Appendix C – Strategic Flood Risk Assessment

Page Left Intentionally Blank

McCloy Consulting

Strategic Flood Risk Assessment

Clonsilla Framework Plan

M02127-12_FL01 | December 2024

[PAGE INTENTIONALLY BLANK]

DOCUMENT CONTROL

Document Filename *For internal use only*	M02127-12_FL01 Clonsilla Framework Plan SFRA Rev 02.docx
Document Reference	M02127-12_FL01
Title	Strategic Flood Risk Assessment
Client	Fingal County Council
Project Manager	Paul Singleton
Author(s)	Duncan Hartwick
Branch	DUBLIN Unit 12, The BEaT Centre, Stephenstown Industrial Estate, Balbriggan T: +353 (0)1 5138963 | W: www.mccloyconsulting.ie

REVISION HISTORY

Rev	Date	Prep	Check	Appr	Amendments	Reason for Issue
00	08/10/2024	DH	PS	KS	Original	Draft For Review / Approval
01	24/10/2024	DH	PS	KS	Pluvial Data added	Issued for Information
02	06/12/2024	JW	PS	KS	FP Boundary updated	Issued for Information

DISTRIBUTION

Recipient	Revision					
	00	01	02	03	04	05
File	✓	✓	✓			
Fingal County Council	✓	✓	✓			

DISCLAIMER

This document has been prepared solely as a Strategic Flood Risk Assessment for Fingal County Council at the instruction of the party named in this document control sheet. McCloy Consulting Ltd accepts no responsibility or liability for any use that is made of this document other than for the purposes for which it was originally commissioned and prepared, including by any third party.

SUSTAINABILITY

As an environmental consultancy, McCloy Consulting Ltd takes its responsibility seriously to try to operate in a sustainable way. As part of this, we try to maintain a paperless office and will only provide printed copies of reports and drawings where specifically requested to do so. We encourage end users of this document to think twice before printing a hard copy – please consider whether a digital copy would suffice. If printing is unavoidable, please consider double sided printing. This report contains 31 pages, which is equivalent to a carbon footprint of approximately 130.2 g CO2 when printed single sided.

MAPPING DISCLAIMER

Maps and figures in this report include OpenStreetMap background mapping licensed under the Open Data Commons Open Database Licence (ODbL) by the OpenStreetMap Foundation (OSMF) © OpenStreetMap contributors as well as Google Maps.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

1 INTRODUCTION

1.1 Terms of Reference

This Strategic Flood Risk Assessment (SFRA) was commissioned by Fingal County Council (Fingal CC) to inform the Clonsilla Framework Plan in relation to flood risk to lands at Clonsilla, Dublin 15 (i.e., the 'Plan Area').

1.2 Statement of Authority

This assessment and report have been prepared and reviewed by the following qualified professionals:

- Duncan Hartwick *BEng (Hons) BSc (Hons)* – Senior Engineer with experience in hydrology, hydraulic modelling, and flood risk assessment.
- Paul Singleton *BEng (Hons) MSc CEng MIEI* – Associate Director and Chartered Engineer specialising in flood risk assessment, hydrology, surface water management, and SuDS design, and a recognised industry professional providing training courses on these topics to the public and private sectors in Ireland and the UK.
- Kyle Somerville *BEng (Hons) CEng MIEI* – Director and Chartered Engineer specialising in flood risk assessment, hydrology, hydraulic modelling, surface water management, and SuDS design.

1.3 Purpose and Scope

The purpose of this SFRA is to identify all potential sources of flooding within the Plan Area and assess their associated risk to people and property. The SFRA also aims to determine the suitability of the Plan Area for future development and set out appropriate flood protection and mitigation measures where appropriate.

This SFRA comprises stage 1 and 2 assessments, as defined in 'The Planning System and Flood Risk Management – Guidelines for Planning Authorities' (i.e., the 'OPW Guidelines') and accompanying Technical Appendices published in 2009 by the Office of Public Works and Department of Environment, Heritage, and Local Government.

This report is intended to allow Fingal CC to apply the Sequential Approach and, where necessary, Justification Test(s) to identify appropriate areas / sites within the Plan Area for development and identify how flood risk can be reduced as part of the Framework Plan process. As such, it is an opportunity to refine the county-level SFRA that informs the current Fingal Development Plan and ensure that all relevant issues related to flood risk to the Plan Area are addressed.

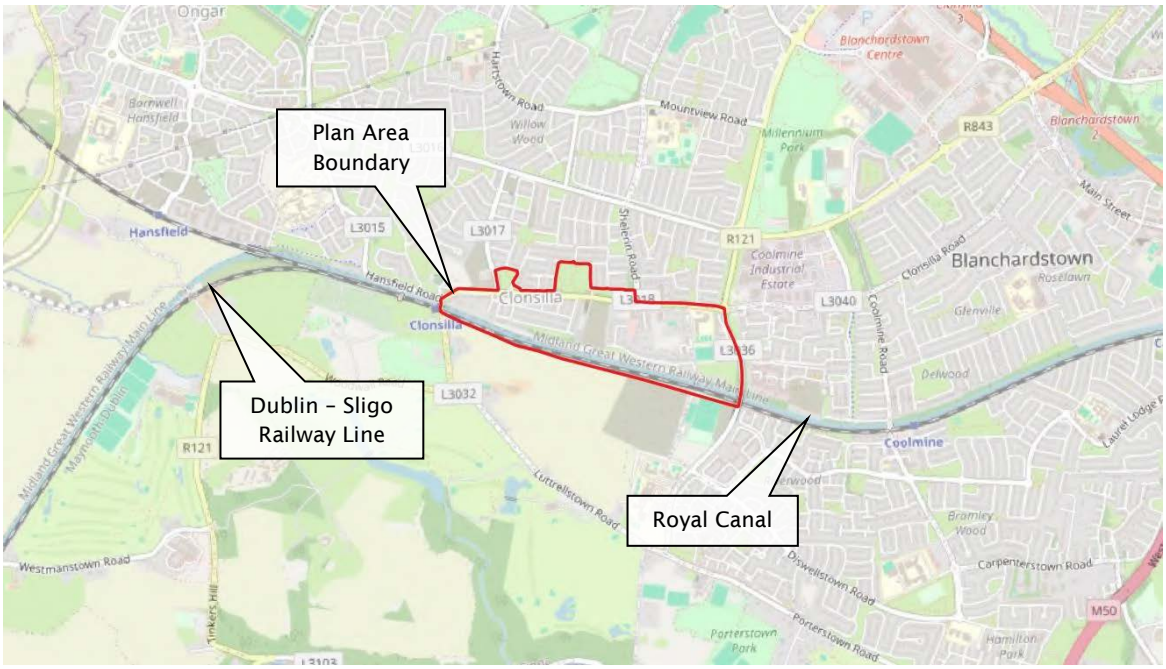
This SFRA is intended for 'plan making' only and not to assess the risk to specific development proposals. Risk to any future development within the Plan Area would be assessed separately by a site-specific Flood Risk Assessment (SSFRA) submitted in support of a planning application. While any future SSFRA may be informed by flood hazard information determined by this SFRA, it would need to be made specific to the proposed development.

2 PLAN AREA INFORMATION

2.1 Location and Boundary

The Plan Area is located at Clonsilla, directly west of Blanchardstown, as shown in Figure 2.1. The Plan Area is bounded by Diswellstown Road (L3036) to the east and Clonsilla Road (R121) to the north and west. The Royal Canal and the Dublin-Sligo railway line run along the southern boundary.

Figure 2.1: Plan Area Location and Boundary



2.2 Existing Land Use

The Plan Area has an area of c. 45 ha and currently comprises primarily residential developed lands, as shown in Figure 2.2. St. Mochta's National School is located in the eastern portion of the Plan Area. The Royal Canal and the Dublin-Sligo railway line run along the southern boundary.

Figure 2.2: Google Maps Imagery Showing Existing Land Use

2.3 Zoning Objectives

Zoning objectives for the Plan Area, as shown in Figure 2.3 and described in Table 2.1, are based on the current Fingal Development Plan. Lands surrounding the Plan Area have similar zoning objectives.

Figure 2.3: Zoning Objectives from the Fingal Development Plan 2023-2029

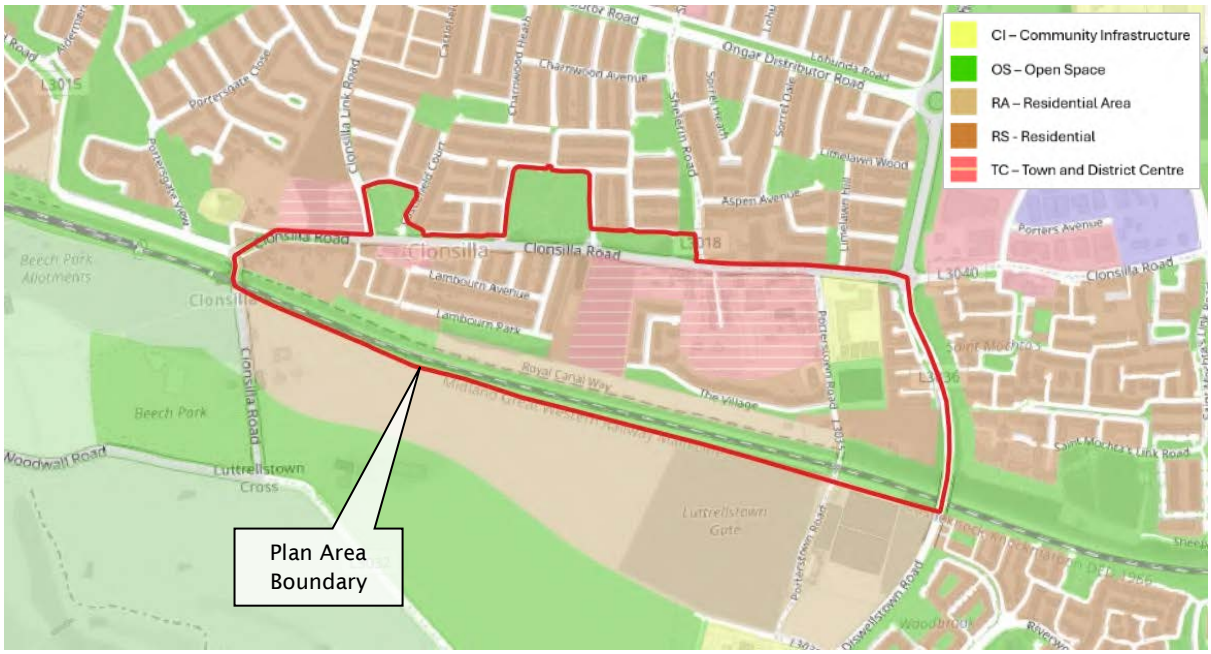


Table 2.1: Land Use Zoning Objectives from the Fingal Development Plan 2023-2029

Zoning Objective Type	Zoning Objective Description
CI – Community Infrastructure	Provide for and protect civic, religious, community, education, health care and social infrastructure
OS – Open Space	Preserve and provide for open space and recreational amenities
RA – Residential Area	Provide for new residential communities subject to the provision of the necessary social and physical infrastructure
RS – Residential	Provide for residential development and protect and improve residential amenity
TC – Town and District Centre	Protect and enhance the special physical and social character of town and district centres and provide and/ or improve urban facilities

2.4 Water Environment

There are no open channel watercourses or drainage channels within or directly adjacent to the Plan Area as evidenced by Ordnance Survey Ireland (OSI) and Environmental Protection Agency (EPA) datasets and confirmed during a site walkover.

As shown in Figure 2.1, the Royal Canal runs in along the southern boundary of the Plan Area. There are several lakes at Luttrellstown Golf Course c. 700 m south of the Plan Area.

2.5 Geology and Hydrogeology

No site investigation / infiltration testing has been conducted for the Plan Area.

Table 2.2 summarises geological and hydrogeological data taken from Geological Survey of Ireland (GSI) mapping that is considered pertinent to the Plan Area.

Table 2.2: Geological and Hydrogeological Data for the Plan Area

Data	Description
Overlying Soil	• Primarily 'Made ground' within Plan Area • 'Shallow well drained mineral' along southern boundary of Plan Area
Subsoil Geology	• Primarily 'Till derived from limestones' within Plan Area • 'Bedrock outcrop or subcrop' along southern boundary • Subsoil permeability 'not mapped' • 'Extreme' groundwater vulnerability with 'Rock at or near surface' along the southern boundary
Bedrock Geology	• Lucan Formation • Recorded geotechnical borehole data indicates bedrock met at 0-5 m depth directly north-east of Plan Area
Groundwater Body	• Dublin Groundwater Body • Poorly productive bedrock flow regime • Locally Important Aquifer (Ll) – 'Bedrock which is moderately productive only in local zones'
Groundwater Drinking Water Protection Areas	• None

3 APPROACH TO FLOOD RISK ASSESSMENT

3.1 Definition of Flood Risk

Flood risk is a combination of the likelihood of occurrence of a flood event and the potential consequences arising from that flood event. It is expressed as follows:

Flood Risk = Likelihood of Flooding x Consequences of Flooding

Flooding presents a risk only when people, property, infrastructure, and / or environmental assets are located in the area that could potentially flood.

3.1.1 Likelihood of Flooding

The likelihood of flooding is defined in the OPW Guidelines as the percentage probability of a flood of a given magnitude or severity occurring or being exceeded in any given year. It is generally expressed as an Annual Exceedance Probability (AEP) or return period. For example, a 1% AEP flood event refers to a flood with a magnitude that has a 1-in-100 (i.e., 1%) chance of occurring or being exceeded in any given year. AEP is the inverse of return period, as shown in Table 3.1.

Table 3.1: Return Period and Annual Exceedance Probability

Return Period (Years)	Annual Exceedance Probability (%)
1	100
10	10
50	2
100	1
200	0.5
1000	0.1

3.1.2 Consequences of Flooding

The consequences of flooding are determined by the hazards associated with the flooding (e.g., depth of water, speed, flow, rate of onset, duration, wave action, water quality) and the vulnerability of the people, property, and environment assets potentially affected (e.g., age profile of the population, type of development, presence, reliability of mitigation measures).

3.2 Objectives of the OPW Guidelines

This SFRA recognises the core objectives of the OPW Guidelines, which are to:

- Avoid inappropriate development in areas that are at risk of flooding.
- Prevent new developments from increasing flood risk elsewhere, including flood risk that may arise from surface water runoff.
- 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.
- Ensure that the requirements of EU and national law in relation to the natural environment and nature conservation are complied with at all stages of flood risk management.

In achieving the aims and objectives of the OPW Guidelines, Fingal CC should:

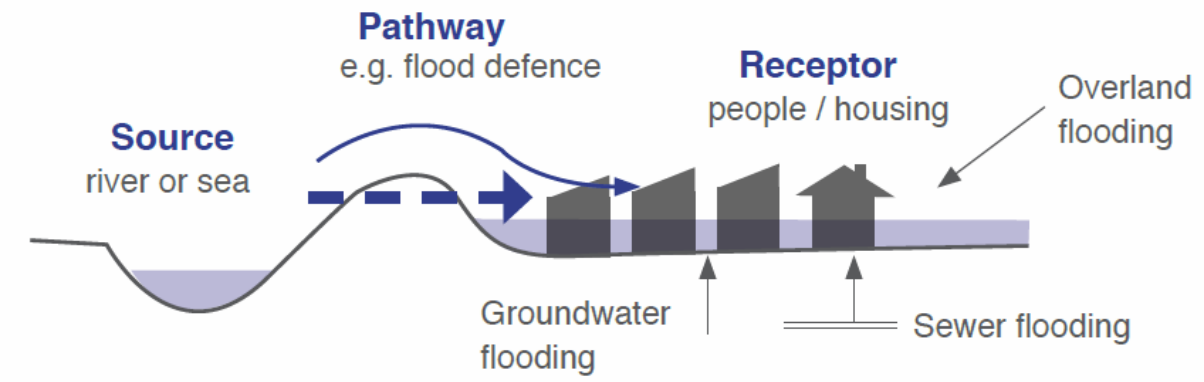
- Adopt a sequential approach to flood risk management, which aims to avoid flood risk where possible, substitute less vulnerable uses where avoidance is not possible, and mitigate and manage the risk where avoidance and substitution are not possible.
- Apply the Justification Test for development in flood risk areas.

A precautionary approach should also be applied to flood risk management to reflect uncertainties in existing flooding datasets and risk assessment techniques and in the ability to predict the future climate, the future performance of existing flood defences, and the extent of future coastal erosion. Development should therefore be designed with careful consideration of likely future changes in flood risk, including the effects of climate change and coastal erosion, to ensure that future occupants are not subject to unacceptable risks.

3.3 Source-Pathway-Receptor Model

In accordance with the OPW Guidelines, this SFRA advocates the use of the Source-Pathway-Receptor model to identify the sources of flooding (e.g., high sea levels, intense or prolonged rainfall leading to increased runoff and increased flows in rivers and sewers), the receptors (i.e., the people and assets affected by flooding), and the pathways by which floodwater reaches those receptors (e.g., overland flow, river and coastal floodplains, river channels and sewers). A depiction of the Source-Pathway-Receptor model as it applies to FRAs, taken from the OPW Guidelines, is shown in Figure 3.1.

Figure 3.1: Sources, Pathways, and Receptors of Flooding



3.4 Flood Zones

Flood Zones are geographical areas where the likelihood of flooding **(from rivers and sea only)** is within a certain range. The OPW Guidelines and Fingal SFRA define three Flood Zones, as outlined in Table 3.2.

Table 3.2: Flood Zones

Flood Zone	Description	Probability (Rivers)	Probability (Sea)
A	Probability of flooding from rivers and sea is highest	Greater than 1% or 1-in-100	Greater than 0.5% or 1-in-200
B	Probability of flooding from rivers and sea is moderate	Between 0.1% or 1-in-1000 and 1% or 1-in-100	Between 0.1% or 1-in-1000 and 0.5% or 1-in-200

Flood Zone	Description	Probability (Rivers)	Probability (Sea)
C	Probability of flooding from rivers and sea is low (any parts of the Plan Area not in Flood Zone A or B)	Less than 0.1% or 1-in-1000	Less than 0.1% or 1-in-1000

When determining Flood Zones, the presence of flood defences should be ignored as areas protected by flood defences still carry residual risk associated with overtopping or breach of defences.

Flood Zones are generated without the inclusion of allowances for climate change. Therefore, land zoning based on delineated Flood Zones will not account for climate change flood extents, which will be wider than the present day scenario flood extents in most instances.

3.5 Receptor Vulnerability

The OPW Guidelines define three vulnerability classifications for different land uses and types of development: highly vulnerable (including essential infrastructure), less vulnerable, and water compatible. Examples of different land uses and types of development under each classification are provided in Table 3.3.

The vulnerability of a development to flooding depends on the nature of the development, its occupancy, and the construction methods used. The classifications are primarily based on the ability to manage the safety of people in flood events and the long-term implications in terms of the recovery of function and structure of the development.

Table 3.3: Receptor Vulnerability Classifications

Vulnerability Classification	Land Uses / Type of Development *
Highly Vulnerable Development (including Essential Infrastructure)	• Garda, ambulance, and fire stations and command centres required to be operational during flooding • Hospitals • Emergency access and egress points • Schools • Dwelling houses, student halls of residence, and hostels • Residential institutions such as residential care homes, children's homes, and social services homes • Caravans and mobile home parks • Dwelling houses designed, constructed, or adapted for the elderly or other people with impaired mobility • Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution in the event of flooding (SEVESO sites, IPPC sites, etc.)
Less Vulnerable Development	• Buildings used for: retail, leisure, warehousing, commercial, industrial, and non-residential institutions • Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans • Land and buildings used for agriculture and forestry • Waste treatment (except landfill and hazardous waste) • Mineral working and processing • Local transport infrastructure.

Vulnerability Classification	Land Uses / Type of Development *
Water Compatible Development	• Flood control infrastructure • Docks, marinas, and wharves • Navigation facilities • Ship building, repairing, and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location • Water-based recreation and tourism (excluding sleeping accommodation) • Lifeguard and coastguard stations • Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms • Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan)

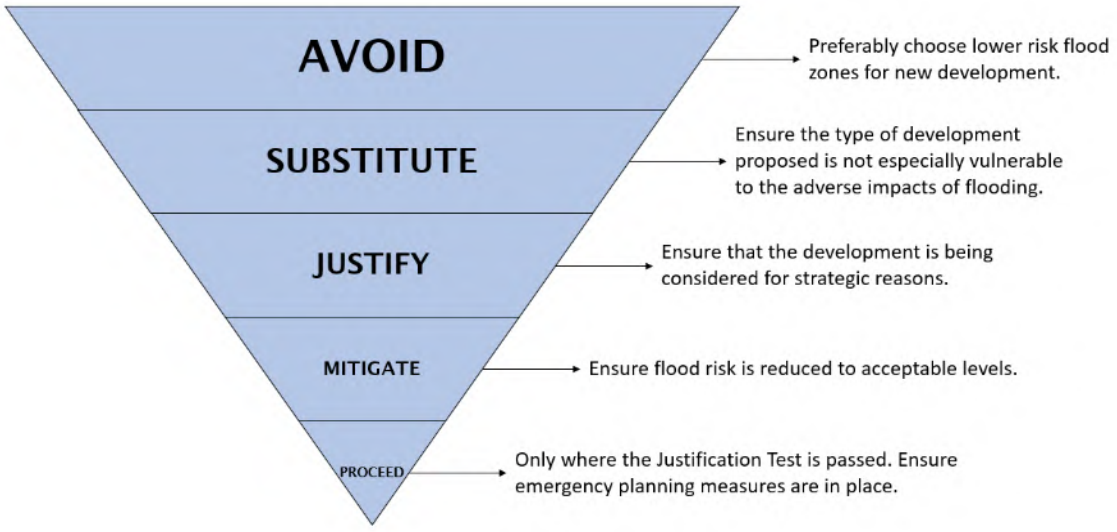
** Uses not listed here should be considered based on their own merits.*

3.6 The Sequential Approach and Justification Test

3.6.1 Sequential Approach

This SFRA recommends a sequential approach to planning to ensure the core objectives of the OPW Guidelines outlined in Section 3.2 are implemented. A sequential approach is particularly important at the plan-making stage but also applicable in the layout and design of new development at the development management stage. The principles of the sequential approach in flood risk management are summarised in Figure 3.2.

Figure 3.2: The Sequential Approach



In general, most types of development would be considered inappropriate in Flood Zone A.

In Flood Zone B, highly vulnerable development (e.g., hospitals, dwelling houses, and primary infrastructure) would be considered inappropriate, but less vulnerable development (e.g., retail, commercial, and industrial uses) may be considered appropriate.

Development in Flood Zone C is considered appropriate from a flood risk perspective.

While preferred, a sequential approach to flood risk management is not always possible as many urban centres are affected by Flood Zones yet are targeted for key social and economic development. To reflect this, the OPW Guidelines set out the Justification Test to facilitate the assessment of the balance between consideration of flood risk and the need for continued development in towns and cities.

3.6.2 Justification Test

The Justification Test has been designed to rigorously assess the appropriateness, or otherwise, of particular developments that, for the reasons outlined above, are being considered in areas of moderate or high flood risk. The test is comprised of two processes:

- Plan Making Justification Test – used at the plan preparation and adoption stage where it is intended to zone or otherwise designate land that is at moderate or high risk of flooding
- Development Management Justification Test – used at the planning application state where it is intended to develop land at moderate or high risk of flooding for uses or development vulnerable to flooding that would generally be inappropriate for that land

Table 3.4 is a matrix of receptor vulnerability versus Flood Zone to illustrate appropriate development and scenarios where development is required to meet the Justification Test.

Table 3.4: Vulnerability and Flood Zone Matrix for Justification Test

Development Vulnerability	Flood Zone A	Flood Zone B	Flood Zone C
Highly Vulnerable (including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less Vulnerable	Justification Test	Appropriate	Appropriate
Water-compatible	Appropriate	Appropriate	Appropriate

3.6.3 Plan Making Justification Test

The Plan Making / Development Plan Justification Test should be carried out as part of the SFRA using mapped Flood Zones. It applies where land zonings have been reviewed with respect to the need for development of areas at a high or moderate risk of flooding for uses which are vulnerable to flooding and which would generally be inappropriate, as set out in Table 3.2, and where avoidance or substitution is not appropriate. Where land use zoning objectives are being retained, they must satisfy all of the following criteria as per Table 3.4 of the OPW Guidelines included as Table 3.5.

Table 3.5: Plan Making Justification Test

No.	Criteria
1	The urban settlement is targeted for growth under the National Spatial Strategy, regional planning guidelines, statutory plans as defined above or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act, 2000, as amended.

No.	Criteria
2	The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and, in particular: • Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement • Comprises significant previously developed and/or under-utilised lands • Is within or adjoining the core of an established or designated urban settlement • Will be essential in achieving compact and sustainable urban growth • There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement
3	A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed, and the use or development of the lands will not cause unacceptable adverse impacts elsewhere. N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment.

In cases where existing zoned lands are discovered to be within flood zones, the Development Plan Justification Test has been applied, and it is demonstrated that it cannot meet the specified requirements it is recommended that planning authorities reconsider the zoning by implementing the following:

- Remove the existing zoning for all types of development on the basis of the unacceptable high level of flood risk
- Reduce the zoned area and change or add zoning categories to reflect the flood risk
- Replace the existing zoning with a zoning or a specific objective for less vulnerable uses
- Prepare a local area plan informed by a detailed flood risk assessment to address zoning and development issues in more detail and prior to any development

If the criteria of the Justification Test have been met, design of structural or non-structural flood risk management measures as prerequisites to development in specific areas, ensuring that flood hazard and risk to other locations will not be increased or, if practicable, will be reduced. The mitigation measures are required prior to development taking place.

3.7 Climate Change Adaptation

It is likely that climate change will have an impact on flood risk in Ireland as a result of rising sea levels and more frequent extreme rainfall events. Climate change is a dynamic process and therefore requires a precautionary and flexible approach to ensure appropriate provision for or adaptation to its potential consequences.

Guidance on climate change objectives and actions is set out in the 'Flood Risk Management Climate Change Sectoral Adaptation Plan' published in 2019 by the OPW. The long-term goal adopted by the OPW on climate adaptation for flooding and flood risk management is "p*romoting sustainable communities and supporting our environment through the effective management of the potential impacts of climate change on flooding and flood risk*". To deliver this goal, the OPW has identified the following adaptation objectives:

- Objective 1 – Enhancing our knowledge and understanding of the potential impacts of climate change for flooding and flood risk management through research and assessment
- Objective 2 – Adapting flood risk management practice to effectively manage the potential impact of climate change on future flood risk
- Objective 3 – Aligning adaptation to the impact of climate change on flood risk and flood risk management across sectors and wider government policy

The OPW have adopted two indicative potential futures for assessing flood risk: the Mid-Range Future Scenario (MRFS) and the High-End Future Scenario (HEFS). These were selected to reflect, based on information available at the time, a future in the latter part of the century that would be:

- typical or near to the general average of the future climate projections (MRFS), or
- a more extreme future based on the upper end of the range of projections of future climatic conditions and the impacts such changes would have on the drivers of flood risk (HEFS).

The allowances, in flood risk terms, for both the MRFS and HEFS are shown in Table 3.6. For the purposes of this SFRA, climate change flood mapping has been prepared and is included in Appendix C.

Table 3.6: OPW Climate Change Allowances

Parameter	Mid-Range Future Scenario (MRFS)	High End Future Scenario (HEFS)
Mean Sea Level Rise	+ 500 mm	+ 1000 mm
Peak River Flood Flows	+ 20%	+ 30%
Extreme Rainfall Depths	+ 20%	+ 30%

Due to the uncertainty of the potential effects of climate change, this SFRA sets out recommendations in line with the precautionary approach adopted by the Guidelines in terms of managing the effects of climate change. These include:

- Recognising that significant changes in the flood extent may result from an increase in rainfall or tide events and, accordingly, adopt a cautious approach to zoning land in transitional areas.
- Ensuring that the finished levels of structures are designed to protect against flooding such that flood defences, land raising, and ground floor levels are sufficient to cope with the effects of climate change over the lifetime of the development.
- Ensuring that both the structures designed to protect against flooding and the protected development are capable of adaptation to the effects of climate change when there is more certainty about the effects and when there is still time for such adaptation to be effective.

3.8 Stages and Scales of Flood Risk Assessment

3.8.1 Stages of Flood Risk Assessment

FRAs are typically undertaken over three stages, in order of increasing detail, as described in Table 3.7. Progression to a more detailed stage depends on the outcomes of the previous stage. This staged approach ensures that the level of assessment undertaken is appropriate for the scale and nature of the flood risk issues, site or area, and type of development proposed. It also prevents unnecessary flood modelling and development of mitigation and management measures.

Table 3.7: Stages of Flood Risk Assessment

Stage	Purpose
Stage 1: Flood Risk Identification	To identify whether there may be any flooding or surface water management issues relevant to a plan area or proposed development site that may warrant further investigation.

Stage	Purpose
Stage 2: Initial Flood Risk Assessment	To confirm sources of flooding that may affect a plan area or proposed development site and to appraise the adequacy of the existing flood risk information. If necessary, to determine what surveys and modelling approach are appropriate to match the spatial resolution required and complexity of the flood risk issues identified.
Stage 3: Detailed Flood Risk Assessment	To provide a quantitative assessment of flood risk to a proposed or existing development, the effect of the development on flood risk elsewhere, and the effectiveness of any proposed mitigation measures. Typically involves the construction of a hydraulic model that covers a wide enough area to capture catchment-wide impacts and hydrological processes.

3.8.2 Scales of FRA

There are three scales of FRA described in the OPW Guidelines, as described in Table 3.8.

Table 3.8: Scales of Flood Risk Assessment

Scale	Purpose	Responsibility
Regional Flood Risk Appraisal (RFRA)	• To appraise the source and significance of all types of flood risk in a region based on readily derivable information to inform the regional planning guidelines and influence spatial allocations for growth in housing and employment. • To identify areas where more detailed studies are required or where flood risk management measures may be required at a regional level to support the proposed growth.	Regional Authorities
Strategic Flood Risk Assessment (SFRA)	• To provide a broad assessment of all types of flood risk in the area to inform strategic land use planning decisions and to identify opportunities for reducing flood risk. • Typically involves up to a Stage 2 – Initial Flood Risk Assessment. • A site-specific flood risk assessment would be recommended where the initial flood risk assessment demonstrates the potential for a significant level of flood risk or where there is conflict with the vulnerability of proposed development.	Local Authorities

Scale	Purpose	Responsibility
Site-specific Flood Risk Assessment (SSFRA)	• To identify and assess all types of flood risk for a proposed new development and to assess the potential effects of climate change, the impact of development on flooding, and residual risks. • To propose appropriate site management and mitigation measures to reduce flood risk to an acceptable level. • If stages 1 and 2 of assessment have been undertaken to appropriate levels of detail, it is likely that the SSFRA will require detailed channel and site surveys and flood modelling.	Planning Applicants

3.9 Strategic Flood Risk Assessment

The purpose of this report is to carry out an SFRA at Plan Area scale. The following detailed requirements are set out in the Technical Appendices of the OPW Guidelines and have been undertaken where relevant information is available:

- Identify principal rivers, sources of flooding and produce Flood Zone maps for across the local authority area and in key development areas.
- An appraisal of the availability and adequacy of the existing information.
- Assess potential impacts of climate change to demonstrate the sensitivity of an area to increased flows or sea levels.
- Identify the location of any flood risk management infrastructure and the areas protected by it and the coverage of flood-warning systems.
- Consider, where additional development in Flood Zone A and B is planned within or adjacent to an existing community at risk, the implications of flood risk on critical infrastructure and services across a wider community-based area and how the emergency planning needs of existing and new development will be managed.
- Identify areas of natural floodplain, which could merit protection to maintain their flood risk management function as well as for reasons of amenity and biodiversity.
- Assess the current condition of flood-defence infrastructure and of likely future policy with regard to its maintenance and upgrade.
- Assess the probability and consequences of overtopping or failure of flood risk management infrastructure, including an appropriate allowance for climate change.
- Assess, in broad terms, the potential impact of additional development on flood risk elsewhere and how any loss of floodplain could be compensated for.
- Assess the risks to the proposed development and its occupants using a range of extreme flood or tidal events.
- Identify areas where site-specific FRA will be required for new development or redevelopment.
- Identify drainage catchments where surface water or pluvial flooding could be exacerbated by new development and develop strategies for its management in areas of significant change.
- Identify where an integrated and area based provision of SuDS and green infrastructure are appropriate in order to avoid reliance on individual site by site solutions.
- Provide guidance on appropriate development management criteria for zones and sites.

4 STAGE 1 – FLOOD RISK IDENTIFICATION

4.1 Preamble

This section is intended to form a Stage 1 assessment of flood risk by presenting available flood risk information used to identify flooding or surface water management issues within the Plan Area that warrant further investigation. In accordance with the OPW Guidelines, both primary and secondary sources of flood risk information have been used to inform this SFRA.

4.2 Primary Sources of Flood Risk Information

Table 4.1 lists primary sources of flood risk information in chronological order and indicates whether they are relevant to this SFRA. Sources deemed relevant are discussed further in this section.

Table 4.1: Primary Sources of Flood Risk Information

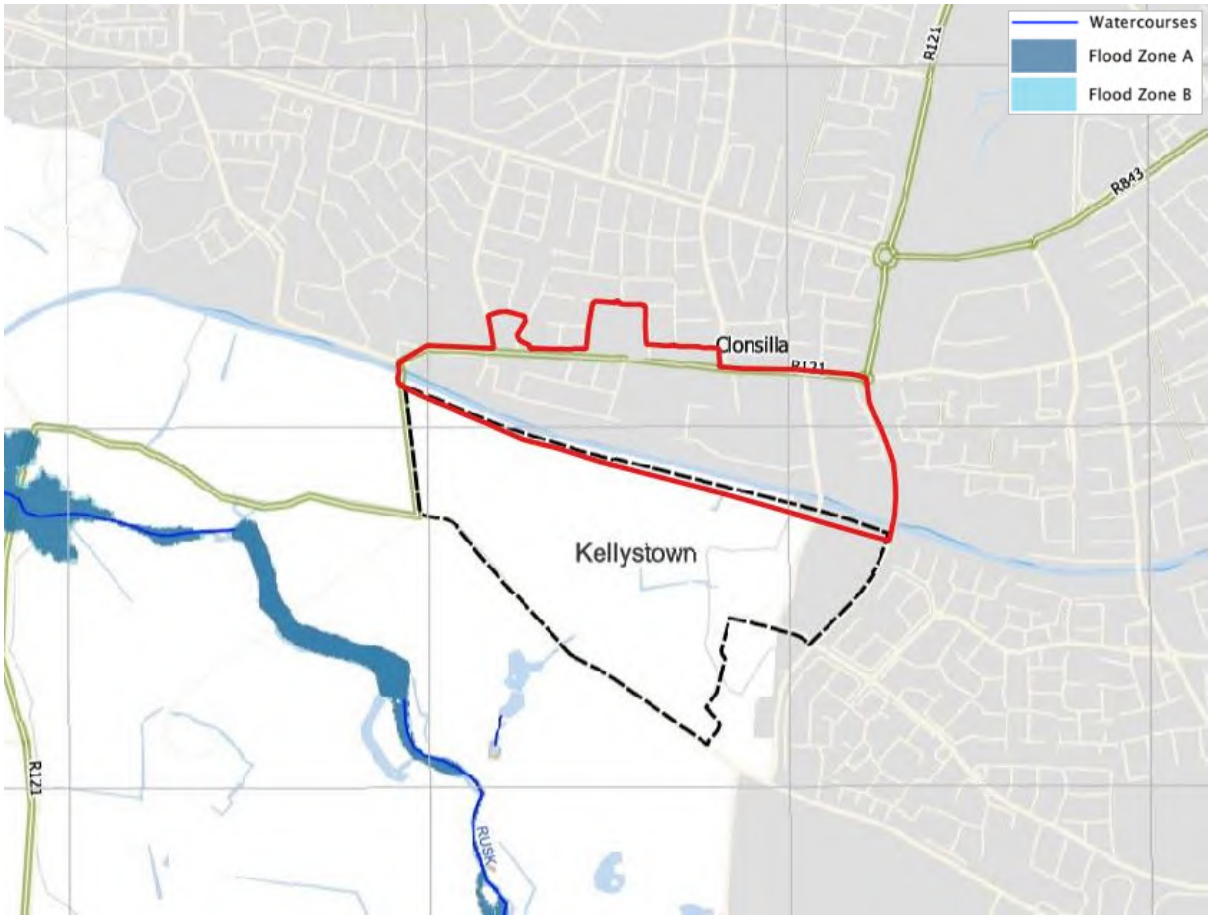
Information Source	Year Published	Findings	Relevant?
Fingal East Meath Flood Risk Assessment and Management Study (FEM FRAMS)	2010	The Plan Area is not included in FEM FRAMS flood mapping.	No
Catchment Flood Risk Assessment and Management (CFRAM) Study	2015 / 2016	The Plan Area is not included in CFRAM fluvial or coastal flood maps.	No
GSI Groundwater Flooding	2020	GSI historic groundwater flood extent mapping indicates that the Plan Area is not at risk of groundwater flooding.	No
National Indicative Fluvial Mapping (NIFM)	2021	The Plan Area and surrounding lands are not covered by NIFM flood maps.	No
National Coastal Flood Hazard Mapping (NCFHM)	2021	The Plan Area is not covered by NCFHM flood mapping as it is not in an area affected by coastal flooding	No
Strategic Flood Risk Assessment for the Fingal Development Plan 2023-2029	2023	SFRA Flood Zone mapping does include the Plan Area.	Yes – refer to Section 4.2.1

4.2.1 Strategic Flood Risk Assessment for the Fingal County Development Plan

Flood Zone mapping was produced as part of the Fingal SFRA, an extract of which is shown in Figure 4.1. The full SFRA flood map is included in Appendix A.

As shown, the Plan Area is not affected by any fluvial / coastal floodplain and as such, lies wholly in Flood Zone C. It is noted that climate change flood maps included in the Fingal SFRA similarly show no flooding of the Plan Area.

Figure 4.1: Extract from Fingal SFRA Flood Zone Mapping



The Fingal SFRA also includes the following guidance considered pertinent to this SFRA:

- Flood Zones represent flood extents for the existing, undefended present day scenario (i.e., without inclusion of climate change allowance or flood defences).
- Climate change projections are to be applied depending on the receptor vulnerability; HEFS is to be considered for 'highly vulnerable' development and MRFS is to be considered for 'less vulnerable' development.
- A key mechanism for providing flood protection and resilience is the setting of Finished Floor Levels (FFLs) and Finished Ground Levels (FGLs).
- In accordance with the OPW Guidelines, access to and egress from any development should be within Flood Zone C (i.e., outside the 0.1% AEP fluvial / coastal floodplain). Where this is not achievable due to on-site or off-site flood risk, a Flood Management Plan for the development will be required.
- Surface water management is to be provided using SuDS principles and components to ensure drainage from development is managed sustainably and contributes to water quantity and quality improvements as well as contributing to amenity and biodiversity.

4.3 Secondary Sources of Flood Risk Information

Table 4.2 lists secondary sources of flood risk information and indicates whether they are relevant to this SFRA. Sources deemed relevant are discussed further in this section.

Table 4.2: Secondary Sources of Flood Risk Information

Information Source	Year Published	Findings	Relevant?
Internet Background Search	N/A	An internet background search including online news articles and other media found no evidence of flooding within the Plan Area.	No
Past Flood Events Mapping	Updated on Ongoing Basis	The OPW's 'Past Flood Events' mapping / database includes one record of historic flooding c. 300 m west of the Plan.	Yes – refer to Section 4.3.1
Topographical Data	2011	OPW LiDAR data is available via the online GSI Open Topographic Data Viewer	Yes – refer to Section 4.3.2
Arterial Drainage Scheme Benefitting Lands	N/A	The Plan Area is not shown to be within an area of benefitting lands.	No
Drainage District Benefitting Lands	N/A	The Plan Area is not shown to be within an area of lands benefitting from any Drainage District.	No
Flood Relief Schemes	N/A	There are no existing or proposed Flood Relief Schemes in the vicinity of the Plan Area	No
Former Local Area Plans (LAPs)	N/A	There are no former LAPs for the Plan Area.	No
Greater Dublin Strategic Drainage Study (GDSDS)	2005	The GDSDS describes foul and surface water drainage systems in Fingal and includes references to Clonsilla.	Yes – refer to Section 4.3.3
Ordnance Survey Ireland (OSI) and Environmental Protection Agency (EPA) Mapping	N/A	The Royal Canal runs along the southern boundary of the Plan Area. Inundation of surrounding lands is possible in the event of overtopping or failure of the embankments. Several lakes / impounded reservoirs were identified at Luttrellstown Golf Course. Given that these lakes lie at significantly lower ground than the Plan Area (c. 8-10 m lower), there would be no risk of flooding in the event of an uncontrolled release of water.	Yes – refer to Section 4.3.4
Walkover Survey	N/A	A site walkover survey was carried out by McCloy Consulting Ltd. on 28th April 2021.	Yes – refer to Section 4.3.5

4.3.1 Past Flood Events

4.3.1.1 Fingal CC Records

Fingal CC have provided records of previous flood events in the Plan Area, summarised as follows:

- Flooding at The Village, Porterstown due to blocked manhole on 23rd January 2024. Event caused flooding of residential properties in the area.

No further past flood event records were provided.

4.3.1.2 OPW 'Past Flood Events' Mapping

The OPW's 'Past Flood Events' mapping / database provides records of historic flooding and includes flood reports, news articles, photographs, council meeting minutes, and other archived documents. It is noted that not all past events have been included in this dataset.

A past flood event (ID-1692) was recorded on 5th November 2000 at Porter's Gate c. 300 m west of the Plan Area, as shown in Figure 4.2. Council minutes of a meeting from 9th December 2002 states that the flood event affected houses and gardens and that the problem at this location was considered as part of the GDSDS, which was being undertaken at the time.

However, there is no record of flooding within the Plan Area.

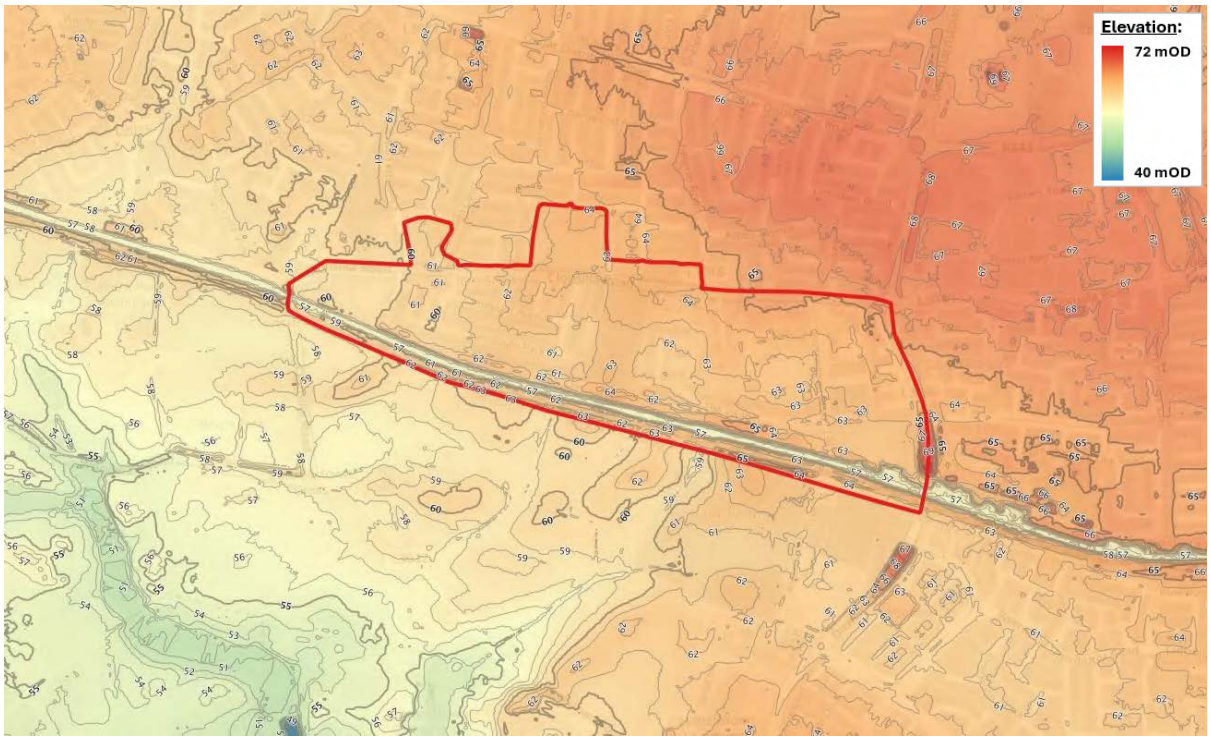
Figure 4.2: OPW 'Past Flood Events' Mapping

4.3.2 Topographical Data

The topography of the Plan Area and surrounds, based on OPW 2 m LiDAR data, is shown in Figure 4.3. Existing ground levels within the Plan Area range from c. 57 to 66 mOD, falling generally from east to west. There are no significant localised depressions within the Plan Area.

Lands to the south and west of the Plan Area are at a similar or lower elevation. Surface water runoff from these areas would therefore not flow towards the Plan Area. Lands to the north and east of the Plan Area are at similar or higher elevations and may contribute overland flow towards part of the Plan Area.

Figure 4.3: Topography of Plan Area and Surrounding Areas



4.3.3 Greater Dublin Strategic Drainage Study

The Greater Dublin Strategic Drainage Study (GDSDS) was commissioned in 2001 to carry out a strategic analysis of the existing foul and surface water systems in the local authority areas of Greater Dublin (including Fingal CC) and adjacent catchments. The objectives of the Study were to identify policies, strategies and projects for the development of a sustainable drainage system for the Greater Dublin Region.

The GDSDS report does contain information relating to drainage in the Clonsilla area. Clonsilla is noted as being served by the 9C (foul) trunk sewer while the majority of the separate sewers serving the Plan Area discharge to the River Tolka be gravity. Despite this, it has been reported that there is a large storm flow response in the foul network (draining to the 9C trunk sewer).

No further details relating to Clonsilla are included in the GDSDS report.

4.3.4 Royal Canal

As presented in Section 2.4, the Royal Canal runs along the southern boundary of the Plan Area. Where the canal sits higher than adjacent ground, inundation of surrounding lower-lying lands would be possible in the event of overtopping or failure of the embankments.

4.3.5 Walkover Survey

A walkover survey of the Plan Area and adjacent lands was carried out by McCloy Consulting Ltd. In February 2024. The purpose of the walkover survey was to ground truth desktop study findings, verify gaps in data, and identify the need for further surveying.

The Plan Area was noted to primarily comprise existing residential development with associated commercial and educational buildings. Green space within the Plan Area generally comprises amenity space within residential areas.

Observations relating to flooding and surface water drainage during the visit are summarised as follows:

- No open watercourses or surface water channels were observed.
- The Royal Canal was noted to be lower than surrounding areas.
- No evidence of flooding was found within the Plan Area.

4.4 Summary

In accordance with the OPW Guidelines, all available sources of flood risk information have been reviewed with the purpose of identifying any potential sources of flood risk to the Plan Area. The findings of the Stage 1 assessment indicate that lands within the Plan Area may be at risk of pluvial flooding and that the possibility of inundation from the Royal Canal should be further investigated. Therefore, in accordance with the OPW Guidelines, a Stage 2 flood risk assessment has been carried out for the Plan Area and is presented in Section 5 of this SFRA.

5 STAGE 2 – INITIAL FLOOD RISK ASSESSMENT

5.1 Preamble

This section is intended to form a Stage 2 assessment of flood risk by confirming the sources of flooding that may be significant or possibly significant to the Plan Area, appraising the adequacy of existing flood risk information, and determining whether further assessment is required. The Stage 2 assessment is based on the flood risk information reviewed as part of the Stage 1 assessment presented in Section 4.

5.2 Initial Assessment

Table 5.1 presents an initial assessment of sources of flooding that may be significant or possibly significant to the Plan Area and determines whether further assessment is required.

Table 5.1: Significance of Sources of Flooding to the Plan Area

Source of Flooding	Significant?	Reason	Assess Further?
Fluvial flooding	No	There are no watercourses or open channels within or directly adjacent to the Plan Area. OPW and Fingal CC flood mapping indicates that the Plan Area is not affected by fluvial flooding.	No
Coastal flooding	No	The Plan Area is not in an area affected by coastal flooding.	No
Pluvial / surface water flooding	Yes	Topographical data indicates that areas within the Plan Area may be at risk of pluvial flooding.	Yes – refer to Section 5.3
Urban drainage flooding	Possible	Fingal CC records indicate flooding from urban drainage has occurred within the Plan Area.	Yes – refer to Section 5.5
Groundwater flooding	No	GSI groundwater flood mapping indicates that the Plan Area is not affected by groundwater flooding.	No
Flooding from artificial sources (e.g., impoundments)	Possible	The Royal Canal runs along the southern boundary of the Plan Area. Where the canal sits higher than adjacent ground, inundation of surrounding lower-lying lands is possible in the event of overtopping or failure of the embankments.	Yes – refer to Section 5.4

5.3 Pluvial / Surface Water Flooding

5.3.1 Pluvial Flooding to the Plan Area

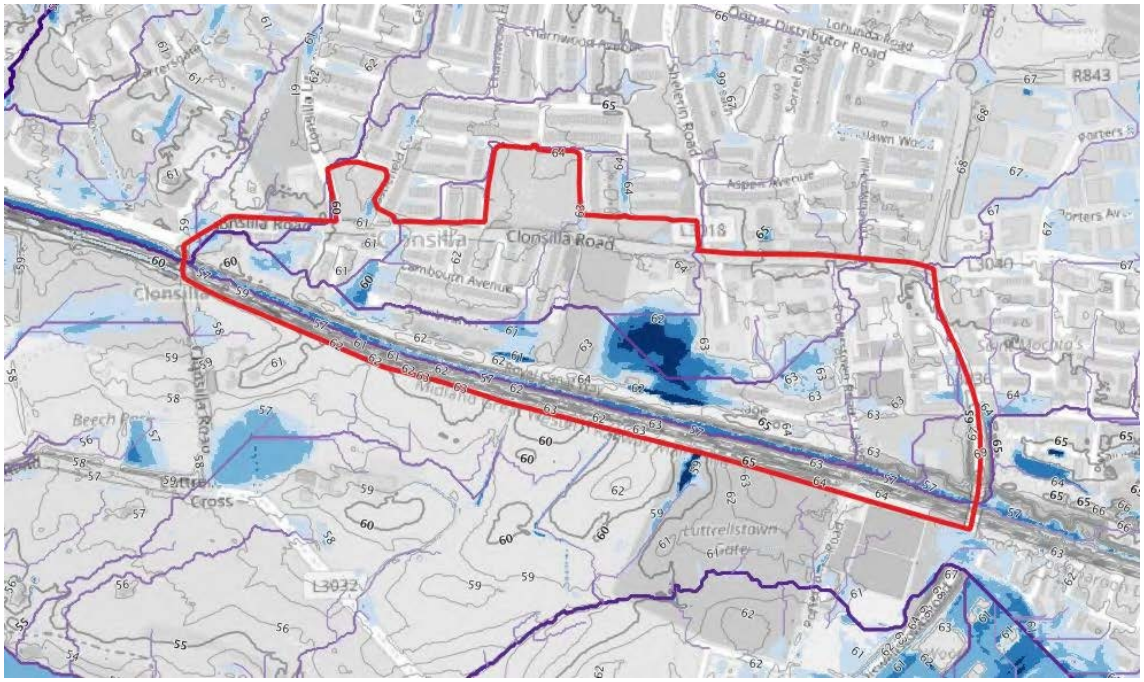
Topography (as shown in Figure 4.3) indicates that the Plan Area may be affected by pluvial flooding from both off-site and from rainfall within the Plan Area.

A site-specific analysis of possible surface water flooding at the site has been undertaken. The refined analysis identifies relative depressions and flowpaths based on a GIS Rho-8 flow accumulation analysis to identify likely surface water flow routing. The analysis is based on relatively close resolution OPW 2 m LiDAR height data.

The outcome is shown on Figure 5.1 (flow paths shown in purple) with a primary flow path across the Plan Area from east to west coinciding with a significant area of surface water ponding at the western end of The Village. Other flow paths and areas of ponding are apparent across the Plan Area.

Surface water flood risk to existing development is managed by local urban drainage (refer to Section 5.5). Future development should consider pluvial flows from adjacent lands as part of an appropriate SuDS drainage scheme.

Figure 5.1: Height Data Depression Analysis



5.3.2 Pluvial Flooding from the Site

With any future development, the Plan Area may be subject to an increase in impermeable area (i.e., roofs and hardstanding) and therefore has the potential to cause an increase in flood risk elsewhere if surface water discharge is not adequately managed.

Residual impact of surface water to future development and off-site receptors should be mitigated through an effective surface water drainage network and surface water management. In line with the Fingal SFRA, surface water drainage should follow and implement SuDS principles that integrates multi-functional SuDS components within the Plan Area to manage water at or near the surface in a way that provides maximum water quantity, water quality, amenity, and biodiversity benefits.

5.4 Royal Canal

The Royal Canal extends 146 km from Dublin to the River Shannon. It rises through a series of locks, reaching its peak level near Mullingar before descending to join the Shannon at Richmond Harbour. Work on constructing the canal was completed in 1817. The canal was closed in 1961 and, following extensive restoration work, was reopened in 2010 for navigation.

Waterways Ireland is the cross-border navigation authority responsible for the management, maintenance, and development of seven inland navigable waterways, including the Royal Canal. Water levels in the canal are controlled, and the infrastructure is subject to regular monitoring and maintenance by Waterways Ireland.

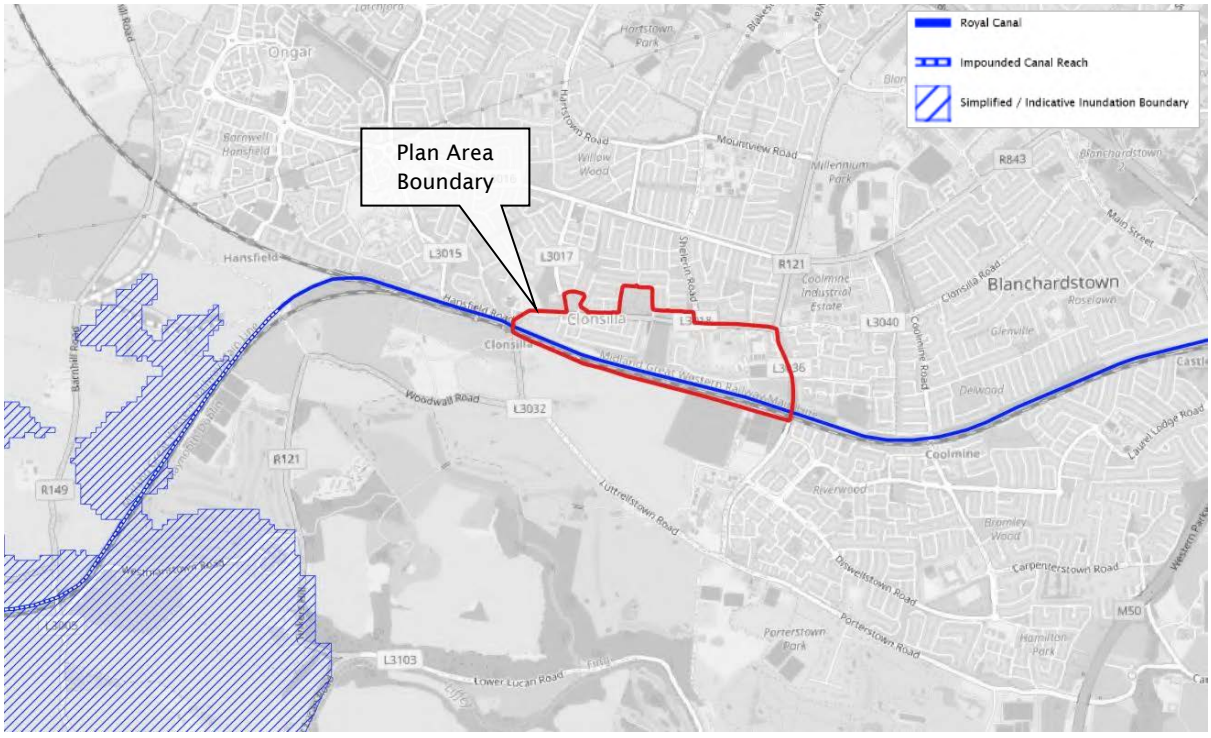
The Royal Canal sits lower than the surrounding ground for most of its length through Fingal. A stretch of canal, approximately 2.5 km from Westmanstown to the Co. Kildare border, sits higher than the surrounding ground. In the event of overtopping or failure of the embankment along this stretch of canal, floodwater would pose a risk to the surrounding, lower-lying land.

While not a matter for determination of Flood Zones, the potential risk of flooding due to canal / impoundment breach has been considered as part of this assessment. The scope or remit of this SFRA does not extend to inundation modelling. A simple and rationalised assessment has been undertaken to determine lands on flow paths and elevations where floodwater could tend to flow onto in the event of a breach of the impoundment.

Figure 5.2 shows the Royal Canal, highlighting the extent where the waterbody is impounded where local topography generally falls towards the River Liffey. South of the canal, a simplified inundation extent is determined by a "water drop" flow path and catchment analysis between upstream and downstream impounded limits. Height data is limited to OSI 25 m height data. North of the canal, a simplified flood extent is determined based on all adjacent land that is impounded by the canal up to the estimated water level (56.5 mOD).

The Royal Canal sits at lower elevations than the Plan Area at that location, and the Plan Area is not within the indicative possible inundation area determined and shown in Figure 5.2.

Figure 5.2: Possible Inundation Area of the Royal Canal



5.5 Urban Drainage Flooding

Flooding from urban drainage networks has the potential to cause a significant risk to developed areas where extreme rainfall can overwhelm drainage network capacity. As stated in Section 4.3.1.1, properties within the Plan Area have been affected by flooding from urban drainage.

The capacity of urban drainage networks in areas where issues are identified should be considered and maintenance continued / undertaken where there is adequate capacity. Future development should be drained using SuDS in manner that does not increase the risk of flooding from existing urban drainage networks.

5.6 Summary

The findings of the Stage 2 assessment presented in this section indicate that lands within the Plan Area are not at significant risk of flooding from any source. Therefore, in accordance with the OPW Guidelines, no detailed stage 3 assessment needs to be carried out for the purposes of this SFRA.

Given that no fluvial or coastal flood risk has been identified at the Plan Area, the Plan Area is wholly located in Flood Zone C and future development of any vulnerability classification (as defined in the OPW Guidelines) would be considered 'appropriate'.

Residual impact of surface water to future development and off-site receptors should be mitigated through an effective surface water drainage network and surface water management.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary

This SFRA report has been prepared in accordance with the OPW Guidelines and provides Stage 1 and 2 assessments of all sources of flood risk within the Plan Area to assist Fingal CC in making informed strategic decisions in relation to the future development of the Plan Area.

In achieving the aims and objectives of the OPW Guidelines, Fingal CC should:

- Adopt a sequential approach to flood risk management, which aims to avoid flood 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.
- Apply the Justification Test for development in Flood Zones.

No fluvial or coastal flood risk has been identified at the Plan Area. Therefore, in line with the OPW Guidelines and Fingal SFRA, the Plan Area is wholly located in Flood Zone C and is appropriate for development of any vulnerability classification (as defined in the OPW Guidelines).

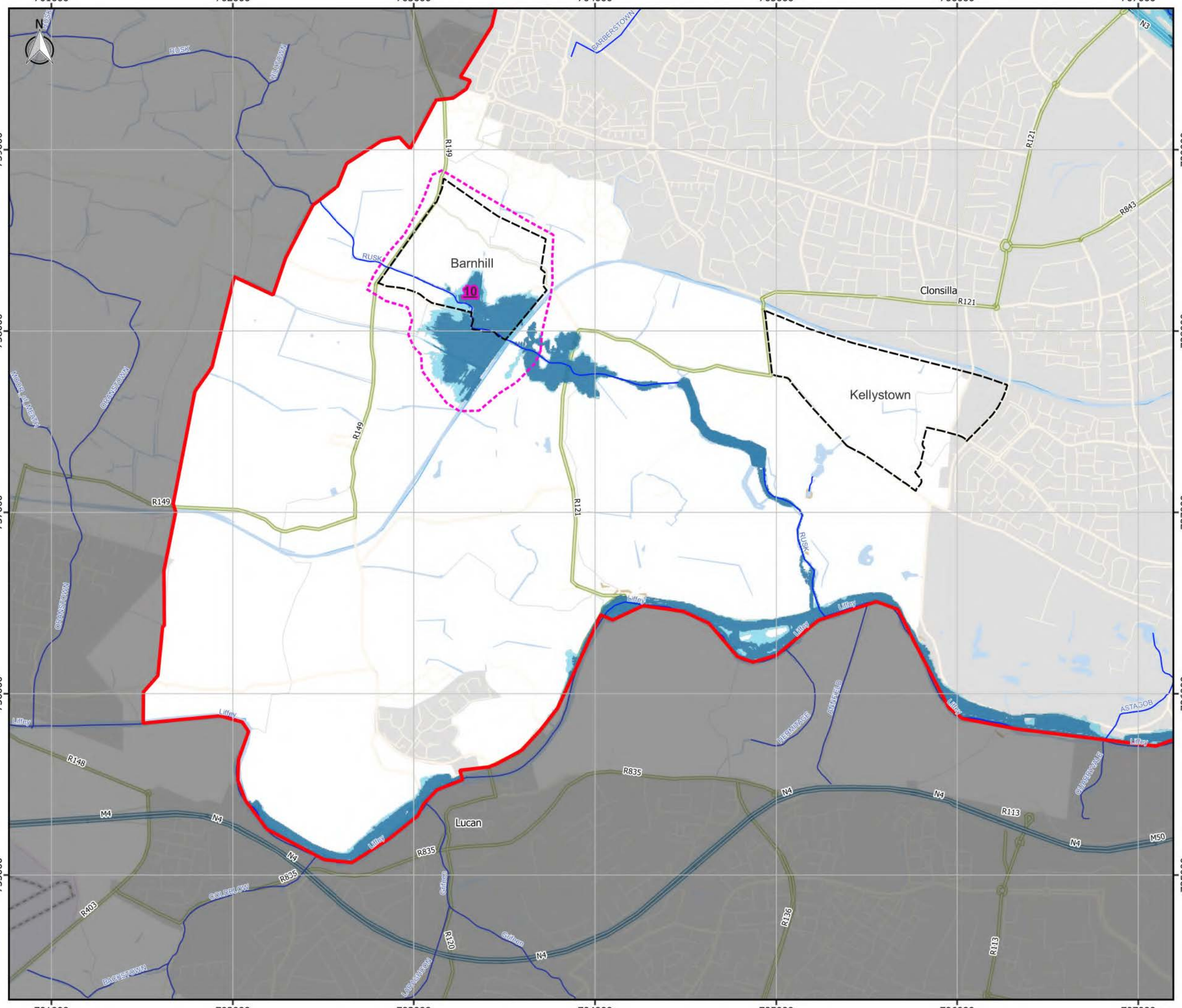
A precautionary approach should also be applied to flood risk management to reflect uncertainties in available flood data, risk assessment techniques, and climate change projections.

6.2 Development Land Use Zoning Appropriateness

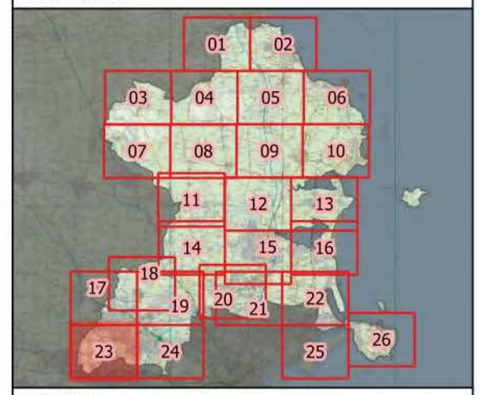
The SFRA will be reviewed and updated every six years in line the County Development Plan review process. Additionally, outputs from future studies and datasets may trigger a review and update of the SFRA during the lifetime of the 2023-2029 Fingal Development Plan. With regard to climate change, the OPW is currently transitioning to regional-based climate models that reflect the likely varied impacts across the island of Ireland. This is likely to be implemented during the lifetime of the 2023-2029 Fingal Development Plan. Proposed developments for the Plan Area should take account of the most up to date OPW guidance on climate change as part of SSFRAs.

Appendix A

Fingal CC Flood Mapping



KEY PLAN



LEGEND

- Fingal County Administrative Boundary
- Watercourses
- LAP & Masterplan Boundaries
- Flood Zone A
- Flood Zone B
- Defended Areas
- Area for Further Consideration

REV:	NOTE	DATE:
03	DRAFT ISSUE	22/02/2022

Comhairle Contae Fhine Gall
Fingal County Council

McCloy Consulting
Unit 12, The Beat Centre, Stephenstown Industrial Estate, Balbriggan, Co. Dublin
T: +353 (0)1 5138963
E: info@mccloyconsulting.ie
W: www.mccloyconsulting.ie

MAP:	FLOOD ZONE MAP	
FLOOD PROBABILITY:	FLUVIAL: 1% / 0.1%	COASTAL: 0.5% / 0.1%
SOURCE CRS:		ITM EPSG:2157
DRAWN BY:	DL	DATE: 22/02/2022
CHECKED BY:	PS	DATE: 22/02/2022
APPROVED BY:	DKS	DATE: 22/02/2022
DRAWING NUMBER:	M02127-06_FIG_FL123	
MAP SERIES:		PAGE 23 OF 26
DRAWING SCALE:		1:20000 @ A3