McCloy Consulting

Flood Risk Assessment

Ninth Lock Road, Clondalkin, Dublin 22

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1 INTRODUCTION

1.1 Terms of Reference

This Flood Risk Assessment (FRA) was commissioned by Thornmeadow Developments Limited to support the preliminary stages of a planning application for the proposed development of a site at Ninth Lock Road, Clondalkin, Dublin 22 (hereafter referred to as 'the site').

1.2 Statement of Authority

This report and assessment have been prepared and reviewed by qualified professionals with appropriate experience in the fields of flood risk, drainage, hydrology, and hydraulic modelling studies. The key staff members involved in this project are as follows:

- Joanna Poprawa *BEng (Hons)* – Graduate Consultant / Flood Analyst with experience in flood risk assessment in Ireland.
- Duncan Hartwick *BEng (Hons) BSc (Hons)* – Senior Engineer specialising in hydrology, hydraulic modelling, and flood risk assessment with experience on projects across Ireland and the UK.
- Paul Singleton *BEng (Hons) MSc CEng MIEI* – Associate Director and Chartered Engineer specialising in flood risk assessment, hydrology, drainage design and Sustainable Drainage Systems (SuDS); a recognised industry professional providing training courses on these topics to the public and private sectors in Ireland and the UK.

1.3 Purpose

This report is intended to present a detailed site-specific FRA (SSFRA) to ensure all relevant issues related to flooding are addressed. This 'Stage 3' FRA will assess the adequacy of existing information and present analysis undertaken to supplement existing data.

The assessment will therefore determine potential sources of flooding at the site. This report will also determine flood zones relevant to planning policy guidelines specific to flood risk management planning and will provide a basis for appropriate design and mitigation measures to be considered as part of the proposed development.

1.4 Approach to the Assessment

1.4.1 Method of Assessment

The method of assessment complies with the Source-Pathway-Receptor model, allowing for a spatial assessment of flood risk to people, properties, and the environment at the site. The assessment investigates the existing runoff characteristics and the potential impact the proposed development will have on pluvial / surface water runoff.

Consideration has been given to the sources and extent of fluvial flooding at the site, as well as flooding from pluvial sources, overland flow, and ponding of localised rainfall at the site. A walkover survey of the site was carried out by McCloy Consulting to investigate all sources of potential flooding. A topographical survey of the site was also commissioned and undertaken by a third party.

1.4.2 Available Flood Risk Data

For the purposes of this assessment, the primary stakeholders are the Office of Public Works (OPW) and South Dublin County Council (SDCC). OPW and SDCC data has been used to form the basis of this assessment and is presented in line with the relevant guidance and requirements.

The site and surrounding area are included in flood maps produced as part of the OPW's Catchment Flood Risk Assessment and Management (CFRAM) programme.

However, in the absence of CFRAM climate change flood levels at the site, detailed hydraulic modelling was undertaken by McCloy Consulting to gain a better understanding of flood risk at the site and inform future development.

1.4.3 Planning Guidance

The requirements for flood risk assessments are generally as set out in the '*The Planning System and Flood Risk Management – Guidelines for Planning Authorities*', published by the OPW and Department of the Environment, Heritage and Local Government in November 2009 (hereafter referred to as 'the OPW Guidelines'). The OPW Guidelines are supplemented by Departmental Circular PL 2/2014 issued by the Department of Environment, Community and Local Government on 13th August 2014, which relates to use of OPW flood mapping in assessing planning applications and clarifications of advice contained within the OPW Guidelines. Further guidance is also provided in the CIRIA Research Project 624 '*Development and Flood Risk: Guidance for the Construction Industry*'.

Policy objectives applicable to the site are set out in the *South Dublin County Development Plan 2022-2028* (SDCC CDP), specifically through the *Strategic Flood Risk Assessment for the South Dublin County Development Plan 2022-2028* (SDCC SFRA).

SDCC has adopted a different 'Flood Zone' standard than outlined in the OPW Guidelines. While the OPW Guidelines specify that Flood Zones are to be derived from 'present day' hydrological estimates without taking account of flood defences, SDCC policy objectives require Flood Zones to be derived from 'High-End Feature Scenario (HEFS)' climate change hydrological estimates.

Based on OPW climate change guidance, as set out in the *Climate Change Sectoral Adaptation Plan* published in September 2019, the High-End Future Scenario represents a 30% increase in river flows and 1 m increase in sea level.

Therefore, for the purposes of this assessment Flood Zones are defined as follows:

- Flood Zone A – where the Annual Exceedance Probability (AEP) of flooding from rivers and the sea is highest (greater than 1% AEP + 30% flow for river flooding or 0.5% AEP + 1 m sea level for coastal flooding).
- Flood Zone B – where the probability of flooding from rivers and the sea is moderate (between 0.1% and 1% AEP + 30% flow for river flooding and between 0.1% and 0.5% AEP + 1 m sea level for coastal flooding for coastal flooding).
- Flood Zone C – Flood Zone C where the probability of flooding from rivers and the sea is low (less than 0.1% + 30% flow for river flooding and 0.1% AEP + 1 m sea level for coastal flooding. Flood Zone C covers all plan areas which are not in zones A or B.

2 SITE AND PROPOSAL DETAILS

2.1 Site Location

The application site is located within the existing Elmfield Industrial Estate, Clondalkin, Co. Dublin. The site context and boundary are shown in Figure 2.1 and Figure 2.2 respectively.

Figure 2.1: Site Context

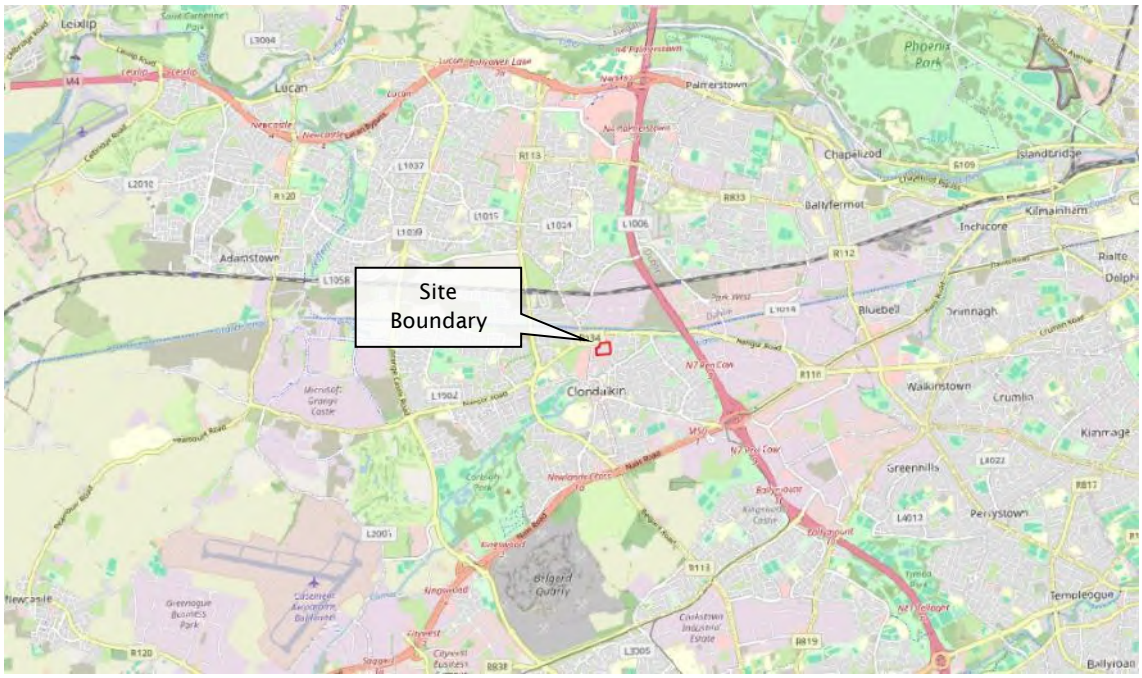
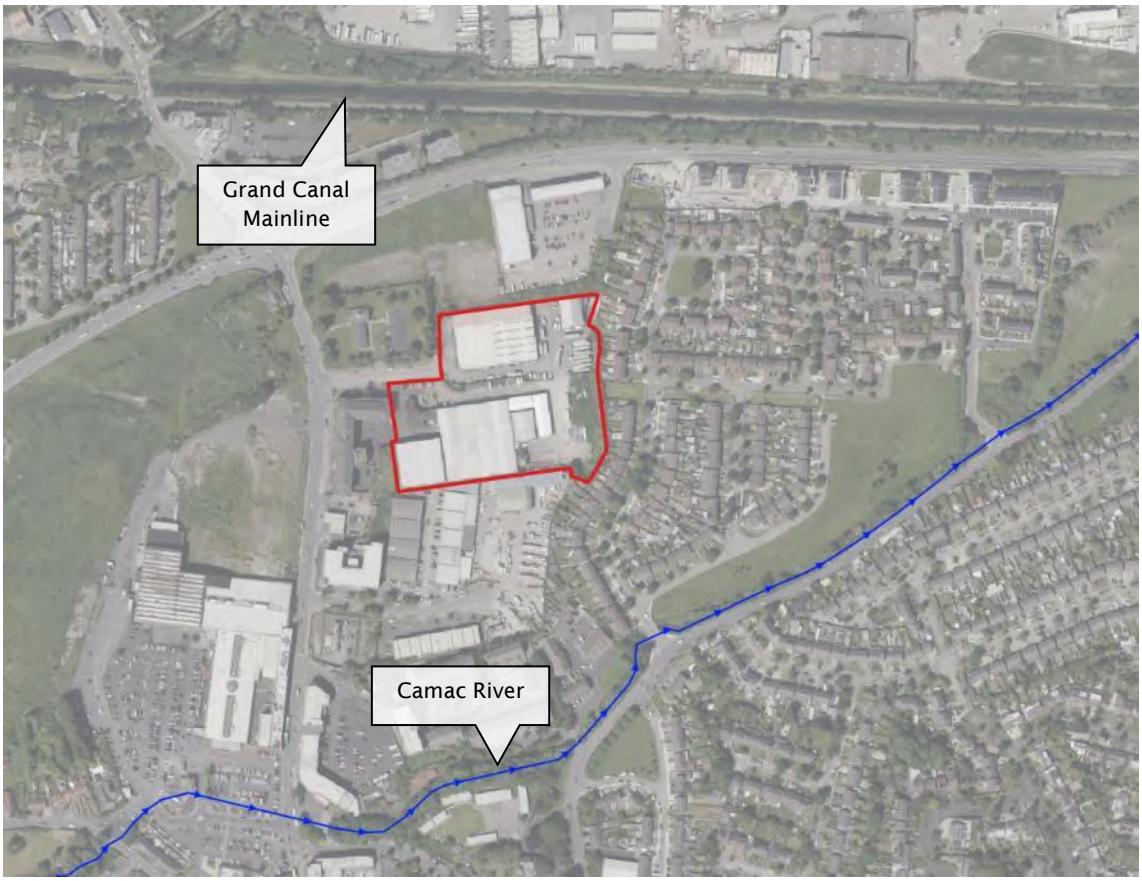


Figure 2.2: Site Boundary

2.2 Affecting Watercourses

EPA and OPW FSU datasets indicate that the only watercourse in close proximity is the Camac (Cammock) River, which flows in an eastward direction c. 130 m south of the site, as shown in Figure 2.3. The Grand Canal Main Line is c. 170 m north of the site.

Figure 2.3: Affecting Watercourses



2.3 Site Description

Existing site characteristics are as follows:

- The site comprises existing commercial development.
- Ground levels fall from north to south.
- Existing site access is via the public Ninth Lock Road to the west.

Ground levels are based on a topographical survey commissioned and undertaken by a third party.

2.4 Development Proposals

The development proposals described in the planning application that this assessment is intended to support are as follows:

> *Thornmeadow Developments Limited intend to apply for permission for a Large-Scale Residential Development on lands at the Securispeed Logistics site, Elmfield, Ninth Lock Road, Clondalkin, Dublin 22. The proposed development will consist of the demolition of the existing warehouses and structures on site and the construction of a mixed-use residential-led development comprising a total of 408 no. residential units (comprising 24 no. studio units, 230 no. 1 bedroom units, 149 no. 2 bedroom/3 persons units and 5 no. 3 bedroom/5 person housing units comprising a block of 3 no. terraced units and 2 no. detached units with balconies) and 1 no. childcare facility. The residential units will comprise a mixture of apartments and own-door houses and range in height from 2-9 storeys. The proposed development will also comprise all associated car parking (202 no. spaces), cycle parking, refuse and storage areas, plant, landscaping, open space, boundary treatment, public lighting, ESB substations, and site and infrastructural works necessary to facilitate the proposed development.*

Proposed site layout plan drawings are included in Appendix A.

2.5 Vulnerability Classification

Based on the classification criteria set out in the OPW Guidelines, the site comprises development with the vulnerability classification shown in Table 2.1.

Table 2.1: Vulnerability Classification for the Proposed Development

Element of Proposals	Land Use (per OPW Guidelines)	Vulnerability Class (per OPW Guidelines)
Dwellings	Residential	Highly Vulnerable
Access Roads / Car Parking	Local Transport Infrastructure	Less Vulnerable
Landscaped Areas	Amenity Open Space	Water Compatible

3 BACKGROUND INFORMATION REVIEW

A background information review based on existing flood risk data was carried out to build an understanding of the potential sources of flooding at the site. This section outlines the key findings of a background information review.

3.1 Background Search and Site Walkover

Based on an initial internet / media background search, there are no articles referencing flooding in the vicinity of the site.

McCloy Consulting carried out a walkover survey in July 2025 to investigate all potential sources of flooding. No evidence of flooding or surface water ponding were observed at the site. The Camac River to the south was observed to be extensively culverted and flowing in a relatively obstruction-free channel in the open sections.

3.2 South Dublin County Council

3.2.1 South Dublin County Development Plan 2022-2028

The current South Dublin CDP contains the following policy objectives considered pertinent to this assessment:

- Policy GI4 Objective 1: To limit surface water run-off from new developments through the use of Sustainable Drainage Systems (SuDS) using surface water and nature-based solutions and ensure that SuDS is integrated into all new development in the County.
- Policy IE3 Objective 2: To maintain and enhance existing surface water drainage systems in the County and to require Sustainable Drainage Systems (SuDS) in new development.
- Policy IE4 Objective 1: To require site specific flood risk assessments to be undertaken for all new developments within the County in accordance with The Planning System and Flood Risk Management - Guidelines for Planning Authorities (2009).
- Policy IE4 Objective 2: To require all developments in the County to be designed and constructed in accordance with the "Precautionary Principle" detailed in the OPW Guidelines.

3.2.1.1 South Dublin Strategic Flood Risk Assessment

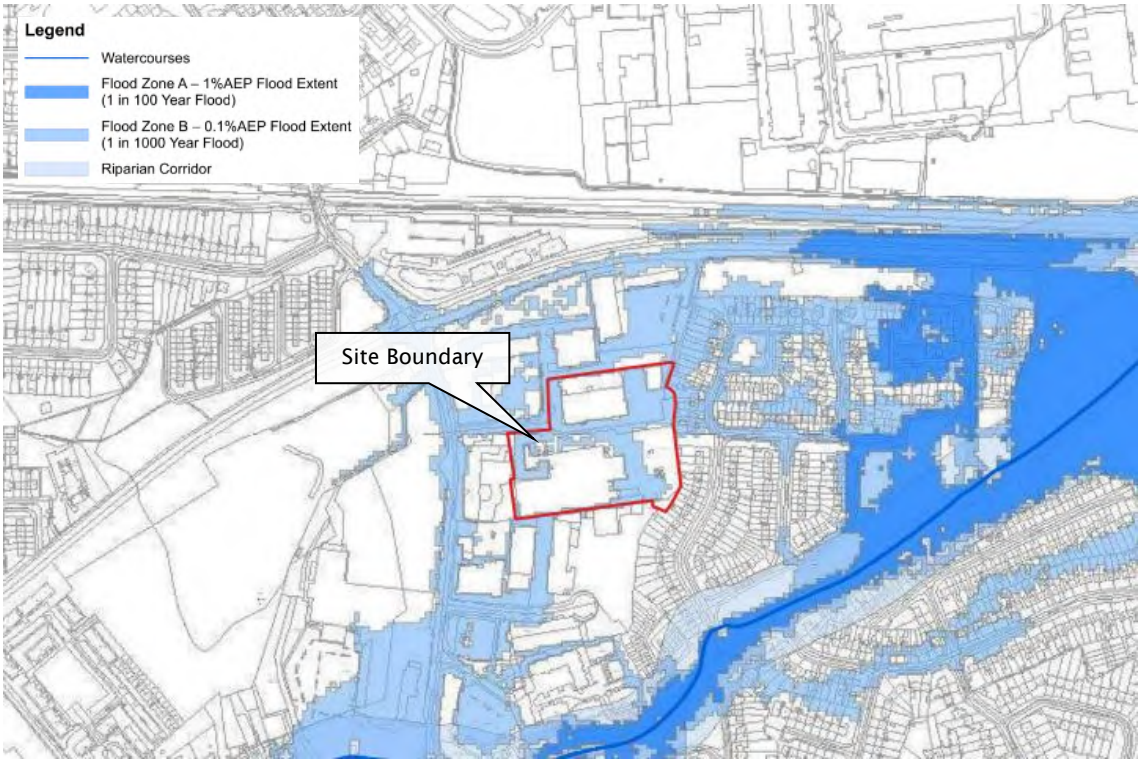
The South Dublin County Development Plan SFRA 2022-2028 includes the following guidance which is considered pertinent to the FRA:

- When determining Flood Zones, flood protection structures should be ignored, as defended areas still face residual risk from overtopping or breach, and long-term maintenance of defences cannot be guaranteed.
- The sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain.
- FRAs should address surface water management for development, demonstrating consideration of GDSDS policies and incorporation of SuDS in accordance with SDCC SuDS Guidance policy.
- FRAs should examine residual risk associated with culvert blockages, defence failure and climate change (HEFS) to set finished flood levels where appropriate. The FRAs should ensure development does not block flow paths, does not increase flood risk elsewhere, is designed to appropriate standard of flood resilient construction and demonstrates emergency evacuation procedures during flood events.

Flood Zone mapping produced as part of the South Dublin CDP SFRA indicates that parts of the site lie within Flood Zone B. Figure 3.1 shows an extract from the South Dublin CDP SFRA Flood Zone map. It is understood that South Dublin CDP SFRA Flood Zones are based on the CFRAM 1% AEP and 0.1% AEP High End Future Scenario (HEFS) climate change flood extents.

The full version of the CDP SFRA flood map relevant to the site is included in Appendix B.

Figure 3.1: Extract from South Dublin CDP SFRA Flood Zone Map



3.2.2 Clondalkin LPF Strategic Flood Risk Assessment

The Clondalkin LPF Strategic Flood Risk Assessment (SFRA) has been prepared for South Dublin County Council and published in March 2026 to support the Clondalkin Local Plan Framework (LPF), which will guide the future growth of Clondalkin over the plan period and beyond.

Flood Zone maps produced as a part of Clondalkin LPF SFRA have been based on the Eastern CFRAM High-End Future Scenario (HEFS). This complies with the approach in defining Flood Zone A and Flood Zone B within the overall South Dublin CDP.

Figure 3.2 presents an extract of the Clondalkin LPF SFRA and indicates that the site is partly affected by Flood Zone B (0.1% AEP HEFS CC).

Figure 3.2: Extract from Clondalkin LPF SFRA Flood Maps

3.3 Geological Survey Ireland

Geological Survey Ireland (GSI) provides 'Groundwater Flooding Data' viewer[1] with groundwater and surface water flood data. The data viewer indicates that the site is unaffected by historic groundwater and surface water flooding and predicted groundwater flooding.

3.4 Office of Public Works Data

3.4.1 Past Flood Events

OPW 'Past Flood Event' mapping includes a number of recorded flood events along the Camac River but no records of historic flooding in the vicinity of the site.

3.4.2 Catchment Flood Risk Assessment and Management Study

As part of the Catchment Flood Risk Assessment and Management (CFRAM) Programme, the OPW produced detailed flood maps for areas identified as being at significant risk of flooding. CFRAM flood maps based on detailed hydraulic modelling are available for the site and surrounding area. The site is included in the area covered by the Eastern CFRAM Study, which included detailed modelling of the Camac River.

Present day scenario flood mapping was produced with nodes showing flood levels for key return periods. An extract from the present day CFRAM map is included in Figure 3.3 and demonstrates that the site lies outside the floodplain of the Camac River.

As shown in Figure 3.4, CFRAM climate change flood mapping available from floodinfo.ie indicates that the site is affected by the 0.1% AEP High End Future Scenario (HEFS) flood extents. Unlike for the present day scenarios, detailed CFRAM flood maps showing modelled flood levels were not published for climate change scenarios.

The full version of the CFRAM flood map relevant to the site is included in Appendix B.

[1] https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228

Figure 3.3: CFRAM Present Day Flood Mapping

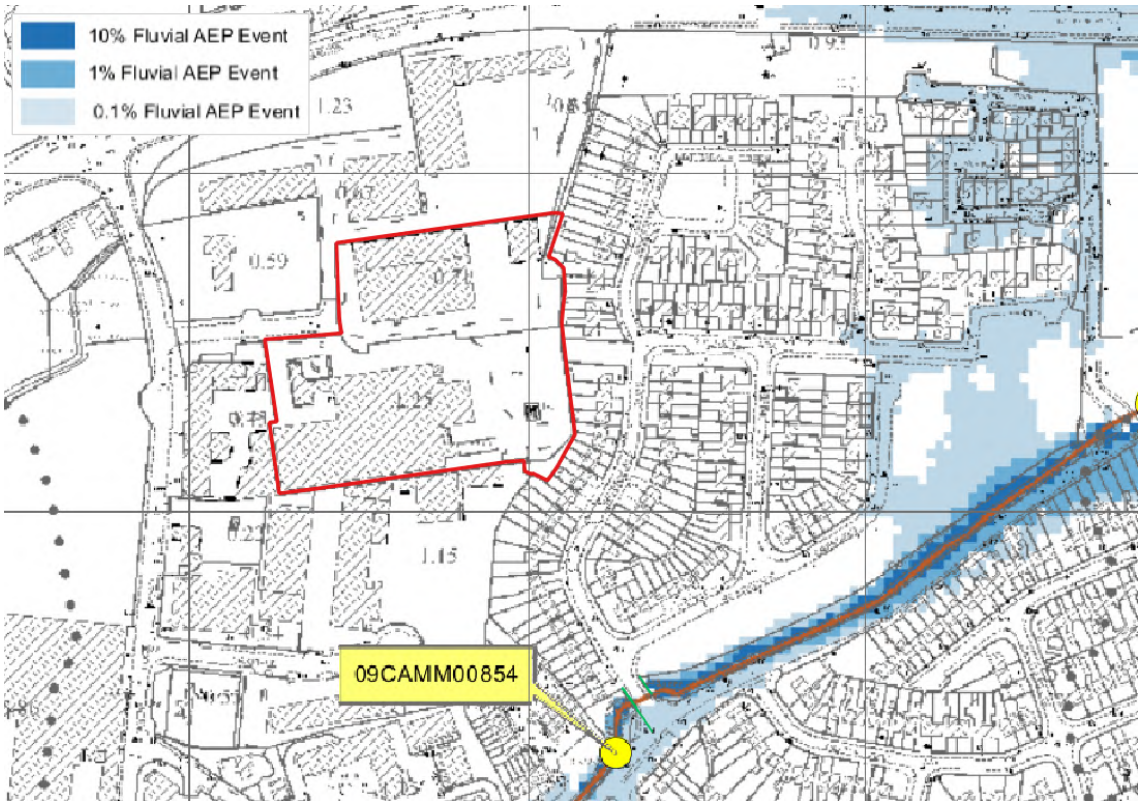
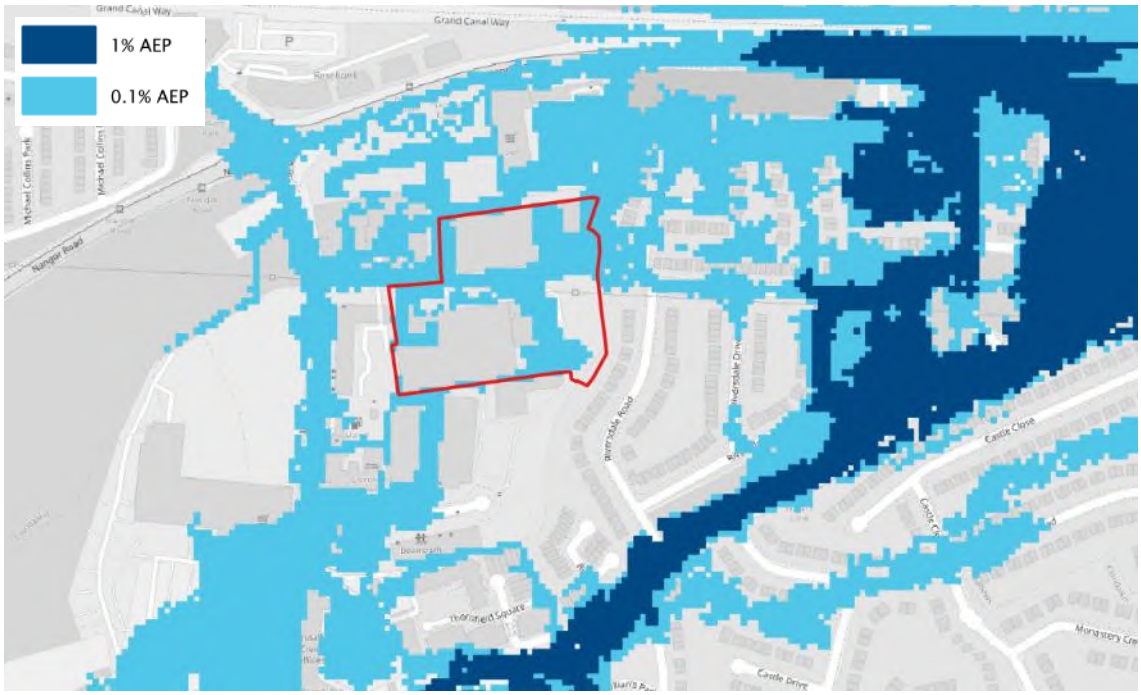


Figure 3.4: CFRAM HEFS CC Flood Mapping



4 ASSESSMENT OF FLOOD MECHANISMS

4.1 Initial Assessment

Table 4.1 presents an initial assessment of potential flooding mechanisms at the site based on the background information review presented in the previous section of this report. Flooding mechanisms screened as being significant or possibly significant have been assessed further in subsequent sections.

Table 4.1: Potential Flooding Mechanisms at the Site

Mechanism	Significant?	Reason
Fluvial Flooding	Yes	OPW CFRAM flood mapping indicates that the site is within the 0.1% AEP HEFS flood extents of the Camac River.
Coastal Flooding	No	The site is not located in a coastal area.
Urban Drainage Flooding	Possible	No evidence of drainage incapacity or previous urban drainage flooding were found during a background search. However, the site is in an urbanised area where surrounding development is served by urban drainage.
Surface Water / Pluvial Flooding	Possible	Available flood data does not suggest that the site is at risk from pluvial flooding. However, the site lies at a lower elevation than adjacent lands.
Surface Water Discharge	Yes	Any development has the potential to increase the impermeable area at a site and thereby cause an increase in the rate and volume of surface water runoff from the site.
Groundwater Flooding	No	GSI groundwater flood mapping indicates that the site is not in an area at risk of groundwater flooding. The urbanised nature of the site and surrounding area, as well as the generally flat topography, means there are no areas that would be susceptible to impoundment of groundwater.
Artificial Sources of Flooding	No	The site is directly south of the Grand Canal. However, the canal lies at a lower level than the site and water levels in the canal are controlled. OSI mapping indicates that there are no other impoundments, reservoirs, etc. in the vicinity of / that could drain towards the site.

4.2 Fluvial Flooding

4.2.1 Preamble

OPW CFRAM mapping indicates that the site lies outside the present day scenario floodplain but may be at risk during a 0.1% AEP HEFS CC scenario which is defined as Flood Zone B by the South Dublin CDP. In the absence of CFRAM flood levels for the required HEFS CC design flood events, detailed hydraulic modelling was undertaken by McCloy Consulting to accurately determine design flood extents and flood levels to inform future development at the site.

Hydrological estimates were determined using best available Irish methodologies, and the modelling approach is consistent with or exceeds the detailed OPW CFRAM model standards. The flood modelling methodology used is consistent with or exceeds OPW model standards.

The model results summarised in this section are intended to supersede existing OPW and SDCC flood mapping / data and are considered fit for the purpose of this assessment.

Full model summary details are included in Appendix C.

4.2.2 Flood Zones

As stated previously, SDCC policy requires Flood Zones to be based on High-End Future Scenario (HEFS) flood extents. Detailed hydraulic modelling has been undertaken for the Camac River to accurately determine flood extents and flood levels at the site.

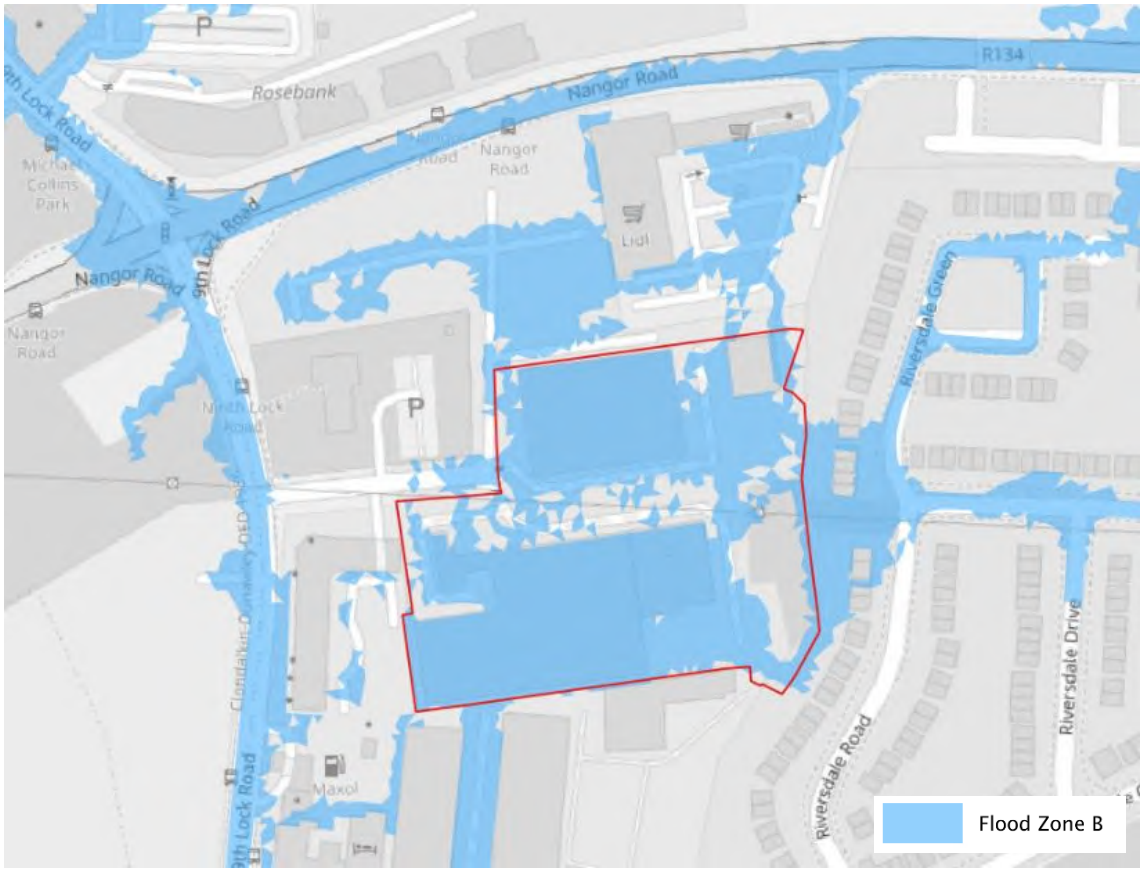
As shown in Figure 4.1, it has been determined through hydraulic modelling that the site is affected by 0.1% AEP HEFS CC fluvial flooding (i.e. Flood Zone B), which is consistent with SDCC and CFRAM HEFS flood mapping, due to an overland fluvial flow path from the Camac River. It is noted that hydraulic modelling confirms that the site is not affected by flooding from the 1% AEP / 0.1% AEP present day events and 1% AEP HEFS CC (i.e. Flood Zone A) flood event.

Table 4.2 present pre-development flood levels for the site at key locations. Comprehensive flood depth / level maps showing flood levels across the site and surrounding area are included in Appendix E.

Table 4.2: Pre-Development Flood Levels

Location	0.1% AEP HEFS CC Flood Level (mOD)
Southern section of the Site	54.99
Northern section of the Site	53.81

Figure 4.1: Flood Zone Map – HEFS CC



4.2.3 Effect of Development

To ascertain the flood risk to the proposed development, and their potential impact on flood risk elsewhere, a version of the hydraulic model with the proposals included has been developed.

The resulting proposed scenario flood map for the affecting 0.1% AEP HEFS CC event is presented in Figure 4.2. As shown, all 'highly vulnerable' residential areas have been raised above and out of the floodplain. 'Less vulnerable' development (roads, parking, amenity space etc.) is affected by flooding but is considered 'appropriate' within Flood Zone B.

The proposed development has been designed to minimise flood risk elsewhere as much as possible by providing storage in landscaped areas and to manage flow routing through the site. The maximum impact on flood risk elsewhere is <10 mm increase to commercial / open space land directly north of the site which is considered within error bounds of the modelling assessment. There is a minor reduction in predicted flood levels in residential areas to the east of the site and lands to the north west.

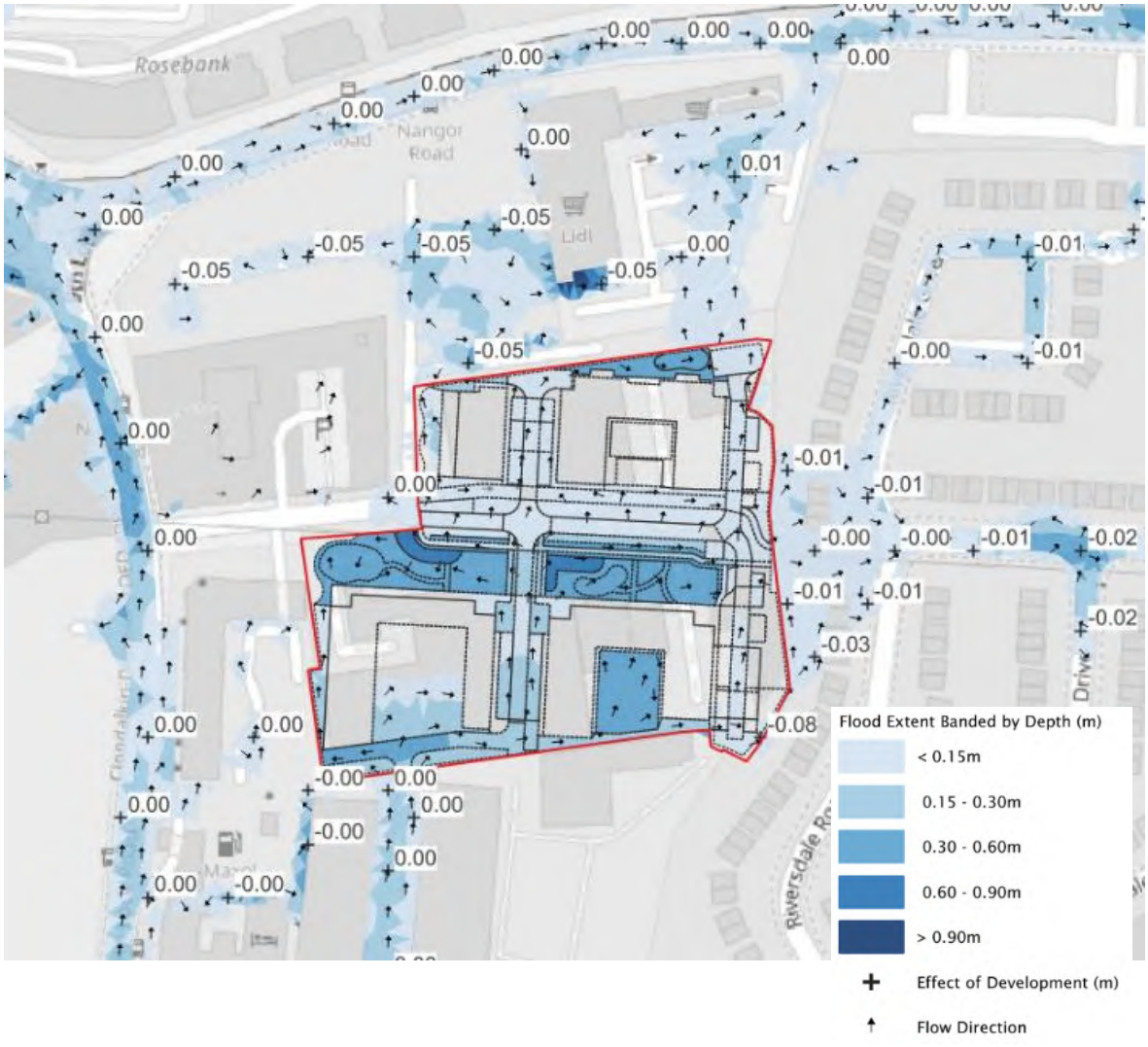
Table 4.2 present post-development flood levels for the site at key locations. As shown, the proposed development leads to a reduction in flood levels within the site due to provision of lower lying open spaces. Comprehensive flood depth / level maps showing flood levels across the site and surrounding area are included in Appendix E.

Mitigation measures for the proposed development are set out in Section 5.2.

Table 4.3: Post-Development Flood Levels

Location	0.1% AEP HEFS CC Flood Level (mOD)
Southern section of the Site	54.42
Northern section of the Site	53.76

Figure 4.2: Proposed Scenario Flood Extents Map – HEFS CC



4.3 Urban Drainage

Sewer infrastructure is known to serve existing commercial and residential developments in the vicinity of the site. No records of local drainage have been provided as part of this assessment.

Lands to the south, east and west of the site are at a similar or lower elevation. Surcharging / flooding from urban drainage in those areas would therefore not flow towards the site. Out-of-sewer flooding originating from the north would likely follow preferential flow paths provided by local roads along Ninth Lock Road in the direction of lower lying lands to the south.

Therefore, the site is not considered to be at risk of flooding due to urban drainage failure.

4.4 Surface Water / Pluvial Flooding

4.4.1 Pluvial Flooding onto the Site

The lands surrounding the site are mixed use commercial, industrial and residential. Lands to the north, east and west of the site are at a similar or lower elevation. Surface water originating in these areas would not flow towards the site.

Overland flow not intercepted by local drainage may be directed towards the site from higher lying area to the south. Surface water flow paths would tend to follow the overland fluvial flow routes as shown in the 'Existing Flow Route Analysis' in Figure 4.3. Pluvial and fluvial overland flows have been considered in detail as part of the proposed development as outlined in Section 4.2.3.

Residual risk of surface water flooding will be mitigated by SuDS based surface water management as discussed in Section 5.2.

Figure 4.3: Existing Flow Route Analysis

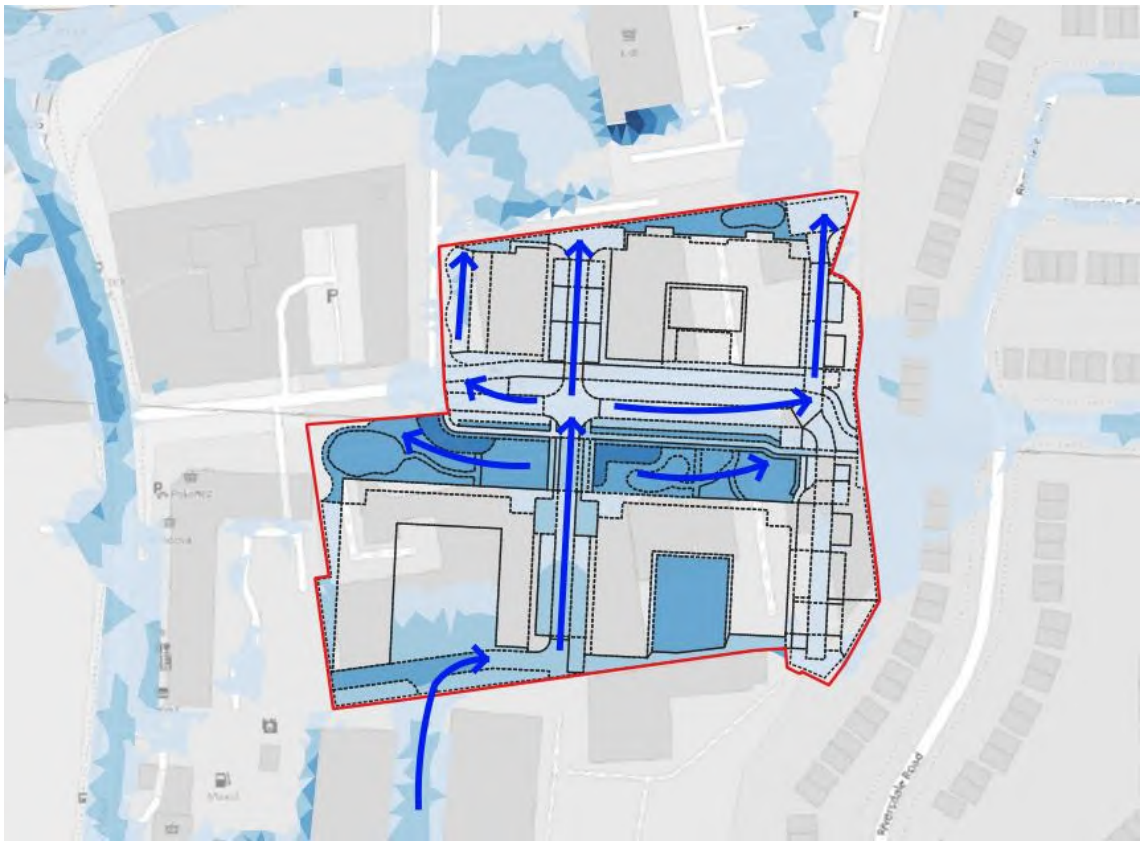
4.4.2 Pluvial Flooding from the Site

Development proposals have the potential to increase the impermeable footprint of the site and increase the rate and volume of surface water runoff accordingly. The proposed development shall include SuDS to mitigate surface water runoff from the site, as discussed in Section 5.2.

The SuDS measures will alter the existing flow routes as shown in the 'Modified Flow Route Analysis' in Figure 4.4 to ensure no risk of surface water flooding to proposed residential blocks by diverting pluvial runoff to open green spaces and maintaining overland flow paths to the north and east.

It is noted that off-site flow paths will not be modified by the proposed development and will remain as shown in the 'Existing Flow Route Analysis'.

Figure 4.4: Modified Flow Route Analysis



5 SUMMARY OF FINDINGS AND RECOMMENDATIONS

5.1 Summary of Findings

OPW CFRAM mapping indicates that the site lies outside the present day scenario floodplain but may be at risk during a 0.1% AEP HEFS CC scenario which is defined as Flood Zone B by the South Dublin CDP.

In the absence of CFRAM flood levels for the required HEFS CC design flood events, detailed hydraulic modelling was undertaken by McCloy Consulting to accurately determine design flood extents and flood levels to inform future development at the site. It has been determined through detailed site-specific hydraulic modelling that the site is predicted to be affected by fluvial flooding in the 0.1% AEP HEFS CC event and as such, is located in Flood Zone B.

No other significant flood mechanisms are anticipated at the site.

5.2 Design Requirements

This section sets out mitigation measures incorporated into the development proposals submitted in support of the planning application and / or to be further considered and developed in any detailed design or variation post-determination of the planning application.

5.2.1 Land Use

This assessment has demonstrated that part of the proposed development is located within Flood Zone B. Therefore, a Justification Test has been prepared and is included in Section 5.5.

The Justification Test outlines that the development is restricted to previously developed and / or appropriate areas, incorporates required flood risk mitigation (described subsequently in this report), and does not pose a risk of flooding to lands elsewhere.

5.2.2 Design Levels

The OPW Guidelines require freeboard to be applied to relevant design flood levels when setting Finished Floor Levels (FFLs) and Finished Ground Levels (FGLs). However, neither the OPW Guidelines nor South Dublin CDP SFRA provide specific freeboard requirements so the industry standard of 300 mm freeboard to climate change flood levels has been adopted. Generally, freeboard is applied to Flood Zone A for less vulnerable development and to Flood Zone B for highly vulnerable development as follows:

- FGLs for less vulnerable development (i.e., access roads, car parking) should be sited above the Flood Zone A (1% AEP HEFS CC) level + 300 mm freeboard.
- FFLs for highly vulnerable development (i.e., dwelling houses,) should be sited above the Flood Zone B (0.1% AEP HEFS CC) level + 300 mm freeboard.

In line with these requirements, proposed highly vulnerable development has been provided with freeboard to the post-development flood level within the relevant section of the site as follows:

- Residential blocks in the southern section of the site are set at a FFL of **55.07 mOD**; 650 mm above the Flood Zone B level in the southern section of the site (54.42 mOD).
- Residential blocks in the northern section of the site are set at a FFL of **54.14 mOD**; 380 mm above the Flood Zone B level in the northern section of the site (53.76 mOD).

It is noted that the site and surrounding area have been shown not to be affected by Flood Zone A (HEFS CC) so freeboard requirements to 'less vulnerable' development do not apply. Notwithstanding, FGLs should ideally be designed such that the ground falls away from any built development. Where adjacent ground unavoidably falls towards a building, drainage design should ensure that water is diverted away from the structures.

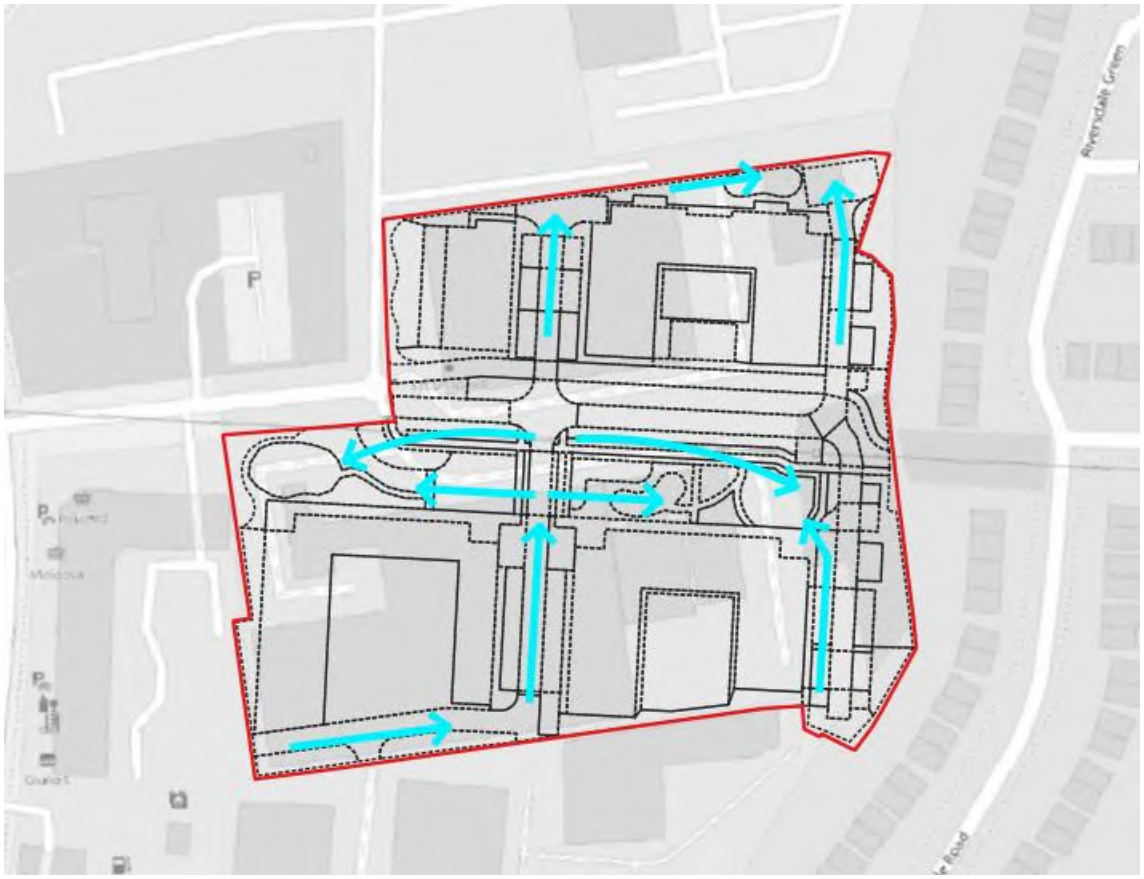
5.2.3 Drainage Design

Surface water drainage design should be per the requirements of the South Dublin County Development Plan 2022-2028 and to the standards of the South Dublin County Council Water Services Department.

The South Dublin County Development Plan 2022-2028 states that it is an objective to incorporate and promote the use of Sustainable Urban Drainage Systems (SuDS), and that these are to be designed in accordance with the Greater Dublin Regional Code of Practice for Drainage Works. Drainage design is to be carried out by others and submitted under separate cover.

In the unlikely event of a surface water flood event greater than the designed capacity of the surface water drainage system (i.e. 1% AEP + CC), overland flow would follow up the exceedance pathways shown in Figure 5.1, generally following lower lying areas towards open green areas.

Figure 5.1: Exceedance Flow Paths



5.3 Flood Management Plan

This assessment has shown that the site and surrounding area may be at risk of flooding during an extreme 0.1% AEP HEFS CC flood event. To inform actions to be taken during a flood event, the applicant shall undertake to implement a Flood Management Plan (FMP). The FMP incorporates but is not limited to:

- Identification of sources of flood warnings.
- Identification of person(s) responsible for activating the emergency plan.
- Identification of levels of alert (Alert / Warning / Severe) and specific actions to be taken (including warning signals, if applicable).
- Identification of 'safe / flood free zones' and muster points.
- Identification of contact groups and individuals to be notified in the event of or prior to a flood.
- Identification of Emergency Contacts.

It is anticipated that flood risk at the site can be adequately managed by addressing the following:

- The FMP shall as a minimum seek to ensure all users / occupants move to areas in the vicinity of the site outside the predicted floodplain and prevent further access / re-access to areas to by affected by flooding.
- If moving residents / occupants in advance of a flood event is not possible, the FMP should outline plan for people to remain in and / or move to upper floors of the proposed development which are not at risk of flooding in any event.
- There should be an appropriate level of preparedness to suit Local Authority / Met Eireann severe weather warnings or other multi-agency warning. Any FMP must be updated on an ongoing basis to reflect sources of flood warning information as they may become available (e.g., full rollout of a national flood forecasting system). Where forecasting is available, vulnerable users / occupants should be evacuated from the site, if feasible.
- Access to affected areas should be restricted during periods when flooding is predicted.
- A copy of the prepared FMP would be provided to the Planning Authority for approval and all future residents / occupiers for information. The FMP will be considered a 'live' document, managed and implemented by the building owners' management company and updated with relevant information as required.

An FMP for the site / development will be prepared post-planning.

5.4 Maintenance Requirements

5.4.1 Drainage System Maintenance

Site owner(s) / occupier(s) shall be responsible for the maintenance of drainage networks at the site and ensure that adequate drainage system maintenance is provided. Detailed drainage layout for the site is to ensure that key SuDS features requiring maintenance are located in accessible public locations.

Where applicable, maintenance plans for drainage assets should include:

- Cyclical (min. annual) checking of all surface water drainage features, particularly clearing of debris.
- Cyclical (min. annual) visual inspection of any surface or underground drainage features (i.e., to identify blockages and obstructions to be removed by jetting).

5.5 Justification Test

Based on the requirements of the OPW Guidelines, the proposed development does require a Justification Test given that:

- Highly vulnerable development is located in Flood Zone B
- Less vulnerable development in Flood Zone A

The Justification Test is included in Table 5.1.

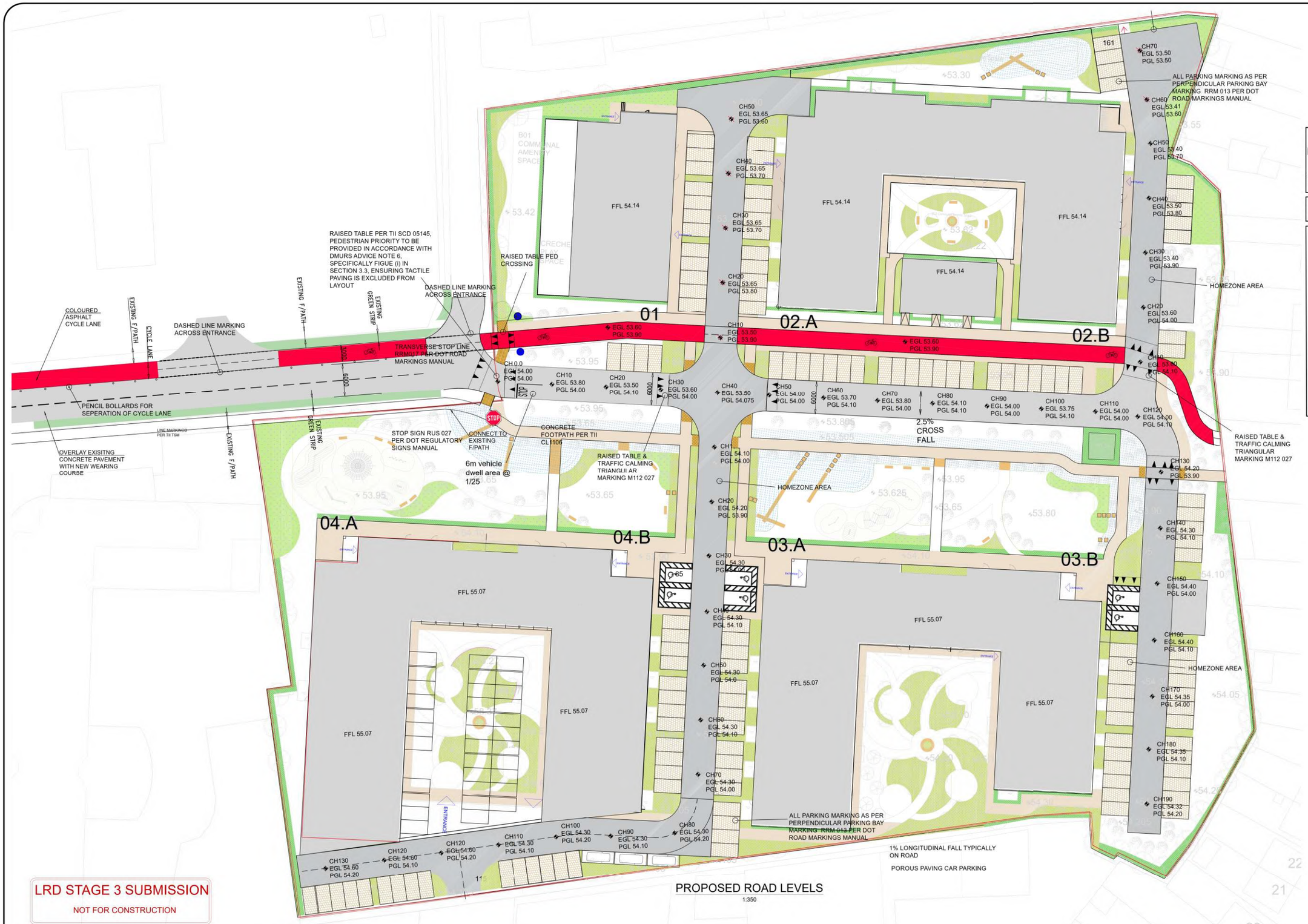
Table 5.1: Justification Test for Development Management

Part	Item	Response
1	The subject lands have been zoned or otherwise designated for the particular use or form of development in an operative plan, which has been adopted or varied taking account of these Guidelines.	Under the South Dublin Development Plan 2022-2028, the subject site is zoned *'Town Centre.'* The key objectives for areas under the Town Centre zoning designation are '*to protect, improve and provide for the future development of Town Centres'*. The uses proposed for the development are permitted in principle under the Town Centre zoning pertaining to the site. The Core Strategy of the Development Plan requires increased housing development within Clondalkin. In this regard, the development will be consistent with CS6 Objective 2 which seeks: *"To promote compact growth and to support high quality infill development in existing urban built-up areas by achieving a target of at least 50% of all new homes to be located within or contiguous to the built-up area of Dublin City and Suburbs (consistent with NSO 1, RSO 2, NPO 3b and RPO 3.2)".*
2	*The proposal has been subject to an FRA that demonstrates:*	*The site has been subject to a site-specific flood risk assessment*
2 (i)	The development proposed will not increase flood risk elsewhere, and, if practicable will reduce overall flood risk	This FRA demonstrates that the proposed development will not increase flood risk elsewhere. Post-development runoff from the site is likely to be reduced compared to the existing scenario, which should reduce overall flood risk.
2 (ii)	The development proposal includes measures to minimise flood risk to people, property, the economy, and the environment as far as reasonably possible.	Proposed development is kept to 'appropriate' Flood Zones as far as possible and all 'highly vulnerable' residential development is located within the first floor of the building or above. A Flood Management Plan (FMP) will be prepared for the site. The FMP establishes that safe access to / egress from the site by emergency services will be possible and informs residents / users of required actions prior to, during and after a flood event. The surface water runoff will be attenuated to pre-development rate, thereby not increasing flood risk elsewhere.

Part	Item	Response
2 (iii)	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.	FFLs of residential development provide freeboard to adjacent flood levels. Residual risk of flooding will be managed at the site by the implementation of a Flood Management Plan (FMP). The FMP establishes that safe access to / egress from the site by emergency services will be possible and informs residents / users of required actions prior to, during and after a flood event.
2 (iv)	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 active streetscapes.	As per Part 1 above, the lands are zoned 'Town Centre' under the South Dublin County Development Plan 2022-2028 and the uses proposed are permitted in principle under this zoning. More recently, a Clondalkin Planning Framework has been prepared and adopted and incorporated as Variation No. 1 of the South Dublin County Development Plan 2022-2028. This Planning Framework clearly identifies the subject site for redevelopment (such as Figure 8.32 of the Clondalkin Local Planning Framework). The Clondalkin Local Planning Framework also supports connectivity and active frontages and the proposed development is consistent with this as it can connect lands to the east, north and south, while also providing active frontages, such as by way of the proposed childcare facility.

Appendix A

Site Drawings



PROPOSED ROAD LEVELS
1:350

LRD STAGE 3 SUBMISSION
NOT FOR CONSTRUCTION

LEGEND

SITE BOUNDARY

PROPOSED ROAD SIGN

PROPOSED RAISED TABLE/RAMP

TACTILE PAVING PER STANDARD DETAIL

SHARED SURFACE COLOURED SMA

PROPOSED PERMEABLE PAVING

PROPOSED FOOTPATH

PROPOSED WHEEL STOPS

LINE MARKINGS & SIGNAGE

LONGITUDINAL MARKINGS

RRM 001	CONTINOUS WHITE LINE

TRANSVERSE MARKINGS

RRM 004	DIRECTION ARROW STRAIGHT
RRM 005	DIRECTION ARROW LEFT
RRM 006	DIRECTION ARROW RIGHT
RRM 017	STOP LINE
RRM018	YIELD LINE
RRM019	NO ENTRY LINES
RRM 022	CYCLE TRACK EDGE LINE
RRM 023	CYCLE TRACK BROKEN EDGE LINE

WORDED & DIAGRAMMATIC MARKINGS

M114	STOP ROAD MARKING
M115	YIELD MARKING
M111	PEDESTRIAN SYMBOL
M115C	CYCLE TRACK YIELD MARKING
M116	CYCLE SYMBOL

TRAFFIC CALMING

M112	TRAFFIC CALMING TRIANGLE

SIGNS & SIGNALS

RUS 026	YIELD SIGN
RUS 027	STOP SIGN
RUS 043	50km/h SPEED LIMIT
RUS 044	30km/h SPEED LIMIT
RUS 050	NO ENTRY
RUS 058	SHARED CYCLE & PEDESTRIAN TRACK
RUS 058 CR	SEGREGATED CYCLE & PEDESTRIAN TRACK
W130	ROAD HUMP
RRM034	ELECTRICAL VEHICLE CHARGING
RRM015	DISABLED PERSONS PARKING SPACE

NOTES

1. For setting out refer to Architect's drawings.
2. This drawing to be read in conjunction with all other Architectural and Engineering drawings and all other relevant drawings and Specifications.
3. DO NOT SCALE THIS DRAWING. Use figured dimensions only.
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Rev	By	Date	Description
A	SOC	27.11.2025	LRD STAGE2 SUBMISSION
B	SOC	21.04.2026	LRD STAGE 3 SUBMISSION
C	SOC	06.05.2026	MCCLOYS FLOOD MODEL LEVEL UPDATE

Scales: AS SHOWN | A1 | Date: MAY 2026 | Drawn: SOC | Checked:

JOB TITLE
LANDS AT ELMFIELD
NINTH LOCK ROAD
THORNMEADOW DEVELOPMENTS

DRG. TITLE
PROPOSED SITE ACCESS
ROAD LAYOUT & LEVELS

GK Consulting Engineers LTD
Unit 11 Millbank Business Centre K78R261
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email info@gkce.ie
www.gkce.ie
Consulting Engineers

DRAWING NUMBER: GK25126_C100
REV.: C

Appendix B

OPW / SDCC Flood Mapping

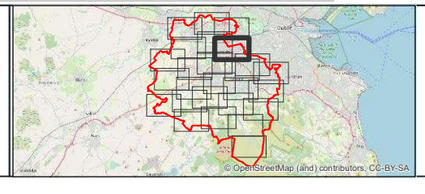
N

Legend

- Watercourses
- Flood Zone A – 1%AEP Flood Extent (1 in 100 Year Flood)
- Flood Zone B – 0.1%AEP Flood Extent (1 in 1000 Year Flood)
- Riparian Corridor
- County Boundary

0 100 200 400 600 800 1,000 m

Comhairle Contae Átha Cliath Theas
South Dublin County Council



No.	Revision	Date	By	Chk'd	App'd
P01	Final Issue	26/07/2022	LA	WV	JPR

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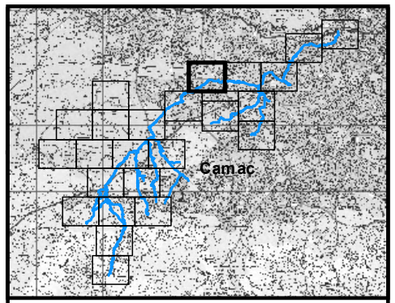
Drawn	Designed	Checked	Approved	Suitability Code - Description
LA	WV	WV	JPR	S2 - Information

Project Stage	FINAL
Project Title	SDCC County Devlopment Plan Stategic Flood Risk Assessment
Drawing Title	SFRA Flood Zone Mapping Sheet 6 of 26
Drawing Number	Project - Originator - Volume - Location - Type - Role - Number SDSFRA - ROD - EWE - SW_AE - DR - ENV - 40006
Scale (A1)	1:6,000
Date:	April 2021
Job No:	20.126
Rev:	P01

DO NOT SCALE USE FIGURED DIMENSIONS ONLY

Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m³/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
09CAMM00854	53.21	N/A	53.7	N/A	54.19	N/A
09CAMM00815	51.67	N/A	52	N/A	52.21	N/A
09CAMM00768	49.91	14.00	50.62	22.99	51.29	37.90
09CAMM00750I	49.56	N/A	50.37	N/A	51.08	N/A



IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

Legend

- 10% Fluvial AEP Event
- 1% Fluvial AEP Event
- 0.1% Fluvial AEP Event
- Modelled River Centreline
- AFA Extents
- Embankment
- Wall
- Defended Area
- 1% AEP Standard of Protection of Flood Defence (Walls / Embankments)
- 1% AEP
- Node Point
- Node ID Node Label

FINAL

REV:	NOTE:	DATE:
01	SOP label updated (Pg 21) Removal of Def. Area (Pg 21)	13/11/2017

EASTERN CFRAM STUDY
CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT

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Map:	Camac Fluvial Flood Extents
Map Type:	EXTENT
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By :	C.McG. Date : 13 November 2017
Checked By :	A.S. Date : 13 November 2017
Approved By :	S.P. Date : 13 November 2017
Drawing No. :	E09CAM_EXFCD_F1_17
Map Series :	Page 17 of 24
Drawing Scale :	1:5,000 @A3

0 50 100 200 300 400 500 Metres

Appendix C

Hydraulic Modelling

PREAMBLE

The purpose of the model was to accurately determine flood extents at the site and design flood levels applicable to the proposed development. Model results are intended to supersede the OPW CFRAM outputs. Watercourse survey data from the CFRAM assessment was used to form the basis of this flood risk assessment. A new InfoWorks ICM 1D-2D model has been developed for the site in v2024.3 format allowing accurate determination of flood levels at the site to inform this assessment.

MODEL OVERVIEW

The following figures display key model elements for the site specific model, discussed in subsequent sections.

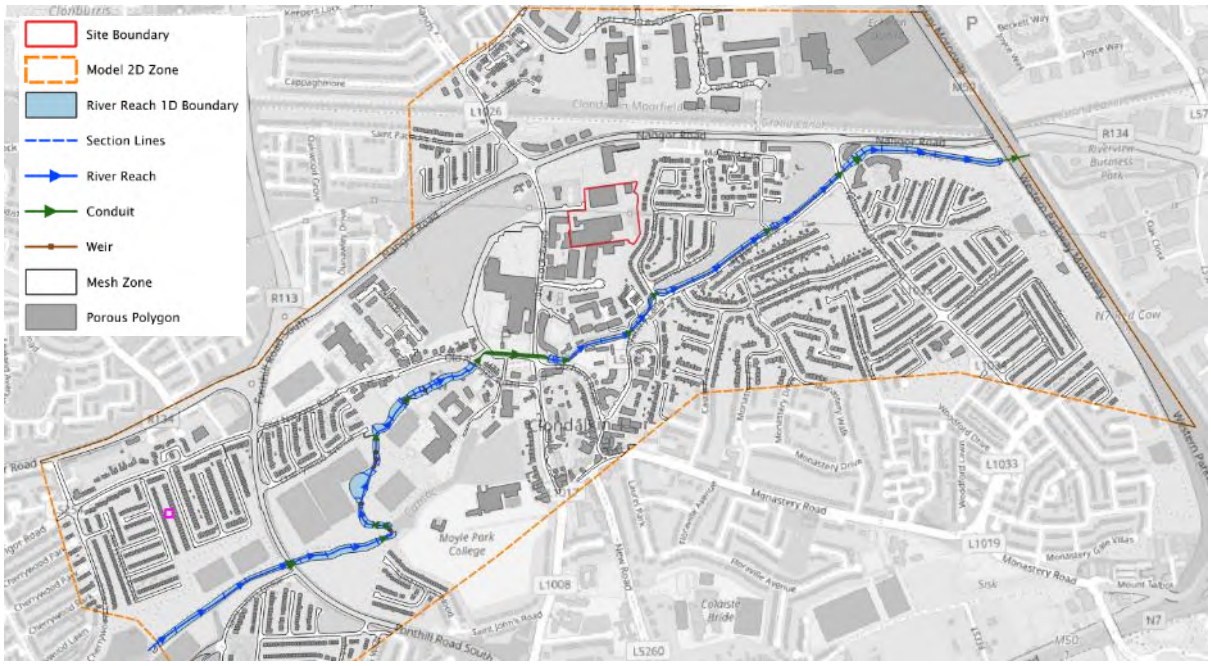


Figure C-1: Site Specific Model – Overview

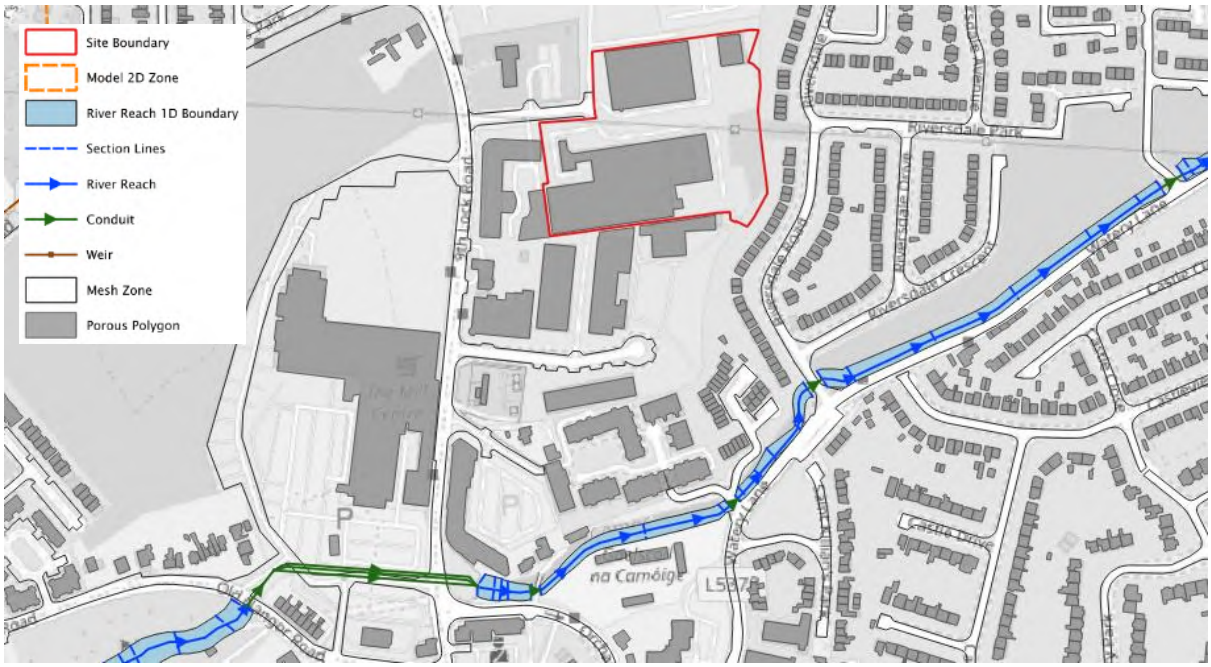


Figure C-2: Site Specific Model – Site Context

HYDROLOGICAL ANALYSIS

Hydrological Context

Section 2.2 of this report describes watercourses affecting the site based on the EPA and OPW FSU datasets. It is noted that only the River Camac was included in the hydraulic model as it is the only 'affecting' watercourse with the potential to contribute to fluvial flooding at the site. The River Camac and site boundary are shown in Figure C-1.

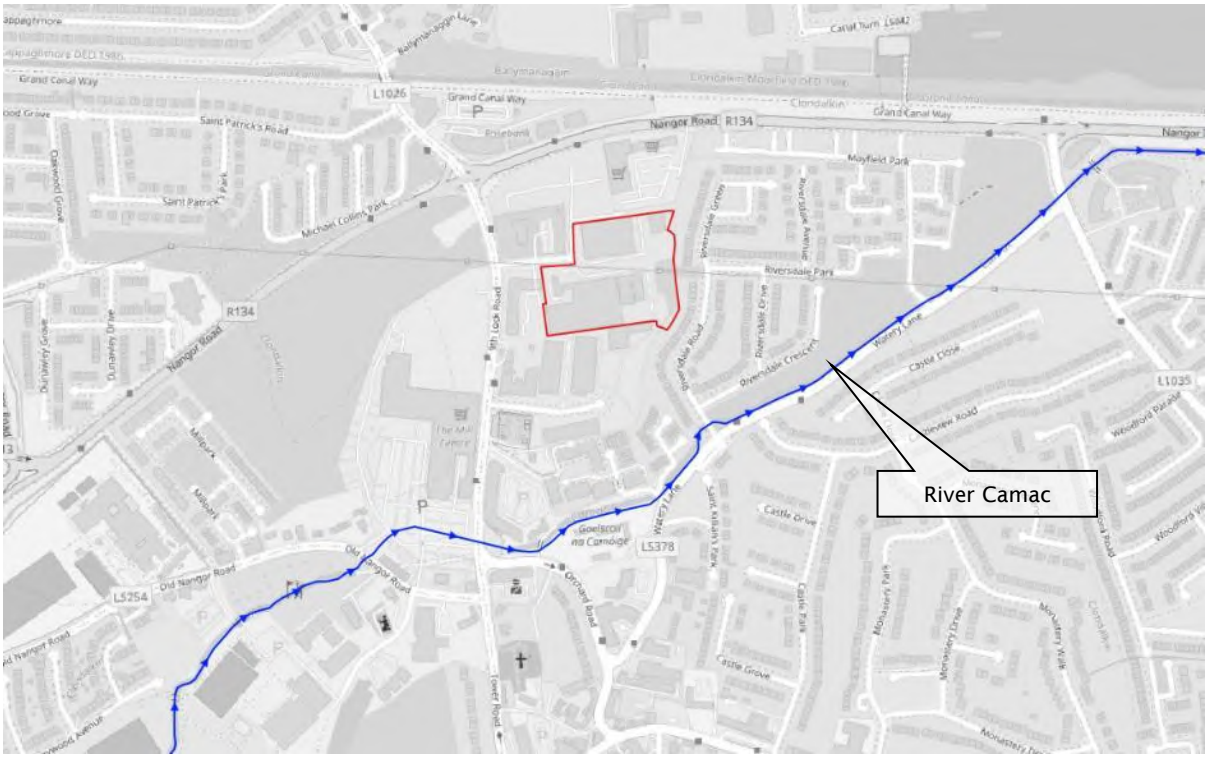


Figure C-3: Modelled Watercourses

Catchment Extent

Assessment of the catchment contributing flows to the watercourse near the proposed site was undertaken using FSU catchment data. FSU data was used to retain consistency with CFRAM. These are illustrated on Figure C-4 and summarised in the table below at key locations to inform the distribution of hydrology within the model.

Table C-1 Catchment Area Summary

Location	FSU Reference	Total Area (km²)
Model Upstream Limit: Forthill Road South.	09_498_2	25.1
Site: 9th Lock Road	09_1315_2	27.6
Model Downstream Limit: M50 Motorway	09_1315_5	35.3

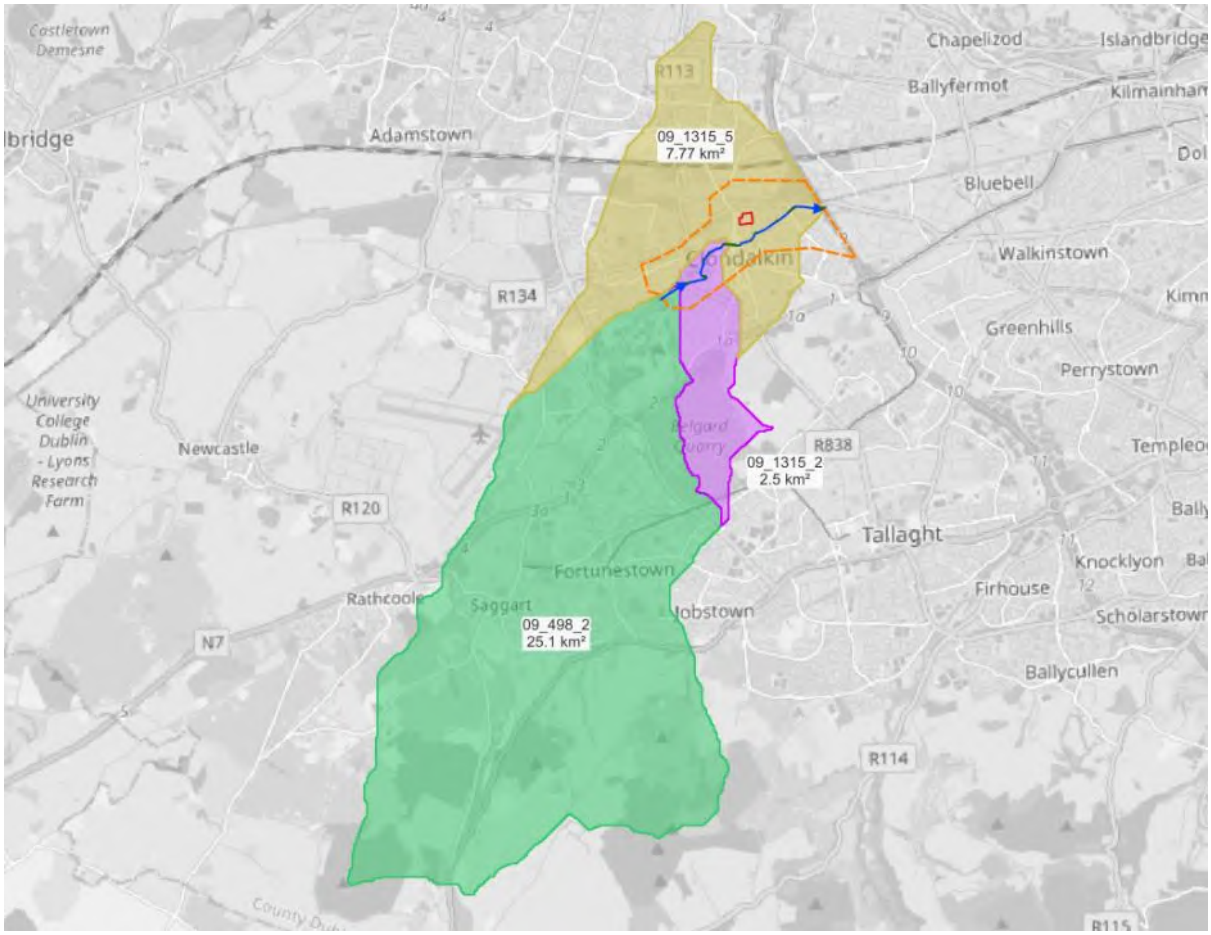


Figure C-4: Watercourse Catchments

Peak Flow Estimation

The estimation of peak flow for the required design annual probability has been necessary to determine the peak inflow for input to the unsteady state hydraulic model. The derivation of the 1% AEP peak flow for the watercourses were assessed using the OPW FEMI Flood Estimation Methodologies for Ireland spreadsheet.

A summary of calculated flows is shown Table C-2 based on the FSU full contributing catchment (35.3km²) before being scaled pro-rata by areas for application to the model.

It is noted that FSU gauging station 9035 used within the CFRAM study is no longer listed as a suitable pivotal site. QMED was calculated using no pivotal stations as closest QMED estimation derived to equate to the CFRAM study. Refer to Appendix D for full hydrology calculations.

The OPW and South Dublin Council Guidelines require consideration of increased flood risk from climate change scenarios. Climate change guidance recommends a High-End Future Scenario (HEFS) for climate change, which represents a 30% increase in flood flows. Therefore, an allowance of 30% was added to the present-day design peak flows.

Table C-2: Design Peak Flow Summary

Catchment	1% AEP (m³/s)	1% AEP HEFS (m³/s)	0.1% AEP (m³/s)	0.1% AEP HEFS (m³/s)
09_1315_5 (35.3km²)	25.67	33.37	34.46	44.80

Hydrograph Analysis

The design hydrograph representing the total catchment response was generated using the OPW FEMI spreadsheet, based on catchment descriptors and adjusted with reference to the most hydrologically similar catchment (16012). The total design flow was then distributed across the model on a pro-rata basis according to contributing subcatchment areas. A consistent time to peak was retained during this process, ensuring synchronous runoff response and providing a conservative representation of catchment behaviour.

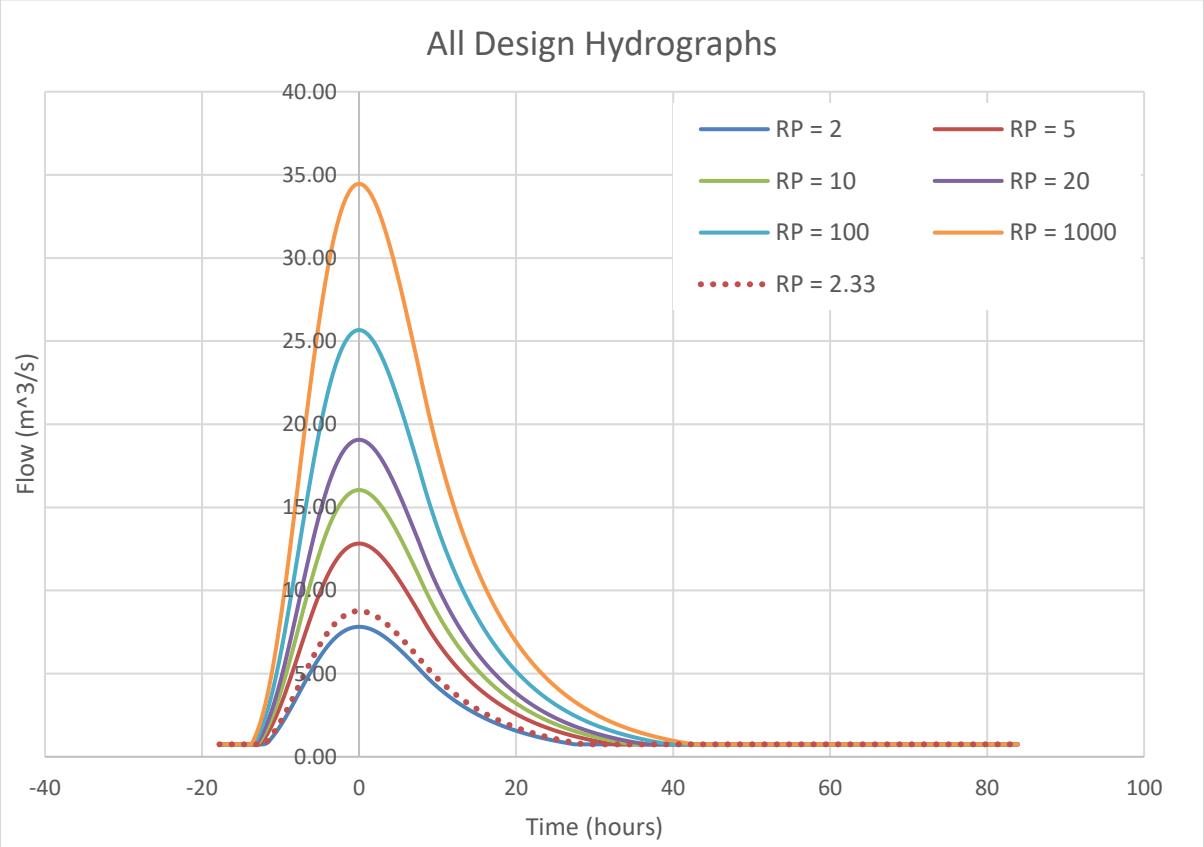


Figure C-5: Design Hydrographs

Application to Model

The calculated flow was scaled pro-rata to catchments derived from the FSU catchments detailed in Table C-1. Flows were distributed throughout the model and applied as point inflows throughout the model.

Application of scaled pro-rata 1% AEP design flows are detailed in the following figure.

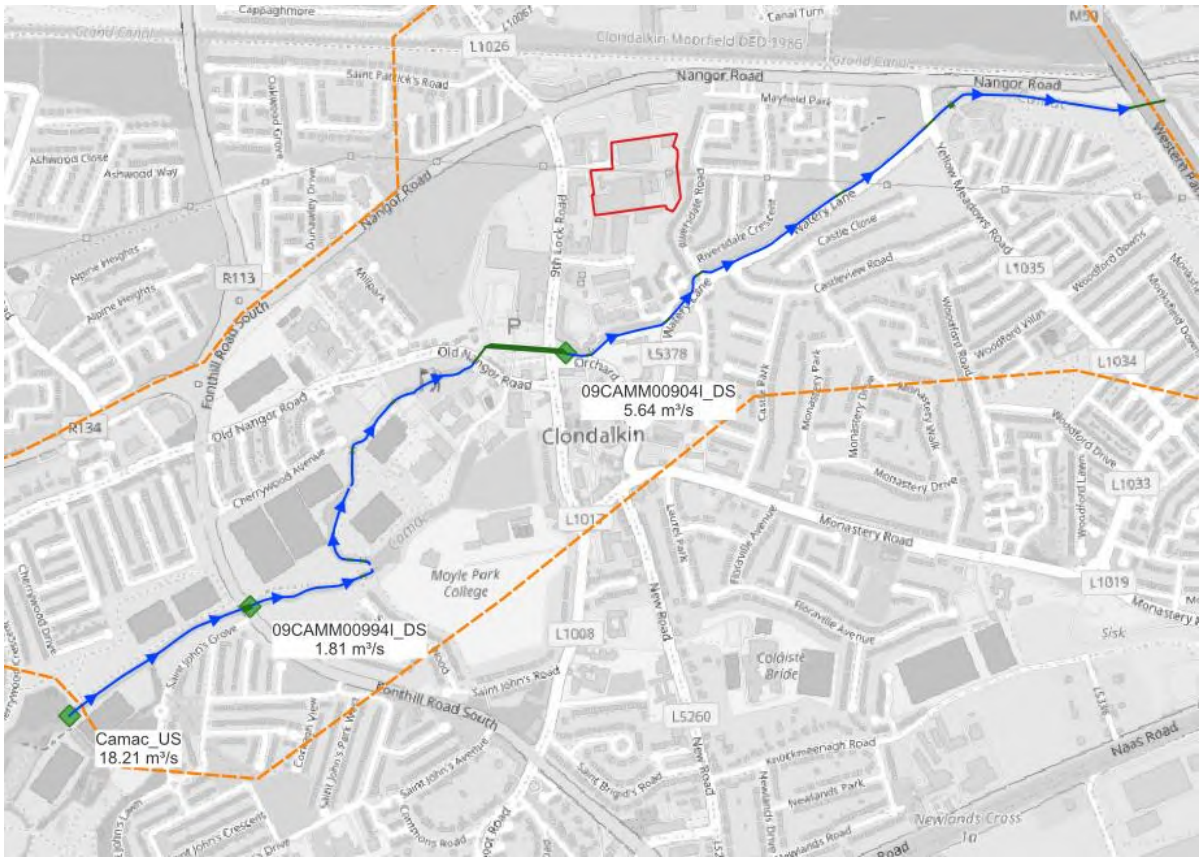


Figure C-6: 1% AEP Flow Application

HYDRAULIC MODEL BUILD

Infoworks ICM V2024.3 is a fully integrated 1D-2D hydrodynamic model which uses a dynamic engine solving full St. Venant equations for both the 1D and 2D simulations. Simulations are conducted in an unsteady state with the numerical simulation applied on a non-structured mesh which makes the model fully flexible from the geometric point of view.

Model elements are displayed in Figure C-1 and Figure C-2 in the preceding section. Each of these elements has been detailed further in the following table setting out the justification for changes, and parameters used.

Table C-3 Model Elements

Model Domain	Component	Parameter	Value(s) / Discussion
Hydrology / Inflows	Fluvial inflows	Inflow File	New hydrology is calculated and distributed across the model using point inflows as detailed in the preceding section.
1D River Reach	Sections	Geometry	The geometry of natural channels is irregular and cannot be characterised using simple mathematical relationships. Therefore, representation in mathematical models requires that the stream geometry, in the form of discrete cross sections, be taken transversely at key locations in the watercourse. Cross sections from the CFRAM study were utilised and trimmed to top of bank for integration with the 2D domain.
	Sections	Roughness	The roughness of the river reach is represented by applying Manning's n roughness values to the river sections for floodplains and river channel. A roughness value of 0.04 was used representing a natural channel winding with pools, shoals and some weeds and stones.
	Bank Lines	Geometry	The river reach bank lines were developed using the trimmed river reach section ends and composite ground model with bank point connections at max. 10m intervals.
	Bank Lines	Discharge Coeff / Modular Limits	Values of 0.75 and 0.675 for discharge coefficient and modular limits were used respectively. Values are reduced by 25% from the default values of 1 and 0.9 to aid model stability in the high end scenarios. Model sensitivity to bank coefficients is assessed.
	Reach	Boundary Condition	Free outfall condition was applied to the DSL of the 1D model. Elevation difference in excess of 6m from the area of interest and DSL is sufficiently robust to negate applying a boundary condition.

Model Domain	Component	Parameter	Value(s) / Discussion
1D Culverts	Inlets	Losses	Culvert inlet losses were represented using culvert inlet object links, with coefficients assigned according to inlet configuration.
	Outlets	Losses	Culvert outlet losses were represented using culvert inlet object links, with coefficients assigned according to inlet configuration.
	Conduits	Roughness	Conduit roughness values were assigned based on material type and condition observed from site survey photographic review.
	Conduits	Geometry	Conduit geometry was defined using surveyed dimensions where available, supported by site observations and photographic records. Refer to Structures Register.
	Conduits	Losses	Conduit loss coefficients were applied based on observed inlet and outlet conditions; where inlet / outlet links were applied conduit loss was set to none to avoid double counting.
2D Mesh	2D Zone	Ground Model	Combination of OPW 2m LiDAR, and topographic site survey per Figure B-5.
	2D Zone	Roughness	0.04 was adopted as the base 2D roughness representative of mixed urban fabric with grass; roughness zones were used to vary areas coinciding with roads.
	2D Zone	Mesh	Max 25m² / min 5m² / terrain sensitive meshing activated / maximum height variation 0.25m.
	2D Zone	Infiltration	No infiltration has been included in the model in keeping with the approach used in similar CFRAM models. The absence of infiltration in the model is likely to present conservative results.
	2D Zone	Boundary Condition	Normal depth condition.
	Mesh Zones	Mesh Parameters	None applied.
	Mesh Zone	Level parameter	Building polygon threshold levels represented as mesh zones; assumed as 0.3m above underlying average ground levels.
	Roughness Zones	Roughness	Roughness was differentiated from the base 2D zone roughness of 0.04 for roads and other hardstanding areas by defining Manning's n coefficient Urban fabric (roads, hardstanding): 0.02

Model Domain	Component	Parameter	Value(s) / Discussion
	Mesh Level Zones	Level parameter	None applied.
	Porous Polygons	Porosity parameter	Buildings also given degree of porosity (10%) to allow water to flow through them following threshold breach.
Boundary Conditions	1D	Outfall Node	Free outfall condition was applied to the DSL of the 1D model. Elevation difference in excess of 6m from the area of interest and DSL is sufficiently robust to negate applying a boundary condition.
	2D	2D Zone	Normal conditions were applied at the boundaries of the 2D model domain. The downstream boundary has been positioned to ensure that any flooding affecting the site is captured within the model, and that the site's flood behaviour is not artificially influenced by boundary effects.

Ground Data Sources

Out of bank topography was based on a combination of OPW 2m LiDAR and topographical survey. The data was combined to create a composite terrain model which provided improved definition in the area of interest. The composite terrain model was sampled at a 2m grid.

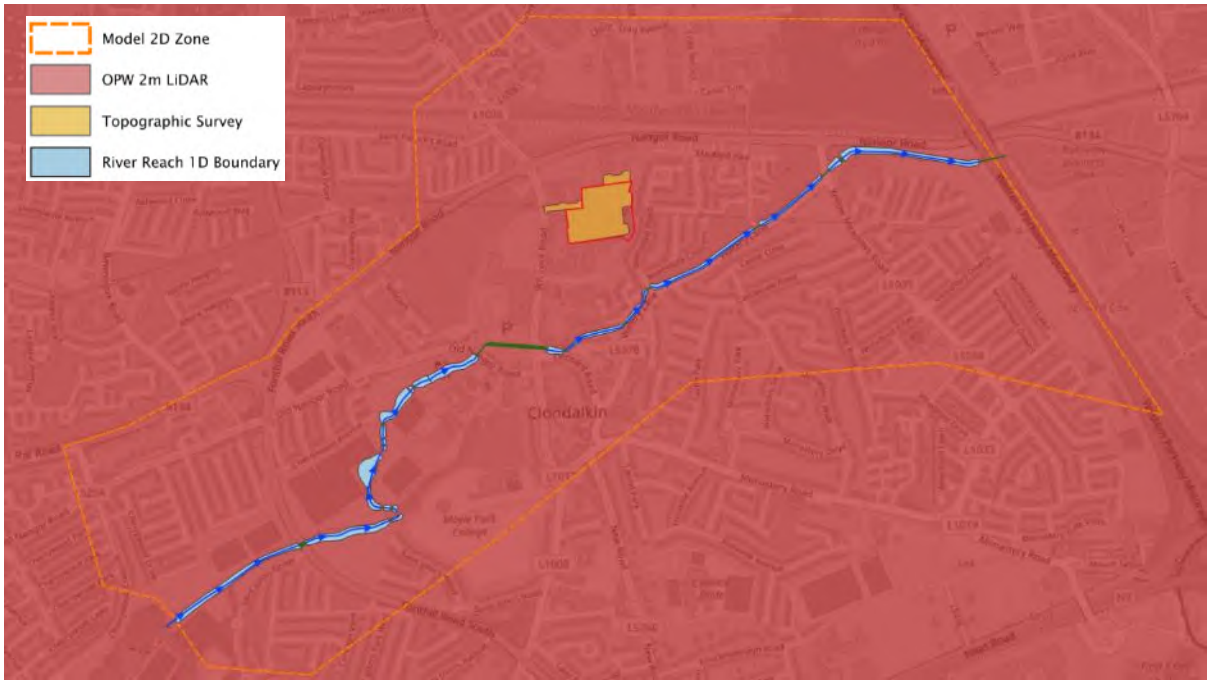


Figure C-7 Ground Model Data Sources

Structures Register

Table B-4 provides specific details for the structures included in the model geometry.

Table C-4 Structure Register

Model Reference	Shape	Length (m)	Width (mm)	Height (mm)	Bottom Roughness (n)	Top Roughness (n)	Comment
09CAMM00750I.1	RECT	71.3	3370	2110	0.04	0.02	
09CAMM00789D_US_main.1	RECT	8.2	12500	2560	0.04	0.02	
09CAMM00789D_US_side.1	RECT	8.2	4350	1970	0.04	0.02	
09CAMM00795D_IN.1	RECT	25.2	3285	1796	0.04	0.02	Double Barrel
09CAMM00818D_IN.1	RECT	18.7	3260	2120	0.04	0.02	Double Barrel
09CAMM00851D_IN.1	RECT	11.9	2475	1990	0.04	0.02	Double Barrel
09CAMM00863D_IN.1	RECT	8.9	2385	2035	0.04	0.02	Double Barrel
09CAMM00881D_IN.1	RECT	3	4810	2570	0.04	0.02	
09CAMM00904I_US.1	RECT	35.3	4810	1849	0.015	0.015	Equivalent Area
09CAMM00904I_MID.1	RECT	158.1	2600	1905	0.015	0.015	Change in Area
09CAMM00923D_IN.1	RECT	5	7920	2096	0.04	0.02	
NLS_Section_C_IN.1	RECT	4.7	8182	1973	0.04	0.02	
09CAMM00961I_IN.1	CIRC	8.5	1200	1200	0.02	0.02	Double Barrel
09CAMM00963D_IN.1	RECT	4.4	6930	2180	0.04	0.02	
09CAMM00968D_IN.1	RECT	4.6	7510	2490	0.04	0.02	
09CAMM00994I_IN_mid.1	RECT	17.3	4050	1504	0.04	0.02	
09CAMM00994I_IN_left.1	RECT	17.3	2360	1515	0.04	0.02	
09CAMM00994I_IN_right.1	RECT	17.3	2290	1519	0.04	0.02	
09CAMM00904I_MID.2	CIRC	166	900	900	0.013	0.013	
09CAMM00904I_MID.3	CIRC	169	1000	1000	0.013	0.013	

Assumptions and Limitations of Modelling

The representation of any complex system by a model requires a number of assumptions to be made. In the case of the hydraulic model developed for the purposes of the study it is assumed that:

- The terrain model (based on 2m LiDAR, supplemented by ground-based topographic survey) accurately represents the surface topography and associated flow paths;
- Original structures and cross section survey data within the CFRAM datasets obtained are an accurate representation of present-day geometry; additional survey and site walkover was conducted to verify existing structures and geometry where possible.

- The calculated hydrology provide an accurate representation of flows for the given return periods; and
- Roughness does not vary with time.

The primary limitations of the study are noted as follows:

- The spill at Moyle Park College and Mill Pond is represented by a 1D irregular weir controlling passforward flow on the Camac with spill to the Mill Pond controlled by the river reach right bank. Storage within the Mill Pond and Mill race are represented in 2D per the CFRAM modelling. It is likely that LiDAR does not fully represent storage capacity at the Mill Pond; water levels in the Camac are potentially slightly conservative at the L524 (Old Nangor Road) where levels spill and produce the flood mechanism that affects the site.
- No allowance for infiltration has been made within the model in line with typical CFRAM fluvial methodology; and,
- The model does not represent any topographic features smaller than the minimum resolution of the underlying terrain model derived for the site.

Proposed Geometries

The proposed development was assessed through amendments to the model 2D surface to represent the proposed platform levels at the site. Proposed site geometries were incorporated within the hydraulic model using mesh level zones, applied to reflect the proposed finished ground levels across the development area.

The mesh level zones were used to update the underlying model topography within the site boundary, while retaining the existing ground representation outside the areas directly affected by the development. This allowed the model to assess the influence of the proposed land raising and regrading on local flood routing, flood storage and flood levels both within the site and in the surrounding area.

No proposed site drainage network, attenuation features, gullies, or other positive drainage measures were represented within the hydraulic model, other than where these coincided with proposed landform features represented in the 2D surface. The proposed scenario therefore assesses the effect of the proposed ground level changes only, rather than the hydraulic performance of the detailed drainage strategy.

It is also noted that the principal flood risk mechanism assessed relates to the 0.1% AEP High End Future Scenario fluvial event. The likelihood of a coincident design drainage exceedance event occurring concurrently with this extreme fluvial scenario is considered low. On this basis, the omission of the proposed positive drainage system from the hydraulic model is not considered to materially affect the conclusions of the assessment in relation to fluvial flood risk or off-site impacts.

MODEL SENSITIVITY

A model sensitivity analysis was carried out on the base model to assess the sensitivity of the simulation to changes in roughness, flow, and downstream boundary within the model. The testing was completed using the 0.1% AEP + HEFS event, as flood risk at the site only emerges under this extreme hydrological scenario, which lies beyond the typical design horizon.

Given the severity of this event, absolute changes in predicted depths and extents may appear more pronounced; however, the results provide a conservative indication of model responsiveness and the relative influence of key parameters.

Roughness

The sensitivity of the model to roughness was assessed by varying the roughness values in the model independently in the 1D and 2D domains.

Assessment of the 2D roughness parameters was undertaken by globally increasing the Manning's n roughness within the 2D zone and roughness zones by 20% which is noted to cause an insignificant (<0.01m) change in overland flood levels at the site and 0.01m change in flood levels in channel immediately upgradient of the L5254 Old Nangor Road structure.

Assessment of the 1D roughness parameters was undertaken by globally increasing the Manning's n roughness within the 1D river reach sections and structures by 20% which is noted to cause an increase in overland flood depths at the site of 0.06m and 0.17m change in flood levels in channel immediately upgradient of the L5254 Old Nangor Road structure.

At the study site the model displays a minor sensitivity to roughness. Roughness values have been carefully specified to ensure that a suitably conservative value was adopted, and there is confidence that the model roughness is suitably conservative.

Bank Parameters

The model bank parameters were reduced from default values 1 and 0.9 for coefficient of discharge and modular limit respectively by 25% to promote model stability, particularly in the 0.1% AEP HEFS runs due to large flow exchanges. Reducing bank parameters is a typical practice where bank instabilities prohibit accurate pre/post comparisons.

The sensitivity of the model to altering bank parameters was assessed reverting the bank parameters back to the default values of 1 and 0.9 which is noted to cause no measurable change in overland flood depths at the site and an increase of 0.03m change in flood levels in channel immediately upgradient of the L5254 Old Nangor Road structure.

Flow

The design flows for the model were derived using best industry techniques and the most conservative flows were selected and there is therefore reasonable confidence in the results.

Sensitivity to a potential underestimation in hydrology is assessed by uplifting the 0.1% HEFS hydrology by an additional 20%. The effect of the uplift translates to an increase in flood levels within the site of 0.06m.

Sensitivity due to a potential underestimation in flows is minor and would be accommodated within freeboard provided by the development.

Boundary

The downstream extent of the model was carefully sited to ensure that there was sufficient difference in elevation between the model boundary and site such that a reasonable variation in water level at the boundary would have no influence on water levels predicted at the site. The boundary condition was set as the normal water depth as a function of bed slope.

There is an elevation difference in excess of 6.5m from the site and downstream boundary. The model is therefore considered sufficiently robust the effect of boundary conditions.

Blockage

The sensitivity due to blockage been assessed by simulating the 0.1% AEP HEFS flood coinciding with a 50% blockage within the structure at L5254 Old Nangor Road. The overtopping of the structure is exacerbated increasing in channel flood levels by 0.09m and overland flood levels at the site by up to 0.03m as demonstrated in the following figure.

Sensitivity due to a blockage for the 0.1% HEFS event is minor and would be accommodated within freeboard provided by the development.

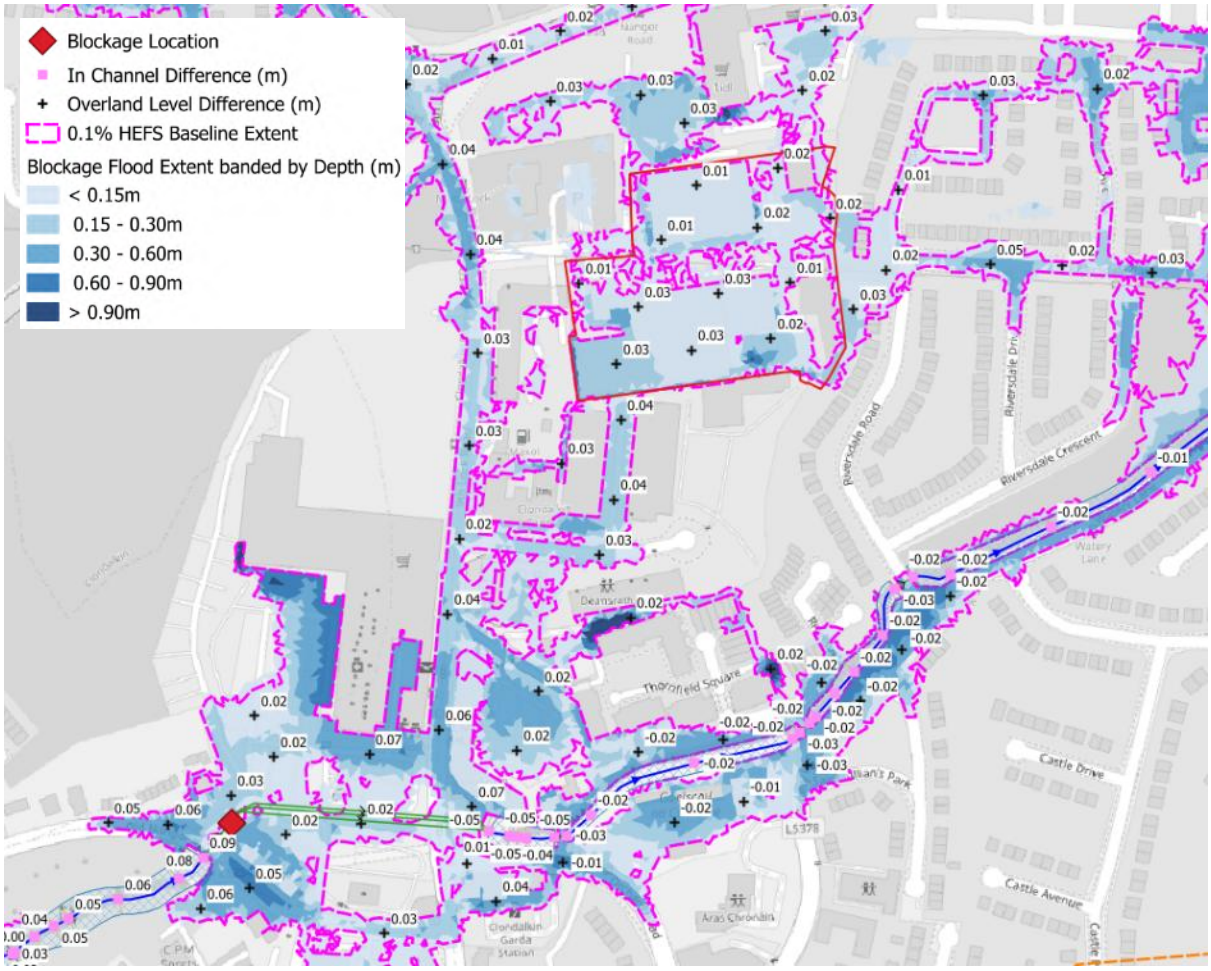


Figure C8 0.1% AEP + HEFS Blockage

Summary

The sensitivity analysis demonstrates that the model is not overly sensitive to variations in the parameters analysed. The freeboard to development levels exceeds the effects of the model sensitivity analysis in all instances.

Appendix D

Hydrological Calculations

OPW

FEMI Flood Estimation Report

CLIENT:	Bluemont Developments Ltd
PROJECT:	Ninth Lock Rd, Clondalkin, Dublin 22
DOC. TITLE	M02258-01
REFERENCE:	N/A
Checked:	DH
Approved:	PS
SUBJECT:	CALCULATION OF QMED & PEAK DESIGN FLOWS IN UNGAUGED CATCHMENTS

A Selection of the Subject Site

A1 Ungauged Node ID: 09_1315_5

A2 Ungauged Node Catchment Descriptors:

Physical Catchment Descriptors			
AREA	35.37	Node East	308173
BFIsoils	0.65	Node North	232035
SAAR	798.52	Centroid East	304950
FARL	0.99	Centroid North	228630
DRAIND	1.30	ALLUV	0.01
S1085	14.57	ARTDRAIN	0.00
ARTDRAIN2	0.00	FOREST	0.10
URBEXT	0.30		

B Module 1: Estimation of the Index Flood (QMED)

B.1. Estimation of QMED without the use of a pivotal site	7.82
B.2. Estimation of QMED by using one pivotal site: 9010	28.86
B.3. Estimation of QMED using three pivotal sites: 10021, 6033, 25040	16.13
B.4. Final chosen QMED estimate:	**7.82**

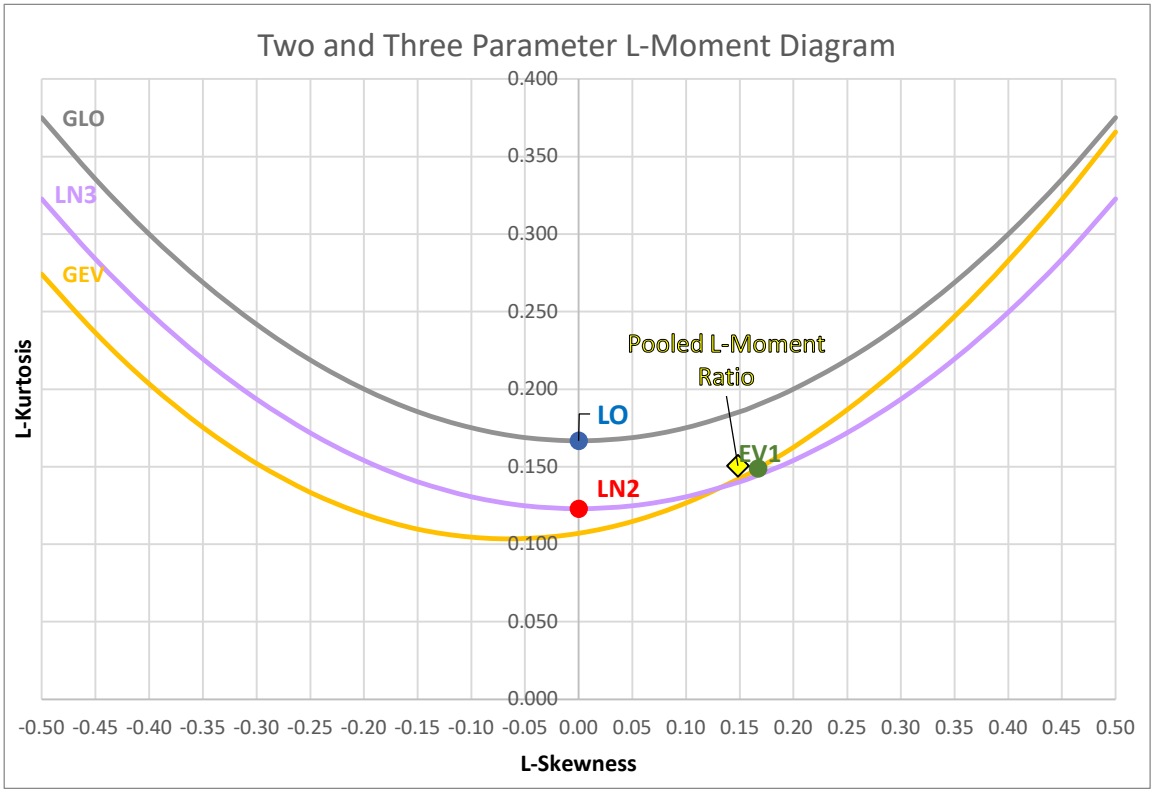
C Module 2: Estimation of the flood growth factors and design flood magnitudes

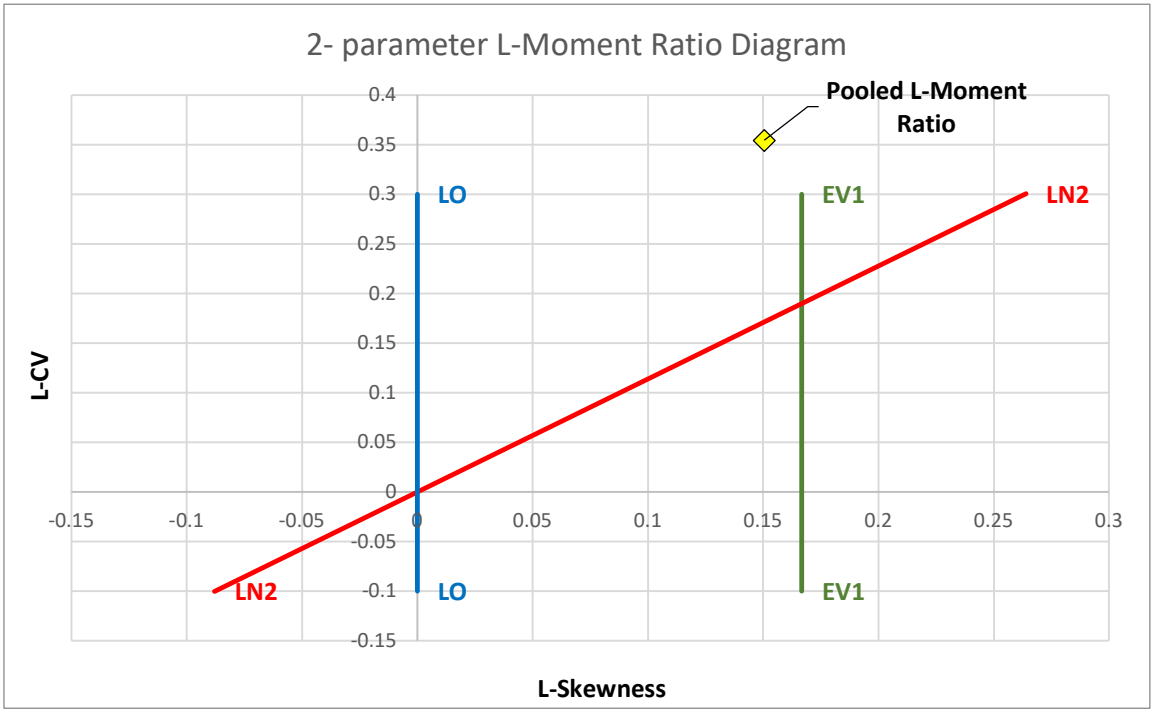
C.1. Selection of Pooling Group for flood frequency analysis

station no.	Location	similarity measure	No. of Yrs of data	t2 L-CV	t3 L-Skewness	t4 L-Kurtosis
10021	COMMON'S ROAD	0.33	41	0.244	0.244	0.126
6033	CONEYBURROW BR	0.76	47	0.232	0.093	0.137
36031	LISDARN	0.92	25	0.151	0.291	0.215
9037	BOTANIC GARDENS	0.96	24	0.342	0.305	0.100
11001	BOLEANY	1.25	51	0.150	0.185	0.240
25040	ROSCREA	1.26	37	0.154	0.120	0.081
7006	FYANSTOWN	1.30	37	0.125	0.050	0.118
24005	ATHLACCA	1.32	35	2.670	0.471	0.447
6013	CHARLEVILLE	1.33	48	0.150	0.040	0.050
16001	ATHLUMMON	1.43	51	0.129	0.000	0.108
9001	LEIXLIP	1.63	66	0.245	0.207	0.139
15001	ANNAMULT HSE	1.69	57	0.169	0.023	0.092

C.2. Selection of the best fit flood frequency distribution to the pooled data

L-Moment Ratio Diagrams:





Final Growth Factors and Design Flows:

GEV		
Return Period (T)	**Growth Factors**	**Design Flows**
1.3	**0.564**	**4.410**
2	**1.000**	**7.817**
5	**1.641**	**12.825**
10	**2.053**	**16.046**
20	**2.439**	**19.067**
25	**2.560**	**20.012**
30	**2.658**	**20.775**
35	**2.740**	**21.415**
50	**2.927**	**22.880**
100	**3.283**	**25.667**
200	**3.631**	**28.385**
500	**4.079**	**31.883**
1000	**4.409**	**34.462**
Custom Return Period	2.33	1.122	8.767

D Module 3: Generation of Design Hydrograph Shape Parameters

D.1. Generation of Initial Design Hydrograph Shape Parameters

Catchment Wetness Indicator **(CWI)** 116

Baseflow: 0.75 m^3/s

n	Tr (hours)	C (hours)
6.15	18.17	74.68

D.2. Selection of most hydrologically similar catchments

	Station No.	Dij similarity measure	n	Tr	C
1st most similar	16012	0.179	9.574	42.661	14.175
2nd most similar	14013	0.435	7.708	52.600	31.765
3rd most similar	15007	0.447	9.409	26.964	30.666

D.2. Option 1: Adjusted parameters using most hydrologically similar catchment, 16012

n	Tr	C
6.405	17.782	10.167

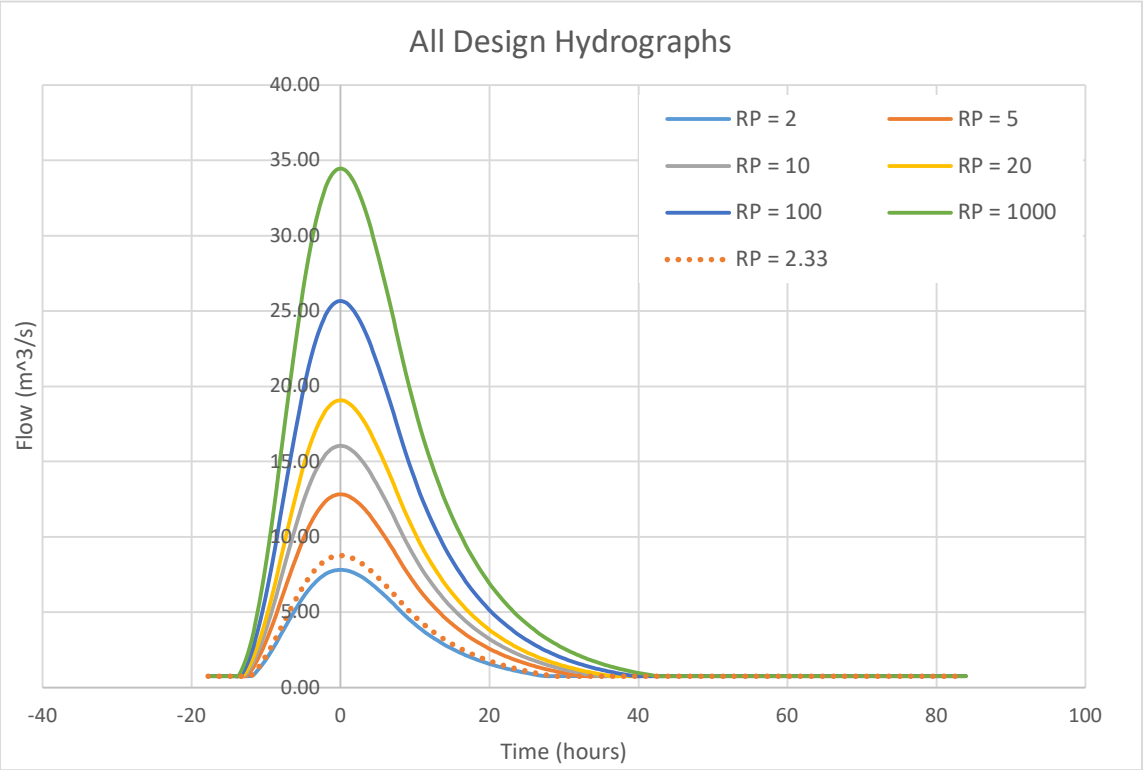
D.2. Option 2: Adjusted Shape parameters using 3 no. Pivotal Sites, 16012, 14013, 15007

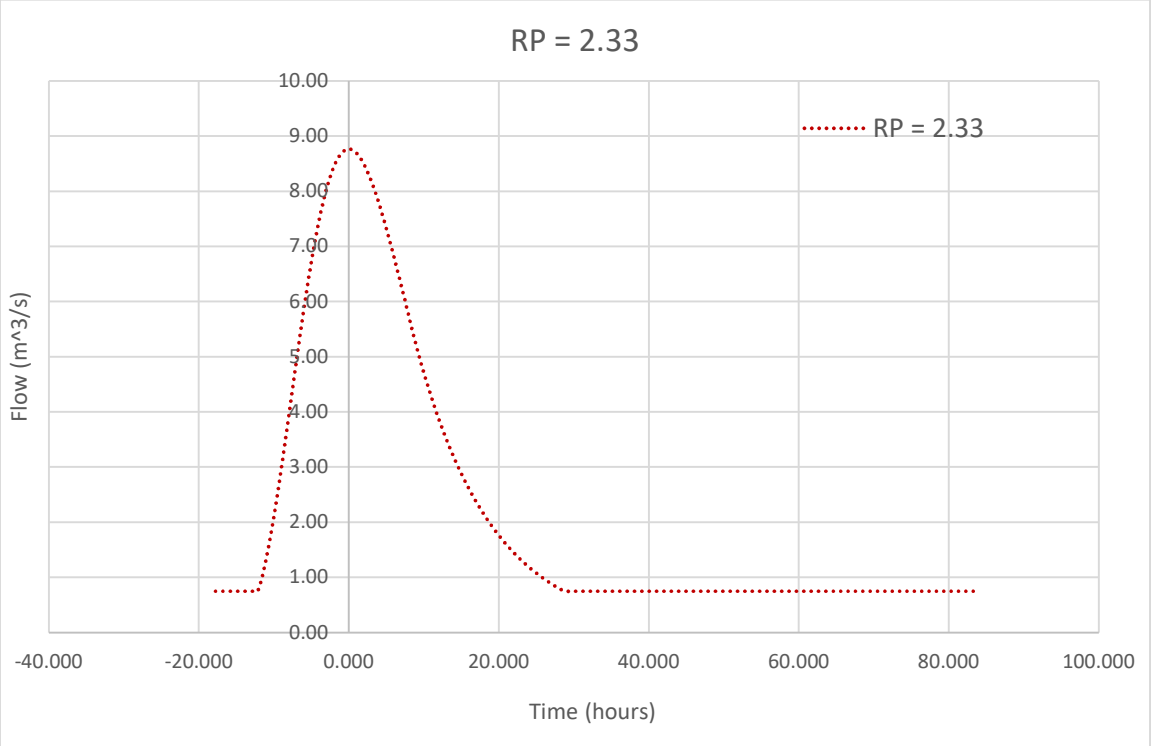
n	Tr	C
6.838	15.024	14.962

Chosen parameter selection method:

Adjusted parameters using most hydrologically similar catchment, 16012

D.3. Final Hydrograph Parameters:	**n**	**Tr**	**C**
	6.405	**17.782**	**10.167**


All Design Hydrographs
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Flow (m^3/s)
-40
-20
0
20
40
60
80
100
Time (hours)
RP = 2
RP = 5
RP = 10
RP = 20
RP = 100
RP = 1000
RP = 2.33


RP = 2.33
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Flow (m^3/s)
-40.000
-20.000
0.000
20.000
40.000
60.000
80.000
100.000
Time (hours)
RP = 2.33

Hydrograph Plot Data:

							Custom RP
Time (Hours)	RP = 2	RP = 5	RP = 10	RP = 20	RP = 100	RP = 1000	RP = 2.33
-17.782	0.750	0.750	0.750	0.750	0.750	0.750	0.750
-17.273	0.750	0.750	0.750	0.750	0.750	0.750	0.750
-16.764	0.750	0.750	0.750	0.750	0.750	0.750	0.750
-16.256	0.750	0.750	0.750	0.750	0.750	0.750	0.750
-15.747	0.750	0.750	0.750	0.750	0.750	0.750	0.750
-15.239	0.750	0.750	0.750	0.750	0.750	0.750	0.750
-14.730	0.750	0.750	0.750	0.750	0.750	0.750	0.750
-14.221	0.750	0.750	0.750	0.750	0.750	0.750	0.750
-13.713	0.750	0.750	0.750	0.750	0.750	0.769	0.750
-13.204	0.750	0.750	0.750	0.750	0.927	1.245	0.750
-12.696	0.750	0.750	0.878	1.043	1.404	1.885	0.750
-12.187	0.750	1.006	1.258	1.495	2.013	2.703	0.750
-11.678	0.841	1.379	1.726	2.051	2.760	3.706	0.943
-11.170	1.110	1.821	2.279	2.708	3.645	4.894	1.245
-10.661	1.420	2.329	2.914	3.463	4.661	6.259	1.592
-10.153	1.766	2.897	3.625	4.307	5.798	7.785	1.981
-9.644	2.144	3.518	4.402	5.231	7.041	9.454	2.405
-9.135	2.550	4.183	5.234	6.219	8.372	11.241	2.860
-8.627	2.975	4.881	6.107	7.257	9.769	13.117	3.337
-8.118	3.414	5.601	7.008	8.328	11.210	15.052	3.829
-7.610	3.860	6.332	7.923	9.414	12.673	17.016	4.329
-7.101	4.305	7.062	8.836	10.500	14.134	18.978	4.828
-6.592	4.742	7.780	9.735	11.567	15.571	20.907	5.319
-6.084	5.166	8.476	10.605	12.602	16.964	22.777	5.794
-5.575	5.571	9.140	11.436	13.589	18.293	24.562	6.248
-5.067	5.952	9.764	12.217	14.517	19.542	26.238	6.675
-4.558	6.303	10.341	12.939	15.375	20.696	27.788	7.069
-4.049	6.622	10.865	13.594	16.153	21.744	29.195	7.427
-3.541	6.906	11.330	14.176	16.845	22.676	30.446	7.746
-3.032	7.152	11.735	14.682	17.446	23.485	31.533	8.022
-2.523	7.360	12.076	15.109	17.953	24.167	32.449	8.255
-2.015	7.529	12.352	15.454	18.364	24.720	33.192	8.444
-1.506	7.658	12.564	15.720	18.679	25.144	33.761	8.589
-0.998	7.748	12.712	15.905	18.899	25.441	34.159	8.690
-0.489	7.801	12.798	16.013	19.027	25.613	34.391	8.749
0.020	7.817	12.825	16.046	19.067	25.667	34.462	8.767
0.528	7.799	12.795	16.009	19.023	25.607	34.382	8.747
1.037	7.748	12.712	15.905	18.899	25.441	34.159	8.690
1.545	7.667	12.580	15.739	18.703	25.176	33.803	8.600
2.054	7.559	12.402	15.517	18.439	24.821	33.327	8.478
2.563	7.426	12.184	15.244	18.114	24.384	32.740	8.329
3.071	7.271	11.929	14.926	17.736	23.874	32.056	8.155
3.580	7.096	11.642	14.566	17.309	23.300	31.285	7.959
4.088	6.904	11.327	14.173	16.841	22.670	30.439	7.744
4.597	6.698	10.989	13.749	16.338	21.993	29.529	7.512
5.106	6.480	10.631	13.301	15.805	21.276	28.567	7.267
5.614	6.252	10.257	12.833	15.249	20.528	27.562	7.012
6.123	6.017	9.871	12.350	14.676	19.755	26.525	6.748
6.631	5.776	9.476	11.857	14.089	18.965	25.464	6.478
7.140	5.532	9.076	11.356	13.494	18.164	24.389	6.205
7.649	5.287	8.673	10.852	12.895	17.358	23.306	5.929
7.649	5.287	8.673	10.852	12.895	17.358	23.306	5.929
8.412	4.904	8.046	10.067	11.963	16.103	21.622	5.501

9.174	4.550	7.465	9.340	11.098	14.939	20.059	5.103
9.937	4.221	6.925	8.664	10.296	13.859	18.609	4.734
10.700	3.916	6.424	8.038	9.551	12.857	17.263	4.392
11.463	3.633	5.960	7.457	8.861	11.928	16.015	4.074
12.226	3.370	5.529	6.918	8.220	11.066	14.858	3.780
12.989	3.126	5.129	6.418	7.626	10.266	13.784	3.507
13.752	2.900	4.759	5.954	7.075	9.524	12.787	3.253
14.515	2.691	4.415	5.523	6.563	8.835	11.863	3.018
15.278	2.496	4.095	5.124	6.089	8.196	11.005	2.800
16.041	2.316	3.799	4.754	5.649	7.604	10.210	2.597
16.804	2.148	3.525	4.410	5.240	7.054	9.472	2.410
17.567	1.993	3.270	4.091	4.862	6.544	8.787	2.235
18.329	1.849	3.034	3.796	4.510	6.071	8.152	2.074
19.092	1.715	2.814	3.521	4.184	5.632	7.562	1.924
19.855	1.591	2.611	3.267	3.882	5.225	7.016	1.785
20.618	1.476	2.422	3.030	3.601	4.847	6.509	1.656
21.381	1.370	2.247	2.811	3.341	4.497	6.038	1.536
22.144	1.271	2.085	2.608	3.099	4.172	5.602	1.425
22.907	1.179	1.934	2.420	2.875	3.870	5.197	1.322
23.670	1.094	1.794	2.245	2.667	3.591	4.821	1.226
24.433	1.014	1.664	2.082	2.474	3.331	4.472	1.138
25.196	0.941	1.544	1.932	2.296	3.090	4.149	1.056
25.959	0.873	1.432	1.792	2.130	2.867	3.849	0.979
26.721	0.810	1.329	1.663	1.976	2.660	3.571	0.908
27.484	0.751	1.233	1.542	1.833	2.467	3.313	0.843
28.247	0.750	1.144	1.431	1.700	2.289	3.073	0.782
29.010	0.750	1.061	1.328	1.577	2.123	2.851	0.750
29.773	0.750	0.984	1.232	1.463	1.970	2.645	0.750
30.536	0.750	0.913	1.143	1.358	1.828	2.454	0.750
31.299	0.750	0.847	1.060	1.259	1.695	2.276	0.750
32.062	0.750	0.786	0.983	1.168	1.573	2.112	0.750
32.825	0.750	0.750	0.912	1.084	1.459	1.959	0.750
33.588	0.750	0.750	0.846	1.006	1.354	1.818	0.750
34.351	0.750	0.750	0.785	0.933	1.256	1.686	0.750
35.113	0.750	0.750	0.750	0.865	1.165	1.564	0.750
35.876	0.750	0.750	0.750	0.803	1.081	1.451	0.750
36.639	0.750	0.750	0.750	0.750	1.003	1.346	0.750
37.402	0.750	0.750	0.750	0.750	0.930	1.249	0.750
38.165	0.750	0.750	0.750	0.750	0.863	1.159	0.750
38.928	0.750	0.750	0.750	0.750	0.801	1.075	0.750
39.691	0.750	0.750	0.750	0.750	0.750	0.997	0.750
40.454	0.750	0.750	0.750	0.750	0.750	0.925	0.750
41.217	0.750	0.750	0.750	0.750	0.750	0.858	0.750
41.980	0.750	0.750	0.750	0.750	0.750	0.796	0.750
42.743	0.750	0.750	0.750	0.750	0.750	0.750	0.750
43.505	0.750	0.750	0.750	0.750	0.750	0.750	0.750
44.268	0.750	0.750	0.750	0.750	0.750	0.750	0.750
45.031	0.750	0.750	0.750	0.750	0.750	0.750	0.750
45.794	0.750	0.750	0.750	0.750	0.750	0.750	0.750
46.557	0.750	0.750	0.750	0.750	0.750	0.750	0.750
47.320	0.750	0.750	0.750	0.750	0.750	0.750	0.750
48.083	0.750	0.750	0.750	0.750	0.750	0.750	0.750
48.846	0.750	0.750	0.750	0.750	0.750	0.750	0.750
49.609	0.750	0.750	0.750	0.750	0.750	0.750	0.750
50.372	0.750	0.750	0.750	0.750	0.750	0.750	0.750
51.135	0.750	0.750	0.750	0.750	0.750	0.750	0.750
51.898	0.750	0.750	0.750	0.750	0.750	0.750	0.750
52.660	0.750	0.750	0.750	0.750	0.750	0.750	0.750
53.423	0.750	0.750	0.750	0.750	0.750	0.750	0.750

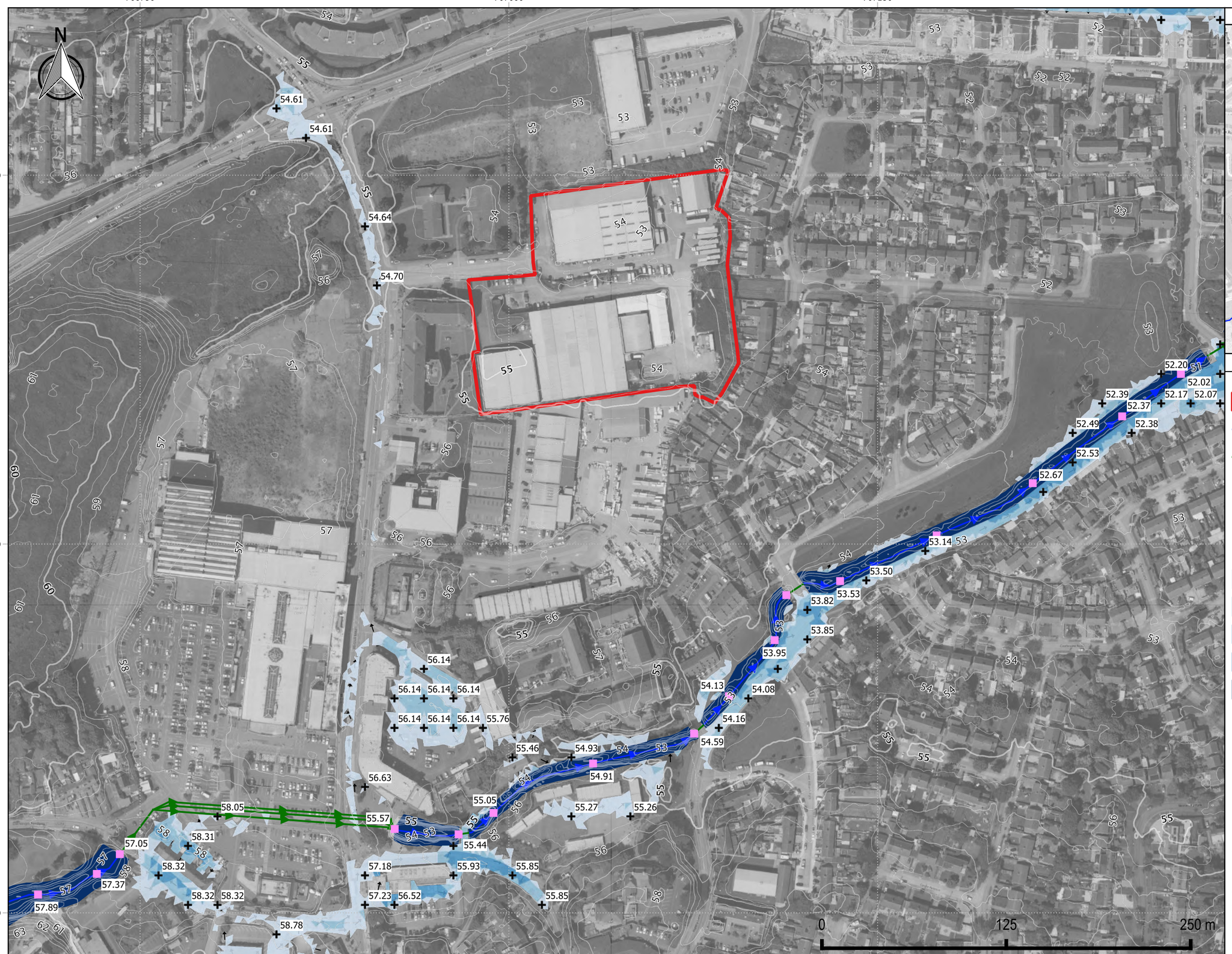
54.186	0.750	0.750	0.750	0.750	0.750	0.750	0.750
54.949	0.750	0.750	0.750	0.750	0.750	0.750	0.750
55.712	0.750	0.750	0.750	0.750	0.750	0.750	0.750
56.475	0.750	0.750	0.750	0.750	0.750	0.750	0.750
57.238	0.750	0.750	0.750	0.750	0.750	0.750	0.750
58.001	0.750	0.750	0.750	0.750	0.750	0.750	0.750
58.764	0.750	0.750	0.750	0.750	0.750	0.750	0.750
59.527	0.750	0.750	0.750	0.750	0.750	0.750	0.750
60.290	0.750	0.750	0.750	0.750	0.750	0.750	0.750
61.052	0.750	0.750	0.750	0.750	0.750	0.750	0.750
61.815	0.750	0.750	0.750	0.750	0.750	0.750	0.750
62.578	0.750	0.750	0.750	0.750	0.750	0.750	0.750
63.341	0.750	0.750	0.750	0.750	0.750	0.750	0.750
64.104	0.750	0.750	0.750	0.750	0.750	0.750	0.750
64.867	0.750	0.750	0.750	0.750	0.750	0.750	0.750
65.630	0.750	0.750	0.750	0.750	0.750	0.750	0.750
66.393	0.750	0.750	0.750	0.750	0.750	0.750	0.750
67.156	0.750	0.750	0.750	0.750	0.750	0.750	0.750
67.919	0.750	0.750	0.750	0.750	0.750	0.750	0.750
68.682	0.750	0.750	0.750	0.750	0.750	0.750	0.750
69.444	0.750	0.750	0.750	0.750	0.750	0.750	0.750
70.207	0.750	0.750	0.750	0.750	0.750	0.750	0.750
70.970	0.750	0.750	0.750	0.750	0.750	0.750	0.750
71.733	0.750	0.750	0.750	0.750	0.750	0.750	0.750
72.496	0.750	0.750	0.750	0.750	0.750	0.750	0.750
73.259	0.750	0.750	0.750	0.750	0.750	0.750	0.750
74.022	0.750	0.750	0.750	0.750	0.750	0.750	0.750
74.785	0.750	0.750	0.750	0.750	0.750	0.750	0.750
75.548	0.750	0.750	0.750	0.750	0.750	0.750	0.750
76.311	0.750	0.750	0.750	0.750	0.750	0.750	0.750
77.074	0.750	0.750	0.750	0.750	0.750	0.750	0.750
77.837	0.750	0.750	0.750	0.750	0.750	0.750	0.750
78.599	0.750	0.750	0.750	0.750	0.750	0.750	0.750
79.362	0.750	0.750	0.750	0.750	0.750	0.750	0.750
80.125	0.750	0.750	0.750	0.750	0.750	0.750	0.750
80.888	0.750	0.750	0.750	0.750	0.750	0.750	0.750
81.651	0.750	0.750	0.750	0.750	0.750	0.750	0.750
82.414	0.750	0.750	0.750	0.750	0.750	0.750	0.750
83.177	0.750	0.750	0.750	0.750	0.750	0.750	0.750
83.940	0.750	0.750	0.750	0.750	0.750	0.750	0.750
83.940	0.750	0.750	0.750	0.750	0.750	0.750	0.750

Appendix E

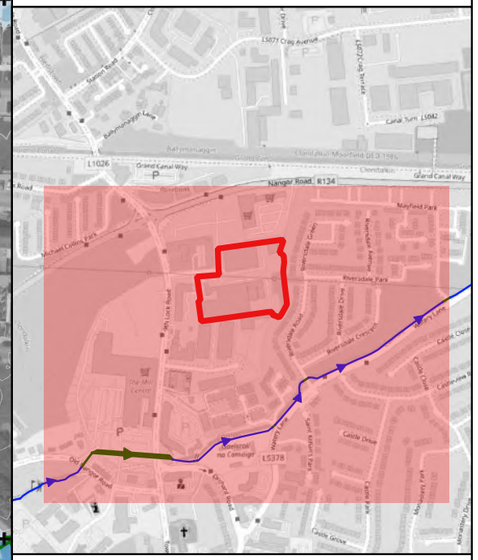
Site-Specific Flood Mapping

706750 707000 707250

732000 731750 731500



MODEL OVERVIEW



LEGEND

- Site Boundary
- River Reach
- Conduit

FLD2 Constraints

- Spot Points (In-Channel)
- Spot Points (Out-of-Bank)

Flood Extent Banded by Depth (m)

- 0.02 - 0.15
- 0.15 - 0.30
- 0.30 - 0.60
- 0.60 - 0.90
- > 0.90

NOTES
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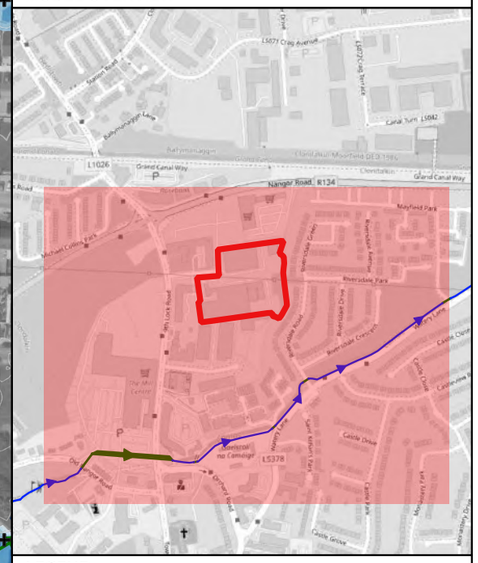
PROJECT NINTH LOCK RD, CLONDALKIN, DUBLIN 22		**HYDROLOGY SCENARIO** PRESENT DAY	**SCALE** 1:2500	**ORIGINAL SIZE** A3
MAP TYPE FLOOD EXTENT / DEPTH MAP		**GEOMETRY SCENARIO** BASELINE	**DRAWN BY** DL	**APPROVED BY** DKS
SOURCE FLUVIAL	**FLOOD EVENT** 1% AEP	**FIGURE NUMBER** M02258-01_FL01	**REVISION** 1	**DATE** 11/05/2026

706750
707000
707250
732000
731750
731500

N

0
125
250 m

MODEL OVERVIEW



LEGEND

- Site Boundary
- River Reach
- Conduit

FLD2 Constraints

- Spot Points (In-Channel)
- Spot Points (Out-of-Bank)

Flood Extent Banded by Depth (m)

- 0.02 - 0.15
- 0.15 - 0.30
- 0.30 - 0.60
- 0.60 - 0.90
- > 0.90

NOTES
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PROJECT NINTH LOCK RD, CLONDALKIN, DUBLIN 22	**HYDROLOGY SCENARIO** PRESENT DAY	**SCALE** 1:2500	**ORIGINAL SIZE** A3
MAP TYPE FLOOD EXTENT / DEPTH MAP	**GEOMETRY SCENARIO** BASELINE	**DRAWN BY** DL	**APPROVED BY** DKS
SOURCE FLUVIAL / **FLOOD EVENT** 0.1% AEP	**FIGURE NUMBER** M02258-01_FL02	**REVISION** 1	**DATE** 11/05/2026

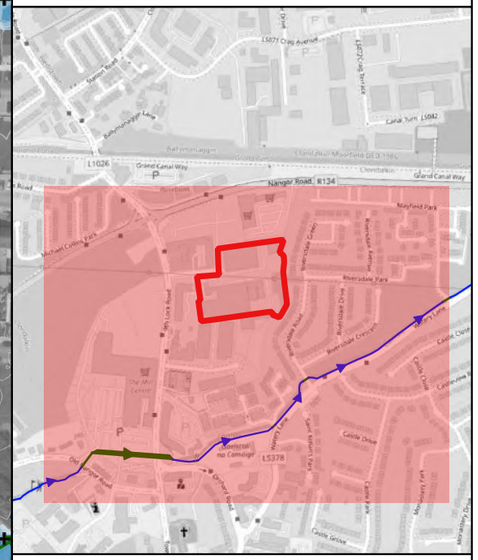
706750 707000 707250

732000 731750 731500

N

0 125 250 m

MODEL OVERVIEW



LEGEND

- Site Boundary
- River Reach
- Conduit

FLD2 Constraints

- Spot Points (In-Channel)
- Spot Points (Out-of-Bank)

Flood Extent Banded by Depth (m)

- 0.02 - 0.15
- 0.15 - 0.30
- 0.30 - 0.60
- 0.60 - 0.90
- > 0.90

NOTES

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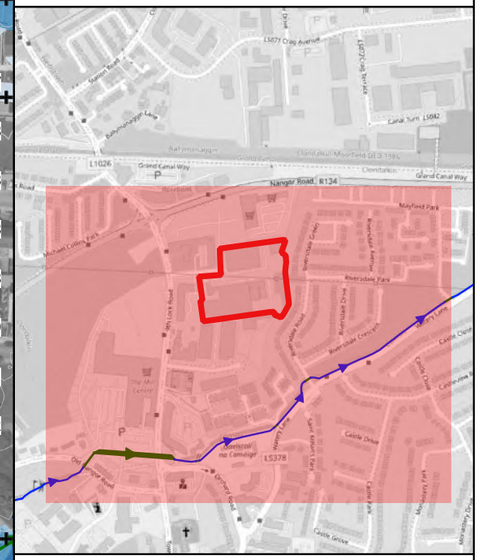
PROJECT NINTH LOCK RD, CLONDALKIN, DUBLIN 22		**HYDROLOGY SCENARIO** CLIMATE CHANGE	**SCALE** 1:2500	**ORIGINAL SIZE** A3
MAP TYPE FLOOD EXTENT / DEPTH MAP		**GEOMETRY SCENARIO** BASELINE	**DRAWN BY** DL	**APPROVED BY** DKS
SOURCE FLUVIAL	**FLOOD EVENT** 1% AEP + CC	**FIGURE NUMBER** M02258-01_FL03	**REVISION** 1	**DATE** 11/05/2026

706750
707000
707250
732000
731750
731500
N
0
125
250 m

MODEL OVERVIEW



LEGEND

- Site Boundary
- River Reach
- Conduit

FLD2 Constraints

- Spot Points (In-Channel)
- Spot Points (Out-of-Bank)

Flood Extent Banded by Depth (m)

- 0.02 - 0.15
- 0.15 - 0.30
- 0.30 - 0.60
- 0.60 - 0.90
- > 0.90

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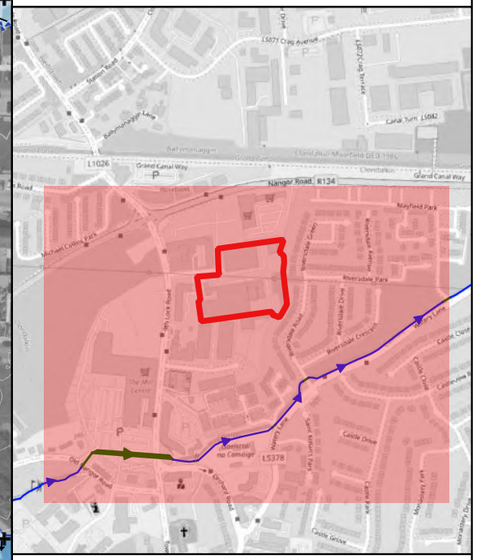
PROJECT NINTH LOCK RD, CLONDALKIN, DUBLIN 22		**HYDROLOGY SCENARIO** CLIMATE CHANGE	**SCALE** 1:2500	**ORIGINAL SIZE** A3
MAP TYPE FLOOD EXTENT / DEPTH MAP		**GEOMETRY SCENARIO** BASELINE	**DRAWN BY** DL	**APPROVED BY** DKS
SOURCE FLUVIAL	**FLOOD EVENT** 0.1% AEP + CC	**FIGURE NUMBER** M02258-01_FL04	**REVISION** 1	**DATE** 11/05/2026

706750 707000 707250

732000 731750 731500

N

MODEL OVERVIEW



LEGEND

- Site Boundary
- River Reach
- Conduit

FLD2 Constraints

- Spot Points (In-Channel)
- Spot Points (Out-of-Bank)
- Baseline Extent

Flood Extent Banded by Depth (m)

- 0.02 - 0.15
- 0.15 - 0.30
- 0.30 - 0.60
- 0.60 - 0.90
- > 0.90

0 125 250 m

NOTES
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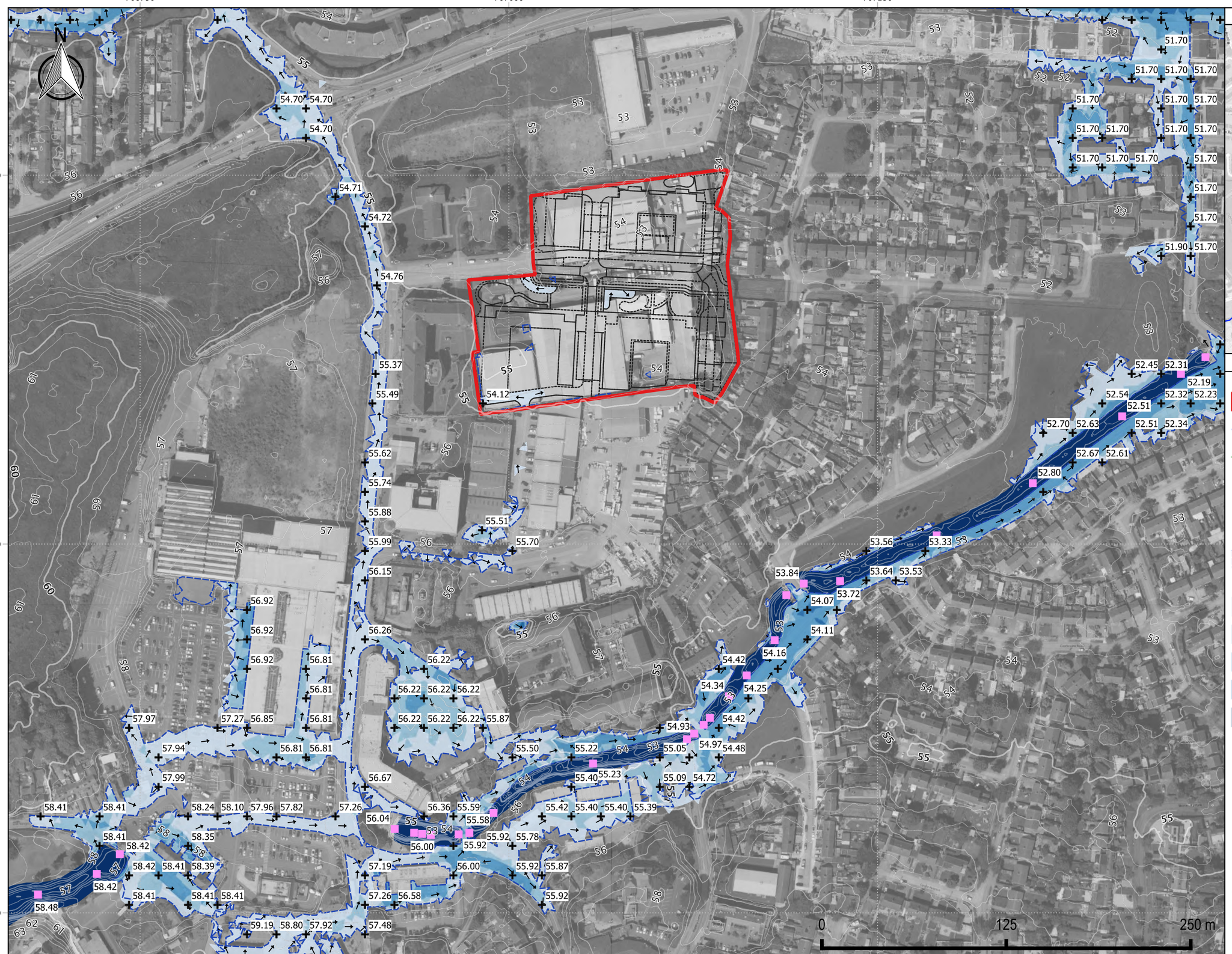
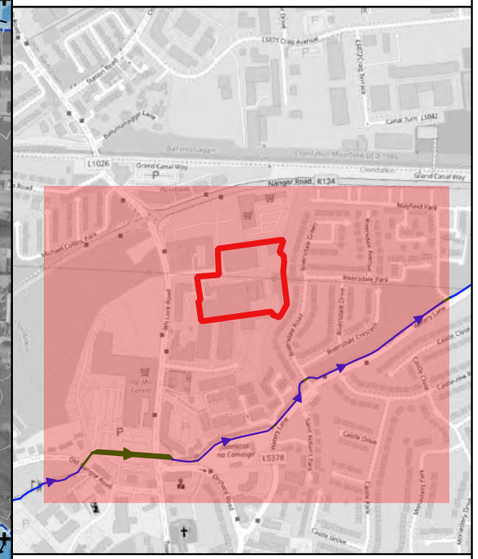
PROJECT NINTH LOCK RD, CLONDALKIN, DUBLIN 22		**HYDROLOGY SCENARIO** PRESENT DAY	**SCALE** 1:2500	**ORIGINAL SIZE** A3
MAP TYPE FLOOD EXTENT / DEPTH MAP		**GEOMETRY SCENARIO** PROPOSED	**DRAWN BY** DL	**APPROVED BY** DKS
SOURCE FLUVIAL	**FLOOD EVENT** 1% AEP	**FIGURE NUMBER** M02258-01_FL05	**REVISION** 1	**DATE** 11/05/2026

706750 707000 707250

732000 731750 731500



MODEL OVERVIEW



LEGEND

- Site Boundary
- River Reach
- Conduit

FLD2 Constraints

- Spot Points (In-Channel)
- Spot Points (Out-of-Bank)
- Baseline Extent

Flood Extent Banded by Depth (m)

- 0.02 - 0.15
- 0.15 - 0.30
- 0.30 - 0.60
- 0.60 - 0.90
- > 0.90

NOTES

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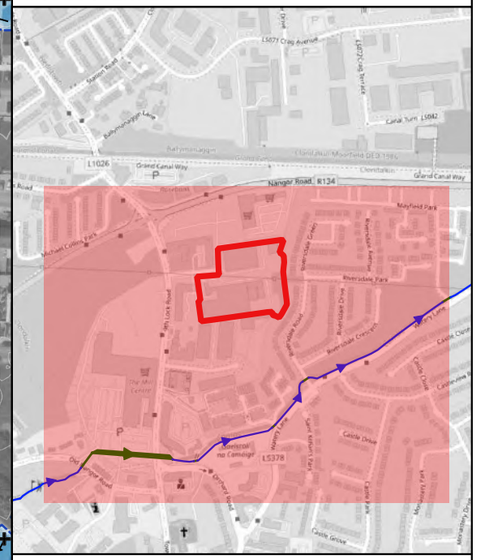
PROJECT NINTH LOCK RD, CLONDALKIN, DUBLIN 22		**HYDROLOGY SCENARIO** PRESENT DAY	**SCALE** 1:2500	**ORIGINAL SIZE** A3
MAP TYPE FLOOD EXTENT / DEPTH MAP		**GEOMETRY SCENARIO** PROPOSED	**DRAWN BY** DL	**APPROVED BY** DKS
SOURCE FLUVIAL	**FLOOD EVENT** 0.1% AEP	**FIGURE NUMBER** M02258-01_FL06	**REVISION** 1	**DATE** 11/05/2026

706750
707000
707250
732000
731750
731500

N

0
125
250 m

MODEL OVERVIEW



LEGEND

- Site Boundary
- River Reach
- Conduit

FLD2 Constraints

- Spot Points (In-Channel)
- Spot Points (Out-of-Bank)
- Baseline Extent

Flood Extent Banded by Depth (m)

- 0.02 - 0.15
- 0.15 - 0.30
- 0.30 - 0.60
- 0.60 - 0.90
- > 0.90

NOTES
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PROJECT NINTH LOCK RD, CLONDALKIN, DUBLIN 22		**HYDROLOGY SCENARIO** CLIMATE CHANGE	**SCALE** 1:2500	**ORIGINAL SIZE** A3
MAP TYPE FLOOD EXTENT / DEPTH MAP		**GEOMETRY SCENARIO** PROPOSED	**DRAWN BY** DL	**APPROVED BY** DKS
SOURCE FLUVIAL	**FLOOD EVENT** 1% AEP + CC	**FIGURE NUMBER** M02258-01_FL07	**REVISION** 1	**DATE** 11/05/2026

706750
707000
707250
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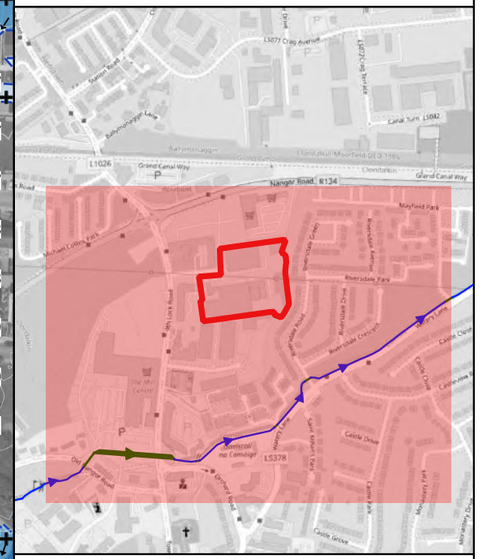
731750
731500

MODEL OVERVIEW



LEGEND

- Site Boundary
- River Reach
- Conduit

FLD2 Constraints

- Spot Points (In-Channel)
- Spot Points (Out-of-Bank)
- Baseline Extent

Flood Extent Banded by Depth (m)

- 0.02 - 0.15
- 0.15 - 0.30
- 0.30 - 0.60
- 0.60 - 0.90
- > 0.90

0 125 250 m

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MAP TYPE FLOOD EXTENT / DEPTH MAP	**GEOMETRY SCENARIO** PROPOSED	**DRAWN BY** DL	**APPROVED BY** DKS
SOURCE FLUVIAL / **FLOOD EVENT** 0.1% AEP + CC	**FIGURE NUMBER** M02258-01_FL08	**REVISION** 1	**DATE** 11/05/2026