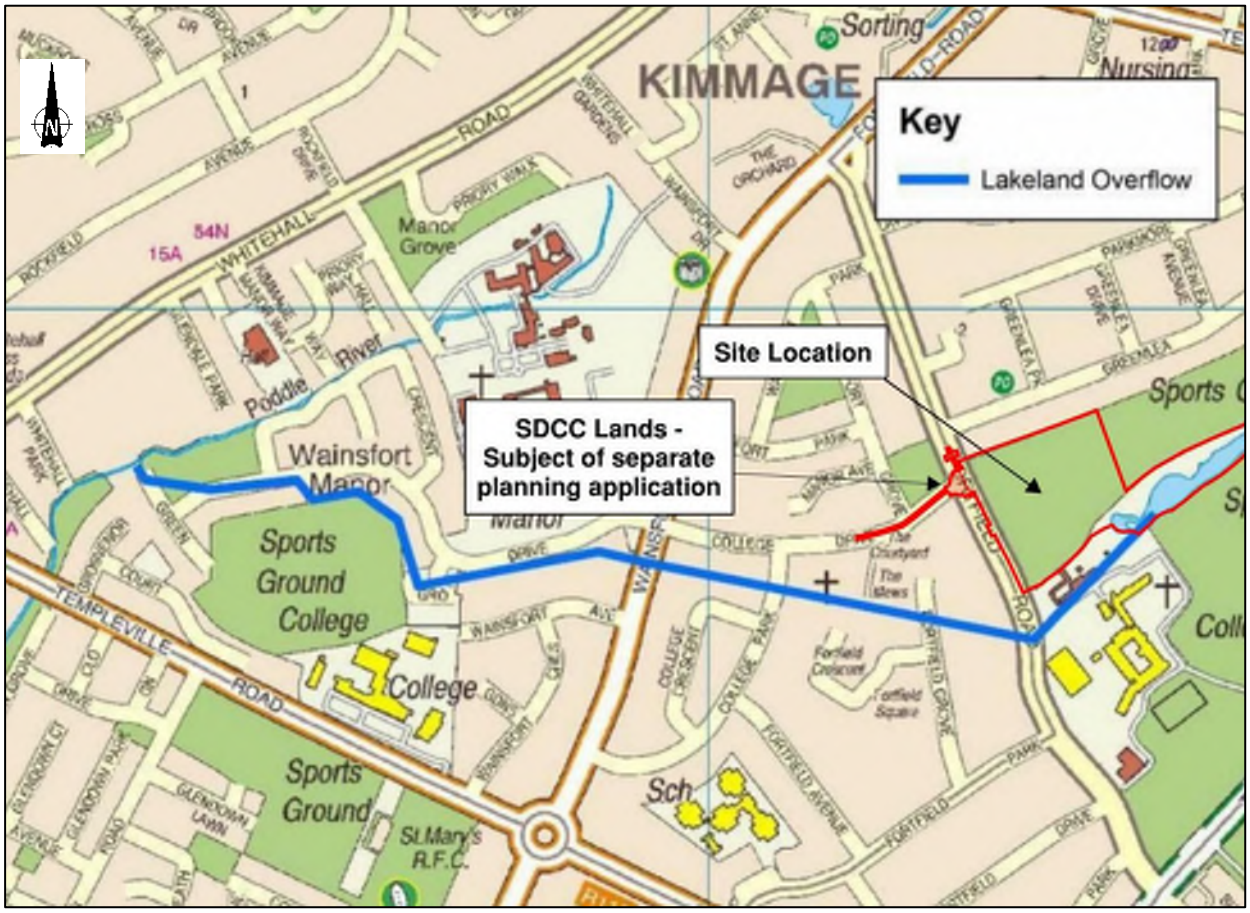

Figure 4-2: Route of Lakelands Overflow

4.2 Topographical Survey

A topographical survey of the site and its environs was completed by Murphy Geospatial in February 2022. The survey indicates that the ground level within the site varies from approximately 48.5m AOD at the south-western corner, to 47.0m AOD at the north-eastern corner of the site. In general, the site slopes gently in a north westerly direction. The topographic survey includes the pond to the east. Topographic survey drawings are provided in Appendix A. There have been no significant changes to the are since the completion of the topographic survey in 2022.

The profile of the pond was surveyed at 27 no. locations. The locations of the surveyed cross sections are shown with red markers in Figure 4-3.

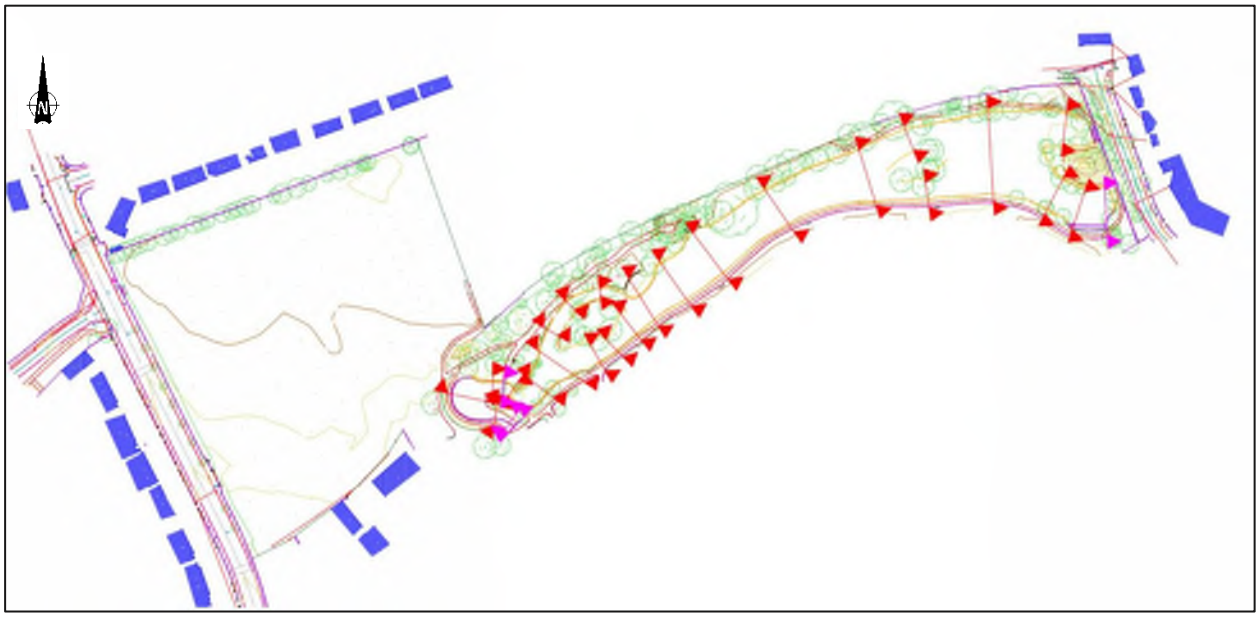

Figure 4-3: Topographical Survey Extent

4.3 Site Walkover

PUNCH Consulting Engineers visited the site on 14th of April 2022 and 22nd February 2024 to identify the key features of the site, to establish any potential sources of flooding and to identify the likely routes of flood waters. Appendix B contains a selection of key images taken during this site visit.

The following was established from the site visit and review of the topographical survey:

a) The site has a gentle slope, south-west to north-east;
b) Lands around the perimeter of the pond are raised;
c) There is a well maintained pedestrian path around the pond;
d) There were 4 no. weirs identified in the pond;
e) The downstream weir discharges into a large concrete trapezoidal channel;
f) There are two small islands within the pond;
g) A trash screen was noted immediately upstream of the inflow culvert;
h) Reeds were identified on the banks of the pond;
i) Mature trees were identified along the left bank and on the small islands;
j) There is a pedestrian arch-bridge crossing the pond;
k) The ground was dry at the time of visiting;

4.4 Site Geology

The geology of the site was reviewed using data from the Geological Survey of Ireland (available at www.gsi.ie). The soil type at the location of the proposed development is identified as 'Deep well drained material (mainly basic)' as shown in Figure 4-4. The surrounding areas comprise mainly 'Made Ground' with some areas of poorly drained mineral to the southeast.

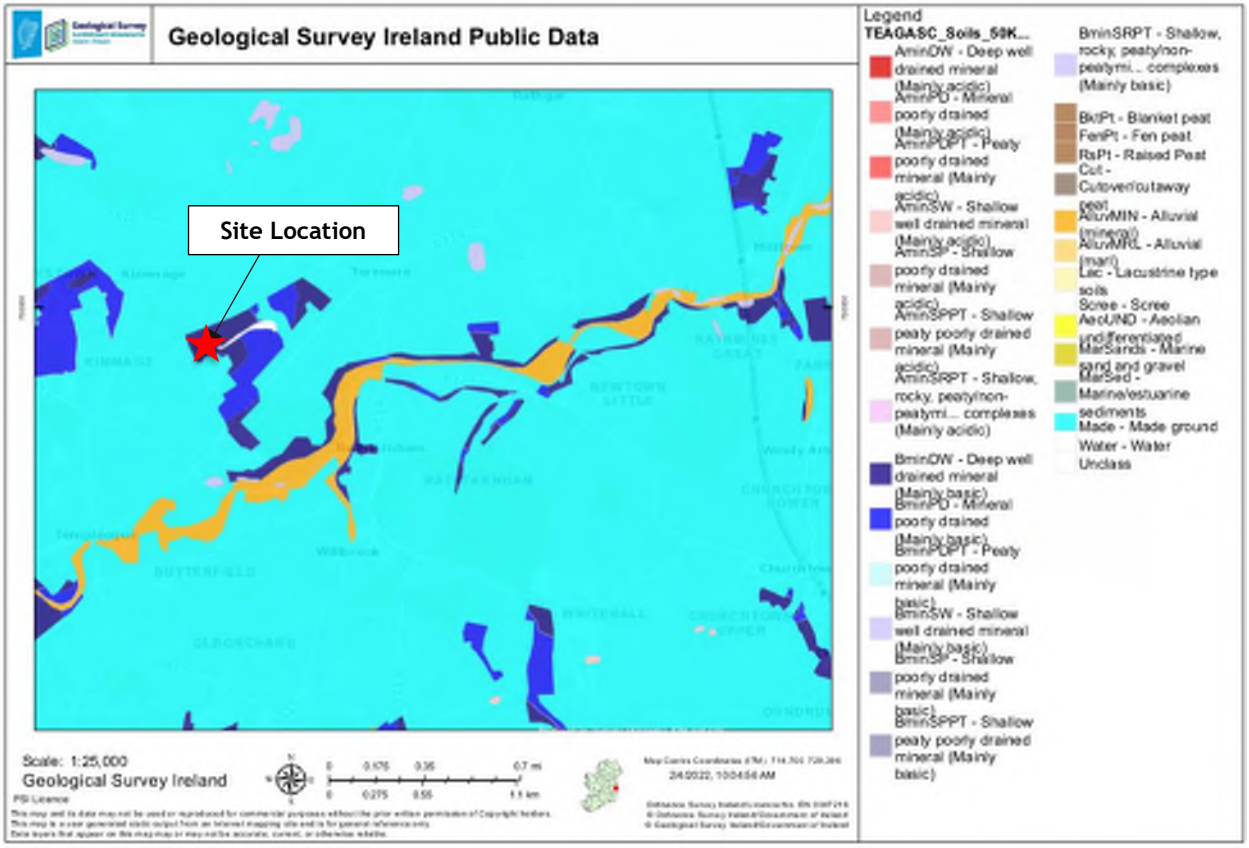

Figure 4-4: Geology of the surrounding area (source: Geological Survey of Ireland)

4.5 Review of Historic Mapping

A review of the OSI Historical maps[1] was carried out. Figure 4-5 shows an extract from the 25-inch historic map for the site. The historic OSI records illustrate the historic "fish pond" consistent with its contemporary arrangement.

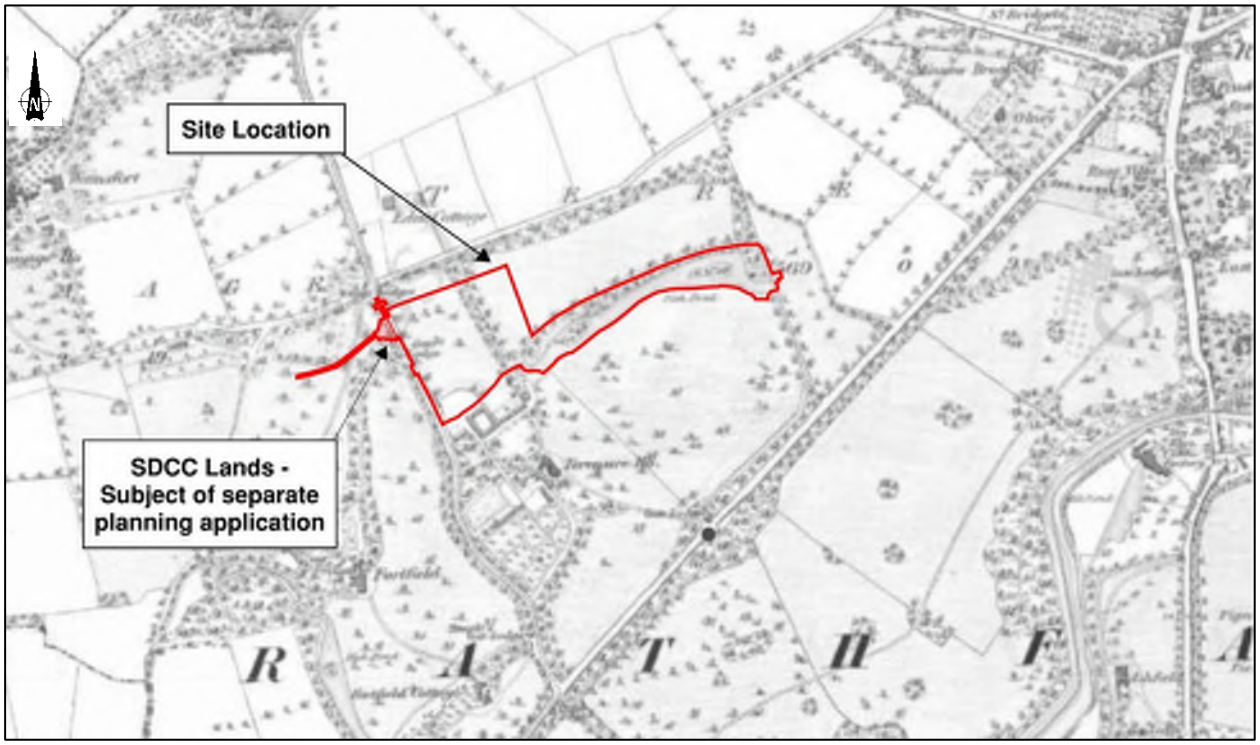

Figure 4-5: Extract from OSI historical 25-inch map (© OSI)

[1] Maps available: http://map.geohive.ie/mapviewer.html

4.6 History of Flooding

The Office of Public Works (OPW) Flood Hazard Mapping website holds a record of historic flood events. A review of the database indicates that there have been no instances of flooding on the proposed site as shown in Figure 4-6. The closest historic flood event is located approximately 450m to the north of the site on Wainsfort Road. See Appendix C for full report. Please note that this is not a guaranteed record of all flood events.

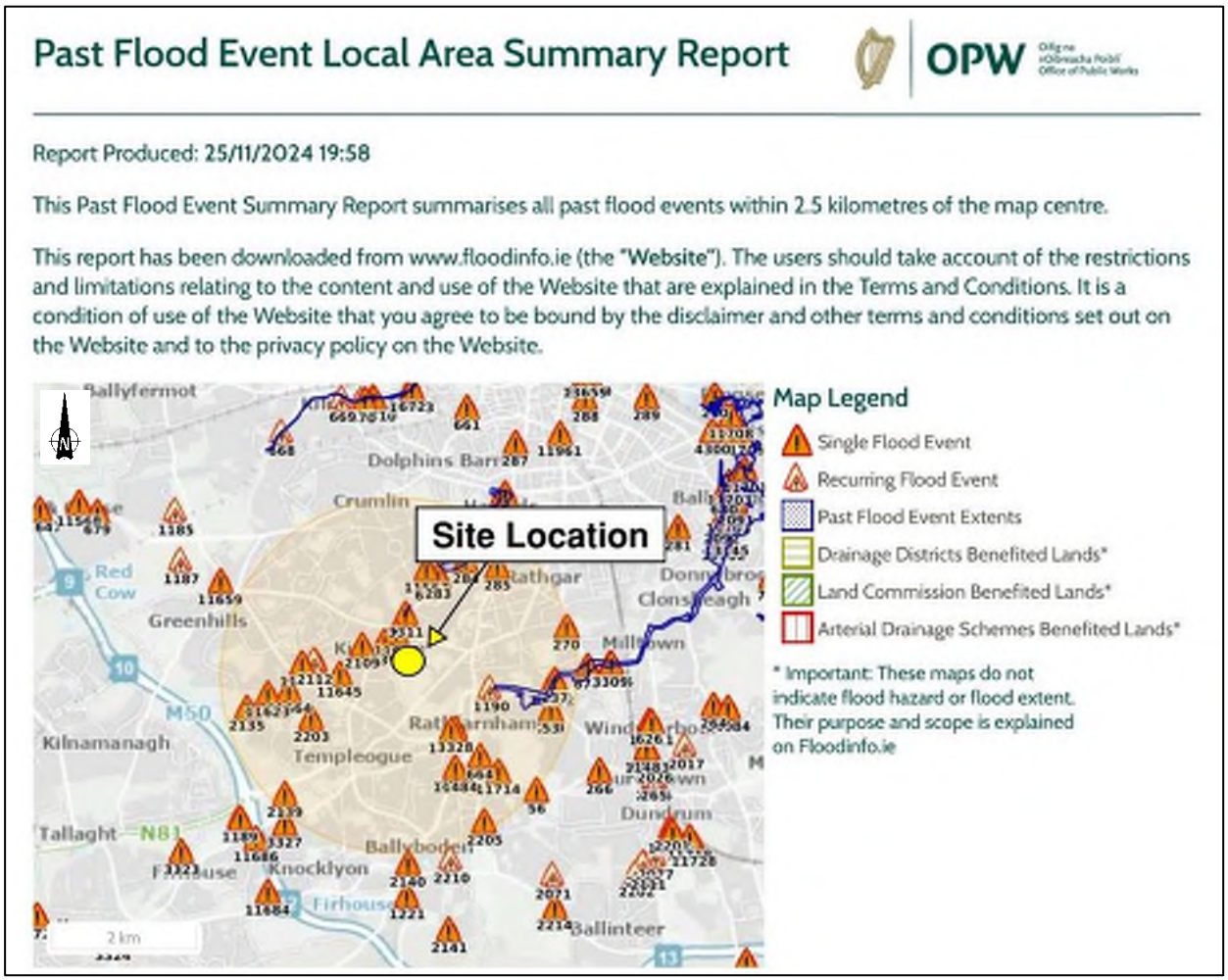

Figure 4-6: Extract from OPW Floodmaps Database Report Appendix C

http://www.floodmaps.ie/index.aspx?ReturnUrl=%2fView%2fDefault.aspx

4.7 DCC Development Plan Strategic Flood Risk Assessment

A Strategic Flood Risk Assessment (SFRA), prepared as part of the DCC Development Plan 2022-2028, includes Flood Zone mapping for the Fortfield Road area and highlights some areas of flood risk concern. Figure 4-7 below is a copy of the SSFRA flood zone mapping for the Fortfield Road area (Area 16A).

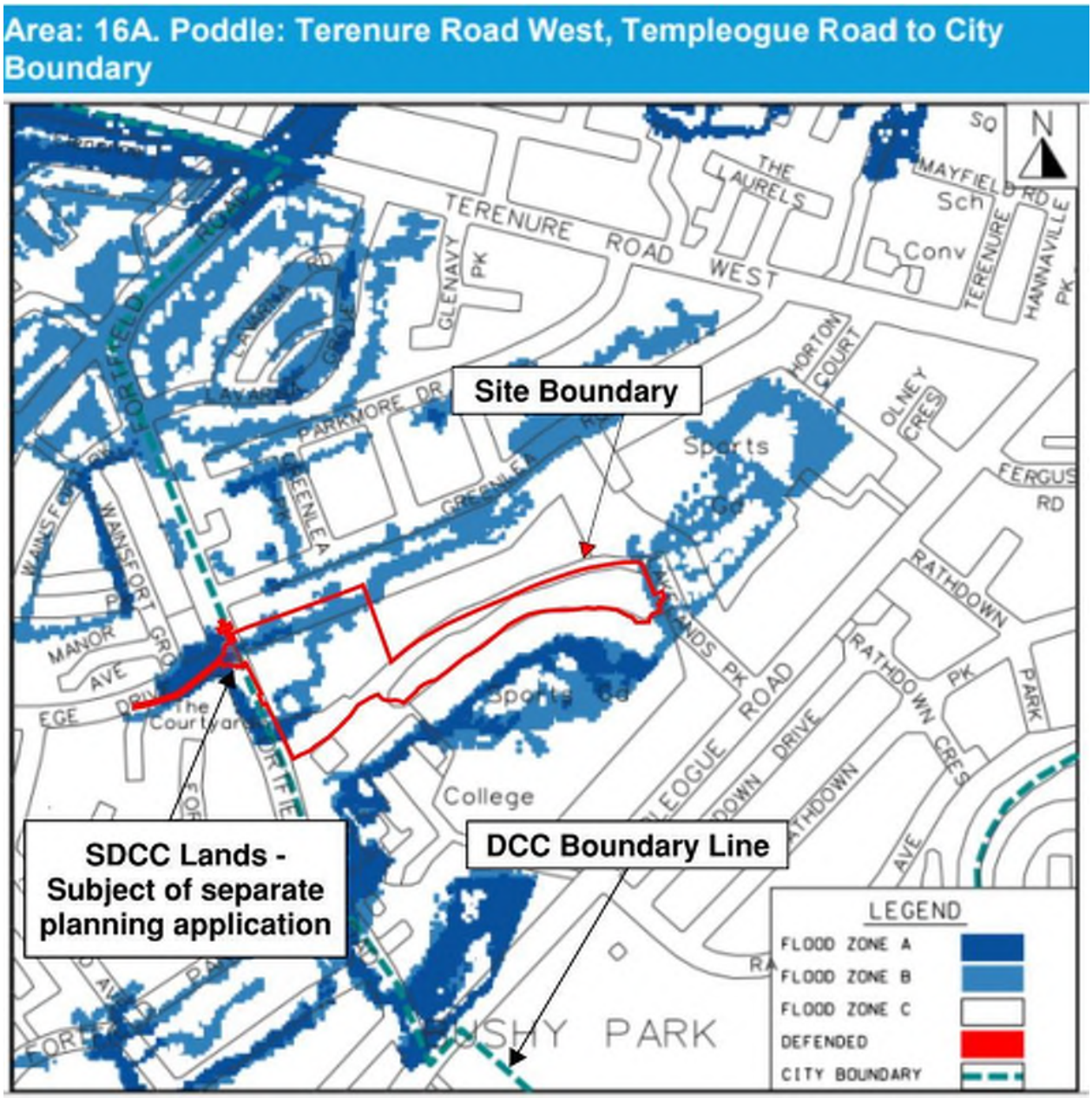

Figure 4-7: SSFRA Flood Zone Map for Area 16A.

According to the DCC Development Plan SFRA Flood Zone Map of the area, the development site is shown to be at risk of flooding and is partially located in Flood Zones A and B. It should be noted, however, that the flooding within the site, shown in Figure 4-7, is pluvial in nature, see Section 4.9 for more detail.

4.8 Groundwater Flooding

Groundwater flooding occurs when the level of the water stored in the ground rises as a result of prolonged rainfall. A review of data from the Geological Survey of Ireland (www.gsi.ie), does not indicate a groundwater flood risk to the site.

4.9 Pluvial Flooding

Pluvial flooding is the result of rainfall-generated overland flows which arise before run-off can enter any watercourse or sewer. It is usually associated with high intensity rainfall.

4.9.1 Assessment of 1%AEP Pluvial Flood Volume

Following consultation with DCC and Nicholoas O'Dwyer, their appointed engineers for the Poddle Flood Alleviation Scheme, it was established that the predicted flooding on the site, shown in Figure 4-7 above, is pluvial in nature. PUNCH was furnished with 1%AEP predicted flood extents for the area from Nicholas O'Dwyer and these are shown in Figure 4-8 below.

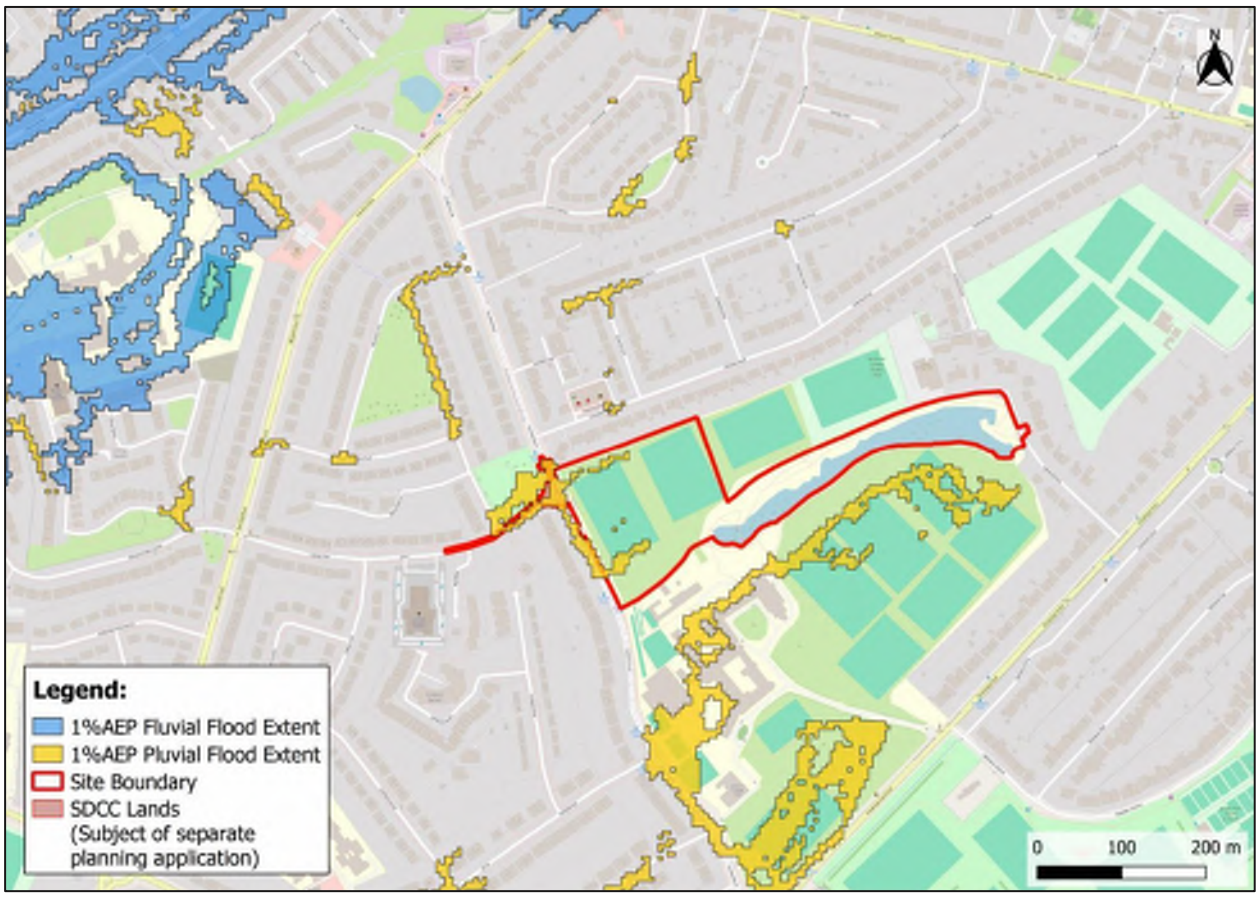

Figure 4-8: 1%AEP Fluvial and Pluvial Flood Extents (Received from Nicholas O'Dwyer)

To alleviate concerns relating to pluvial flooding at the site, the associated flow paths and flood volumes were examined. Publicly available LiDAR data[2] was utilised to describe the topography of the area and ascertain the likely direction of overland flow and volume of pluvial ponding. Figure 4-9 illustrates the predicted pluvial flow paths at, and adjacent to the site. It is noted that the water flows south to north along Fortfield Road and west to east along College Drive before converging at a low point outside the north-western corner of the site boundary.

[2] Open Topographic Data Viewer (www.gsi.ie)

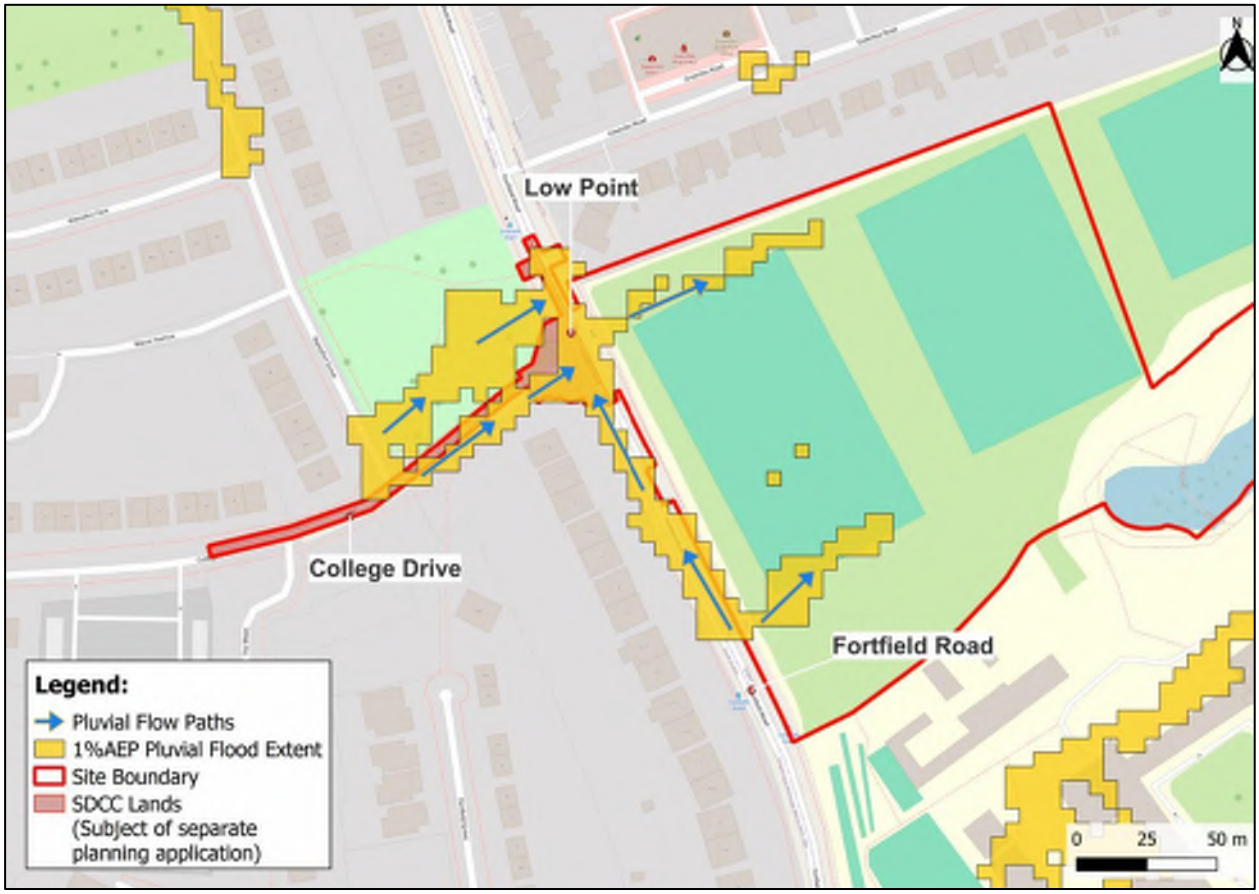

Figure 4-9: 1%AEP Pluvial Flow Paths

To calculate the pluvial flooding volume, the flood extents were superimposed on the LiDAR data and the top water level on Fortfield Road was estimated at 47.7mAOD. The associated pluvial flood volume is estimated at 70m^3.

4.9.2 Assessment of 0.1%AEP Pluvial Flood Volume

The 0.1%AEP pluvial flood extent was not available from Nicholas O'Dwyer and therefore the flood extent from the DCC DP SFRA was used to estimate the 0.1%AEP flood volume. Figure 4-10 is an extract from the DCC DP SFRA flood zone map showing the pluvial flood extents within the site. Flood Zone B corresponds with the 0.1% AEP extent.

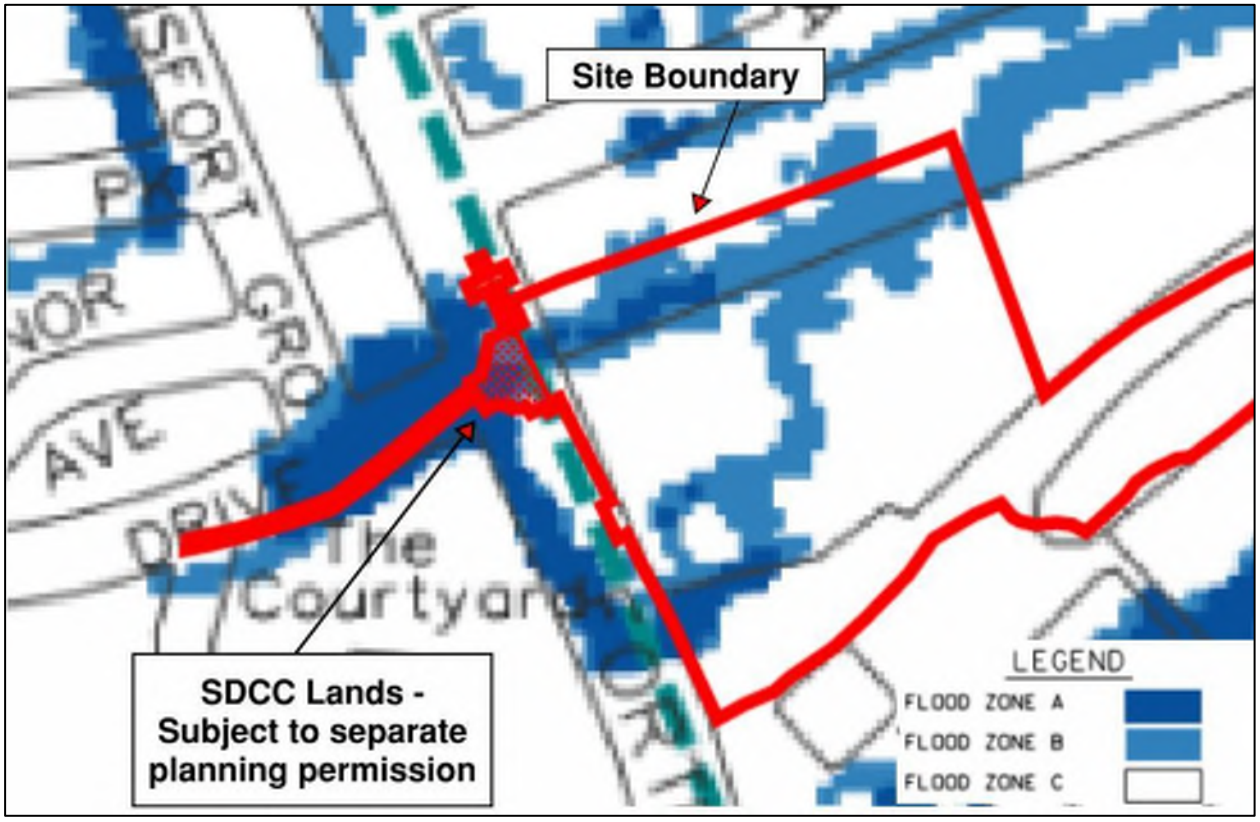

Figure 4-10: 0.1%AEP Pluvial Flood Extent (Site Boundary Shown in Red)

To calculate the pluvial flood volume, the 0.1%AEP flood extent was digitised in and around the site boundary and superimposed onto the LiDAR data. The associated 0.1% AEP pluvial flood volume is estimated at 120m^3.

4.9.3 Proposal to Alleviate Pluvial Flooding

A proposal has been developed to address the pluvial flooding on Fortfield Road, which includes the provision of a detention basin within the proposed development site. This detention basin has a storage capacity of 91.80m^3, representing a 31% overprovision for the 1% AEP flood event. This volume is designed to fully accommodate the predicted pluvial flood volumes in accordance with the design requirements for the 1% AEP flood extents.

These works will remove pluvial flooding from this section of Fortfield Road for storm events up to and including the 1%AEP event, offering a significant reduction in pluvial flood risk to that area. Figure 4-11 presents the revised pluvial flood extent in the vicinity of Fortfield Road following the proposed pluvial flood alleviation works.

Further details on the detention basin proposal are included in the Engineering Planning Report (222102-PUNCH-XX-XX-RP-C-0002) and PUNCH Drawing 222102-PUNCH-XX-XX-DR-C-0470 accompanying this planning application.

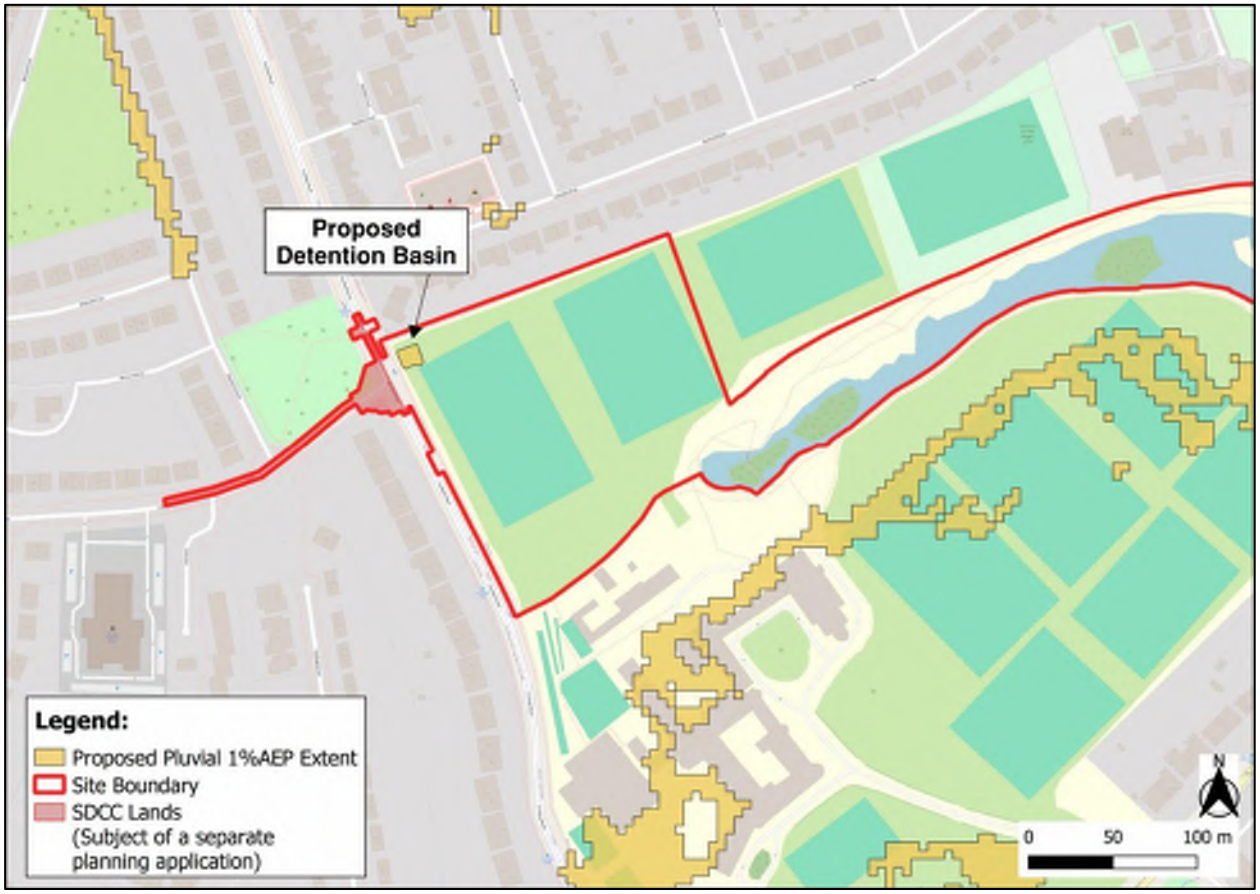

Figure 4-11: Proposed 1%AEP Pluvial Flood Extent

A further exercise was carried out to confirm that the 0.1%AEP pluvial flood event will not result in property flooding. This was done by calculating the available overground pluvial storage volume within the site including the detention basin, roads and verges and comparing it against the estimated 0.1% pluvial flood volume of 120m^3. This exercise confirmed that there is sufficient storage available within the site to ensure that the development will not flood even in the extreme 0.1%AEP pluvial event.

The provision of a suitable surface water drainage system for the proposed development on the site will mitigate against pluvial flood risk as demonstrated in the accompanying Engineering Planning Report. The redevelopment of the site will not adversely affect pluvial flood levels or extents in the area.

4.9.4 Review of Existing Surface Water Infrastructure

Dublin City Council was contacted regarding existing surface water infrastructure in the vicinity of the site. Figure 4-12 below is an extract from the DCC existing drainage record drawing. The drawing indicates that the following services are in the vicinity of the site:

1. There is a 300mm concrete stormwater sewer flowing south to north along Fortfield Road. This increases to 450mm on approach to the Greenlea Road junction.
2. There is an existing pond located at the site's southern boundary adjacent to Terenure College Rugby Football Club. According to the drainage records the pond is fed from an existing off-take known as Lakelands Overflow on the River Poddle, at Wainsfort Manor to the west of the subject site. This overflow is piped underground via a 1230mm x 1230mm concrete box culvert for approximately 1.4km before discharging into the pond. The pond drains to the River Dodder to the southeast of the subject site via a 1450mm x 1480mm concrete box culvert.

Please refer to Appendix D for full existing drainage record drawings.

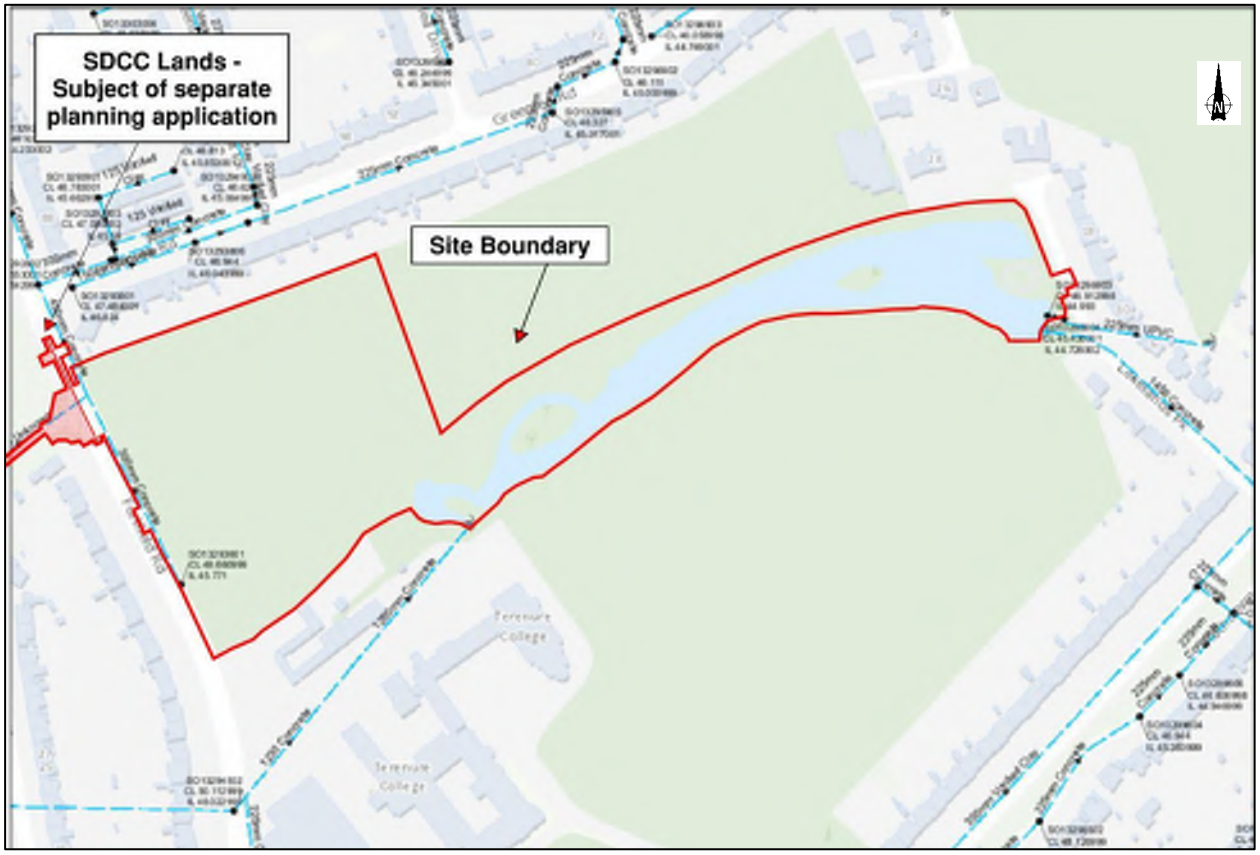

Figure 4-12: Existing Stormwater drainage in the vicinity of the site (source: Dublin City Council).

4.10 Fluvial Flooding

Fluvial flooding is the result of a river exceeding its capacity and excess water spilling out onto the adjacent floodplain.

4.10.1 Catchment Flood Risk Assessment and Management Study (CFRAMS) Mapping

The CFRAMS is an OPW led national programme which seeks to identify and map potential existing and future flood hazard in areas at significant risk from flooding. It also aims to identify flood relief measures and prepare Flood Risk Management Plans for these areas.

The site of the proposed development is located in an area which has been assessed as part of the Eastern CFRAM Study (UoM 09). The OPW has published detailed flood hazard mapping for the area based on results from the CFRAMS. This includes flood extent and flood depth mapping for a number of return periods for fluvial and coastal flood events. The CFRAMS assessment in this area is based on hydraulic modelling of the River Liffey and associated tributaries.

The CFRAMS fluvial flood zone mapping produced for the area can be seen in Figure 4-13. The map shows that the site is not at risk from fluvial flooding, however the existing pond within the site boundary has not been modelled as part of this study.

Figure 4-13: CFRAMS fluvial map for the area.

4.11 Coastal Flooding

Coastal flooding results from sea levels which are higher than normal and result in sea water overflowing onto the land. Coastal flooding is influenced by the following three factors which often work in combination: high tide level, storm surges and wave action.

Examination of CFRAMS coastal flood extent mapping and the National Coastal Flood Hazard Mapping (NCFHM) does not reveal any coastal flood risk to the site. The site is located approximately 6km from the coast at a minimum elevation of approximately 47mAOD. The general ground levels for the site are much higher than expected extreme coastal flood levels and thus the site is at a low risk of coastal flooding.

4.12 Estimate of Flood Zone

PUNCH Consulting Engineers have reviewed the available information as outlined in the above sections and concluded that the site is located within Flood Zone C for coastal flooding. However, we have concluded that there isn't sufficient information available to determine if the pond, located within the site boundary, would pose a fluvial flood risk to the proposed residential development. For this reason, a hydraulic model of the pond was developed and extreme event flood levels assessed, as discussed further in Section 5. The result of this modelling exercise revealed that the site is located in Flood Zone C for fluvial flooding.

In relation to pluvial flooding, Section 2.24 of the OPW's "The Planning System and Flood Risk Management Guidelines" states that *"..flood zones are determined on the basis of the probability of river and coastal flooding only.."*. This point is also echoed in Section 1.4.1 of the DCC's Development Plan SFRA report.

In summary, the site is located in Flood Zone C for both coastal and fluvial flooding.

5 Hydraulic Model of Existing Artificial Pond

5.1 Introduction

Given the lack of flood risk data available relating to the existing pond within the site, it has been deemed prudent to construct a hydraulic model of this waterbody. PUNCH has engaged with DCC relating to the design parameters and the resulting conclusions.

A 1D hydraulic model was developed to assess the 'in-channel' flows in the pond using Flood Modeller (v 5.1 © 2021 CH2M HILL). A detailed survey of the pond was carried out by Murphy Geospatial in February 2022 and the modelled channel dimensions are based on this survey. The channel roughness values are based on site observations. This model is used to ascertain the predicted flood level during the 1 in 100yr and the 1 in 1000yr flood events in the vicinity of the proposed development.

Catchment flow rates have been estimated using the Flood Studies Update (FSU) Wp4.2 method and then added to flows from the Lakelands Overflow. The hydrological analysis and the steps taken to construct the hydraulic model are discussed in the following sections.

5.2 Catchment Area

5.2.1 FSU Database

The open drainage pond located on the site is fed via the Lakelands Overflow from the Poddle River at Wainsfort Manor located to the west of the subject site. Due to the off-line nature of the pond, it is not included in the FSU database of watercourses. The closest FSU node on the Poddle River which includes the site within its catchment area is 09_1874_11. This catchment area (shown in Figure 5-1) suggests that the site drains back to the Poddle River when in fact records show that it drains south to the ponds in Bushy Park and on to the Dodder River.

Given that the FSU database does not include the Lakelands Overflow from the Poddle River or the pond on the site, it cannot provide an appropriate contributing catchment area for the subject lands. However, the FSU does provide relevant catchment characteristics for the area which can be used in alternative flood estimation techniques.

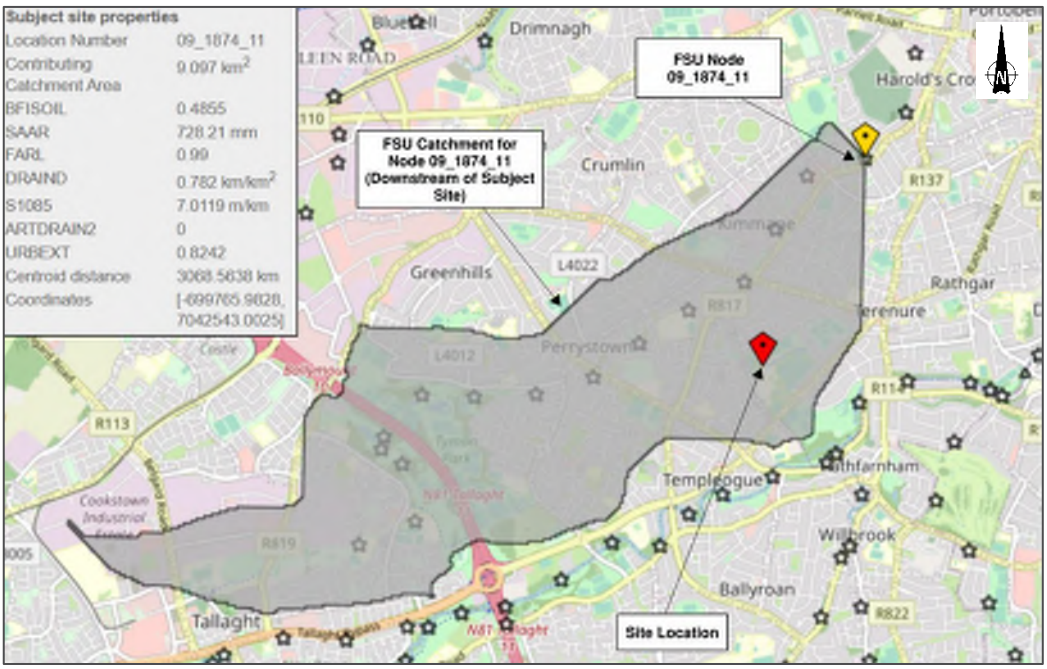

Figure 5-1: Location of FSU Node (09_1874_11)

5.2.2 Contributing Area for Subject Site

To establish the contributing area for the subject site, surface water infrastructure data was requested from DCC. In addition, publicly available online mapping sources were referenced. The contributing area was estimated from an extensive review of this information.

A catchment area of 46 hectares (0.46 km^2) was calculated, of which 30 hectares is classed as urban. The remining area (16 ha) is classed as greenfield which includes grasslands, gardens and open space, and the grassed portion of Templeogue College. The contributing area is identified in Figure 5-2. It should be noted that the surface water sewer network to the north of College Drive (i.e. on Greenlea Road, Parkmore Drive, and Lavarna Grove) does not contribute to the catchment area of the subject site. These sewers discharge separately to the River Poddle to the north. Due to the ground topography, the greenfield areas located adjacent to the pond do not drain into it.

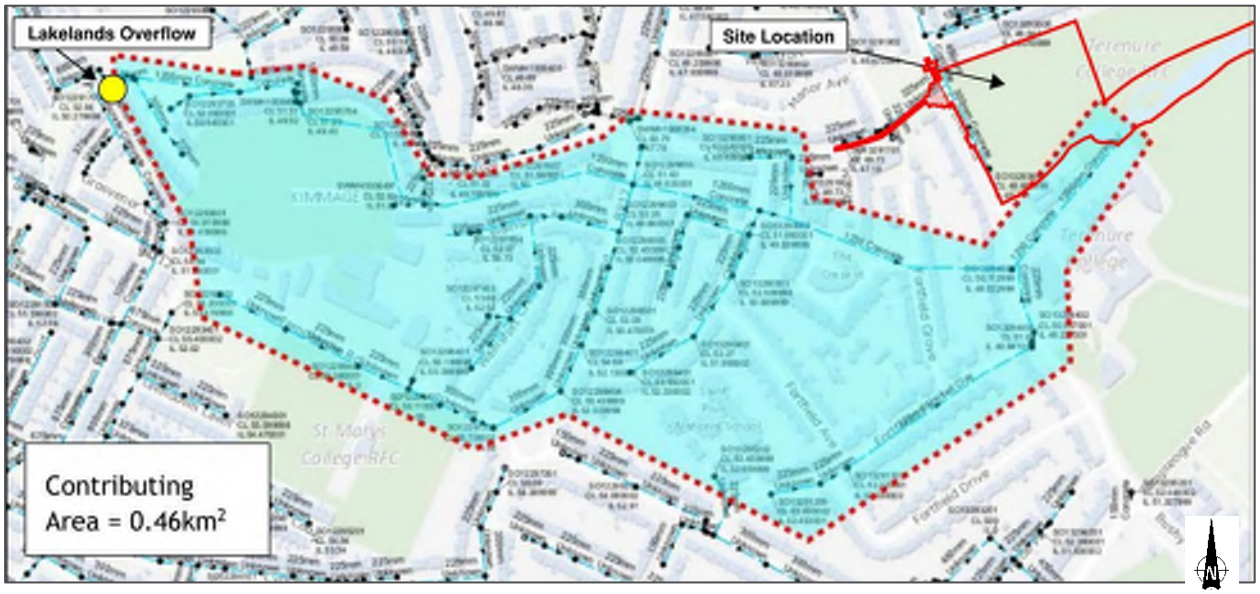

Figure 5-2: Contributing Catchment Area

5.3 Fluvial Flow Estimation

One of the fundamental parameters of any hydraulic model is the flow rate used. Several methodologies are available to estimate the flow rates expected during extreme events in the watercourse at the site of the proposed development.

In relation to this site, there will be two sources of fluvial flow. The first will be from the Lakelands Overflow and the second from the contributing catchment between the overflow and the subject lands.

According to the Eastern CFRAM Study HA09 Hydraulics Report, the maximum capacity of the Lakelands Overflow is approximately 2.75 m^3/s. This figure will be added to the extreme fluvial flow estimates for the contributing catchment.

The FSU Wp4.2 Flood Estimation in Small and Urbanised Catchments was used to estimate the runoff from the catchment, given the urban location of the site. The parameters required for the equation (excluding Area and URBEXT) were taken from FSU Node 09_1874_11 which is located to the east of the proposed development. The Area measurement was taken from Section 5.2.2 above and the URBEXT parameter was conservatively calculated based on the pervious areas within the catchment.

Table 5-1: FSU Flow Estimation

c		
Area	km^2	0.460
SAAR*	mm	728.21
BFI*	-	0.4855
FARL*	-	0.99
S1085*	m/km	7.012
URBEXT	-	0.86
Q_{med}	m^3/s	**0.34**
1%AEP	**m3/s**	**0.67**
0.1%AEP	**m3/s**	**0.81**

The maximum flow from the Lakelands Overflow (2.75m^3/s) is added to the FSU flow estimates to produce the total contributing flows. These flows are presented in Table 5-2.

Table 5-2: Total Contributing Flow Estimates

Flow Estimates		
1%AEP	m^3/s	3.42
0.1%AEP	m^3/s	3.56

It should be noted that the capacity of the incoming 1230mm x 1230mm concrete box culvert will act as a throttle to surface water. In its current configuration the maximum discharge from this box culvert along its flattest reach is 0.65m^3/s. However, as this culvert could be replaced and upgraded in the future, this throttling effect was ignored and the conservative flow values from Table 5-2 have been used in the hydraulic model analysis.

5.4 Climate Change

Advice on the expected impacts of climate change and the allowances to provide for future flood risk management in Ireland is given in the "OPW Assessment of Potential Future Scenarios, Flood Risk Management Draft Guidance", 2009. Two climate change scenarios are considered. These are the Mid-range Future Scenario (MRFS) and the High-End Future Scenario (HEFS). The MRFS is intended to represent a "likely" future scenario based on the wide range of future predictions available. The HEFS represents a more "conservative" future scenario at the upper boundaries of future projections. Based on these two scenarios the OPW recommended allowances for climate change are given in Table 4-2.

Table 5-3: Recommended allowances for climate change (Taken from OPW – Assessment of Potential Future Scenarios for Flood Risk Management)

Parameter	MRFS	HEFS
Extreme Rainfall Depths	+20%	+30%
Flood Flows	+20%	+30%
Mean Sea Level Rise	+500 mm	+1000 mm
Land Movement	-0.5 mm/year*	-0.5 mm/year*
Urbanisation	No general allowance – Review on Case by Case Basis	No General allowance – Review on Case by Case Basis
Forestation	-1/6Tp**	-1/3Tp** +10% SPR***

Notes:
* Applicable to the southern part of the country (Dublin – Galway and south of this)
** Reduce the time to peak (Tp) by a third; this allows for potential accelerated runoff that may arise as a result of drainage of afforested land
*** Add 10% to the Standard Percentage Runoff (SPR) rate; this allows for increased runoff rates that may arise flowing felling of forestry

The Strategic Flood Risk Assessment (SFRA) prepared for the DCC Development Plan 2022-2028 also provides a table of climate change allowance requirements, reproduced here as Table 5-4.

Table 5-4: Recommended allowances for climate change (DCC Development Plan 2022-2028 SFRA)

Development Vulnerability	Fluvial Climate Change Allowance (increase in flows)	Tidal Climate Change Allowance (increase in sea level)	Storm Water / Surface Water
Less Vulnerable	20%	0.5m (MRFS)	20% increase in rainfall
Highly Vulnerable	20%	0.5m (MRFS)	20% increase in rainfall
Critical or Extremely Vulnerable (e.g. hospitals, major sub-stations, blue light services)	30%	1.0m (HEFS)	30% increase in rainfall

Based on the recommendations presented in Table 5-3 and Table 5-4, it was considered appropriate to increase the design flows by 20% to account for the impact of climate change on the development. The maximum flow from Lakelands Overflow is 2.75m^3/s, so the 20% increase is only applied to the FSU flow estimates. The final flow estimation values, including an allowance for climate change, are presented in Table 5-5. These flows will be used in the hydraulic model analysis.

Table 5-5: Final Flow Estimates

Flow Estimates		
$1\%AEP_{,CC}$	m^3/s	3.55
$0.1\%AEP_{,CC}$	m^3/s	3.72

5.5 Hydrograph Synthesis

The Eastern CFRAMS UoM 09 Hydraulic Report was consulted to establish a suitable inflow hydrograph shape. This CFRAMS report details model calibration data which was collected for the Greater Dublin Strategic Drainage Scheme (GDSDS) in October 2002. Included in this data set are recorded flows at the Lakelands Overflow Culvert from the Poddle River. Figure 4.14.18 from the report is reproduced here as Figure 5-3. It can be seen from this graph that flows from the Lakelands overflow rise steadily over a 12hr period and then recede rapidly over the next 8hr. Although this hydrograph relates to an individual flow event, it also describes the general response of the overflow in high flow conditions.

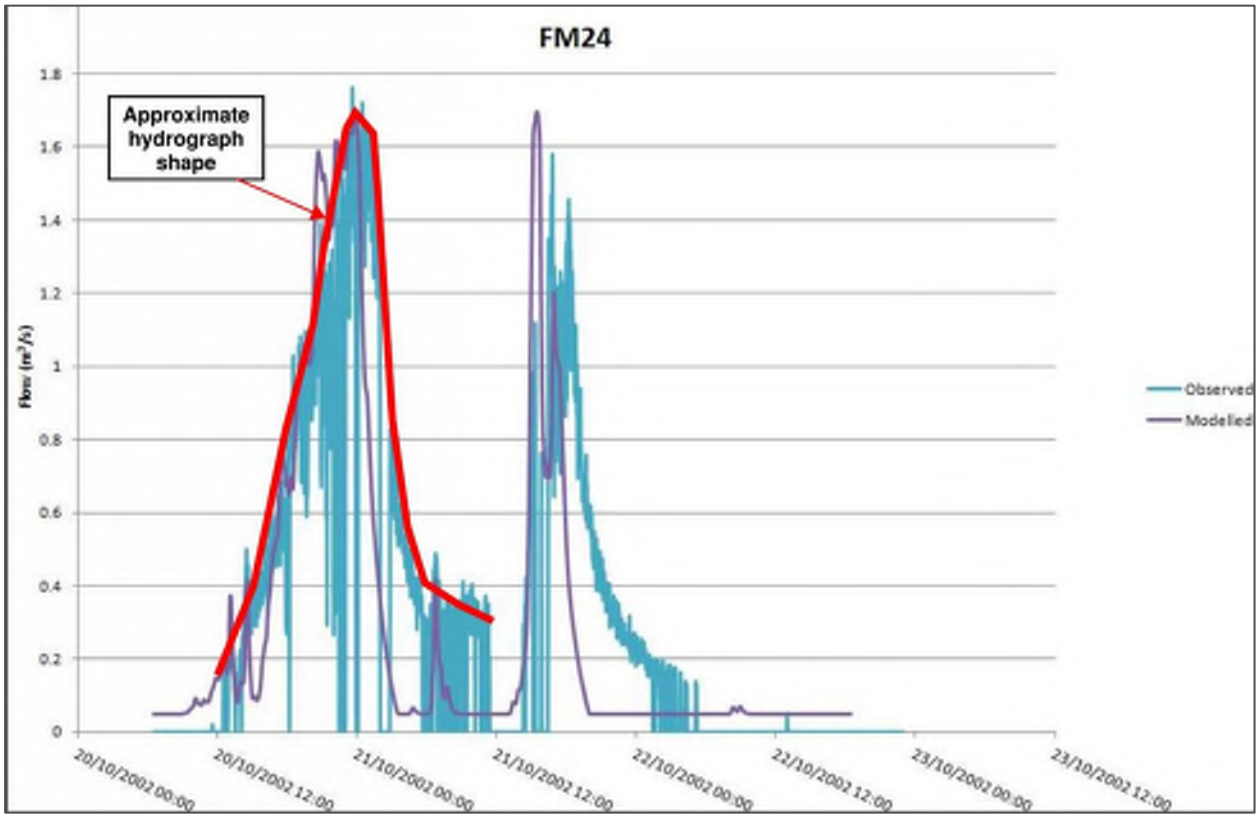

Figure 5-3: Lakelands Overflow Culvert – Recorded Hydrograph (Figure 4.14.18 Eastern CFRAMS UoM09 Hydraulics Report)

Punch consulting have traced an approximate hydrograph shape over the recorded flow hydrograph in Figure 5-3 and applied this shape to the design flows estimated in Section 5.4 of this report. The resulting 1%AEP and 0.1%AEP inflow hydrographs are presented in Figure 5-4 and will be used in the hydraulic model analysis.

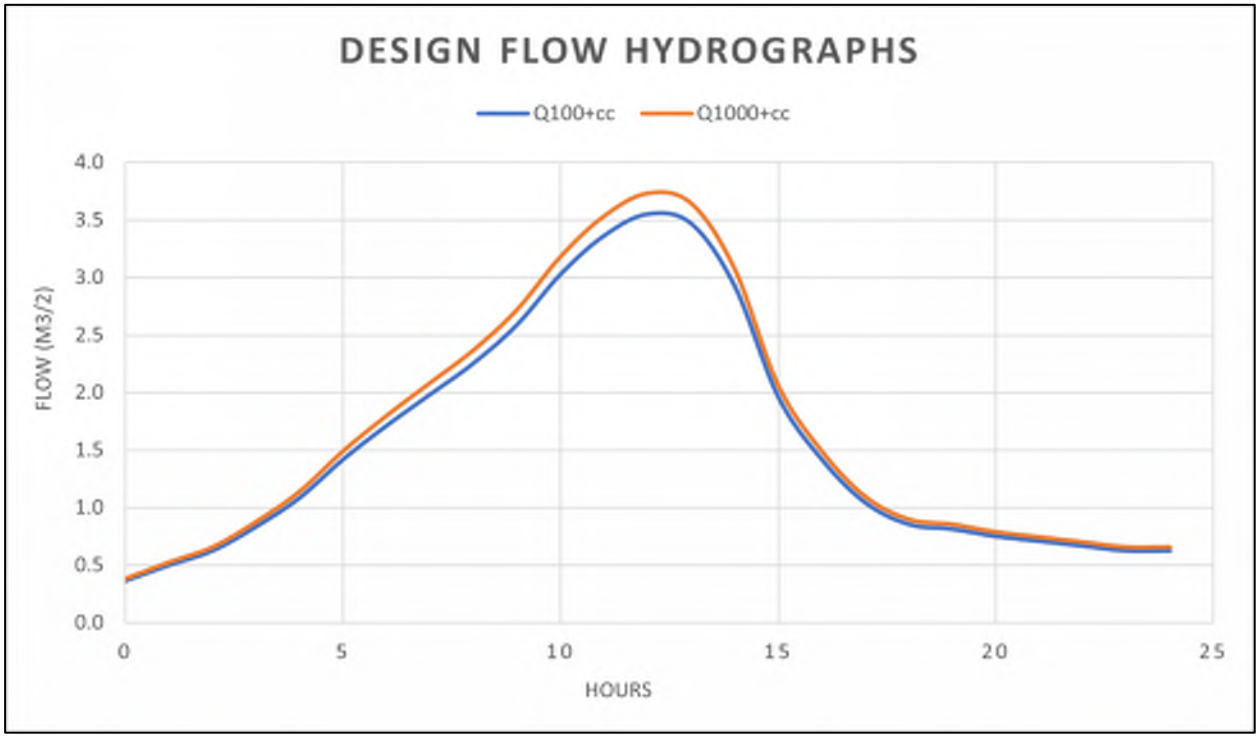

Figure 5-4: Design Flow Hydrographs

5.6 Model Setup

A hydraulic model of the pond was established using geometrical data taken from a river survey carried out by Murphy Geospatial in February 2022 (see Appendix A for survey details). The survey allowed engineers at PUNCH to understand the surrounding topography and longitudinal slope of the pond. Cross sections were taken at 27 locations, as shown in Figure 5-5 below.

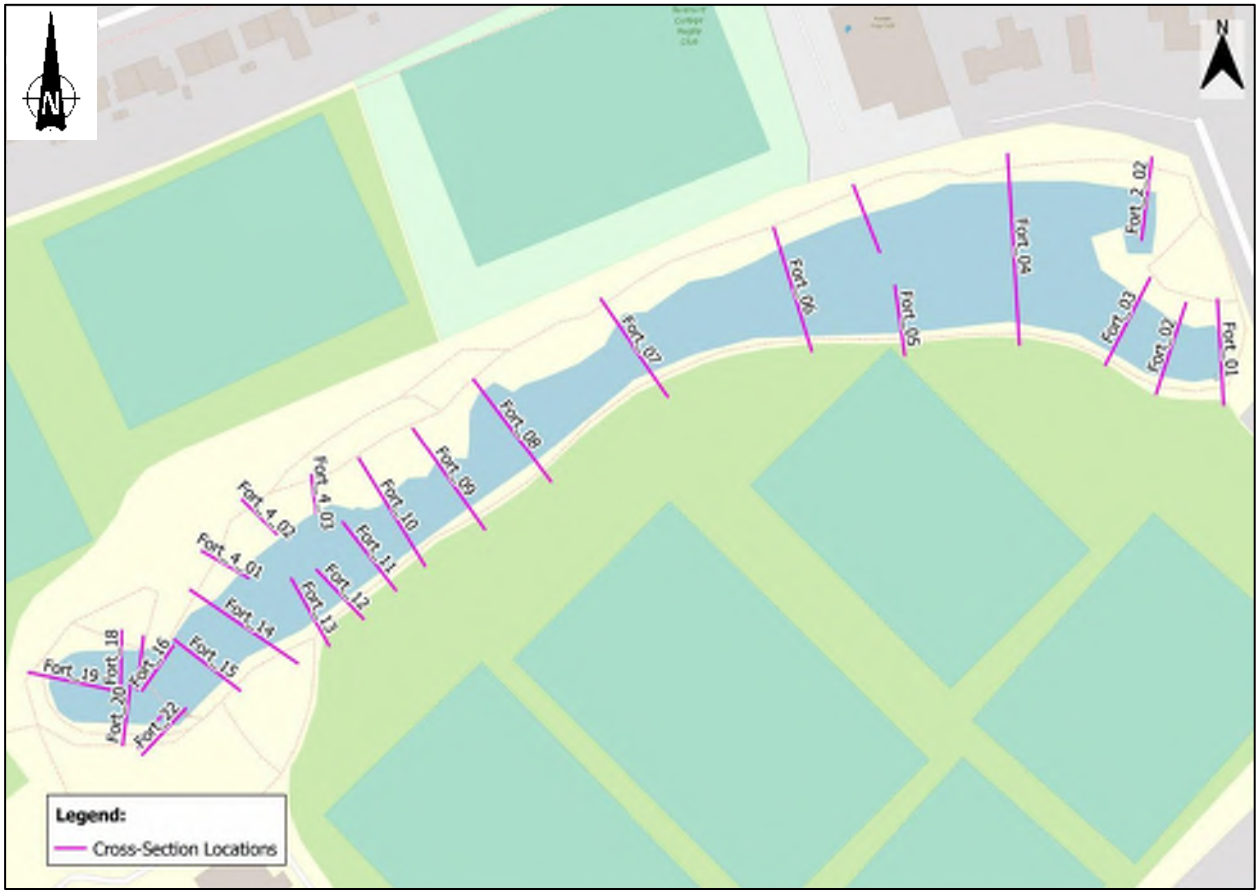

Figure 5-5: River Survey Locations

The Manning's roughness values used in the model vary throughout the cross-sections. A value of 0.04 was used for the channel bed while a value of 0.06 was applied to the channel banks to simulate heavy vegetation.

There are four weirs located along the pond and two small islands, as identified in Figure 5-6. The weirs are of hydraulic significance as they control upstream water levels and limit discharge and have therefore been included in the model. Islands A and B haves also been included in the model as the contraction of the watercourse around the islands could result in increased water levels. There is a pedestrian arch-bridge over the pond immediately upstream of Weir 1. This has not been included in the model as the soffit is higher than peak flood levels.

Figure 5-6: Modelled Features

At the downstream extent of the pond, weir no. 4 discharges into a large open concrete channel which drains to a 1.45m x 1.48m box culvert.

5.6.1 Weir Set up

Due to the hydraulic importance of the weirs on the pond a detailed description has been provided for each one as follows:

Weir 1:

Weir 1 is located at the upstream end of the pond at a narrow point in the channel. The weir is approximately 3.5m long and comprises a horizontal concrete crest which is overtopped as shown in Photo 5-1.

Photo 5-1: Weir 1

The elevation of this weir was not recorded in the topographic survey and it was necessary to estimate the level using the bank survey and photographs. A conservative elevation of 47.0mOD was adopted for this weir in the model.

Weir 2:

Weir 2 is located between the right bank and Island A. It is approximately 10m long and comprises a series of stepping-stones with low flow channels between the stones as shown in Photo 5-2.

Photo 5-2: Weir 2

The elevation of this weir was not recorded in the topographic survey and it was necessary to estimate the level using the bank survey and photographs. A conservative elevation of 46.9mOD was adopted for this weir in the model.

Weir 3:

Weir 3 is located between the left bank and Island A. It is approximately 5m long and comprises a series of stepping-stones with a low-flow step in the middle as shown in Photo 5-3.

Photo 5-3: Weir 3

The elevation of this weir was not recorded in the topographic survey and it was necessary to estimate the level using the bank survey and photographs. A conservative elevation of 46.9mOD was adopted for this weir in the model.

For model stability purposes and given that Weirs 2 and 3 have the same elevation, the weirs were combined into a single weir 15m long with an elevation of 46.9mOD. This weir was located immediately downstream of Island A in the model.

Weir 4:

Weir 4 is located at the downstream end of the pond and operates as a dam as seen in Photo 5-4. All discharge from the pond passes this weir, with a low-flow notch provided in the centre. The weir is approximately 18m long with a horizontal concrete crest approximately 0.25m wide. The crest elevation is 46.5mOD. Details of this weir have been recorded in the topographic survey.

Photo 5-4: Weir 4

5.7 Modelling Results

The 1%AEP and 0.1%AEP flow hydrographs were run through the hydraulic model. The maximum water levels in the channel for these events are presented in long-section format in Figure 5-7 and Figure 5-8. The flood extents associated with these events are presented in Figure 5-9.

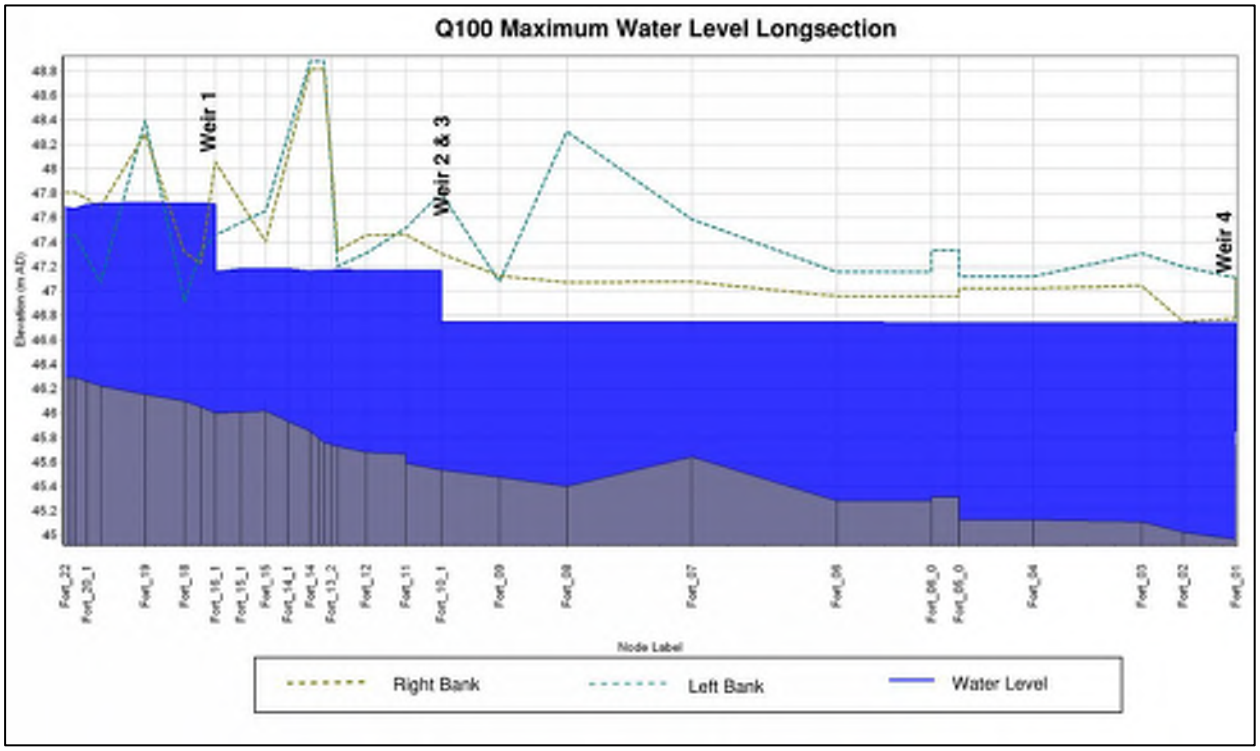

Figure 5-7: 1%AEP Maximum Water Level

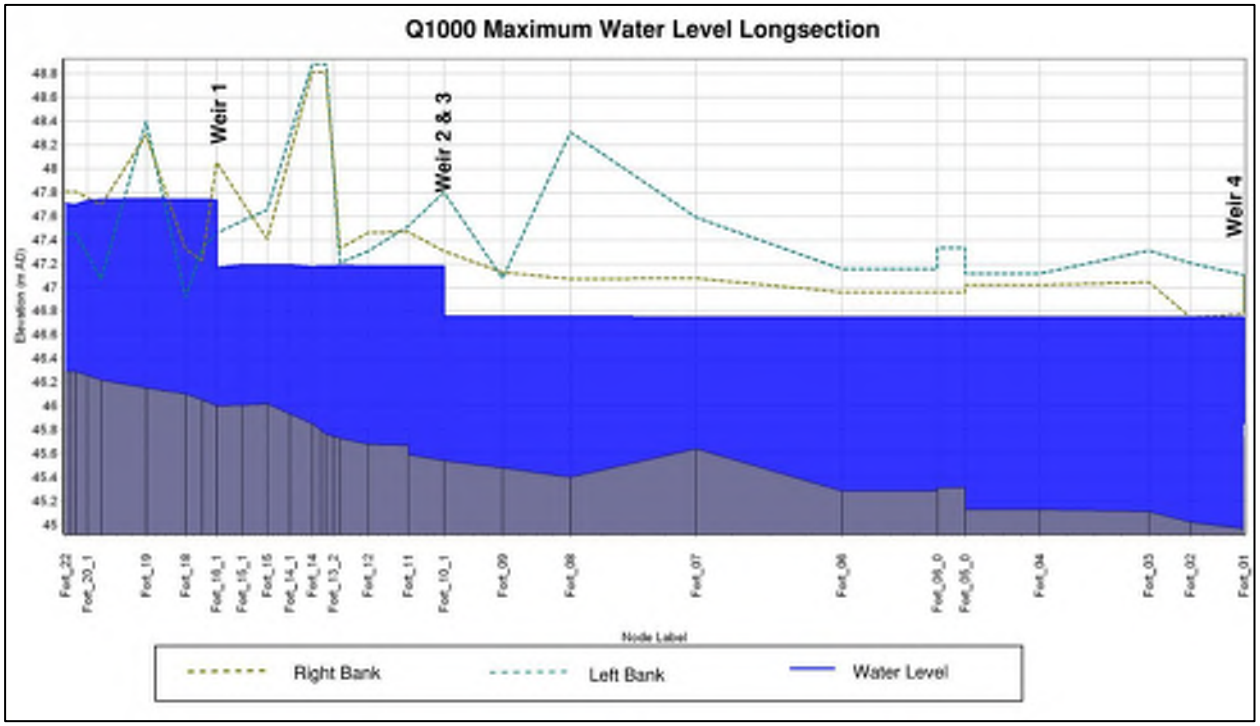

Figure 5-8: 0.1%AEP Maximum Water Level

Figure 5-9: Flood Extents

The plan flood extents demonstrate that the flood waters are contained within the pond channel extents and do not pose a flood risk to the proposed development. Furthermore, the lands around the pond upstream of Weir no. 1 rise to levels of between 48.2mOD and 48.9mOD providing additional freeboard as shown in cross-sections A and B in Figure 5-10.

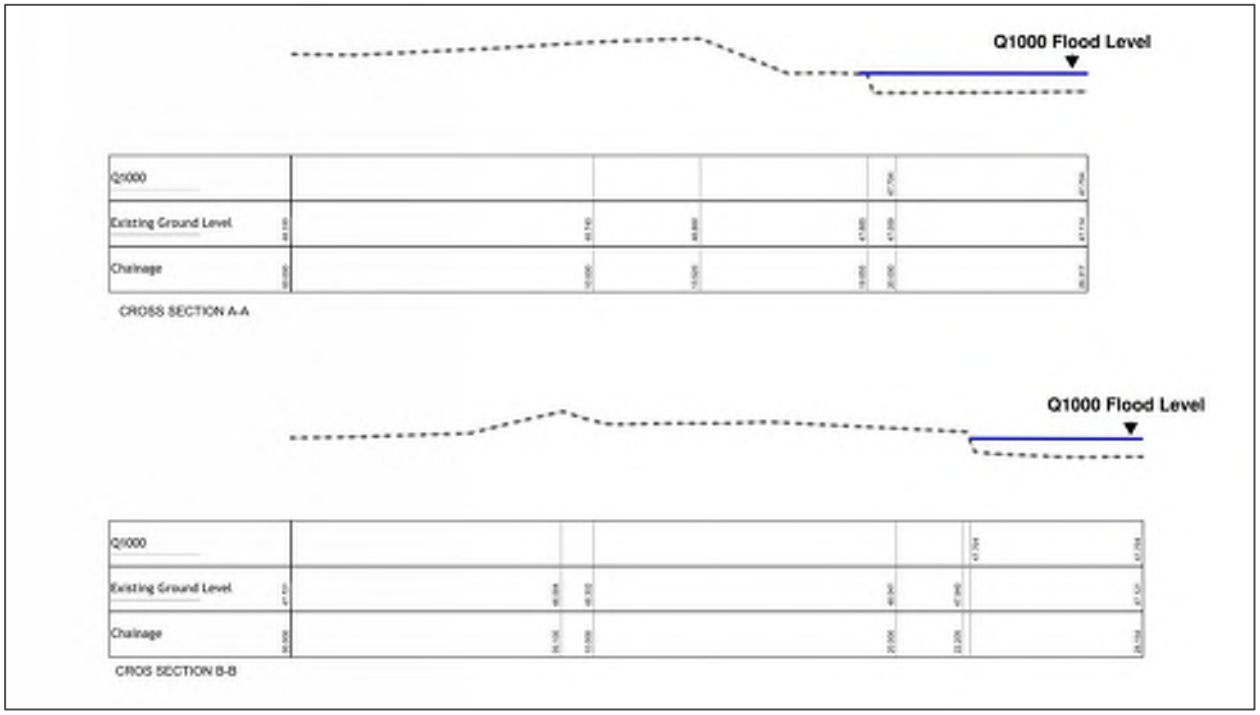

Figure 5-10: Cross-Sections

The maximum flood levels in the pond for the 1%AEP and 0.1%AEP flood events (including climate change allowance) occur at the upstream end of the pond and are presented in Table 5-6.

Table 5-6: Maximum Flood Levels

Maximum Flood Levels		
1%AEP +cc	mOD	47.68
0.1%AEP+CC	mOD	47.70

As per the Dublin City Council Development Plan (2022-2028) SFRA guidelines, a 300mm freeboard is applied to the 1%AEP+cc flood level in Table 5-6 to determine the minimum FFLs for the proposed residential development as 47.98mOD.

All proposed residential units and entry to the proposed basement are above 48.0mOD which provides adequate freeboard.

It is not proposed to alter the topography of the site around the pond.

5.8 Estimate of Flood Zone

Following the hydraulic assessment of the adjacent pond, PUNCH Consulting Engineers has concluded that that the proposed residential dwellings are located in Flood Zone C.

5.9 Culvert Blockage

The blockage of the outlet culvert downstream of Weir No. 4 has been assessed to ascertain any potential impact on the proposed development. From examination of ground levels in this area, it is concluded that in the unlikely event that the downstream culvert becomes fully blocked and water levels rise at Weir No. 4, water will overtop the pond and flow in a south-easterly direction away from the proposed development. Such a blockage scenario is not expected to have any impact on the proposed development.

6 Flood Risk Assessment

6.1 Sources of Flooding

When carrying out a flood risk assessment, one should consider all the potential flood risks and sources of flood water at the site. In general, the relevant flood sources are:

- Fluvial Flooding

  Fluvial flooding is the result of a river exceeding its capacity and excess water spilling out onto the adjacent floodplain. The proposed development is adjacent to an existing drainage pond. Hydraulic analysis of the pond has provided estimated 1%AEP and 0.1%AEP flood levels. All proposed FFLs at the site will be set above the 0.1%AEP +CC flood level with a minimum freeboard of 300mm which provides resilience against flooding.

- Pluvial Flooding

  Pluvial flooding is the result of rainfall-generated overland flows which arise before run-off can enter any watercourse or sewer. It is usually associated with high intensity rainfall. The proposed storm network (as part of this development) has been designed to ensure there is no flood risk to the development from extreme precipitation events. Furthermore, a detention basin to accommodate pluvial flooding along Fortfield Road is proposed as part of the development. The redevelopment of the site does not adversely affect flooding levels or extents in the area.

- Coastal Flooding

  Coastal flooding is the result of sea levels which are higher than normal and result in sea water overflowing onto the land during high tides or storm surges. CFRAMS mapping shows that the study area is not at risk of coastal flooding.

- Groundwater Flooding

  Groundwater flooding occurs when the level of the water stored in the ground rises as a result of prolonged rainfall. A groundwater flood risk has not been identified within or around the site. The proposed development includes a basement level and a Basement Impact Assessment (BIA) has been completed out and is included in this planning application.

6.2 Site Vulnerability

The proposed development is residential in nature, which is classified as a "Highly Vulnerable Development" in the guidelines. The Planning System and Flood Risk Management Guidelines gives definitions for the type of developments that can take place in each Flood Zone. Only Coastal and Fluvial flood zones are considered in determining whether a Justification Test is required.

Table 6-1: Matrix of Vulnerability versus Flood Zone to indicate Justification Requirement

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

It has been demonstrated in this report that the proposed residential dwellings are located within Flood Zone C for both coastal and fluvial flooding. As such, for this development, it is not strictly necessary to apply the Justification Test. However, given that the site is shown within Flood Zones A and B on the

Dublin City DP SFRA mapping it was deemed prudent to complete the Justification Test for Development Management.

6.3 Flood Mitigation Measures

Hydraulic modelling of the existing drainage pond within the site has assessed the risks of localised flooding for the 1%AEP and 0.1%AEP flood events. The following measures will be required in order to mitigate against any flooding:

1. The Finished Floor Levels (FFL) of the ground floor of the proposed buildings on the site will be set at or above 48.0mOD. This level equates to the 0.1%AEP flood level including a 20% allowance for climate change and 300mm freeboard.
2. The proposed basement will be isolated from the flood zone and the entrance will be set at a level at or above 48.0mOD (0.1%AEP +CC+Freeboard).
3. All ventilation shafts, ducts, and other access/utilities entering the basement development will do so at a height at or greater than 48.0mOD (0.1%AEP +CC+Freeboard) in order to remove potential flow paths of surface water to the proposed basements;
4. The proposed basement walls and floor will be sealed using suitable materials/treatments to prevent flooding via ingress from groundwater.
5. Surface water flows shall be attenuated on site and the runoff rate from the site will not be greater than the runoff rate agreed with DCC in order to reduce the risk of flooding elsewhere as a result of the development. Please refer to the Engineering Planning report prepared by PUNCH Consulting Engineers which forms part of this submission for more detail.
6. A flood warning alarm will be installed in the basement, which may be by means of a float in an outlet drainage pipe, which will warn the operators of the development if water levels start to rise in the basement.
7. Emergency access to the development shall be provided via a dedicated route through the development (running east of Block D and returning south of the other blocks in a circulatory route discharging to Fortfield Road). This route is above the 0.1%AEP flood level.
8. A detention basin is proposed in the north-western corner of the site to accommodate pluvial flood water from Fortfield Road. This will remove pluvial flood risk in this area from storm events up to and including the 1%AEP event.

It is noted that the proposed development has no impact on the flood risk outside the site of the proposed development. There will be no increase in surface water runoff from the site following the implementation of SuDS options on the site to allow for the runoff rate to match that of the greenfield runoff rate of the site.

6.4 Flood Risk Management

Flood risk management under the EU Floods Directive aims to minimise the risks arising from flooding to people, property and the environment. Minimising risk can be achieved through structural measures that block or restrict the pathways of floodwaters, such as river defences or non-structural measures that are often aimed at reducing the vulnerability of people and communities such as flood warning, effective flood emergency response, or resilience measures for communities or individual properties.

The mitigation measures outlined in Section 6.3 will be implemented to ensure that the flood risk to other properties or to people in the vicinity will not be increased during an extreme flood event. Flooding will not affect emergency access/egress at the site.

6.5 Sequential Approach

"The Planning System and Flood Risk Management" Guidelines published by the OPW set out a sequential approach to managing flood risk and to avoid development in areas that are at risk. A graphical representation of the Sequential Approach is included in the guidelines and is shown here as Figure 6-1.

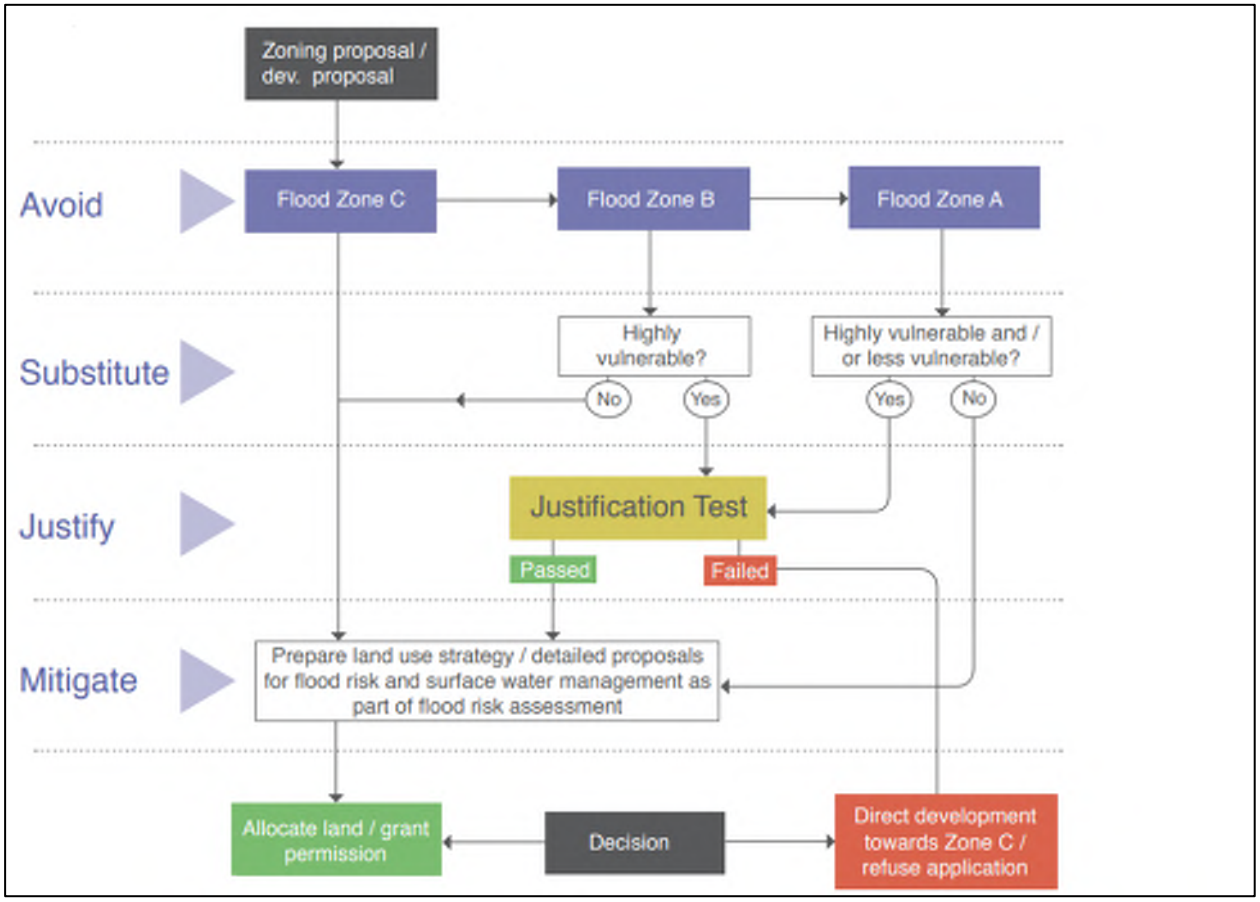

Figure 6-1: Graphical Representation of the Sequential Approach (The Planning System and Flood Risk Management" Guidelines 2009[3])

Given that the site is located in Flood Zone C, the development is deemed appropriate when examined using the sequential approach shown above.

[3] Refer to Fig. 3.2: Sequential approach mechanism in the planning process

A detention basin is proposed in the north-western corner of the site to accommodate pluvial flood water from Fortfield Road. This will remove pluvial flood risk in this area from storm events up to and including the 1%AEP event.

7 Justification Test

Chapter 5, Box 5.1 of the Planning System Flood Risk Management Guidelines for Planning Authorities sets out that all of the following criteria must be satisfied in order to meet the development management Justification Test. Figure 7-1 contains responses to each of the items in Box 5.1 and it is concluded that the proposed development complies with the requirements of the development management Justification Test.

Figure 7-1 - Response to Development Management Justification Test for Proposed Development

	Item	Response
1.0	The subject lands have been zoned or otherwise designated for the particular use or form of development in an operative development plan, which has been adopted or varied taking account of these Guidelines.	The land on which the development is proposed is currently zoned primarily as "Zone Z15 – Community and Social Infrastructure" with a small portion zoned as "Zone Z1 – Sustainable Residential Neighbourhood". The lake area is zoned as "Zone 11 Waterways Protection" in the Dublin City Council Development Plan 2022-2028. See McGill Planning's *Z15 Compliance Statement* included in the planning application documentation for further details on the suitability of the proposed development within Z15 zoned lands.
2.0	The proposal has been subject to an appropriate flood risk assessment that demonstrates:	
2.1	The development proposed will not increase flood risk elsewhere and, if practicable, will reduce overall flood risk.	The development site is not located within fluvial or coastal Flood Zones and as such will not increase fluvial or coastal flood risk elsewhere. There is no identifiable groundwater flood risk to the site. The Dublin City DP SFRA flood mapping shows pluvial flooding within the site boundary. To alleviate concerns relating to pluvial flooding at the site, the associated pluvial flow paths and flood volumes were examined. A proposal has been developed, in direct consultation with DCC, to address the pluvial flooding on Fortfield Road, which includes the provision of a detention basin within the proposed development site boundary. These flood alleviation measures will also remove pluvial flooding from a section of Fortfield Road for storm events up to and including the 1%AEP event, offering a significant reduction in pluvial flood risk to that area over existing conditions. A further exercise was carried out to confirm that there is sufficient storage available within the site to ensure that the development will not flood even in the extreme 0.1%AEP pluvial event.

		The provision of a suitable surface water drainage system for the proposed development on the site will mitigate against pluvial flood risk as demonstrated in the accompanying Engineering Planning Report. The redevelopment of the site will not adversely affect pluvial flood levels or extents in the area.
2.2	The development proposal includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible.	The principal measures taken to minimise flood risk are as follows: • The Finished Floor Levels (FFL) of the ground floor of the proposed buildings on the site will be set at or above 48.0mOD. This level equates to the 0.1%AEP flood level including a 20% allowance for climate change and 300mm freeboard. • The proposed basement will be isolated from the flood zone and the entrance will be set at a level at or above 48.0mOD (0.1%AEP +CC+Freeboard). • A detention basin is proposed in the north-western corner of the site to accommodate pluvial flood water from Fortfield Road. This will remove pluvial flood risk in this area from storm events up to and including the 1%AEP event.
2.3	The development proposed includes measures to ensure that residual risks to the area and/or development can be managed to an acceptable level as regards the adequacy of existing flood protection measures or the design, implementation and funding of any future flood risk management measures and provisions for emergency services access.	The residual risk of flooding to the site during the 0.1%AEP pluvial flood event was investigated. It was determined that there is sufficient storage available within the site to ensure that the development will not flood even in the extreme 0.1%AEP pluvial event. Therefore, the development proposed includes measures to ensure that residual risks to the area and/or development can be managed to an acceptable level as regards the adequacy of existing flood protection measures
2.4	The development proposed addresses the above in a manner that is also compatible with the achievement of wider planning objectives in relation to development of good urban design and vibrant and active streetscapes.	It is PUNCH Consulting Engineers opinion that the proposed development complies with item 2.4. This is discussed in greater detail in McGill's Planning's *Planning Report* and *Z15 Compliance Statement* submitted as part of the planning application for the proposed development.

8 Conclusion

PUNCH Consulting Engineers were appointed to carry out a Site-Specific Flood Risk Assessment for the proposed residential development at Fortfield Road, Terenure, County Dublin.

This Site-Specific Flood Risk Assessment has been carried out in accordance with "*The Planning System & Flood Risk Management Guidelines*" published by the Department of the Environment, Heritage and Local Government in November 2009 and DCC Development Plan.

A review of flood risk in the area was carried out as the site is located adjacent to an existing man-made pond and the Dublin City DP SFRA flood mapping indicates flooding within the site boundary.

For the purposes of carrying out this SSFRA a 1D hydraulic model of the adjacent drainage pond was developed and analysed. The results of the hydraulic modelling indicate that flood waters from the 1%AEP and 0.1%AEP events are retained within the contoured lands around the pond and do not pose a flood risk to the proposed development. The proposed development site is therefore deemed to be within fluvial Flood Zone C. A minimum FFL of 48.0mOD is proposed.

Following consultation with DCC and Nicholoas O'Dwyer, their appointed engineers for the Poddle Flood Alleviation Scheme, it was established that the predicted flooding on the site, shown on the Dublin City DP SFRA flood mapping is pluvial in nature. As pluvial flooding should not be used in the designation of flood zones, and in the absence of any identifiable fluvial or coastal flood risk to the site, it is concluded that the proposed development site is wholly located in Flood Zone C.

To alleviate concerns relating to pluvial flooding at the site, the estimated 1%AEP and 0.1%AEP flood volumes, within and around the site, were calculated. These volumes were used in the development of pluvial flood alleviation measures which are discussed more fully in the Engineering Planning Report (222102-PUNCH-XX-XX-RP-C-0002). These flood alleviation measures will remove pluvial flooding from a section of Fortfield Road for storm events up to and including the 1%AEP event, offering a significant reduction in pluvial flood risk to that area over existing conditions.

Given that the site is wholly located in Flood Zone C, a Justification Test is not required as part of this SSFRA report. However, given that the site is shown within Flood Zones A and B on the Dublin City DP SFRA mapping it was deemed prudent to complete the Justification Test for Development Management.

The mitigation measures proposed in this document will ensure that the development is in compliance with the relevant sections of the Dublin City Council DP as outlined in Section 2.2 as well as in full compliance with the Dublin City Council DP SFRA and The Planning System & Flood Risk Management Guidelines.