

Whitestown Way, Tallaght

Site Specific Flood Risk Assessment

240192-X-X-X-XXX-RP-DBFL-CE-0002

May 2026

Project Title:	Whitestown Way, Tallaght		
Document Title:	Site Specific Flood Risk Assessment		
File Ref:	240192-X-X-X-XXX-RP-DBFL-CE-0002		
Status:	P3 - Planning	Rev:	1
	S - Issued		

Status	Rev.	Date	Description	Prepared	Reviewed	Approved
P1	0	13/02/26	Stage 2 Submission	Maria Doyle	Noel Gorman	Noel Gorman
P1	1	15/05/26	Stage 3 Submission	Maria Doyle	Noel Gorman	Noel Gorman

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1 Introduction

1.1 Background

DBFL Consulting Engineers were commissioned, on behalf of the applicant, ARP 4.2 Sustainable Communities (Ireland) Fund, to prepare a Site Specific Flood Risk Assessment (SSFRA) in support of a planning application for the proposed Whitestown Way large-scale residential development in Tallaght, Dublin 24, within the administrative area of South Dublin County Council (SDCC).

1.2 Location

The subject site has a gross area of 1.32 hectare and is located south of the N81, within Tallaght Business Park Estate. The site is generally bound to the east by Whitestown Way, to the south by Riverside Business Park, to the west by Whitestown Road/Whitestown Industrial Estate and the Vita Actives premises, and to the north by Whitestown Road, the Vita Actives premises and undeveloped land. A site location plan is shown in Figure 1-1 below.

The subject site has been zoned 'REGEN' with the objective of facilitating enterprise and/or residential led regeneration, under the South Dublin County Development Plan 2022-2028.

1.3 Objectives

This report aims to inform the Planning Authority of the flood risk associated with the proposed development of the subject site. The report will assess the site and the development proposal in accordance with the requirements of 'The Planning System and Flood Risk Management - Guidelines for Planning Authorities' and provides the following.

- Confirmation of the site's flood zone category.
- Information to support an informed decision on the planning application in the context of flood risk.
- Appropriate flood risk mitigation and management measures for residual flood risk.

1.4 Flood Risk Assessment Scope

This SSFRA relates only to the application site and utilises the information obtained from various sources, together with assessment of flood risk for the existing land and proposed development. The report follows the requirements of 'The Planning System and Flood Risk Management - Guidelines for Planning Authorities', referred to as 'The Guidelines' for the remainder of this report.

1.5 Approach

- ✓ Chapter 1: This chapter considers 'The Guidelines' as they relate to the proposed application.
- ✓ Chapter 2: 'The Guidelines' as they relate to the proposed application.
- ✓ Chapter 3: Flood risk identification
- ✓ Chapter 4: Initial (non-quantitative) flood risk assessment
- ✓ Chapter 5: Detailed (quantitative) flood risk assessment
- ✓ Chapter 6: Justification Test
- ✓ Chapter 7: Summary and conclusion of Site-Specific Flood Risk Assessment (SSFRA)

1.6 Existing Site

The subject site for this application is located south of the N81. The site is generally bound to the east by Whitestown Way, to the south by Riverside Business Park, to the west by Whitestown Road/Whitestown Industrial Estate and the Vita Actives premises, and to the north by Whitestown Road, the Vita Actives premises and undeveloped land. Locality plan is shown in Figure 1-1 below.



Figure 1-1: Site Location and Stream Network

The topography of the site generally falls from southwest to northeast. Site levels range from between 95.5m and 98m. A localised depression was observed in the northeast corner of the site.

The subject site lies within the Dodder Catchment, "Dodder_SC_010" and drains to the Dodder River, 60m south of the development through a tributary stream, Whitestown Stream. Environmental Protection Agency (EPA) catchments and subcatchments are shown in Figure 1-2 and were sourced from the EPA Maps, which were prepared under the Water Framework Directive (WFD). The Dodder Catchment Flood Risk Management Plan refers to Whitestown Stream as Tallaght Stream, noting that it starts in the Wicklow Mountains, flows north through Tallaght where it joins the River Dodder Main Channel. The stream is approximately 8.2km in length, falls at an average gradient of 1 in 25 and drains a catchment of approximately 12.9km².

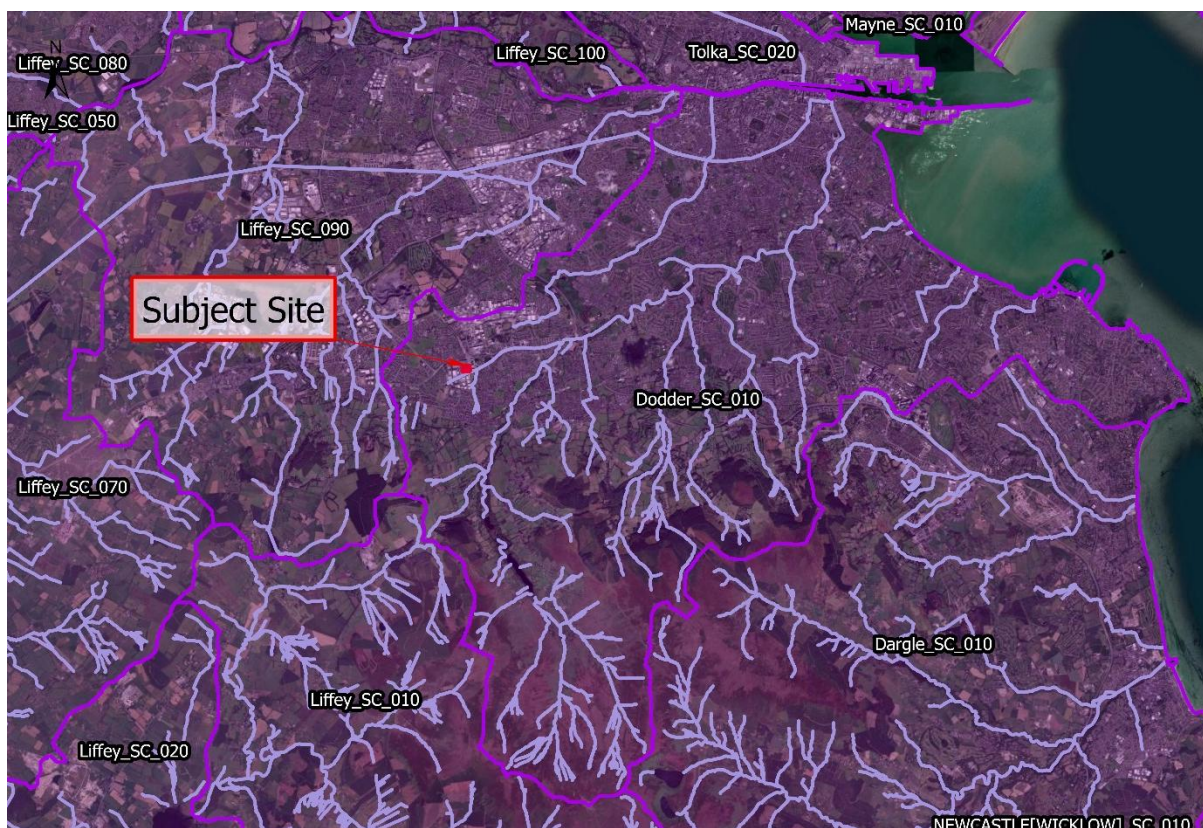


Figure 1-2: EPA Subcatchment Boundaries and Stream Network (WFD)

1.7 Existing Surface Water Network

An extensive surface network serves existing adjacent developments and runs through the site. A trunk 1,050mm surface water sewer runs through the subject site and serves part of the Tallaght Industrial Estate and multiple housing estates north of the N81. A 225mm surface water pipe runs adjacent to the subject site through Whitestown Way from north to south. Both pipes discharge into the Whitestown stream, as shown in Figure 1-3 below.

There are private surface water pipes running through the site from adjacent developments and Whitestown Road. There are 225mm, 300mm, and 675mm surface water pipes running through the site that are proposed to be diverted.



Figure 1-3: Existing Surface Water Outfall Locations

1.8 Proposed Development

The proposed development will consist of the construction of a development comprising 2 no. blocks, ranging in height from 1 to 6 storeys, on a site at Whitestown Way, Tallaght, Dublin 24.

The development will comprise the following: 169 no. apartments (1 beds, 2 beds), 2no. commercial units, and a crèche, with car, cycle and motorbike parking provided at ground level under the proposed podium.

Vehicular access is provided from Whitestown Way and cyclist and pedestrian access is also proposed along the northern boundary of the site as a shared surface linking Whitestown Road and Whitestown Way. All associated site development works and services provision, public and communal open spaces, ESB substations, plant areas, waste management areas, landscaping and boundary treatments are also proposed.

2 Planning Guidelines and Flood Risk Assessment

2.1 General

The Guidelines and their associated Technical Appendices outline the requirements for a Site-Specific Flood Risk Assessment.

The proposed development for this site has been split into two types of developments. The proposed residential building and crèche units are classified as a **“Highly Vulnerable Development”**, according to Table 3.1 of the Guidelines. Therefore, in accordance with Tables 3.1 and 3.2 of The Guidelines, which are shown below in Figure 2-1 and Figure 2-2, the Sequential Approach indicates that this type of development should be located within Flood Zone C; where the probability of flooding from rivers and the sea is low (less than 0.1% AEP (Annual Exceedance Probability) event for both fluvial and coastal flooding). Flood Zone C covers all the area of the plan that lie outside the delineated Zones A or B.

The proposed roadway and retail units are categorised by the Guidelines as **“Less Vulnerable”** development and are considered appropriate to be located within Flood Zones C or B, where the probability of fluvial flooding is moderate. This type of development may also be compatible with Flood Zone A, where the probability of flooding is high, subject to satisfactory performance in a site Justification Test.

Vulnerability class	Land uses and types of development which include*:
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; and 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 (SEVESO sites, IPPC sites, etc.) in the event of flooding.
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; and Local transport infrastructure.
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; and 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 on their own merits

Table 3.1 Classification of vulnerability of different types of development

Figure 2-1: Vulnerability Class of Housing Developments (Table 3.1 of The Guidelines)

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

Figure 2-2: Criteria for the Requirement for a Justification Test

2.2 Flood Risk Assessment Stages

This Site-Specific Flood Risk Assessment will initially use existing available flood risk information to determine the flood zone category of the subject site and to confirm the application of the Sequential Approach in accordance with the Guidelines. Refer to Figure 2-3 for details.

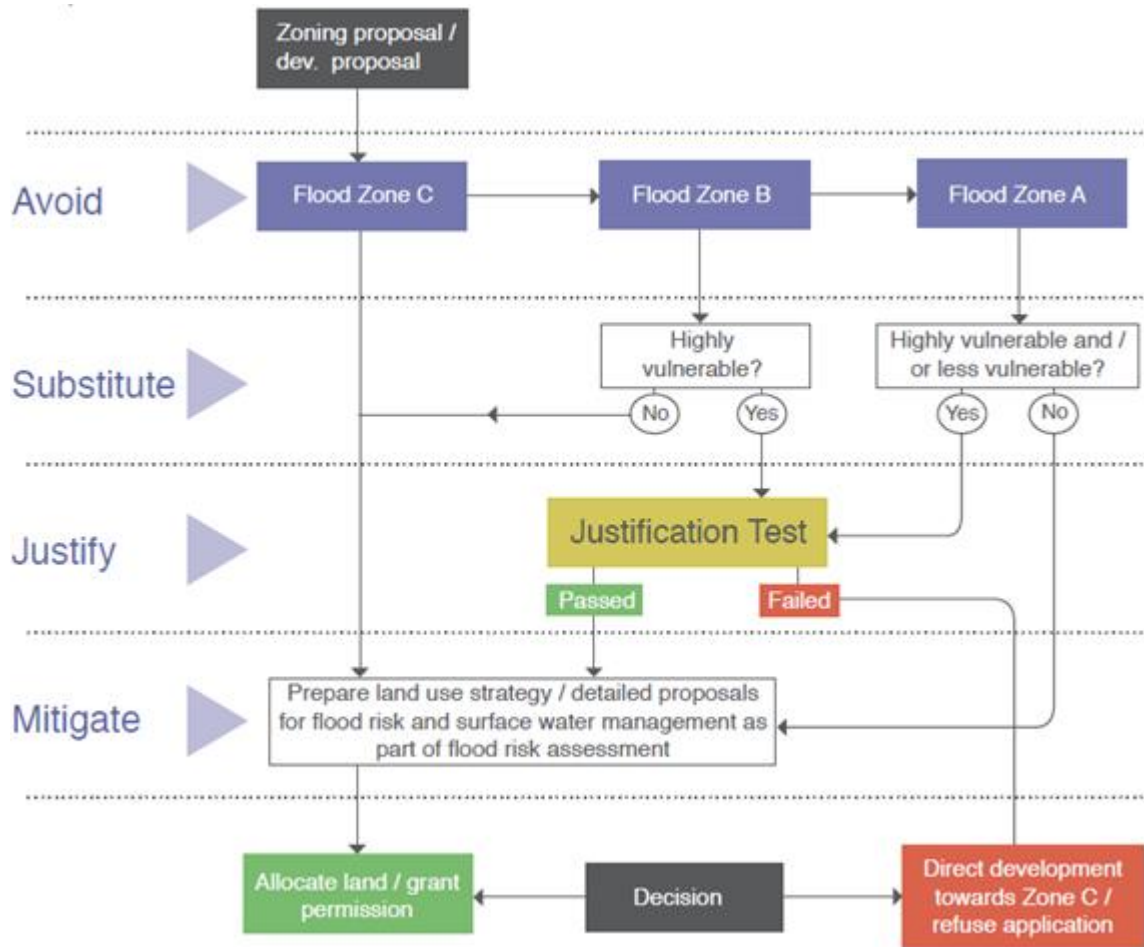


Figure 2-3: Sequential Approach Mechanism for the Planning Process

3 Stage 1: Flood Risk Identification

3.1 General

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

3.2 Available Flood Risk Information

The available flood risk information and data sources for the subject site and surrounding area that were consulted are listed below in Table 3-1.

Table 3-1: Information Sources Consulted

	Information Source	Coverage	Quality	Confidence	Identified Flood Risks	Flood Risk
Primary Data Sources & Modelled Data	OPW CFRAM Fluvial Maps	Regional	High	High	Flood maps indicate that the majority of the development works and site extents are outside the 0.1% AEP flood extents. The southeast corner of the site is shown as being within the 0.1% and 1% AEP flood extents.	✓
	OPW CFRAM Tidal Maps	Regional	High	High	Flood map indicates the site to be outside the 0.1% AEP event coastal flood zone.	✗
	Irish Costal Protection	Nationwide	High	High	Flood maps indicates that the development	✗

	Strategy Study (ICPSS)				site is beyond 0.1% AEP event.	
	SDCC Development Plan Strategic Flood Risk Assessment (SFRA)	Local	High	High	Flood risk at access road at southeastern portion of the site.	✓
Secondary Data Sources	OPW Historic	Nationwide	Varies	Varies	No records of flooding on site	✗
	Historic OSI Maps	Nationwide	Moderate	Low	No records of flooding on site	✗
	EPA Streams	Nationwide	Moderate	Moderate	No designated river/stream within the site	✗
	Drainage Records	County	Moderate	Moderate	Trunk 1050mm diameter Uisce Éireann surface water pipe running through the site.	✗
	Geological Survey Ireland Maps	Nationwide	Moderate	Low	Made Ground	✗

3.3 Identified Flood Risks/Flood Sources

3.3.1 OPW Predicative, Historic & Benefiting Lands Maps & Flood Hazard Information

A review of the OPW website¹ indicates that the site has not experienced any flooding in the past. The flood history report identifies 11 flood events within a 2.5km radius of the site since 2000; however, none of these events are recorded as having impacted the site. Based on the flood report, the nearest recorded flood events, as shown in Figure 3-1, and notable flood events are summarised in Table 3-2 below.

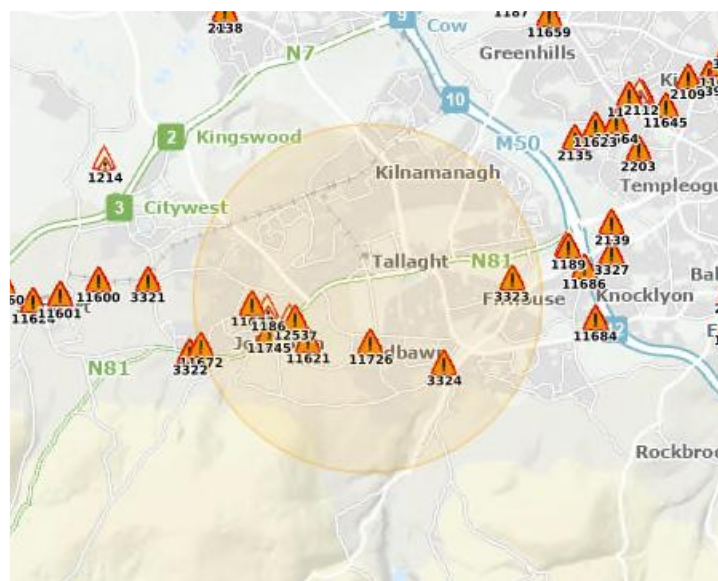


Figure 3-1: Past Flood Events Within 2.5km of the Subject Site

Table 3-2: Past Flood Events Within 2.4km of the Subject Site

Flood Event ID	Description	Max Flood Depth	Proximity to Site
ID-11726	Flooding of a property and road caused by the inundation of surface water drainage.	0.6m	0.6km

¹ www.floodinfo.ie

ID-11621	Flooding caused by runoff from overland flows and overflow from a culverted watercourse adjacent to the area that affected 30-70 properties and nearby roads.	0.2m	1km
ID-11657	Flooding caused by the Camac River overtopping its banks causing 1km of the N81 to be inundated and 110 residential properties. The Camac Flood Alleviation Scheme is currently ongoing.	1.2m	1.1km
ID-1253	Persistent flooding of the Killinarden Stream at N81 in Jobstown.	-	1.1km

Therefore, historical flood hazard information presents very low additional inherent flood risks to the development and shall not be investigated further.

3.3.2 Fluvial Flooding Risk

As part of the EU Floods Directive, the OPW is undertaking a Catchment Flood Risk Assessment and Management (CFRAM) Study. An initial part of this Study was a national Preliminary Flood Risk Assessment (PFRA) to identify areas at risk of significant flooding. The PFRA report and maps identify areas deemed to be at risk of flooding (referred to as Areas for Further Assessment, or 'AFAs'), as they require more detailed assessment on the extent and degree of flood risk by the later CFRAM Studies.

The majority of the subject site is beyond the fluvial flood extents of the 0.1% AEP event. This indicates that the site is in Flood Zone C. A small portion on the eastern boundary of the subject site is within the 0.1% and 1% AEP flood extents, which indicates that these areas are within Flood Zone B and A respectively. The current scenario flood risk maps are reproduced in Figure 3-2 below and Appendix A.



Figure 3-2: CFRAM Current Scenario 10-Year, 100-Year and 1000-Year Flood Extents

3.3.3 Dodder Catchment Flood Risk Management Plan

RPS was appointed by the OPW, Dublin City Council (DCC), Dun Laoghaire Rathdown County Council (DLRCC), and SDCC to work on the Dodder CFRAM Study with flood maps published in 2010.

According to this study done by RPS, the River Dodder has a history of flooding and is known as a "flashy" river with a quick response to rainstorms. This is largely due to its source being in the Dublin mountains which provides it with a steep gradient and periods of high rainfall. The Tallaght Stream (also known as the Whitestown Stream) has a significantly wide riparian strip along the stream reducing potential property damage during flood events. Flooding along Whitestown Stream can be attributed to a combination of insufficient channel capacity and insufficient bridge/culvert conveyance capacity. Flooding generally overtops the riverbanks during the 1% and 0.1% AEP events. A portion of the subject site is located within the extents of the 1% and 0.1% AEP events, as shown in Figure 3-3 below.

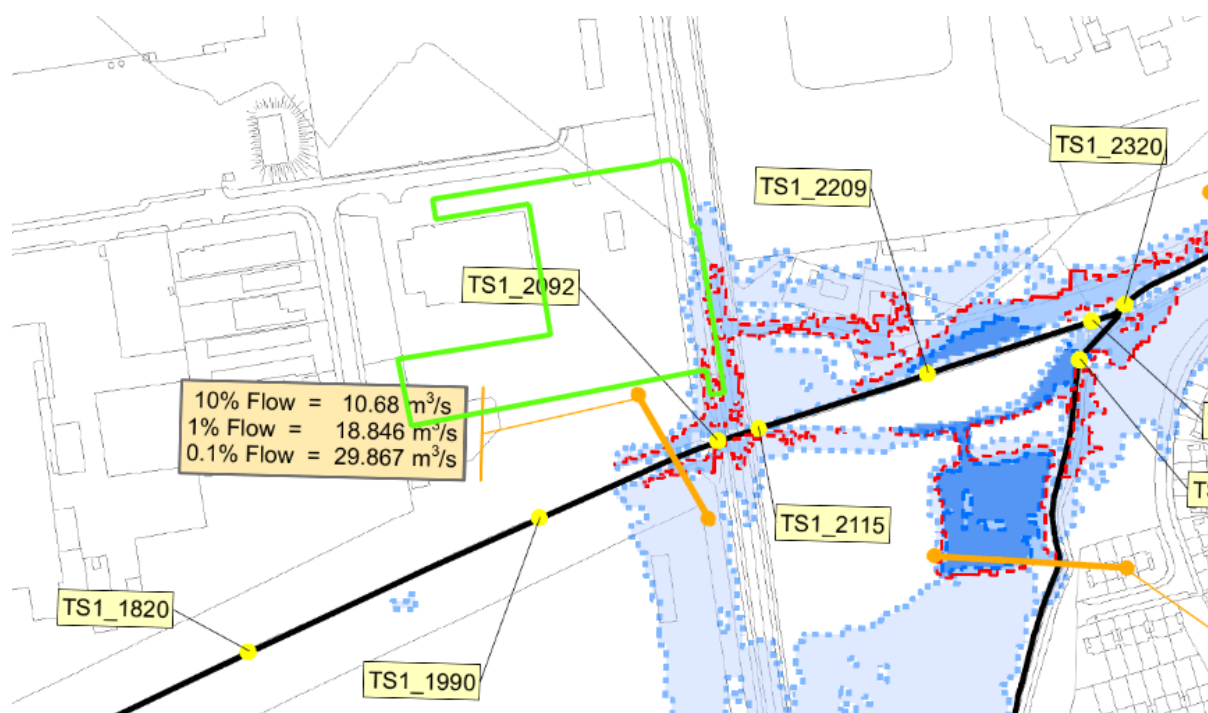


Figure 3-3: Dodder Catchment Flood Risk Assessment and Management Study Flood Extents

3.3.4 Tallaght LAP Strategic Flood Risk Assessment

SDCC appointed a consultant to undertake a Strategic Flood Risk Assessment for the Tallaght LAP in 2020. It is noted in this report that the Tallaght Stream, modelled as part of the Eastern CFRAM Mapping, did not show flooding to properties during the 1% AEP event but that some areas in Tallaght had flooding in October 2011 due to heavy rainfall. After the October 2011 event occurred, additional maintenance was proposed for several culverts on the Tallaght Stream to reduce risk of flooding. It highlighted that the main flood risk for the area is the Tallaght Stream.

3.3.5 Tidal Flooding Risk

The OPW completed the Irish Coastal Protection Strategy Study (ICPSS) in 2013, which provides strategic current scenario and future scenario (up to 2100) coastal flood hazard maps and strategic coastal erosion maps for the national coastline. The OPW undertook a National Coastal Flood Hazard Mapping (NCFHM) project in 2021, which aim was to produce updated national scale coastal flood extent and depth maps for various AEP events. The subject site is outside the extents of the mapped coastal/tidal flood zones identified in these studies, and, therefore, will not be considered further in terms of flood risk.

3.3.6 Other Sources

Additional information sources were consulted to identify any further potential flood risk to the subject site. These sources are listed in Table 3-3 below.

Table 3-3: Other Sources Consulted to Assess the Flood Risk to the Subject Site

Source	Findings
Topographical surveys of the area	No evidence of flooding based on topography.
Flood defences information	No flood defence information available.
Soil data from EPA and GSI	Subsoils identified as Made Ground.
Groundwater information from GSI	No karst features or gravels identified in the site. Groundwater vulnerability is classified as Low and the bedrock aquifer is a locally important bedrock aquifer. See Figure 3-4 below.
Site Investigation Report	No evidence of flooding within the site. Groundwater was found at depths ranging from 1.08 to 4.5 mBGL.
Walkover survey	No evidence of flooding within the site.
Development Plan & Local Area Plan	Lands are zoned for mixed-use development.
Local information & local authority consultation	A news article from October 2011 states that a manhole cover lifted at the Maldron Hotel at the N81/Whitestown Way, which is approximately 150m from the subject site. No evidence of flooding within the site.
Historical maps	No evidence of flooding within the site.
Aerial maps	No evidence of flooding within the site.



Figure 3-4: Karst Landforms and Groundwater Vulnerability at the Subject Site

3.4 Source-Pathway-Receptor

A Source-Pathway-Receptor model has been developed to identify the potential sources of floodwater, receptors that may be affected (including the people, property, and infrastructure associated with the proposed development), and the pathways through which floodwater may spread during 0.1% AEP (1000-year) and 1% AEP (100-year) storms events. The analysis, summarised in Table 3-4 below, assesses the likelihood and magnitude of each flooding source, the performance and response of the associated pathways, and the resulting consequences for receptors in the context of the proposed development. The identified sources, pathways and receptors are assessed further in Section 4

Table 3-4: Source-Pathway-Receptor Analysis

Source	Pathway	Receptor	Likelihood	Consequence	Risk
Tidal	Tidal flooding from coast (approximately 12km away), with the site at 96m AOD	Subject development	Remote	Low	Very Low
Fluvial	Flooding from surcharged Whitestown Stream 60m south of the subject site.	Subject development	Possible	Medium	Moderate
Surface Water Drainage (Pluvial)	Flooding from development's surcharging drainage systems	Subject development	Possible	Medium	Low
Groundwater flooding	Rising groundwater level (GWL) on the site	Site area	Low	Low	Very Low
Human or Mechanical Error (Pluvial)	Blockage of new surface water drainage network	Areas of development draining to the surface water network	Possible	Medium	Low

The Source-Pathway-Receptor model identified a potential risk of fluvial flooding from the Whitestown Stream, and pluvial flooding associated with the proposed site drainage in the future.

In particular, surface water run-off from the site has the potential to pose a localised flood risk if the downstream drainage network and ditches are not designed and constructed in accordance with the regulations, including the Greater Dublin Strategic Drainage Study (GDSDS), and does not adequately account for flood exceedance events, defined as storm events greater than the 1% AEP, where the capacity of the drainage network may be exceeded.

3.5 Summary

In summary, from the source-pathway-receptor model, the flood risks are as follows:

- The proposed development is considered to be at **negligible risk** from tidal flooding.
- There is **low risk** of fluvial flooding to the proposed buildings within the development with the current proposals locating all the buildings to be **outside Flood Zone C**. There is a **moderate risk** of fluvial flooding to the proposed access road due to a small portion of the access road being **within Flood Zone A and B**.
- There is a **very low** likelihood for groundwater flooding, with the possibility of groundwater rising above the ground levels being considered as low.
- There is a **low risk** of pluvial flooding and infrastructure flooding with a potential for surcharge to occur during exceedance events and or in the event of blockage within the proposed drainage network, where a storm exceeds the drainage network's design capacity.

4 Stage 2: Initial Flood Risk Assessment

4.1 Initial Fluvial Flood Risk Assessment

The CFRAM flood extents map identified that most of the site is within Flood Zone C, which is classified as low risk of fluvial flooding up to the 1% AEP event, as shown in Appendix A . All portions of the site where buildings are proposed are within Flood Zone C.

A small portion of the subject site, located in the eastern area at the site access road, is shown on CFRAM flood extents mapping to be within Flood Zone A and B due to fluvial flooding from the Whitestown Stream. The cause of this flooding is assumed to be due to insufficient channel capacity and insufficient bridge conveyance capacity at the culvert under Whitestown Way, as shown in Figure 4-1 below. There is a weir located upstream of this culvert.

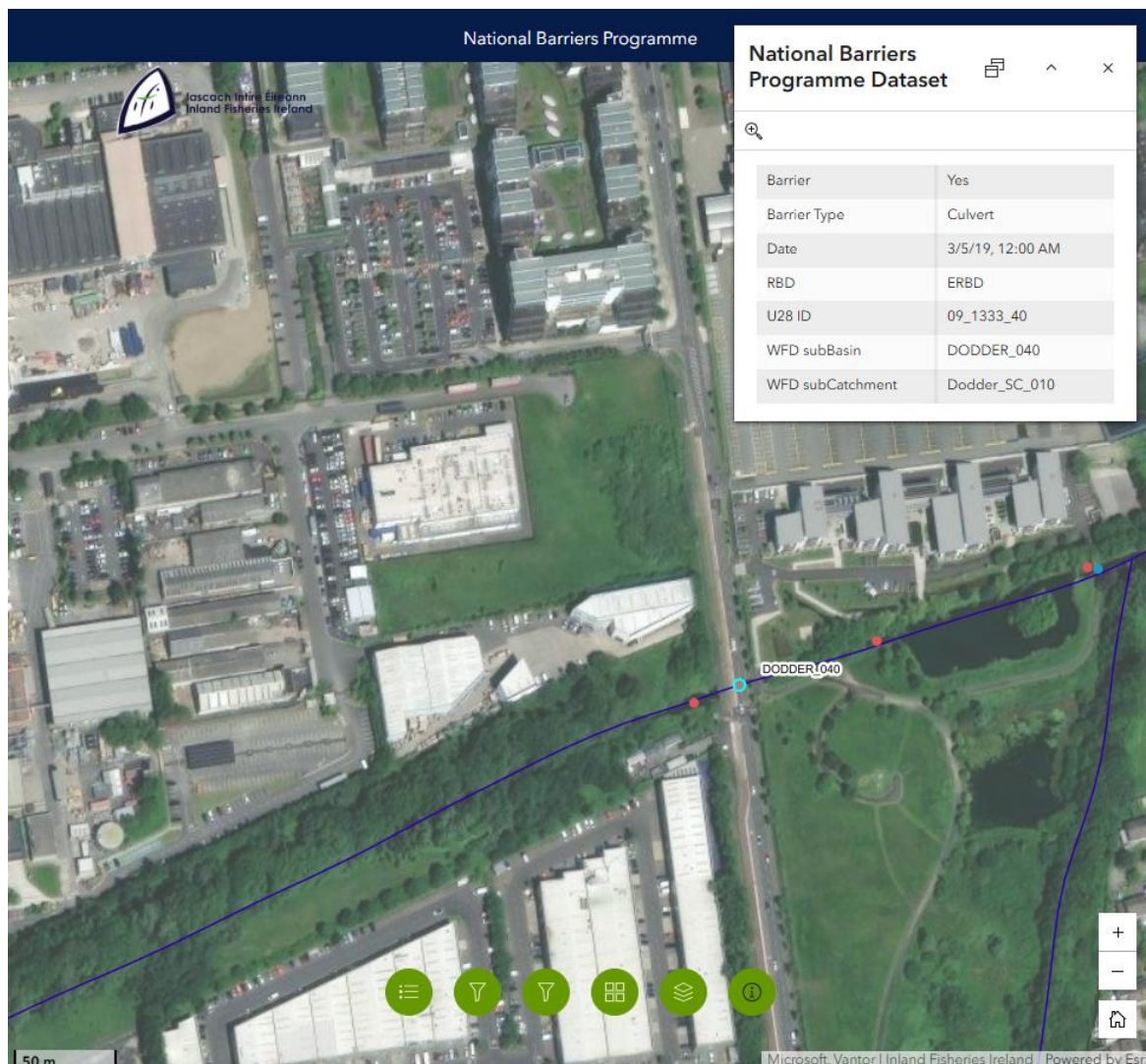


Figure 4-1: Fisheries Ireland Portal Indicating the Presence of a Culvert Conveying Whitestown Stream Under Whitestown Way

The Dodder Catchment Flood Risk Assessment and Management Plan flood extent maps for the current scenario are found in Figure 3-3 and Appendix A. Water levels and flood extents are provided on the mapset. The extents of the 100-year and 1000-year flood events are within the subject site boundary. Node TS1_2092 is upstream of a bridge that crosses Whitestown Way over Whitestown Stream. The water level at this node is 96.09m in the 100-year event and 96.35m in the 1000-year event.

Flood depth mapping and fluvial flood extents incorporating climate change allowances are not available for the Whitestown Stream in this location. The Tallaght LAP SFRA requires Finished Floor Levels (FFLs) to be set above the 1% AEP fluvial flood level, with an allowance for climate change and freeboard. The SFRA states that the 0.1% AEP flood extents can be substituted to represent the 1% AEP plus climate change event. A freeboard allowance of 300mm to the 0.1% AEP has been applied for this development, which is in line with The Guidelines. Given the absence of 1% AEP plus climate change flood extents, the FFL is set 300mm above the 0.1% AEP water level of 96.35m. This complies with the GSDSDS requirement that FFLs should be set 500mm above the 1% AEP flood level, which results in a recommended minimum FFL of 96.59m. The FFL is set at 96.65m to comply with both the GSDSDS and the LAP SFRA.

Node (TS1_2092) is directly upstream of the culvert under Whitestown Stream, and there is another node directly downstream of the culvert (TS1_2115). Table 4-1 summarises the modelled water levels and assumed flood depths at the inlet and outlet of the culvert for the 100-year event.

Table 4-1: Water Levels at Culvert Under Whitestown Way Near Subject Site (Dodder FRA and FMP)

Node	1% AEP Water Level (mAOD)	0.1% AEP Water Level (mAOD)	Culvert Invert Level at Node Location (mAOD)	Assumed Flood Depth in the 1% AEP Event(m)	Assumed Flood Depth in the 0.1% AEP Event(m)
TS1_2092	96.09	96.35	94.1	1.99	2.25
TS1_2115	95.46	95.59	93.9	1.56	1.69

Comparing the water levels and assumed depths between the two nodes and the nature of the flood extents, it is assumed that the reason for the flooding shown at the subject site is due to insufficient capacity of this culvert. It appears that the water backs up at the culvert inlet and

spreads to Whitestown Way and towards the location of the subject site access road before joining the stream channel downstream of the culvert.

It is worth noting that a low confidence rating has been indicated on the flood extents mapping for the area, which means accurate topographical data may not have been available to determine flood extents. The resolution appears to be approximately 4m.

4.2 Initial Pluvial Flood Risk Assessment

The Source-Pathway-Receptor model has identified that there could be potential for pluvial flood risk within the subject lands associated with future drainage networks serving the proposed development. These networks have potential to cause localised flooding unless they are designed in accordance with relevant standards (e.g. the GSDSDS) and if they do not adequately account for flood exceedance events, such as storm periods greater than the 1% AEP.

The Source-Pathway-Receptor model also identified that effective operation and maintenance of the drainage system is essential to minimise the risk pluvial flooding arising from human or mechanical error, such as blockages.

4.3 Flood Zone Category

Following assessment of the flood risks to the Site and available flood data, it is considered that the majority of the subject site is within Flood Zone Category C, and a small portion of the proposed access road is within Flood Zone A and B, as defined by the Guidelines. The residential development proposed is therefore appropriate for Flood Zone C, and a Justification Test is required for the proposed road in Flood Zone A.

5 Detailed Flood Risk Assessment

5.1 General

The detailed flood risk assessment stage will consider pluvial and fluvial flood risk in relation to the following;

- Proposed Surface Water Management measures.
- Flood Exceedance.
- Impact of proposals on flood risk to adjacent areas.
- Effects of climate change.
- Sustainable Urban Structure.
- Residual risks.
- Effectiveness of any flood mitigation measures.

5.2 Surface Water Management

The proposed storm-water proposals and drainage design for the development is generally a standard gully and pipework collection system with an attenuated outfall and associated attenuation storage. Surface water swales will be provided along the access road to convey runoff from the road to the drainage system. Refer to Appendix B for the proposed drainage layout.

The proposed new development will increase the impermeable area and runoff volume relative to the existing greenfield conditions. The new drainage system has the following features;

- Discharged flows are reduced to equivalent green-field run-off rates in accordance with the GSDSDS.
- Attenuation storage is provided in accordance with the GSDSDS. Flows are restricted to greenfield runoff rates therefore this will mimic the undeveloped scenario which should mitigate flood risk to the receiving watercourses.

5.2.1.1 Sustainable Urban Drainage System Proposals

The Sustainable Urban Drainage Systems (SUDS) proposals for the development include;

- Car parking bays and private footpaths constructed from permeable paving.
- Green roofs on mixed-use buildings
- The attenuation basin will be an on-line system for treatment of run-off.
- Inlet kerbs leading to road swales.

- Filter drains.

5.2.1.2 Surface Water Attenuation and Storage

The attenuation volume provided that will serve the subject site has been calculated based on the allowable outflow/greenfield run-off rate of 2.5 l/s. Run-off from the subject site will be controlled/attenuated using a vortex flow control device (Hydro-Brake or equivalent).

The discharge limits and resultant storage volumes are detailed in Table 5-1 below.

Table 5-1: Surface Water Attenuation Storage and Discharge Limits

Site Area Draining to Pond (ha)	Allowable discharge (l/s)	Storage Volume Required (m ³)	Storage Volume Provided by Pond (m ³)
1	2.5	470	493

Attenuation volumes have been calculated using Causeway Flow analysis software taking account of the depth and type of attenuation system.

A total of 493m³ of storm-water storage is provided by the proposed detention basin. Additional volume is provided by the onsite swales and other SuDS measures. The proposed site has an actual runoff factor of 58% when all SuDS features are taken into account.

5.3 Flood Exceedance

For storms greater than the 1% AEP pluvial event, the development's drainage network design will be exceeded and areas with low ground levels will begin to flood. Proposed road levels are designed to fall towards the gullies, SuDS features and grass areas and directing surface water runoff into the drainage system. This will ensure that the proposed residential units are protected from flooding when the drainage network may be exceeded, refer to Drawing No. 240192-X-05-Z00-XXX-DR-DBFL-CE-1350 for the overland flow route.

Lowest finished floor levels are set a minimum of 500mm above the top water level in the corresponding attenuation facility in accordance with recommended minimum freeboards.

5.4 Impact on Adjacent Areas

Adjacent areas will not be impacted by the development for up to the 1% AEP flood event. However, in the event that large storms greater than the 1% AEP flood event exceed the capacity

of the proposed development's drainage system, overland flood routes may be directed towards the surface water drainage outfall to the south of the site and Whitestown Way.

5.5 Climate Change

The potential impact of climate change has been allowed for as follows;

- Pluvial flood risk – the surface water drainage design allows for a 20% increase in rainfall intensities.
- Urban creep – In accordance with Section 8.4.7 of the South Dublin City Council Sustainable Drainage Explanatory Guide and Evaluation Guide (2022), urban creep allowances are not required for high-density developments.

5.6 Sustainable Urban Structure

The development has been designed in accordance with the GDSDS.

5.7 Access and Egress During Flood Events

Based on relevant fluvial flood levels from the CFRAM maps, it is anticipated that for the 0.1% AEP flood event, safe access to and egress from the development can be maintained via the proposed pedestrian entrances, while the vehicular entrance from Whitestown Way is located in Flood Zone A and B making the entrance unavailable in extreme events. Notwithstanding this, emergency vehicle access to the north of the development can be facilitated via the proposed shared surface, for which vehicle tracking has been undertaken to confirm that emergency vehicles can be accommodated.

5.8 Residual Risks

The remaining residual flood risks identified following the detailed assessment are as follows:

- Pluvial flooding from the private drainage system related to a pipe blockage or from flood exceedance.
- Pluvial flooding from the development's drainage system for storms in excess of the 1% AEP design capacity.
- Temporary loss of usage of road network areas within Flood Zones A and B.

5.9 Risk of Downstream Flooding Due to the Proposed Development

All surface water from the proposed site will outfall via the attenuation pond and existing 1,050mm trunk sewer running through the site. The ultimate outfall is to the Whitestown Stream.

Runoff from the subject site is restricted to greenfield runoff rates, in accordance with the GDSDS, to ensure that post-development discharge mimics the existing greenfield scenario. This approach mitigates the risk of increased flooding downstream. The proposed scheme also allows for the provision of extensive SUDs proposal to attenuate storm-water runoff, reduce storm-water runoff, reduce pollution impact, replicate the natural characteristics of rainfall runoff for the site and recharge the groundwater profile.

The following measures will mitigate the risk of downstream flooding:

- Surface water runoff from the development will be attenuated to greenfield runoff rates (Q_{bar}) in accordance with the GDSDS. This will mimic the undeveloped scenario which should mitigate flood risk to the receiving watercourses.
- A total of 493m³ of surface water storage will be provided within the attenuation facilities to store surface water for storms up to the 100-year (1% AEP) storm.
- In accordance with the GDSDS it is proposed to use SUDS for managing stormwater for the proposed development. The aim of the SUDS strategy for the site will be to; attenuate storm-water runoff, reduce storm-water runoff, reduce pollution impact, replicate the natural characteristics of rainfall runoff for the site, recharge the groundwater profile. An extensive SUDS proposal is proposed as part of this application.

5.10 Mitigation Measures

Proposed mitigation measures to address flood risks are summarized below;

- M1. Proposed drainage system to be maintained on a regular basis to reduce the risk of a blockage.
- M2. In the event of storms exceeding the 1% AEP design capacity of the drainage system, then possible flood routing for overland flows towards the drainage outfalls should not be blocked.
- M3. In the event of a fluvial flood event, the overland flow paths should remain clear to ensure the conveyance of flood water through the site.
- M4. Maintain Access and Egress routes via Whitestown Road and the proposed shared surface to ensure emergency access to the development can be facilitated during flood events.

5.10.1 Effectiveness of Mitigation Measures

It is considered that the flood risk mitigation measures, if implemented, are sufficient to provide a suitable level of protection to the proposed development.

The proposed buildings are located in Flood Zone C. The proposed road has been classified as “less vulnerable” and the majority of it is located in Flood Zone C. A small portion of the access road is located in Flood Zone A and B. Alternative access and egress points to the proposed development via the shared surface in the north of the site are available for pedestrian, cyclist and emergency vehicles during any temporary blockage of the vehicular entrance by flooding.

A regularly maintained drainage system will ensure that it remains effective and in good working order should a large pluvial storm occur.

Should extreme pluvial flooding occur that is in excess of the development’s drainage capacity, i.e. probability less than 1% AEP, then overland flood routes will direct the runoff towards the drainage outfalls to protect the subject site.

6 Justification Test

As a portion of the proposed road development includes “Less Vulnerable” development in Flood Zone A, a Justification Test is required. Box 5.1 of the Guidelines states that, when considering development proposals that may be vulnerable to flooding and would generally be inappropriate in accordance with Table 3.2 of the Guidelines, the following criteria must be satisfied:

Table 6-1: Justification Test (Box 5.1 of the Guidelines)

No.	Development Management Criteria	Justification	Met
J1	<i>The subject lands have been zoned or otherwise designated for particular use or form of development in an operative development plan, which has been adopted or varied taking account of these Guidelines.</i>	As per the SDCC Development Plan 2022-2028, the subject site has been zoned as “REGEN” (to facilitate enterprise and/or residential-led regeneration). The proposed development is consistent with the zoning designation.	✓

<p>J2</p>	<p><i>The proposal has been subject to an appropriate flood risk assessment:</i></p>	<p>Yes – Refer to this SSFRA. The findings indicate that the majority of the site is within Flood Zone C (low risk of flooding). The proposed works within Flood Zone A and B are classified as Less Vulnerable development.</p> <p>The proposed works include construction of an access road to the proposed development. The existing road, Whitestown Way, where the access road is proposed to connect to, is in Flood Zone A and B due to fluvial flood risk from the Whitestown Stream.</p> <p>The proposed infrastructure will be flood compatible as it will not be damaged by temporary surface flooding. Alternative access/egress points to the development via the shared surface north of the development and other pedestrian entrances along Whitestown Way, north of the vehicular entrance during any temporary blockage of the entrance by flood water.</p>	<p>✓</p>
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	<p>(i) <i>The development proposed will not increase flood risk elsewhere and, if practicable, will reduce overall flood risk.</i></p>	<p>The development will not increase flood risk elsewhere. The introduction of attenuation for the proposed development will limit the runoff rate to the existing Qbar rate, thereby not increasing the flood risk to surrounding areas. Please refer to Section 3 of the accompanying Infrastructure Design Report for more details.</p>	<p>✓</p>
	<p>(ii) <i>The development proposal includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible</i></p>	<p>The proposed development will include measures to reduce and minimise flood risk. These include flood routing, SuDS, flow restrictions to greenfield rates and flood storage attenuation volumes. Please refer to Section 3 of the accompanying Infrastructure Design Report for more details.</p>	<p>✓</p>

	<p>(iii) <i>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;</i></p>	<p>Residual flood risk to the development can be managed effectively as set out in Section 5 of this report.</p> <p>The site layout facilitates emergency access during times of flood via the proposed shared surface in the north of the development, between Whitestown Way and Whitestown Road.</p>	<p>✓</p>
	<p>(iv) <i>The development proposed addresses the above in a manner that is also compatible with the achievement of wider planning objectives in relation to development of good urban design and vibrant and active streetscapes.</i></p>	<p>The proposed development layout has been selected following input from planners and architects. The layout is compatible with the wider planning objectives in terms of development layout and facilitates the future extension of the proposed road to link Whitestown Way and Whitestown Road, as per the LAP.</p>	<p>✓</p>
<p>J3</p>	<p><i>The acceptability or otherwise of levels of residual risk should be made with consideration of the type and foreseen use of the development and the local development context.</i></p>	<p>The levels of residual risk within the development are acceptable as per the SDCC Development Plan, this report and Local Area Plan.</p>	<p>✓</p>

Based on the Justification Test above, it is considered that the proposed development may be appropriately accommodated and that it satisfies the requirements of the Flood Risk Assessment Guidelines Box 5.1 Justification Test.

7 Conclusions

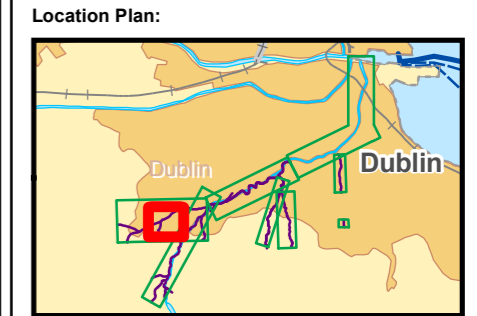
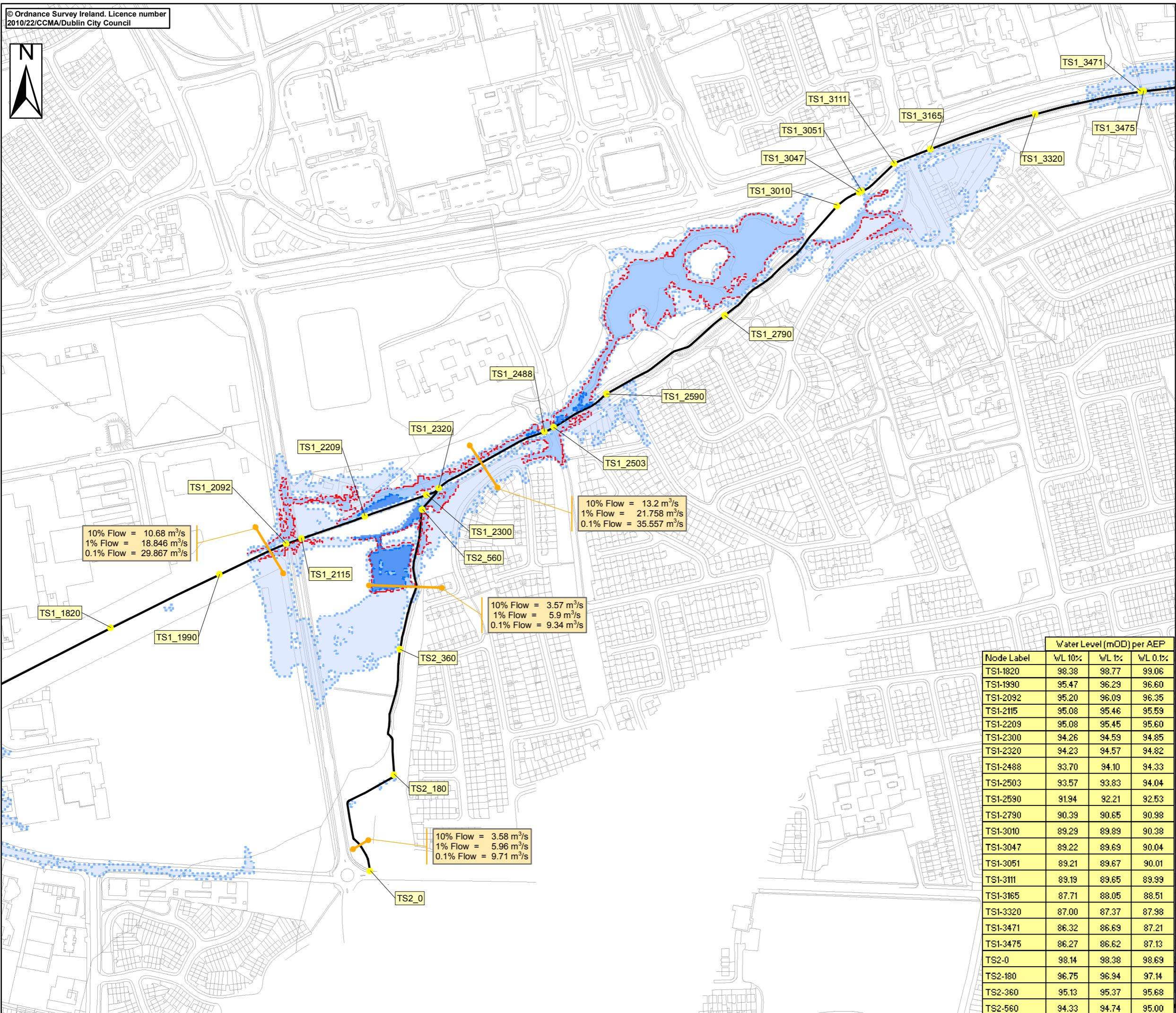
The Site-Specific Flood Risk Assessment for the proposed development was undertaken in accordance with the requirements of the Planning System and Flood Risk Management Guidelines for Planning Authorities, November 2009.

It is concluded that;

- Following the flood risk assessment stages, it was determined that the majority of the subject site, and all areas where buildings are proposed are within Flood Zone C, and at a low risk of fluvial flooding. A small portion of the proposed road in the southeastern area of the site may be within Flood Zone A and B due to flooding from the Whitestown Stream. A Justification Test for the development has been applied and passed for the portion of the development within Flood Zone A and B.
- The proposed development will not increase runoff rates when compared with the existing site and satisfies the requirement of the SFRA to reduce flooding and improve water quality.
- A possible source of flood risk from the surcharging or blockage of the development's drainage systems has been identified. This risk is mitigated by suitable design of the drainage network, regular maintenance and inspection of the network and establishment of exceedance overland flow routes.

In conclusion, the proposed development is considered to be in compliance with The Planning System and Flood Risk Management Guidelines for Planning Authorities

Appendix A : CFRAM Current Scenario Flood Extent Map



- Legend:**
- 10 % AEP Flood Extent (1 in 10 chance in any given year)
 - 1 % AEP Flood Extent (1 in 100 chance in any given year)
 - - - 0.1 % AEP Flood Extent (1 in 1000 chance in any given year)
 - Defended Area
 - High Confidence (<20m) (10% AEP)
 - Medium Confidence (<40m) (10% AEP)
 - Low Confidence (>40m) (10% and 0.1% AEP)
 - High Confidence (<20m) (1% AEP)
 - Medium Confidence (<40m) (1% AEP)
 - Low Confidence (>40m) (1% AEP)
 - River Centreline
 - Node Point
 - OS_2975 Node Label (refer to table)
 - Flow reporting location
- 10% Flow = 1.20
1% Flow = 1.56
0.1% Flow = 2.17
- Peak flow during design flood extent

USER NOTE:
USERS OF THESE MAPS SHOULD REFER TO THE DETAILED DESCRIPTION OF THEIR DERIVATION, LIMITATIONS IN ACCURACY AND GUIDANCE AND CONDITIONS OF USE PROVIDED AT THE FRONT OF THIS BOUND VOLUME. IF THIS MAP DOES NOT FORM PART OF BOUND VOLUME, IT SHOULD NOT BE USED FOR ANY PURPOSE.



Project:
DODDER CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT STUDY

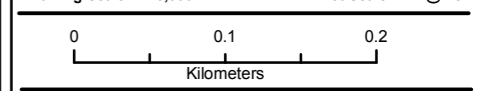
Map:
PRESENT DAY TALLAGHT STREAM

Map Type: FLOOD EXTENT
Source: FLUVIAL FLOODING
Map Area: URBAN AREA
Scenario: CURRENT

Drawn By: A.A.B Date: 26 November 2010
Checked By: A.J. Date: 26 November 2010
Approved By: A.G.B Date: 26 November 2010

Figure No.:
TS/EXT/UA/CURS/102

Map Series: Page 2 of 3
Drawing Scale: 1: 5,000 Plot Scale: 1:1 @ A3



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Node Label	Water Level (mOD) per AEP		
	W/L 10%	W/L 1%	W/L 0.1%
TS1-1820	98.38	98.77	99.06
TS1-1990	95.47	96.29	96.60
TS1-2092	95.20	96.09	96.35
TS1-2115	95.08	95.46	95.59
TS1-2209	95.08	95.45	95.60
TS1-2300	94.26	94.59	94.85
TS1-2320	94.23	94.57	94.82
TS1-2488	93.70	94.10	94.33
TS1-2503	93.57	93.83	94.04
TS1-2590	91.94	92.21	92.53
TS1-2790	90.39	90.65	90.98
TS1-3010	89.29	89.89	90.38
TS1-3047	89.22	89.69	90.04
TS1-3051	89.21	89.67	90.01
TS1-3111	89.19	89.65	89.99
TS1-3165	87.71	88.05	88.51
TS1-3320	87.00	87.37	87.98
TS1-3471	86.32	86.69	87.21
TS1-3475	86.27	86.62	87.13
TS2-0	98.14	98.38	98.69
TS2-180	96.75	96.94	97.14
TS2-360	95.13	95.37	95.68
TS2-560	94.33	94.74	95.00

10% Flow = 10.68 m³/s
1% Flow = 18.846 m³/s
0.1% Flow = 29.867 m³/s

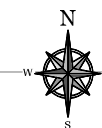
10% Flow = 13.2 m³/s
1% Flow = 21.758 m³/s
0.1% Flow = 35.557 m³/s

10% Flow = 3.57 m³/s
1% Flow = 5.9 m³/s
0.1% Flow = 9.34 m³/s

10% Flow = 3.58 m³/s
1% Flow = 5.96 m³/s
0.1% Flow = 9.71 m³/s

Appendix B : Proposed Drainage Layout

EXISTING DRAINAGE LEGEND

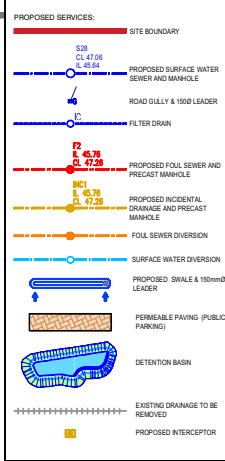


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GENERAL NOTES:

1. ALL DRAWINGS TO BE CHECKED BY CONTRACTOR ON SITE AND ENGINEER INFORMED OF DISCREPANCIES BEFORE WORK COMMENCES.
2. ALL DIMENSIONS AND LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.
3. ALL LEVELS ARE IN METERS AND ARE RELATED TO ORDNANCE DATUM. COORDINATES RELATE TO THE IRISH TRANSVERSE MERCATOR.
4. CONTRACTOR SHALL SURVEY THEMSELVES AS TO THE ACCURACY OF PAVEMENT LEVELS ON SITE PRIOR TO COMMENCEMENT OF WORKS ON SITE.
5. ALL WASTEWATER INFRASTRUCTURE INCLUDING FOUL SEWERS, CONNECTIONS AND MANHOLES TO SAME SHALL COMPLY WITH AND BE CONSTRUCTED IN ACCORDANCE WITH THE FRESH WATER CONNECTION AND DEVELOPER SERVICES WASTEWATER INFRASTRUCTURE STANDARD DETAILS DOCUMENT (WDCS) 03/01.
6. FOUL SEWERS PIPE MATERIAL TO BE IN ACCORDANCE WITH SECTION 3.1.10 OF THE FRESH WATER CODE OF PRACTICE.
7. SURFACE WATER SEWER PIPE MATERIAL TO BE CLASS H CONCRETE TO EN1345 & EN 12201 IN ACCORDANCE WITH THE GREATER DUBLIN REGIONAL CODE OF PRACTICE FOR DRAINAGE WORKS.
8. LOCATION AND INVERT LEVELS OF EXISTING MANHOLES AND OUTLET POINTS TO BE VERIFIED BY CONTRACTOR PRIOR TO COMMENCEMENT OF DRAINAGE WORKS.
9. ALL COVER LEVELS TO MATCH FINISHED ROAD/GEOPATH/CYCLISTRAIL LEVELS UNLESS OTHERWISE STATED.
10. ALL SURFACE WATER DRAINAGE WORKS/CONNECTIONS TO COMPLY WITH THE REQUIREMENTS OF THE LOCAL AUTHORITY.
11. CONTRACTOR TO INCLUDE FOR CCTV SURVEY OF ALL FOUL & SURFACE WATER SEWERS DRAINAGE UPON COMPLETION OF SAME.
12. MANHOLE COVERS IN LANDSCAPED AREAS TO BE SURROUNDED BY A CONCRETE PLINTH 200MM ALL ROUND AND 100MM DEEP FORMED WITH CO2/5 CONCRETE, 20MM AGGREGATE SIZE, BEDDED IN CLASS B4 MATERIAL.



REV	DATE	DESCRIPTION	BY	CHK
1	15/05/2024	STAGE 1 IRO SUBMISSION	BY	NCD
2	15/05/2024	STAGE 2 IRO SUBMISSION	BY	NCD

STATUS	
PROPOSE	PREPARED
P3 - PLANNING PERMISSION	S - ISSUED

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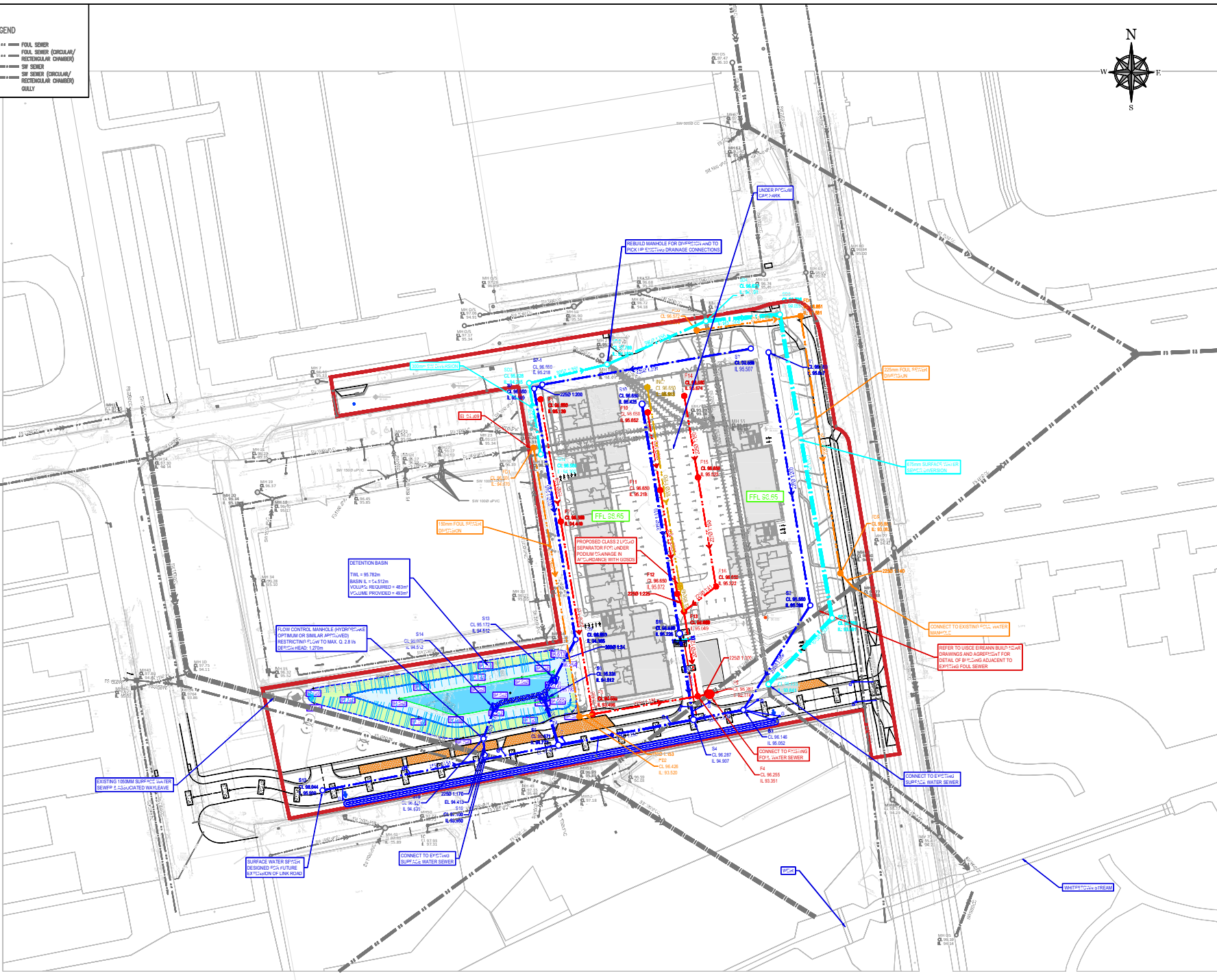
PROJECT REF: SITE AT WHITESTOWN WAY - TALLAGHT

DRAWING TITLE: DRAINAGE LAYOUT

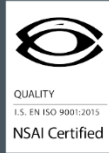
DATE: ARP 4.2 SUSTAINABLE COMMUNITIES (IRELAND) FUND

DESIGNED BY	AUTHOR	SCALE	SHEET SIZE
NCD	OK	1:500	A1

PROJECT NO: 240192-X-05-200-XXX-DR-DBFL-CE-1300 | VERSION: 1



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