Comhairle Contae Átha Cliath Theas South Dublin County Council	DOCUMENT LEAD SHEET	

FLOOD RISK ASSESSMENT

DOC. NO: P2012-C-002

PROJECT: SILVER GRANITE, PALMERSTOWN

STATUS: PLANNING PERMISSION

CLIENT: HOLLYVILLE INVESTMENTS LTD

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Where this document has been revised it is recorded as indicated below. Please replace all superseded pages of this document with current version.

Rev	Date	Description	By	Checked	Approvals	
P	02 Sep 21	Draft Planning Submission	SJ	GD/CP		
☑	Entire Document Issued this Revision					

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1.0 INTRODUCTION

1.1 Background and Scope

As part of an application for development at the existing Silver Granite Public House site at Silver Granite public house, Kennelsfort Road Upper, Johnstown, Dublin 20, GDCL Consulting Engineers were commissioned to undertake a Site-Specific Flood Risk Assessment (SSFRA) to support the submission of a planning application for a proposed mixed-use development on the subject site.

The objective of this report is to assess flood risk to the existing site and the proposed development in accordance with "The Planning System and Flood Risk Management, Guidelines for Planning Authorities" (FRM Guidelines).

This report will include identification and assessment of existing and potential flood risks to / from the site and proposed development.

1.2 Site Details

The site is approximately 0.3ha in area and is bordered to the west by the Walkinstown Kennelsfort Road, Wheatfield Road to the north, a petrol service station to the south and Oakcourt Grove residential estate to the east. The site currently houses a two-storey public house, bookmakers and barbers with off road surface parking. The surrounding area comprises a mix of retail/commercial enterprises and residential development.

The site is located within South Dublin County Council Development Plan 2016 - 2022 Map 2 boundary and zoned as Objective DC - *'To protect, improve and provide for the future development of District Centres'.*

Use Zoning Objectives

Objective RES	To protect and/or improve residential amenity
Objective RES-N	To provide for new residential communities in accordance with approved area plans
Objective SDZ	To provide for strategic development in accordance with approved planning schemes
Objective REGEN	To facilitate enterprise and/or residential-led regeneration
Objective TC	To protect, improve and provide for the future development of Town Centres
Objective MRC	To protect, improve and provide for the future development of a Major Retail Centre
Objective DC	To protect, improve and provide for the future development of District Centres

Figure 1 – South Dublin County Council Development Plan 2016 - 2022 Map 2 Excerpt

The aim of this report is to provide information on the calculations, estimates and assumptions used to design the foul drains, surface water drains, SuDS systems, surface water attenuation and water supply for the proposed development.

Foul and surface water systems for the site will be separate and are designed in accordance with the requirements of South Dublin County Council, the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS), the Building Regulations and the recommendations of the DOE Recommendations for Site development works for Housing areas. In addition, sewers

have been designed with reference to the 'The Planning System and Flood Risk Management Guidelines', the Greater Dublin Regional Code of Practice for drainage works and Irish Water Standards Details for water and wastewater as applicable.

1.3 Proposed Development

The proposed development will involve the demolition of the existing two storey building and infill of the existing basement and the construction of a multistorey mixed-use development consisting of :-

- 50 no. apartments, comprising of 25 no. one-bed apartments and 25 no. two-bed apartments;
- Internal Basement, Gastropub, Retail Unit, Pharmacy and Off-License at Ground Floor Level;
- Commercial parking fronting the development
- Resident parking located within the existing adjacent shopping centre carpark

The schedule of areas breakdown for the commercial units are as follows:

Table 1 - Schedule of Commercial Areas

	Floor Area (m^2)
Gastropub	558
Spar	226
Pharmacy	157
Bar/Off License	147
Total	1088

The proposed development will include upgrading of the existing public parking, landscaping and footpaths currently adjoining the existing building.

2.0 PLANNING GUIDELINES & FLOOD RISK ASSESSMENT

2.1 The Planning System and Flood Risk Management, Guidelines for Planning Authorities

The FRM Guidelines provide "mechanisms for the incorporation of flood risk identification, assessment and management into the planning process". They ensure a consistent approach throughout the country requiring identification of flood risk and flood risk assessment to be key considerations when preparing development plans, local area plans and planned development.

"The core objectives of The FRM Guidelines are to:

- Avoid inappropriate development in areas at risk of flooding;
- Avoid new developments increasing flood risk elsewhere;
- 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 the requirements of EU and national law in relation to the natural environment and nature conservation are complied with for flood risk management."

The key principles of The FRM Guidelines are to apply the Sequential Approach to the planning process i.e.;

- "Avoid the risk, where possible,
- Substitute less vulnerable uses, where avoidance is not possible, and
- Mitigate and manage the risk, where avoidance and substitution are not possible."

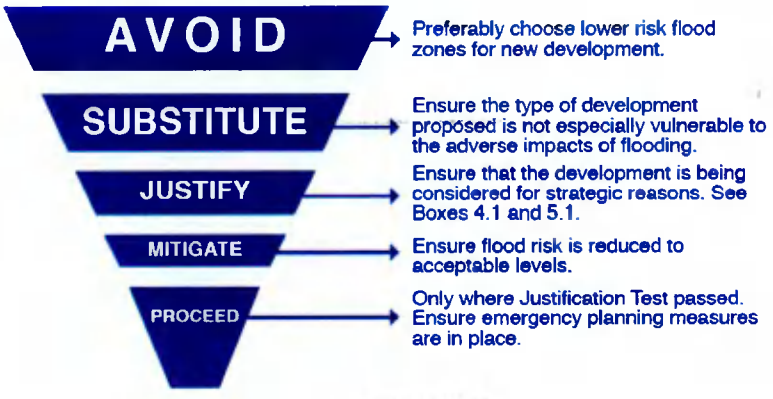


***Figure 2** - Sequential Approach Principles in Flood Risk Management*

Where the *Sequential Test's* **avoid** and **substitute** principals are not appropriate then the FRM Guidelines propose that a *Justification Test* be applied to assess the appropriateness, or otherwise, of particular developments that are being considered in areas of moderate or high flood risk.

2.2 Flood Risk Assessment

The assessment of flood risk requires an understanding of where water comes from (the source), how and where it flows (the pathways) and the people and assets affected by it (the receptors).

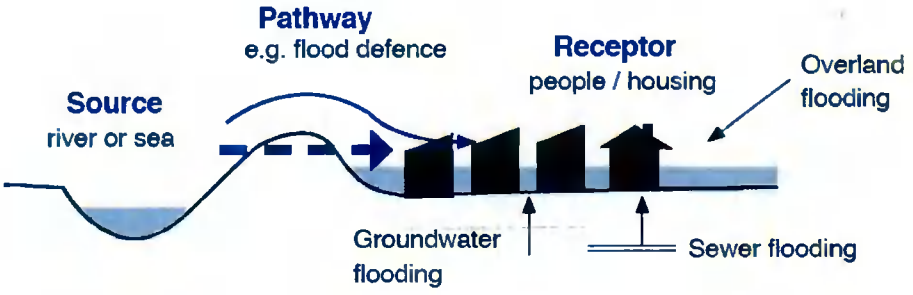


Figure 3 - Source-Pathway-Receptor Model

The principal sources are rainfall or higher than normal sea levels. The principal pathways are rivers, drains, sewers, overland flow and river and coastal floodplains and their defence assets. The receptors can include people, their property and the environment. All three elements are examined as part of the flood risk assessment including the vulnerability and exposure of receptors to determine potential consequences. Mitigation measures typically used in development management can then be used to reduce the impact of flooding on people and communities e.g., by blocking or impeding pathways. The planning process is primarily concerned with the location of receptors and potential sources and pathways that might put those receptors at risk.

Risks to people, property and the environment should be assessed over the full range of probabilities, including extreme events. Flood risk assessment should cover all sources of flooding, including effects of run-off from a development locally and beyond the development site.

2.3 Flood Risk Assessment Stages

The FRM Guidelines outline that a staged approach should be adopted when carrying out a flood risk appraisal or assessment of flood risk for individual planning applications. "These stages are:

- Stage 1 Flood risk identification
- Stage 2 Initial flood risk assessment
- Stage 3 Detailed flood risk assessment

Refer to **Figure 4** below for details:

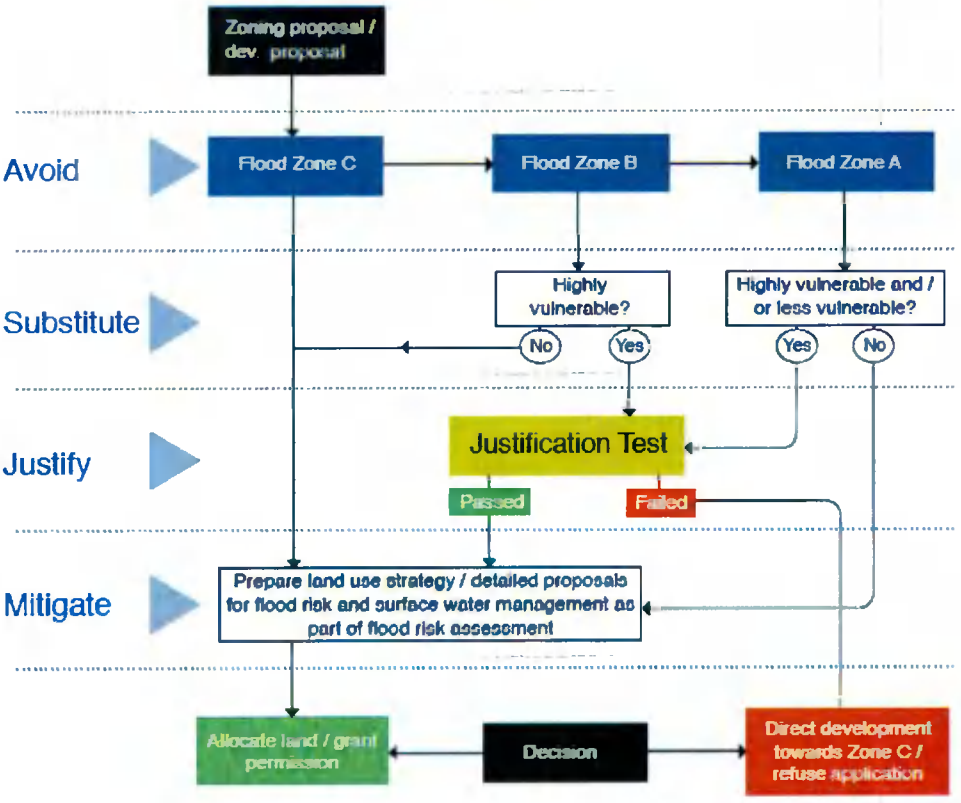


Figure 4 - Sequential Approach mechanism in the Planning Process

2.4 Flood Zones

The FRM Guidelines use flood zones to determine the likelihood of flooding and for flood risk management within the planning process. The three flood zones levels are:

- Flood Zone A – where the probability of flooding from rivers and the sea is highest (greater than 1% AEP (Annual Exceedance Probability) or 1 in 100 for river flooding;
- Flood Zone B – where the probability of flooding from rivers and the sea is moderate (between 0.1% AEP or 1 in 1000 and 1% AEP or 1 in 100 for river flooding); and
- Flood Zone C – where the probability of flooding from rivers and the sea is low (less than 0.1% AEP or 1 in 1000 for both river and coastal flooding). Flood Zone C covers all areas outside zones A and B.

The FRM Guidelines categorises all types of development as either;

- Highly Vulnerable e.g. dwellings, hospitals, fire stations, essential infrastructure,
- Vulnerable e.g. retail, commercial or industrial buildings, local transport infrastructure,
- Water Compatible e.g. flood infrastructure, docks, amenity open space.

2.5 Vulnerability v Flood Zone

The Sequential Approach restricts development types to occur within the flood zone appropriate to their vulnerability class, see Table 2.

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development (including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

Table 2 *– Matrix of Vulnerability versus Flood Zone to illustrate appropriate development and that required to meet the Justification Test*

2.6 Proposed Development's Classification

The proposed development is categorised by the Guidelines as **highly vulnerable** development and appropriate to be located within Flood Zone C only.

2.7 Site Specific Flood Risk Assessment for Development

The FRM Guidelines require a Site-Specific Flood Risk Assessment to "gather relevant information sufficient to identify and assess all sources of flood risk and the impact of drainage from the proposal". It should "quantify the risks and the effects of any necessary mitigation, together with the measures needed or proposed to manage residual risks". It considers the nature of flood hazard, taking account of the presence of any flood risk management measures such as flood protection schemes and how development will reduce the flood risk to acceptable levels. A detailed assessment for a development application should conclude that the development is not at risk from core flood risk elements and that residual risks can be successfully managed with no unacceptable impacts on adjacent lands.

2.8 SSFRA Key Outputs

Key outputs of an SSFRA are:

- Plans showing the site and development proposals (including any relationship with watercourses and structures which may influence local hydraulics as required);
- Surveys of site levels and cross-sections as necessary to indicate development levels relative to sources of flooding and likely flood water levels;
- Assessments of;
    - Potential sources of flood risk;
    - Existing flood alleviation measures;
    - Potential impact of flooding on the site.

- How the layout and form of the development can reduce those impacts, including arrangements for safe access and egress.
- Proposals for surface water management and sustainable drainage.
- The effectiveness and impact of any mitigation measures.
- The residual risks to the site after the construction of any necessary measures and the means of managing those risks; and
- How flood risks are managed for occupants / employees of the site and its infrastructure.

3.0 FLOOD RISK IDENTIFICATION STAGE

3.1 General

The initial flood risk identification stage uses existing information to identify and confirm whether there may be flooding or surface water management issues for the lands in question that warrant further investigation.

3.2 Information Sources Consulted

Information sources consulted for the identification exercise are outlined in **Table 3** below.

Information	Source	Assessment
Predictive and historic flood maps, and benefiting lands maps, such as those available on http://www.floods.ie;	OPW www.floodinfo.ie website consulted.	There were no OPW land commission schemes or benefitting land zones within the subject site's boundary. No flood events were recorded in the immediate vicinity of the site.
Predictive fluvial, coastal, pluvial and groundwater flood maps.	Final CFRAM Study Maps.	No flood risk to the site was identified on any flood risk map. The site is located more than 10km west of the Irish Sea.
Topographical maps, in particular digital elevation models produced by aerial survey or ground survey techniques;	OSI Maps consulted, site topographic survey undertaken and analysed.	Site walkover and interrogation of topographic and OS surveys indicated no flood risk to the site
Information on flood defence condition and performance;	OPW www.floodinfo.ie website consulted.	No defences are present within the subject site or in the vicinity of the site.
Alluvial deposit maps of the Geological Survey of Ireland. These maps, while not providing full coverage, can indicate areas that have flooded in the past.	www.gsi.ie GSI maps consulted.	No evidence of groundwater flooding.
National, regional & local spatial plans, such as the National Spatial Strategy, regional planning guidelines, development plans & local area plans provide key information on existing and potential future receptors.	Strategic Flood Risk Assessment for South Dublin County Council Development Plan 2016-2022	Strategic Flood Risk Assessment for South Dublin County Council Development Plan 2016-2022, indicates potential flood zones for the town. Estimated flood zones do not extend to the subject site.

Table 3 - Information Sources Consulted

3.3 OPW Predictive, Historic & Benefiting Lands Maps & Flood Hazard Information

The OPW website www.floods.ie indicates that there were no OPW land commission schemes or benefitting land zones within the boundary of the subject site. The website does not indicate any flood events in the vicinity of the site.

3.4 Previous Flood Risk Assessments & Predictive Flood Maps

The Strategic Flood Risk Assessment for South Dublin County Council Development Plan 2016-2022 prepared by RPS identifies the 100-year and 1000-year flood events relating to river/stream channels. However, these flood lines are not located in the vicinity of the subject site. The Strategic Flood Risk Assessment for South Dublin County Council Development Plan 2016-2022 has not identified the subject site as being at risk of flooding (Appendix A) and the ECFRAMS maps do not indicate any flood risk in the site or in the immediate vicinity of it.

3.5 Fluvial Flood Predictive Maps

The CFRAMS Fluvial Flood Extents-E09CAR_EXFCD_F2_04 (Appendix B) indicate that the 10%, 1% and 0.1% Fluvial AEP events are contained within the modelled river centreline of the River Liffey therefore the site is outside of the estimated flood plain of the river.

3.6 Tidal Flood Maps

The site is located in excess of 10km west of the coast and is therefore not at risk of tidal flooding.

3.7 Other Sources

Other information sources were consulted to determine if there was any additional flood risk to the site, these included;

- Topographical surveys of the area – no evidence based on topography.
- Flood defence information – there are no flood defences in the vicinity of the site.

3.8 Source-Pathway-Receptor Model

A Source-Pathway-Receptor model was produced to summarize the possible sources of floodwater, the people and assets (receptors) that could be affected by potential flooding (with specific reference to the proposals) and the pathways by which flood water from an event exceeding 1%AEP (Annual Exceedance Probability) would follow - see **Table 4**. It provides the probability and magnitude of the sources, the performance and response of pathways and the consequences to the receptors in the context of the commercial development proposal. These sources, pathways and receptors will be assessed further in the initial flood risk assessment stage.

Source	Pathway	Receptor	Likelihood	Impact	Risk
Tidal	Tidal flooding from coast over 10km away.	**Residents (people)** development, **visitors** and the **buildings** themselves and other **property** such as **vehicles** located in car park areas.	Remote	High	Very Low
Fluvial	Flooding from the existing watercourse to the south of the subject site.	**Residents (people)** development, **visitors** and the **buildings** themselves and other **property** such as **vehicles** located in car park areas.	Very Low	High	Very Low
Surface Water - Pluvial	Flooding from surcharging of the development's drainage systems	**Residents (people)** development, **visitors** and the **buildings** themselves and other **property** such as **vehicles** located in car park areas.	Possible	High	Moderate
Surface Water - Pluvial	Flooding from internal sources – overland flows	**Residents (people)** development, **visitors** and the **buildings** themselves and other **property** such as **vehicles** located in car park areas.	Possible	High	Moderate
Surface Water - Pluvial	Flooding from external sources – overland flows	**Residents (people)** development, **visitors** and the **buildings** themselves and other **property** such as **vehicles** located in car park areas.	Possible	High	Moderate
Groundwater flooding	Rising GWL on the site	**Residents (people)** development, **visitors** and the **buildings** themselves and other **property** such as **vehicles** located in car park areas.	Very Low	High	Very Low
Human or Mechanical Error (Pluvial)	Petrol interceptor and hydrobrake	Areas of development draining to the surface water network; **Residents (people)** development, **visitors** and the **buildings** themselves and other **property** such as	Possible	High	Moderate

Source	Pathway	Receptor	Likelihood	Impact	Risk
		vehicles located in car park areas.			

Table 4 - Source-Pathway-Receptor Analysis

As is the case with the area immediately surrounding the proposed development, one of the key features of heavily piped areas is the groundwater levels are restricted by the conduit effect of the pipework. It is clear from the above flooding analysis that the proposed site is not at risk from tidal, or groundwater flooding due to its geographic location and topography and there is no evidence, both current or historical, that groundwater exists near the surface to create a flood pathway.

However, there is a moderate risk of pluvial flooding of the site and moderate risk of flooding of the site due to the potential surcharging and blockage of the new drainage network. Consequently, an initial flood risk assessment will follow to provide further detail on the causes, effects and possible mitigation measures for the types of flooding identified above.

4.0 INITIAL FLOOD RISK ASSESSMENT STAGE

4.1 INITIAL FLOOD RISK ASSESSMENT STAGE

The only flood risk to the proposed development identified from Stage 1 is a moderate risk of pluvial flooding following development (due to an extreme rainfall event which exceeds the capacity of the surface water drainage network or an extreme rainfall event resulting in overland flows on adjacent public roadways). There is also a moderate flood risk to the development due to a blockage or mechanical failure of the drainage network.

4.2 Initial Pluvial Flood Risk Assessment

The Source-Pathway-Receptor model identified that there could be potential for pluvial flood risk within the development site related to the future drainage networks serving the proposed development and due to overland flow from adjacent public roads.

The drainage system has potential to cause local flooding unless it is designed in accordance with the requirements of the Local Authority, i.e. to incorporate surface water attenuation and storage of surface water runoff in the surface water drainage network for the development and to take account of flood exceedance for storm return periods exceeding 1%AEP (Annual Exceedance Probability).

Proper operation and maintenance of the drainage system should also be implemented to reduce the risk of human or mechanical error causing pluvial flood risk from blockages etc.

4.3 Flood Zone Category

Following the assessment of the flood risks to the site and the available information it is considered that the proposed site is located within Flood Zone Category C as defined by the Guidelines and as indicated by the Final South Eastern CFRAM study map and the Strategic Flood Risk Assessment carried out for SDCC by RPS – refer to **Appendices.**

Therefore, the proposed development of residential and commercial units on the subject site is appropriate for this flood zone category, and **a justification test is not required,** and the Guidelines sequential approach is passed.

5.0 DETAILED FLOOD RISK ASSESSMENT STAGE

5.1 General

As a justification test is not required, a detailed flood risk assessment must be carried out which considers moderate pluvial flood risk in relation to the following;

- Proposed Surface Water Management measures.
- Flood Exceedance.
- Impact of proposals on flood risk to adjacent areas.
- Effects of climate change.
- Access and Egress during Flood Events
- Residual risks.
- Effectiveness of any flood mitigation measures.

The following drawings and reports from GDCL Consulting Civil and Structural Engineers were reviewed:-

1. P-2012-C-001 – Engineering Services Report
2. P-2012-C-100 – Combined Underground Services (Civil)

5.2 Assessment of Flood Risk

5.2.1 Flooding exceedance – Fluvial

The site is not subjected to fluvial flooding. All development is located within Zone C.

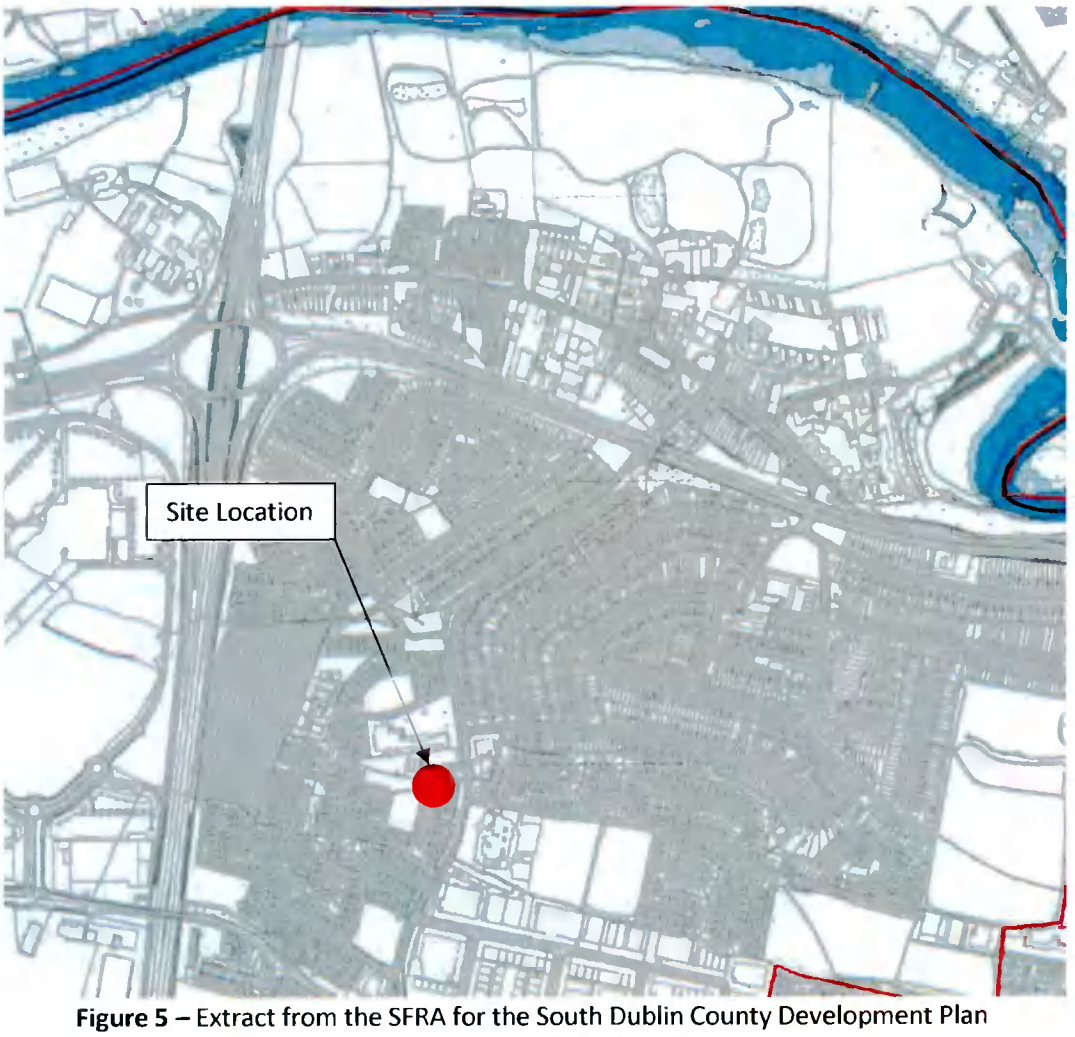


Figure 5 – Extract from the SFRA for the South Dublin County Development Plan 2016-2022

The SFRA for the South Dublin County Development Plan 2016-2022 shows that flooding does not breach the banks of the River Liffey.

5.2.2 Flood Exceedance - Pluvial

Flooding from internal pipe networks

The surface water pipe system has been designed to accommodate runoff from a 1 in 100-year return period event, this is in accordance with the GDSDS section 6.5.1 and table 4.

The surface water drainage network including the surface water storage system is also designed to include an increase in rainfall intensities of 20%, due to climate change.

Flooding from external pipe networks

In order to mitigate the impact of the flooding of external pipe networks, the proposed finished floor level has been set 300-500mm higher than the surrounding ground level, which will ensure adequate overland flood routing away from the proposed development in the event of external drainage surcharging.

Flooding from internal sources – overland flows

Within the site, overland flow paths have been provided to control water flooding from the site drainage system or run-off from high intensity, short duration storms which might fail to enter the drainage system. Proposed landscaping and dropped kerbs will been provided at road edges at low spots in order to allow overland flow to enter open space areas or discharge to the watercourse. These overland flow routes have been designed to direct surface flows away from buildings.

These mitigation measures consist of designing overland flows to direct any floodwater away from buildings, either keeping it within the carriageway or directing the surface water to designated green areas within the site. The finished floor levels for all buildings in the vicinity are designed to be above the surcharged level for any manhole in danger of flooding. Furthermore, finished floor levels for all buildings will be a minimum of 500mm above the maximum flood levels in nearby surface water attenuation systems.

Flooding from internal and external sources – overland flows:

Within the site, overland flow paths have been provided to control water flooding from the site drainage system or run-off from high intensity, short duration storms which might fail to enter the drainage system. Proposed landscaping and dropped kerbs will be provided at road edges at low spots in order to allow overland flow to enter open space areas or discharge to the watercourse. These overland flow routes have been designed to direct surface flows away from buildings.

These mitigation measures consist of designing overland flows to direct any floodwater away from buildings, either keeping it within the carriageway or directing the surface water to designated green areas within the site. The finished floor levels for all buildings in the vicinity are designed to be above the surcharged level for any manhole in danger of flooding. Furthermore, finished floor levels for all buildings will be a minimum of 500mm above the 1% Fluvial AEP Event in nearby surface water attenuation systems.

The OPW records for predictive and historic flood maps and benefiting land maps have also been consulted for recorded flood events in the vicinity of the subject site. A map showing all flood events within the immediate vicinity of the subject site was downloaded from the OPW website and is provided below in the Figure below.

***Figure 6** - OPW Land Benefiting Maps and Historic Flood Maps*

There are no flood events recorded in the immediate vicinity of the subject site. There is 1 no. flood event recorded north of the subject site. This flood event is highly localized and there is no indication that it will have any residual effect on the subject site. Therefore, the likelihood of flooding from surrounding areas is considered low.

5.2.3 Human or Mechanical Error

Source

The subject lands will be drained by an internal private storm water drainage system which will discharge to the existing surface water sewers in the vicinity of the subject site. The internal surface water network is the source of possible flooding from the system if it were to block.

Pathway

If the proposed private drainage system blocks this could lead to possible flooding within the site.

Receptor

The receptors would be building and surrounding landscaped areas.

Likelihood

There is a high likelihood of flooding on the subject site if the surface water network were to block.

Consequence

The surface water network would surcharge and overflow through gullies and manhole lids. It is, therefore, considered that the consequences of such flooding are moderate.

Risk

With a high likelihood and moderate consequence, there is a high risk of surface water overflowing onto the surrounding road network, should the surface water network block.

Flood Risk Management

Levels on-site have been designed such that in the event of the surface water system surcharging, surface water can still escape from the site by overland flow routing without damaging the proposed building. The surface water network would need to be unblocked and maintained should a blockage occur.

5.3 Proposed Surface Water Management Measures

The surface water drainage system was designed by GDCL Consulting Civil and Structural Engineers. The following approach and parameters have been used:-

- Drainage design consists of downpipes, gullies, pipes, manholes, permeable paving, blue roof attenuation, petrol interceptor, underground attenuation systems and discharge control at outlet;
- Attenuation to be 'Stormtech' modular systems and a blue roof;
- Attenuation volume provided by the Stormtech System is 44.7m^3;
- Attenuation volume provided by the Blue Roof System is 96m^3;
- Climate change factor of 20% has been applied;
- Site discharge rate is 1l/s controlled by a 'Hydrobrake';
- Klargester NSBD003 class 1 bypass petrol interceptor (or similar approved) provided at outlet from attenuation system or similar approved;
- Minimum public pipe size of 225mm diameter, pipes are designed using the Modified Rational Method with a return period of 5 years and 75mm/hr rainfall intensity;
- Overland flow routes have been designed to direct surface flows away from buildings.

5.4 Access & Egress During Flood Events

During flood events, access and egress would need to be maintained and overland flow routes and extents would need to be carefully planned. The habitable spaces are located in excess of 500mm above the top water levels for the surface water attenuation system for a 1 in 100-year event.

It would be anticipated that potential ponding on the road surface would be concentrated at the road channels and emergency vehicles could traverse the centreline of the road (which is higher) to gain access to the development if required during an extreme rainfall event where this occurred.

5.5 Mitigation Measures

Proposed mitigation measures to address residual flood risks are summarized below;

- The proposed drainage system to be maintained on a regular basis to reduce the risk of a blockage. A maintenance contract for the petrol interceptor should be entered into with a specialist maintenance company.
- The surface water drainage system to be designed to accommodate runoff from a 1 in 5-year return period event with surface water treated on site by means of a soakaway. The soakaway shall be sized for a 1 in 100-year storm event (conservatively, most flood waters will be contained underground even in the critical 100-year flood event). This model demonstrates that the surface water drainage system performance is adequate for protection against flooding.
- 500mm minimum separation buffer to be maintained between the lowest proposed finished floor level within the proposed development and the estimated top water level for the 1% AEP Fluvial Event.
- Site discharge rate has been significantly reduced due to the proposal of on-site surface water treatment by means of a blue roof and attenuation system.
- A climate change factor of 20% has been applied to rainfall depths in the surface water drainage design.

6.0 RESIDUAL RISKS

6.1 General

The residual flood risks, following the detailed assessment and mitigation measures are as follows:

Flooding exceedance – Fluvial

Due to no overland flood route existing from the nearest fluvial watercourse to the proposed development, and the level difference between the proposed finished floor level and the 1% AEP Fluvial Event water level, the residual risk of fluvial flooding is considered low.

Flooding exceedance – Pluvial

As a result of the design measures detailed in this report, there is a low residual risk of flooding from each of the surface water risks related to pluvial flooding. The flood risk management measures set out in Section 5.6 will minimise the risk, ensuring that any overland flooding from surface water will result in the flooding of the internal roads only.

Human or Mechanical Error

As a result of the flood risk management outlined above, there is a low residual risk of overland flooding from human / mechanical error.

7.0 CONCLUSIONS

This Site-Specific Flood Risk Assessment for the proposed development was undertaken in accordance with the requirements of the Planning System and Flood Risk Management Guidelines for Planning Authorities", November 2009. Following the flood risk assessment stages, it was determined that the site is within Flood Zone A as defined by the Guidelines and based on the PFRAMS mapping. Therefore, the development of mixed-use on the subject site is appropriate for the site's flood zone category and a justification test as outlined in the Guidelines is required. The Guidelines sequential approach is met with the 'Justify' & 'Mitigate' principals being achieved.

The proposed flood mitigation measure(s) outlined in Section 5 should be implemented. It is considered that the flood risk mitigation measures once fully implemented are sufficient to provide a suitable level of protection to the proposed development.

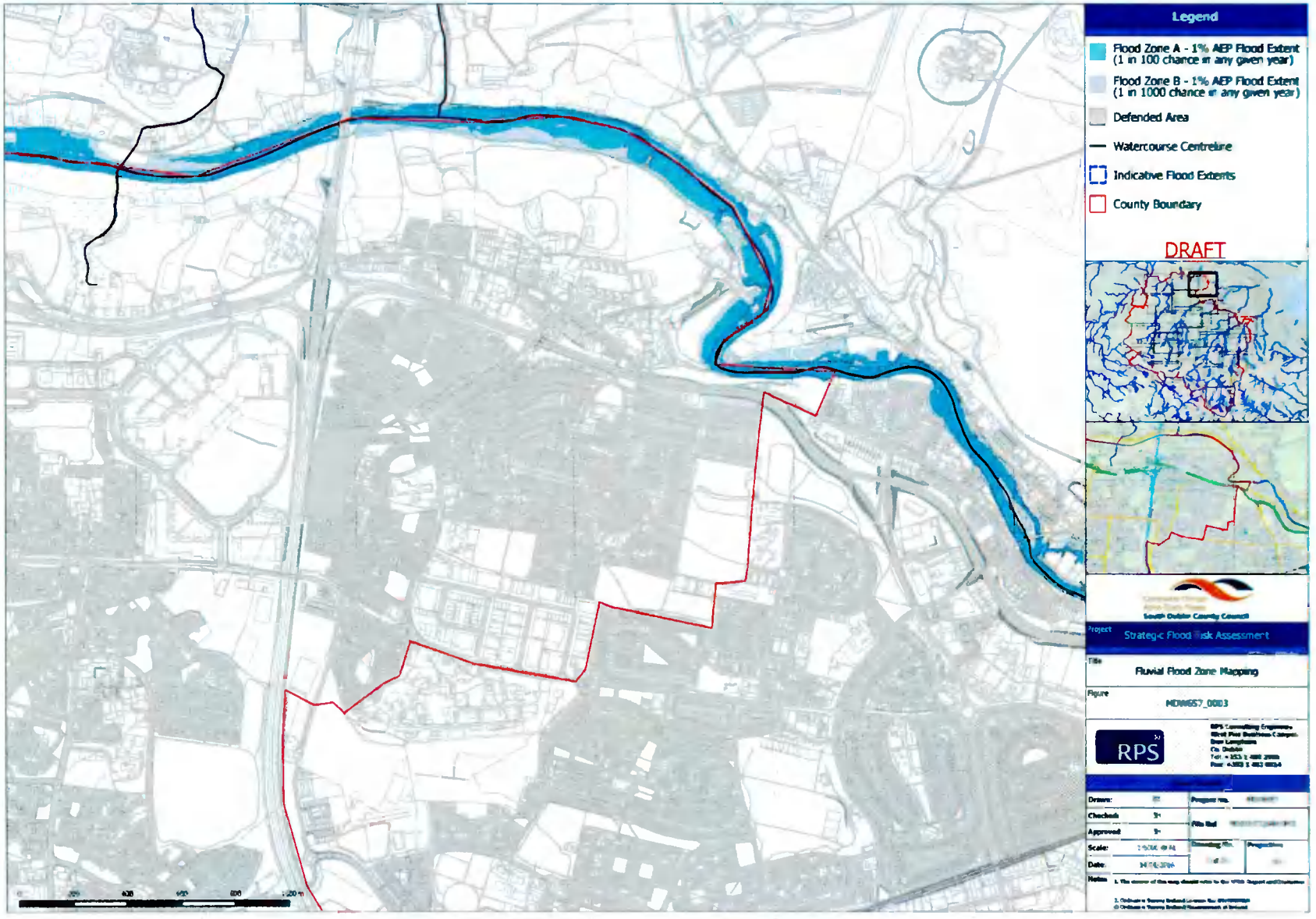
The shallow, localised flooding in the cul-de-sac access road serving the proposed site would not have a negative impact on the proposed development, and is continually flooding locally due to the topography of the road and the poor surface water drainage network.

A regularly maintained drainage system would ensure that the network remains effective and in good working order should a large pluvial storm occur. In the event of extreme pluvial flooding in excess of the development's drainage capacity i.e. exceeding 1% AEP Event, then overland flood routes would direct water towards open space areas to the south.

While the development constitutes 'highly vulnerable' development as defined by the Guidelines, it is appropriate for this flood zone 'A' as indicated by the justification test, and the scheme has been designed to ensure that the risk of flooding of the development is reduced as far as is reasonably practicable. The development does not increase the risk of flooding to adjacent area and roads once mitigation measures are implemented.

APPENDIX A

South Dublin County Council Development Plan 2016 – 2022 Strategic Flood Risk Assessment Flood Maps


Legend
Flood Zone A - 1% AEP Flood Extent (1 in 100 chance in any given year)
Flood Zone B - 1% AEP Flood Extent (1 in 1000 chance in any given year)
Defended Area
Watercourse Centreline
Indicative Flood Extents
County Boundary
DRAFT
Project
Strategic Flood Risk Assessment
Title
Fluvial Flood Zone Mapping
Figure
MDW657_0003
RPS
Drawn:
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Scale:
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APPENDIX B

Lucan to Chapelizod Fluvial Flood Extents (Map E09LUC_EXFCD_F0_10)