Engineering Assessment Report

Proposed Large-scale Residential Development Planning Application No. 1 at Flemington Lane, Balbriggan, Co. Dublin.

August 2026

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Client Name: Lagan Homes
Document Reference: 25-107r.002 Engineering Assessment Report
Project Number: 25-107

Quality Assurance – Approval Status

This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2015, BS EN ISO 14001: 2015)

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Comments

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1. Introduction

This Engineering Assessment Report has been prepared by Waterman Moylan Engineering Consultants, on behalf of the Client, Lagan Homes, as part of a planning submission for a proposed Large-scale Residential Development comprising 146 no. residential units at Flemington Lane, Balbriggan, Fingal, Co. Dublin.

This report aims to provide a comprehensive overview of the engineering design criteria for the subject site at Flemington, Balbriggan.

Supplementary documentation referred to when compiling this report, includes:

- Fingal Development Plan 2023-2029
- Uisce Éireann foul infrastructure maps
- Uisce Éireann watermain infrastructure maps
- Uisce Éireann Confirmation of Feasibility Letter
- Uisce Éireann's Wastewater Code of Practice Rev 3 August 2025
- Uisce Éireann's Water Code of Practice Rev 3 August 2025
- Uisce Éireann's Standard details for Wastewater Infrastructure Rev 5 August 2025
- Uisce Éireann's Standard details for Water Infrastructure Rev 5 August 2025
- Greater Dublin Strategic Drainage Study (GDSDS) Regional Drainage Policies Volume 2, for New Developments
- The SuDS Manual (CIRIA C753)
- Flemington Local Area Plan
- Strategic Flood Risk Assessment for the Fingal Development Plan 2023-2029
- Stingray Infiltration Test BRE Digest 365
- Fingal County Council Green/Blue Infrastructure for Development Guidance Notes

2. Subject Site

2.1 Existing Site Location

The site is located at Flemington and Bremore, Balbriggan, Co. Fingal, Dublin, bounded to the south by Flemington Lane and residential dwellings, and to the north and west by agricultural lands.

The lands, which are currently in agricultural use, slope generally from west to east. The Flemington Local Area Plan (LAP) lands, as depicted by the red line boundary in Figure 2-1, is approximately 17.2 hectares (ha). The LAP is comprised of 4-no. Character Areas. The subject planning application, Application 1, encompasses Character Area no. 4. The balance of the development area and remaining Character Areas 1, 2 & 3 will be subject to a separate planning application, Application 2.

Figure 2-1: LAP Site Location Map (Source: Google Maps)

The subject site of this report with a total site area of c. 4.4 ha, is as per the yellow boundary line, indicated on Figure 2-2.

Refer to Waterman Moylan Drawing-no. FLE-WMC-CA4-ZZ-DR-C-P0010 Proposed Site Location Plan for the precise site location and surrounding lands of the subject development, Planning Application 1.

An aerial view of the subject site can be seen in Figure 2-2, below.

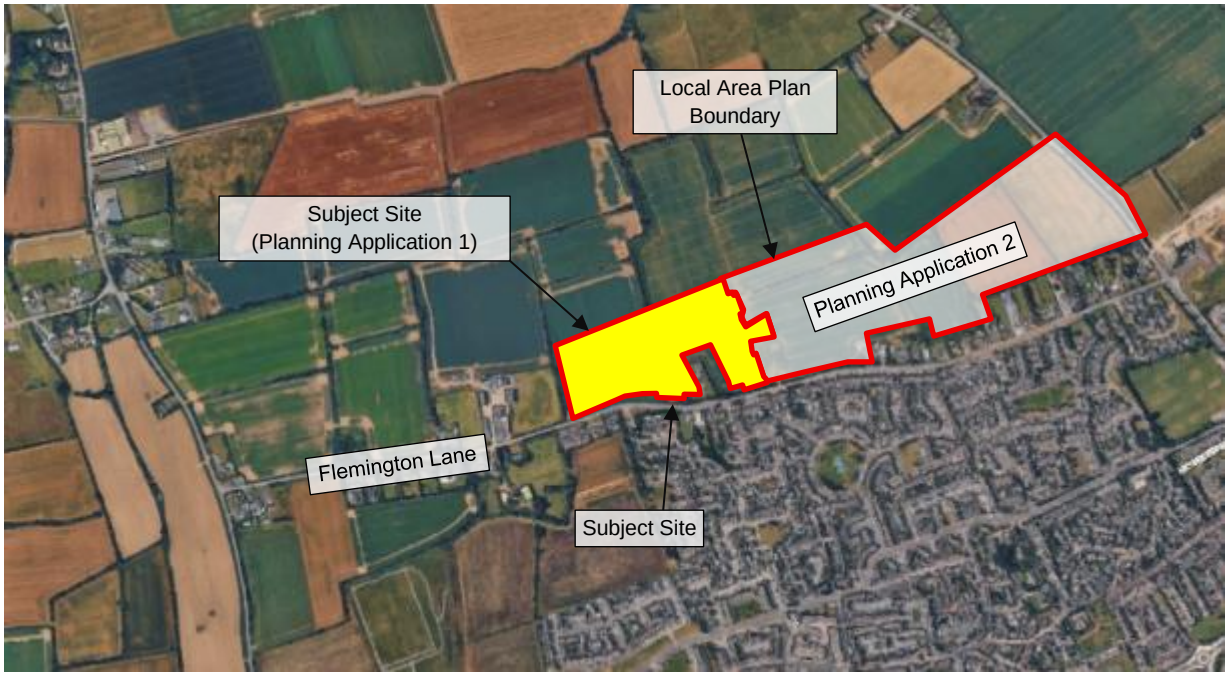

Figure 2-2: Aerial View of the Planning Application 1 Subject Site (Source: Google Maps)

2.2 Existing Site Description

2.2.1 Site Topography

The subject site has an area, and redline boundary, of c. 4.4 ha and falls from west to east with a gradient of approximately 1 in 80. The site is currently in greenfield condition and is used for agricultural purposes.

The existing topography consists of naturally high ground elevations along the western boundary of the site, with levels ranging from 41.72m OD Malin to 39.34m OD Malin. The site falls to the east where the lowest ground elevations are distributed, these levels range from 33.77m OD Malin to 33.22m OD Malin. The local high point on the site (41.72 m OD Malin) is located in the southwest portion of the lands, and the local low point (33.22m OD Malin) is located in the east area of the lands.

Refer to

Figure 2-3 for an illustration of the subject site and existing ground elevations within the site.

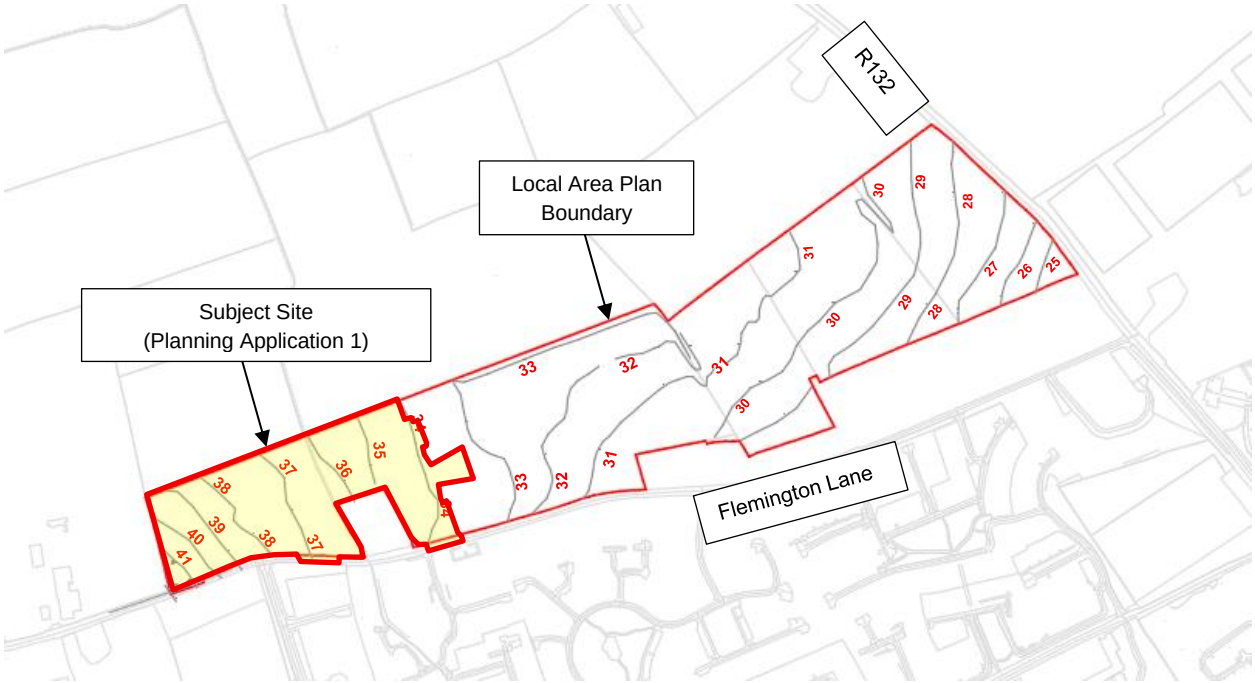

Figure 2-3: Subject Site Topography and Contours

2.2.2 Soil Characteristics – Infiltration Rates

An infiltration assessment was undertaken by Stingray for the wider LAP lands as part of this application. The testing was carried out in accordance with the requirements of BRE Digest 365.

Infiltration testing was carried out at five trial pit locations, including one within the subject site (Trial Pit A). Groundwater was encountered at approximately 1.10 m below existing ground level at this location, indicating that the subject site is not suitable for infiltration.

The infiltration test results are appended under Appendix A of this report.

2.3 Land Use – Zoning

The site is zoned RA - Residential Area by the Fingal County Development Plan 2023-2029 (as varied) and is subject to the Flemington Local Area Plan. Lands to the north are zoned RU - Rural while lands to the west are zoned GB - Green Belt.

Zoning can be found on Sheet no.4 of the Fingal County Development Plan (FCDP).

2.4 Proposed Development

The proposed large scale residential development (LRD) consists of 146no. dwellings in the form of 120no. houses and 26no. apartments in the following mix – 13no. 1-bed, 29no. 2-bed, 91no. 3-bed and 13no. 4-bed, and childcare facility with play space, scooter parking, car parking and drop off area on Flemington Lane. All housing will be one or two storey in height. The apartment buildings will be three storey in height. The creche will be single storey with a first storey pop up.

Three new vehicular accesses off Flemington Lane are proposed to serve the development. The proposal also provides for public open space including a Multi-Use Games Area (MUGA), communal open space associated with apartments, landscaping, boundary treatments, public lighting, car parking, motorcycle

parking, bicycle parking and structures, an active travel hub and cycle route, bin storage structures, works to Flemington Lane itself including two pedestrian crossing points, 2no. ESB substations, infrastructure services and all other associated site development works.

3. Foul Water Drainage

3.1 Introduction

The surrounding area in Balbriggan is serviced by Uisce Éireann with foul water infrastructure.

A Pre-Connection Enquiry (PCE) PCE was made in November 2025 for the entire landholding/LAP area for an estimated 700no. residential units which includes the application site. A response in the form of a Confirmation of Feasibility (COF) Letter, with ref. CDS25008619, was received from Uisce Éireann on the 26th of January 2026. The COF stated the following regarding the foul water drainage connection for the proposed LAP development:-

"Feasible without infrastructure upgrade by Uisce Éireann"

The Confirmation of Feasibility is attached in Appendix B.

3.2 Existing Foul Drainage

The site is greenfield in natural in terms of foul water infrastructure. Existing foul drainage infrastructure information, location of manholes, cover levels, and invert levels, have been sourced from Uisce Éireann Data requests and the Uisce Éireann COF Letter.

Refer to Figure 3-1 for an illustration of the existing foul water network and the proposed connection points.

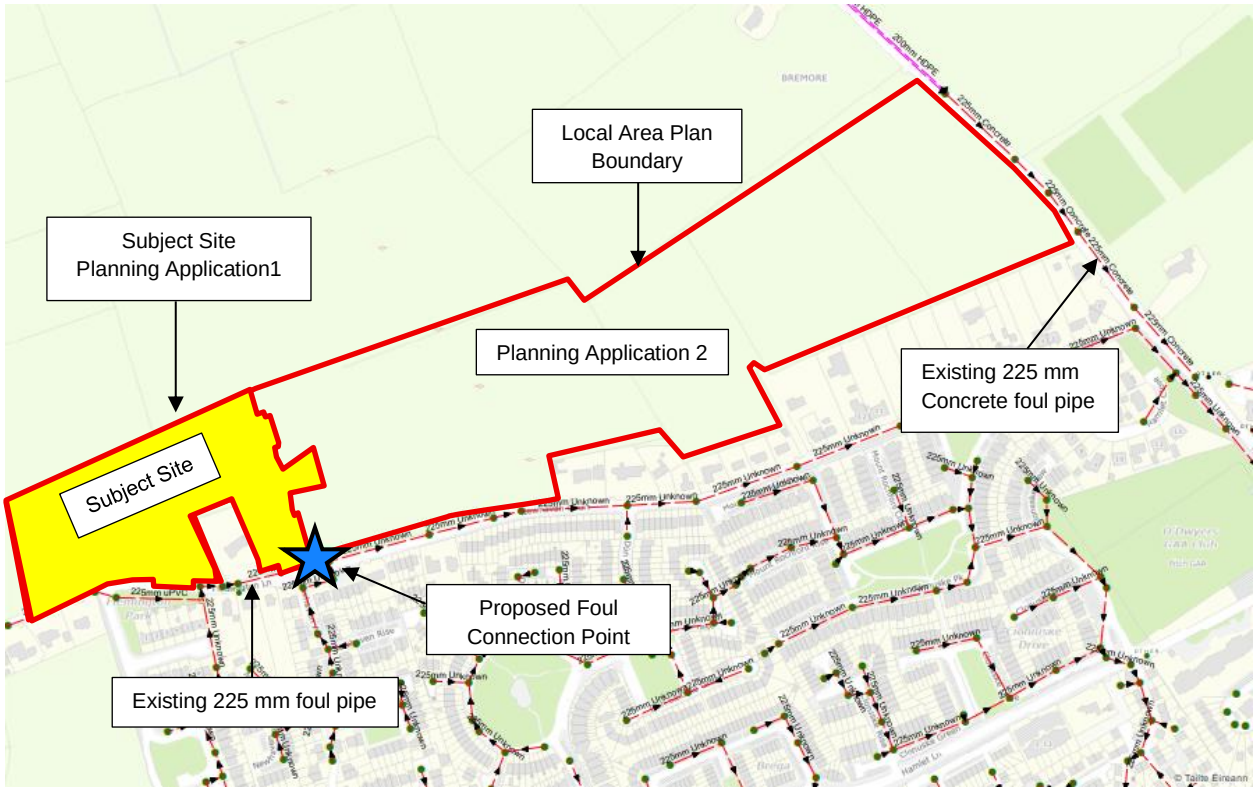

Figure 3-1: Indicative Sketch – Existing Foul Water Network and Proposed Connection

The ultimate outfall of the LAP lands foul sewer is the Barnageeragh Wastewater Treatment plant located in Skerries to the south of the subject site.

The received COF confirms that adequate capacity within the system is available to service the LAP lands.

3.3 Proposed Foul Drainage Network and Calculations

Existing foul drainage infrastructure information, location of manholes, cover levels, and invert levels, have been sourced from available Uisce Éireann and survey data undertaken by Murphy Geospatial in 2025.

It is proposed to connect the subject site's foul drainage into the existing foul manhole located to the southeast of the of the subject site within Flemington Lane. The proposed connection point is indicated in Figure 3-1. The existing manhole has a cover level of 33.10m OD Malin and an invert level of 31.42m OD Malin according to survey data. The existing network is a 225mm diameter foul network along the northern edge of Flemington Lane.

The subject site's proposed foul network will ultimately outfall at the Barnageeragh Wastewater Treatment Plant (WWTP) located c. 6.9 km southeast of the subject development.

Refer to Waterman Moylan Drawing-no. FLE-WMC-ZZ-ZZ-DR-C-P0200 - *Proposed Drainage Layout* for the proposed foul drainage layout.

Based on the Uisce Éireann Code of Practice and the current schedule of accommodation received from the architect, the peak foul flow from the proposed development will be as outlined in Table 3-1.

The schedule of accommodation outlines 146-no. residential units within the subject development and 106-no. individuals at the proposed creche (87-no. children and 19-no. staff).

Table 3-1: Calculation of Proposed Foul Water Flow

Description	No. of Units	Flow (ℓ/h/day)	Population per Unit	Infiltration Factor	Total Discharge (ℓ/d)
Residential Development	146-no.	150	2.7	1.1	65,043
Creche	1-no.	90	106	1.1	10,494
					75,537

Calculation of Proposed Peak Foul Flow		
Total Daily Discharge (from above table)	74,646	ℓ/d
Dry Weather Flow (DWF)	0.874	ℓ/s
Peak Foul Flow (= 6 x DWF)	**5.25**	**ℓ/s**

The total dry weather flow generated from the proposed development is 0.874 ℓ/s and the peak foul water flow generated from the development is calculated as 5.25 ℓ/s, with the proposed outfall from the development as a 1-no. 225 mm diameter pipe laid at a minimum gradient of 1:200.

3.4 Foul Drainage Network Design

Foul water sewers will consist of uPVC or concrete socket and spigot pipes (to IS 6) and will lay strictly in accordance with the Uisce Éireann Code of Practice for Wastewater Infrastructure and requirements for taking charge.

The design of the subject site's foul water drainage network will incorporate 150 mm and 225 mm diameter pipes. The installation of these pipes will adhere to the requirements outlined in Uisce Éireann's Wastewater Standards and Code of Practice.

4. Surface Water Drainage

4.1 Introduction

The surface water management strategy for the proposed development has been prepared with reference to the Flemington Local Area Plan and associated surface water addendum documents, the Greater Dublin Strategic Drainage Study (GDSDS) and the Fingal County Council Green/Blue Infrastructure for Development Guidance Note.

The surface water management strategy has been carefully developed to incorporate nature-based Sustainable Urban Drainage Systems (SuDS) features throughout the site. These elements are integrated into the overall drainage network to facilitate natural attenuation and support water quality improvements. Features such as swales, permeable paving, bio-retention tree pits, rain gardens, and above ground retention basins have been strategically located across the development to manage runoff at source, reduce flow rates, and mimic the site's natural hydrological processes. This approach not only addresses surface water quantity and quality but also enhances local biodiversity and contributes positively to the site's visual and ecological character.

4.2 Hydrology and Flood Risk

According to the Environmental Protection Agency (EPA) online watercourse map viewer, the subject site lies within 2-no. surface water sub-catchments. the majority of the Application 1, subject site, is located within the Delvin_SC_010 Water Framework Directive (WFD) Subcatchment with the remaining eastern portion located in the Palmerstown_SC_010 WFD Subcatchment. Surface water drainage from both sub-catchments ultimately discharge to the Irish Sea, to the east of the subject site.

The Flemington Local Area Plan– Strategic Flood Risk Assessment (SFRA) indicates no areas in the development that at risk of flooding from coastal or fluvial sources and that the subject site in its entirety is within Flood Zone C. The assessment does however identify that the LAP area is affected by pluvial flooding (i.e. flooding caused by high intensity overland rainfall).

The Fingal Strategic Flood Risk Assessment (SFRA) indicates no areas in the subject site of Flemington are at risk of flooding from coastal or fluvial sources and that the site is located entirely within Flood Zone C.

4.3 Existing Flow Route Analysis

As discussed, the subject planning application is the first of two planning applications that will incorporate the entire LAP area. The surface water drainage strategy is designed based on the full LAP area.

Two key aspects of designing levels for the proposed development (designed road levels and finished floor levels) include analysing the natural contours of the site to minimise cut-and-fill operations as far as practically possible, i.e. working with the natural slopes of the land, and, ensuring positive drainage, i.e. designing roads to allow for efficient surface water runoff, avoiding low points that may cause ponding, and ensuring appropriate exceedance flow routes through the development in the event of a flood.

Surface water catchments are designed based on the proposed flow paths generated within the development as a result of the designed levels and on the proposed location of the attenuation areas within green spaces. The proposed site levels have been designed to incorporate flood routing / exceedance flow overland within the internal roads network, conveying the rainfall runoff external to the site and away from proposed residential dwellings and structures in the event of an extreme rainfall event.

As illustrated in the flow route analysis presented in the figure below, surface water runoff across the LAP lands and subject site predominantly flows from west to east, with a general southerly conveyance towards Flemington Lane.

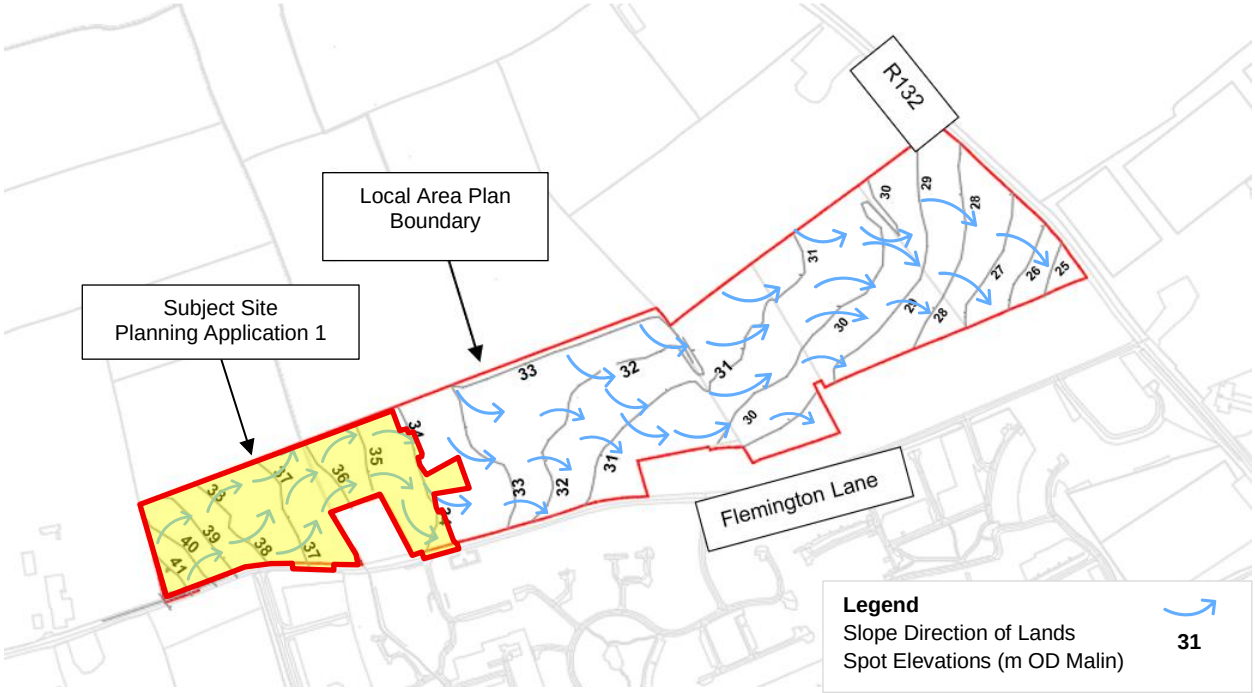

Figure 4-1: Existing Ground Contours of the LAP Lands (Incl. Subject Site)

4.4 Surface Water Catchments & Discharge Rates

4.4.1 LAP Lands

For surface water management purposes, the LAP Lands (Planning Applications 1 and 2) have been divided into 5-no. principal surface water catchments. The below table summarises the areas and locations of the proposed 5-no. catchments.

Table 4-1: Surface Water Catchment Areas in the LAP Lands

Catchment	Location in LAP Lands	Area (Ha)
Catchment 1	West – Planning Application 1 (Subject Site)	2.80 ha
Catchment 2	Central West – Partially Planning Application 1 (Subject Site) Central West – Partially Planning Application 2	4.74 ha
Catchment 3	Central East – Planning Application 2	4.26 ha
Catchment 4	East (North) – Planning Application 2	2.90 ha
Catchment 5	East (South) – Planning Application 2	2.50 ha

Refer to Figure 4-2 below for which illustrates the location and extent of the proposed 5-no. surface water catchments of the LAP Lands.

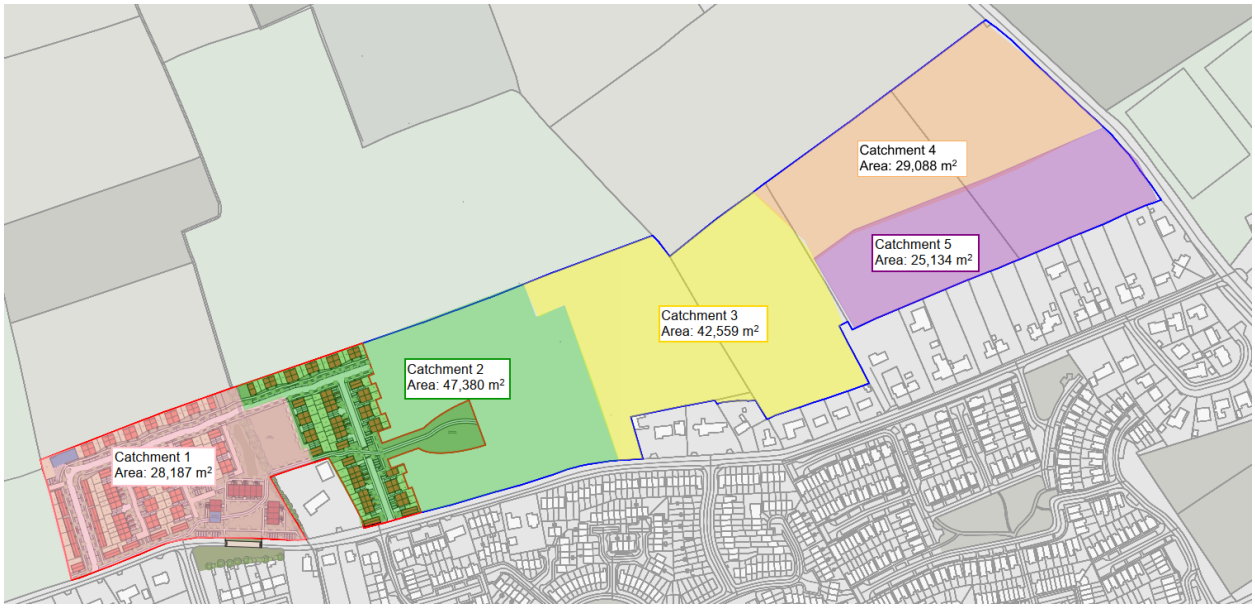

Figure 4-2: Indicative Sketch of Surface Water Catchments in LAP Lands

Surface water from each catchment will be attenuated and discharge at a controlled rate, limited to the greenfield runoff rate as calculated above, to ultimately outfall to the existing surface water network on Flemington Lane.

The total discharge rate of the combined catchments within the LAP Lands is 34.30 ℓ/s corresponding to the overall area of 17.20 ha.

4.4.2 Subject Development

The proposed development extends across the entirety of Surface Water Catchment 1 and part of Surface Water Catchment 2, extending over an approximate combined area of 4.4 ha. Refer to Table 4-1 and Figure 4-2 above for details. The effective surface water catchment area for the subject development is 4.27 ha.

Both catchments will include their own surface water attenuation areas designed to collect, attenuate, and discharge surface water at a controlled rate. 1-no. surface water outfall for the subject site is proposed, located at the southeast of the proposed development, within Flemington Lane into the existing 750 mm diameter storm culvert.

An indicative sketch of the subject development drainage area and the location of the proposed connection to the existing storm culvert is included in Figure 4-3, below.

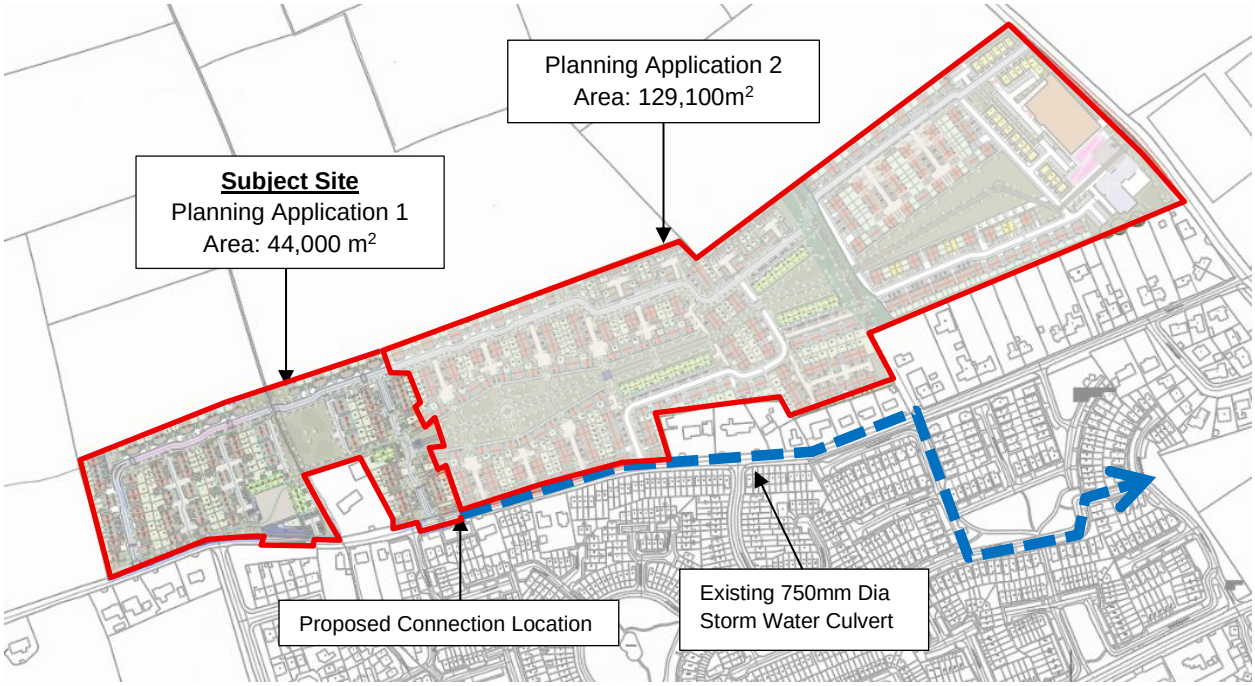

Figure 4-3: Indicative Layout of the Subject Developments Drainage Area and Proposed Connection Point

4.5 Proposed Surface Water Drainage Strategy

4.5.1 Introduction

The surface water runoff from the development will be attenuated and released into the public drainage system at the pre-developed greenfield runoff rate of the subject site by use of flow control devices, ensuring runoff is reduced and controlled. The proposed outfall, a 1-no. 300mm diameter surface water pipe, is proposed to connect the subject developments drainage network to the existing 750mm diameter storm water culvert within Flemington Lane, to the southeast of the subject site.

3-no. attenuation areas are proposed with a flow control device located downstream of each area to ensure the total surface water runoff rate from the development does not exceed the greenfield runoff rate of 8.6 ℓ/s corresponding to the subject sites redline boundary area of c. 4.4 ha. The calculation of the allowable discharge rate (greenfield runoff rate) is included in the following section.

The on-site attenuation is designed to accommodate the 1-in-100-year extreme storm event with a 20% climate change factor included.

The site will be designed with nature-based sustainable urban drainage (SuDS) features including permeable surfacing, bio-retention tree pits, swales, rain gardens, and retention basins.

4.5.2 Allowable Discharge Rate

The allowable flow discharging from the development is referred to as the ‘outflow limit’, also referred to as the greenfield runoff rate of a site.

Several site characteristics dictate the outflow limit of a site including the ground conditions and soil type. According to the HR Wallingford greenfield runoff rate estimation tool, available from uksuds.com, a soil type 2 (with SPR value 0.3) is relevant to the subject site and has thus been used for surface water calculations.

The outflow limit is calculated in accordance with the Institute of Hydrology report No 154 "Flood Estimation for Small Catchments", using the below equations:

Qbar = 0.00108(Area) $^{0.89}$ x (SAAR) $^{1.17}$ x (SOIL) $^{2.1}$

Greenfield Run-off = Qbar x ("n-year" factor)

Allowable Discharge = Greenfield Run-off x Area

- *Q_{bar} is the max. annual peak flow rate*
- *Greenfield run-off is the equivalent flow rate of the undeveloped site*

Where:

	Subject Site	Definition
Area	*50 ha (0.5km²)*	Site area in km² (Or 50 hectares if the site is less than 50 Hectares)
SAAR	*746*	Taken from "1981-2010 Rainfall Grids" published by Met Éireann (downloaded from data.gov.ie/dataset)
SOIL	*Type 2 (SPR of 0.3)*	Runoff constant (Varies between 0.1 and 0.53: Given as 0.3 for an average soil)

Thus, $Qbar_{rural} = 0.00108(0.5)^{0.89} \times (746)^{1.17} \times (0.3)^{2.17}$

$Qbar_{rural} = 0.098$ m3/s (for a 50-ha site)
$= 98.167$ ℓ/s

$Qbar_{rural} = 1.963$ ℓ/s/ha

Hence, our permitted outflow (greenfield runoff rate) for the site with a total area of 4.4 ha is **8.64 ℓ/s** (1.963 ℓ/s/ha x 4.4 ha). As the modelling software, Causeway FLOW, only allows flow rates in intervals of 0.1, the rate has been rounded down to **8.6 ℓ/s** in all surface water calculations.

The volume of surface water to be intercepted and stored on site is discussed in the following section.

4.5.3 SuDS Proposal Summary

The surface water runoff for the development will be intercepted, collected, slowed, and attenuated through the use of nature-based rainwater management and SuDS features. The SuDS features proposed for the subject site are summarised below:

- Permeable paving at private parking / driveways.
- Permeable paving below parking spaces to be taken in charge (Flemington Lane).
- Bio-retention tree pits used in strategic public areas within landscaping and adjacent to hardstanding areas such as the internal roads network.
- Swales located adjacent to footpaths/cycle track or the internal roads network to collect rainfall runoff from same.
- Public rain gardens used within strategic public areas within landscaping and adjacent to hardstanding areas
- Above ground attenuation areas (retention / detention basins) open green space areas.
- Petrol Interceptors upstream of retention basin inlets.
- Hydrobrake manholes downstream of retention basin outlets.

The above-ground retention / detention basins are located within the open green space areas of the development. The attenuation systems are sized to accommodate the extreme 1-in-100-year storm event with 20% climate change.

These SuDS features will also add value to the biodiversity potential of the development.

The images taken from the Fingal County Council Green/ Blue Infrastructure for Development Guidance Document, shown below in Figure 4-4, illustrate already constructed robust and aesthetically pleasing nature-based solutions in the form of swale and a well-established detention basin in a public open space.

Figure 4-4: Constructed Swale and Detention Basin (FCC SuDS Guidance Document)

4.6 Proposed Surface Water Storage

The total area of the catchment, including roads, roofs, parking, footpaths, and green areas, is approximately 4.4 ha, with a net hardstanding contributing area of 2.35 ha, which equates to c. 53% hardstanding area.

It is proposed, in accordance with the recommendations of the Greater Dublin Strategic Drainage Study, that the 1-in-100-year critical design storm will be used for stormwater volumetric calculations (to establish on-site storage required) with a 20% additional allowance.

According to the FLOW model (Causeway software) of the full site's surface water attenuation storage, the site requires a total storage volume of c. 2,115 m^3 surface water for the critical storm event.

Refer to Appendix C for the surface water model including the attenuation storage requirements, completed using FLOW (Causeway) Software, for the subject development.

4.6.1 Total Impermeable Areas

The impermeable area of the subject site is calculated by multiplying the contributing area type receiving rainfall with the respective runoff coefficient. The impermeable areas calculated for the subject development can be found in Table 4-2.

Table 4-2: Contributing Impermeable Areas within the Subject Development

Contributing Area Type	Contributing Area (m^2)	Runoff Coefficient	Impermeable Area (m^2)
Green Spaces	18,920	0.1	1,892
Roads	6,950	0.9	6,255
Footpaths	4,160	0.9	4,149
Parking court/Permeable surfacing	3,164	0.8	2,531
Roof	8720	1.0	8,720
Total Impermeable Area			**23,547 m^2**

SuDS features are designed to intercept, store, slow, filter, and infiltrate runoff from these impermeable areas with the aim of:

- Reducing flood risk;
- Improving water quality;
- Encouraging groundwater recharge, and;
- Enhancing biodiversity and amenity.

4.6.2 Description of Proposed SuDS Features

The SuDS features proposed within the subject development are discussed below:

Permeable surfacing / paving

Permeable paving is proposed for the private parking areas / driveways and for parking bays to be taken in charge to manage surface water runoff directly from these hard surfaces and from the residential dwellings roofs to reduce the risk of flooding. Downpipe collector drains can be routed from the roof gutters to connect into the below ground permeable paving driveways as an additional treatment process before discharging to the surface water mainline.

The storage layer of the permeable paving system has a depth of 450 mm for private parking bays and a depth of 450 mm for parking bays to be taken in charge. The SuDS feature has a void ratio of 30%, meaning 30% of the storage volume consists of void spaces, allowing for effective water retention. This storage layer facilitates the management of stormwater by providing temporary retention, which helps to reduce peak runoff and promote gradual infiltration.

Rain Garden

It is intended that rainfall runoff from the apartment roofs, internal access road, and green areas at localised locations within the subject site will be collected and directed to the proposed rain gardens located adjacent to these elements. Surface water will discharge from the rain garden area downstream for further treatment. This SuDS feature is designed as 800 mm in depth and has an associated voids ratio of 30%.

Bio-retention tree pits

Bio-retention tree pits are proposed adjacent to the internal roads network and footpath arrangements in the subject development. This SuDS feature will capture surface water runoff from the adjacent road and/or footpath, filtering and slowing the surface water within the pit before conveying it to the mainline network and attenuation storage area within each sub-catchment. The pits have been located both within the public

and private realms and are intended to collect only public and private area runoff, respectively. This SuDS feature is designed as 1m in depth, 1m in width & length, and has an associated voids ratio of 30%.

Swales

A swale is a shallow, vegetated, linear depression designed to convey, store, and treat surface water runoff from adjacent impermeable surfaces such as roads, car parks, and footpaths. In line with Fingal County Council's SuDS guidance, swales provide an effective means of slowing runoff close to source while removing pollution at the beginning of the management train. They offer protection to the remaining parts of the management train, enhancing amenity and biodiversity within the development.

Swales are proposed adjacent to the internal access road and along the adjoining footpaths. The swales alongside the access road will provide temporary above-ground storage within the 200 mm deep trough-like swale cross-section. Swales located adjacent to the footpaths or elsewhere will incorporate below-ground storage within an 800 mm deep stone-filled void.

Attenuation Area No. 1

- Detention Basin

An above ground detention basin is proposed within the central open green space area, east of the existing hedge to be maintained, to collect and attenuate surface water from Catchment 1, via controlled flooding of a below ground stone void storage area (discussed below). The basin has an invert level of 34.60m and a top of bank level of 35.10 m OD Malin, with a total depth of 500 mm.

The total above ground storage volume provided by the basin is c. 200 m^3. The basin has side slopes of 1:5 to ensure appropriate accessibility by maintenance machinery and has been designed to ensure the top of water level (T.W.L) is at least 500 mm below the adjacent finished floor levels (FFL) of the residential units.

During the 1-in-100-year flood event including 20% climate change, the top water level (TWL) reaches 35.066 m OD Malin. The lowest adjacent FFL is 35.60 m OD Malin; thus the attenuation area achieves the required 500 mm freeboard.

The detention basin is intended to be dry during the 1-in-1-year and 1-in5-year flood event and surcharges with control flooding for extreme storm events beyond this period.

- Below Ground Stone Void Storage

A below ground stone void storage area is proposed below the detention basin. The proposed surface water network will discharge into this below ground system, and during extreme storm events, runoff will attenuation within this system before overflowing into the above ground detention basin via an open grate manhole system located at the localised low point of the detention basin.

The stone void system offers 40% void storage space, is designed with an area of 550 m^2, a depth of 500 mm and an overall attenuation storage of 110 m^3. A topsoil depth of 450 mm above the stone void system is included in the design. The invert level of the system is 33.65 m OD Malin.

A Hydro-Brake manhole will be provided downstream of attenuation area no. 1 to restrict the outflow and allow the attenuation system to fill during extreme rainfall events.

Attenuation Area No. 2

Below-ground storage is proposed beneath the MUGA pitch, south of the attenuation area no.1, to provide additional attenuation storage and contribute towards the overall site attenuation requirement within the limited open green space available on site.

Similarly, a stone void storage area is proposed. The stone void system offers 40% void storage space, is designed with an area of 600 m^2, a depth of 1.5 m and an overall attenuation storage 360 m^3. A topsoil depth of 450 mm above the stone void system is included in the design. The invert level of the system is 33.15 m OD Malin.

A Hydro-Brake manhole will be provided downstream of attenuation area no. 2 to restrict the outflow and allow the attenuation system to fill during extreme rainfall events.

Temporary Attenuation Area

A temporary attenuation area is proposed to facilitate the remaining storage requirement for the site. The retention basin proposed will be temporary in nature and is intended to be filled-in as part of the future Planning Application 2 design. An appropriate permanent attenuation area will be included in the Planning Application 2 design to facilitate the required surface water catchment under this subject application.

This above ground retention basin is proposed within the application lands of the proposed development to collect and attenuate surface water from Catchment no.2 (within the subject development). The basin has a bottom of bank level of 31.40m OD Malin and a top of bank level of 33.10m OD Malin, the basin is 1.7 m in depth.

The total above ground storage volume required according to the FLOW model is c. 1,150 m^3; the provided storage within the basin is c. 1,230 m^3. The basin has side slopes of 1:2 and has been designed to ensure the top of water level (T.W.L) is at least 500 mm below all the adjacent finished floor levels of the residential units with the exception of one.

During the 1-in-100-year flood event, the T.W.L reaches 32.969 m OD Malin, and the lowest adjacent FFL is 34.00 m OD Malin, this offers a freeboard of over 1 m.

4.6.3 Flow Control Devices

Flow control devices, such as Hydrobrakes, are used within surface water drainage systems to restrict the rate at which runoff is discharged from a development to the receiving drainage network or watercourse. The device limits the peak outflow to a predetermined allowable rate, typically based on the characteristics and capacity of the downstream network, while upstream attenuation storage temporarily retains excess runoff during a storm event. This helps to reduce peak flows and minimise the potential for increased flood risk downstream, while allowing the development drainage system to discharge at a controlled rate.

As discussed, the allowable outflow rate from the proposed development is a total discharge of 8.64 ℓ/s. To achieve this controlled discharge rate, each of the individual attenuation areas within the proposed drainage design will be fitted with a flow control device at its downstream outlet with a final flow control device fitted at the last manhole within the development. This ensures that discharge from each attenuation area is restricted to the required rate and that the available attenuation storage within each element is utilised effectively during storm events. The proposed attenuation systems are arranged sequentially along the surface water drainage network.

A summary of the 4 no. hydrobrake manholes within the drainage network are included below:

Table 4-3: Summary of Flow Control Devices

Hydrobrake Manhole	Catchment	Location	Discharge Rate (ℓ/s)
HB 1	No. 1	Downstream Attenuation Area No. 1	33 ℓ/s
HB 2	No. 1	Downstream Attenuation Area No. 2	16 ℓ/s

HB 3	No. 2	Downstream Attenuation Area No. 3	10 ℓ/s
HB 4	No. 2	Outfall Manhole	8.6 ℓ/s

Refer to the Waterman Moylan Drawing No. FLE-WMC-CA4-ZZ-DR-C-P0210 Proposed SuDS Layout for details of the location of the above flow control devices.

4.6.4 Storage Volume Offered by Proposed SuDS Features

The SuDS features proposed for the subject site are summarised in the tables to follow.

Table 4-4: Summary of Storage Offered

Subject Site (Planning Application 1)					
SUDS feature	Types of Contributing Areas	SUDS Feature Area (m^2)	Voids ratio	Depth (m)	Storage provided (m^3)
Permeable paving	Private driveways and residential roofs	2,920 m^2	0.30	0.45	394 m^3
Bio-Retention Tree Pits	Roads, footpaths, green space areas	29 m^2	0.30	1.00	8.70 m^3
Bio-Retention Rain Garden	Footpaths, roads, green space areas	450 m^2	0.30	0.80	108 m^3
Swales	Road, footpaths, roofs, green space areas	134 m^2	0.30	0.80	32.0 m^3
Attenuation Area No. 1 – Detention Basin	Road, footpaths, roofs, green space areas	542 m^2	1.00	0.50	200 m^3
Attenuation Area No. 1 - Stone Void Storage	Road, footpaths, roofs, green space areas	550 m^2	0.40	0.50	110 m^3
Attenuation Area No. 2 – Stone Void Storage	Road, footpaths, roofs, green space areas	600 m^2	0.40	1.00	360 m^3
Temporary Attenuation Area	Road, footpaths, roofs, green space areas	910 m^2	1.00	1.70	1,230 m^3
Total Storage Offered					2,442 m^3

The subject site requires a total attenuation storage volume of 2,115 m^3; this volume is achieved through the use of the above SuDS features which offer 2,442 m^3 of storage.

Refer to Waterman Moylan Drawing-no. FLE-WMC-CA4-ZZ-DR-C-P0210 for the proposed SuDS layout.

4.7 Local Authority Guidance

The surface water management strategy for the subject development has been developed in accordance with the GDSDS guidelines, CIRIA SuDS Manual guidance, the Fingal County Council Development Plan,

and the Flemington LAP. Under *Section 3.1 Design Guide Summary* of the Development Plan, it is noted that applicants are requested to complete the following as part of a planning submission:

- Surface Water Management Design Statement
- Fingal SuDS Selection Hierarchy Sheet
- Statement of Green / Blue Infrastructure Areas.

The above documents are intended to assist in clearly demonstrating compliance with SuDS development standards and objectives.

These three documents have been completed for the subject development and are included under Appendix D of this report for ease of reference.

4.8 Surface Water Network Design

Calculations for pipe sizes and gradients are based on surface water runoff from hardstanding areas such as the cycle tracks, storage containers, access road, the parking areas, and footpaths, using the Rational Method for surface water design (Bilhams Formula), with a storm return period (N) of 5 years.

Strict separation of surface water and wastewater will be implemented within the development. Drains will be laid in such a manner as to minimise the risk of inadvertent connection of waste pipes to the surface water system.

Surface water local drains will be a minimum of 150mm dia. and generally will consist of PVC (to IS 153) or concrete socket and spigot pipes (to IS 6). These drains will be laid to comply with the requirements of Fingal County Council.

Pipe capacities and velocities have been calculated using the Colebrook-White formula with a roughness coefficient (Ks) of 0.6 mm.

5. SUDS Design

5.1 SUDS Assessment

As per Fingal County Council guidelines surface water and SUDS will be managed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS) Regional Drainage Policies Volume 2, for New Developments and CIRIA documents. These documents specify that surface water run-off is to be managed as close to its source as possible. The following section outlines the SUDS strategy and maintenance for the subject site.

Sustainable Urban Drainage Systems (SUDS) have been developed and are in use to alleviate the detrimental effects of traditional urban stormwater drainage practices that typically consisted of piping run-off of rainfall from developments to the nearest receiving watercourse. Surface water drainage methods that take account of quantity, quality, and amenity issues are collectively referred to as SUDS. They are typically made up of one or more structures, built to manage surface water run-off by using nature-based solutions.

The use of SUDS to control run-off also provides the additional benefit of reducing pollutants in the surface water by settling out suspended solids, and in some cases providing biological treatment.

The proposed surface water drainage system for this development has been designed as a sustainable urban drainage system and uses permeable surfacing for private parking areas / driveways, swales adjacent to roads/footpaths, bio-retention tree pits, rain gardens and above ground retention basins to achieve:

- Treatment of runoff and removal of pollutants to improve quality.
- Restriction of outflow and controlling quantity of flow; and
- Increased amenity value for the development.

A stormwater management or treatment train approach assures that run-off quantity and quality are improved. The following objectives of the treatment train provide an integrated and balanced approach to help mitigate the changes in stormwater run-off flows that occur as land is urbanised and to help mitigate the impacts of stormwater quality on receiving systems:

1) **Source control:** conveyance and infiltration of run-off; and

2) **Site Control:** reduction in volume and rate of surface run-off, with some additional treatment provided.

The applicant has considered the use of all appropriate SUDS measures as part of the site SUDS strategy; details are outlined in Table 5-1.

Table 5-1: SUDS Measures

SUDS Stage	SUDS Measure	Measure Outline	Use on site
Source Control	Permeable Surfacing / Paving	Permeable surfacing materials are made of porous material that enable surface water runoff to flow through or between the blocks into a layer of imported, easily	The permeable paving driveways will collect overland surface water runoff at source from the parking, from adjacent footpath

SUDS Stage	SUDS Measure	Measure Outline	Use on site
		draining, material. Generally permeable surfacing areas will be constructed with permeable pipe systems below ground that connect into the surface water mainline with an inspection chamber.	arrangements, and from the residential dwelling roofs.
	Bio-retention Tree Pits	Bio-retention systems are shallow landscaped depressions that can reduce runoff rates and volumes and treat pollution through the use of engineered soils and vegetation. The are particularly effective in delivering interception of rainfall. The pits will intercept and treat rainfall directly before discharging into the surface water network.	Bio-retention tree pits will be constructed next to parking bays, adjacent to the internal roads network.
	Swales	Swales are shallow, landscaped depressions designed to store and/or convey run-off and remove pollutants. They may be used as conveyance structures to pass the run-off to the next stage of the treatment train and can be designed to promote infiltration where soil and groundwater conditions allow.	Swales are proposed throughout the subject development, adjacent to hardstanding areas such as roads and footpaths.
	Rain Garden	Rain gardens are proposed as a sustainable urban drainage system (SUDS) feature for the site to manage rainwater effectively. These landscaped depressions are designed to collect, filter, and infiltrate rainwater runoff from impermeable surfaces, such as roofs, pavements, and carparks.	Rain gardens are proposed throughout the proposed development will slow down runoff, reducing peak flow rates and improving water quality by allowing natural filtration through soil and vegetation.
Site Control	Retention / Detention Basins	Retention basins are proposed to be utilised for attenuation of surface water. These basins can be utilised during regular weather conditions and generally remain dry with water levels increasing during heavier rainfall events. Retention basins are engineered depressions in the ground and are typical seeded with grass and may also be suitable for planting.	2-no. above ground attenuation areas are proposed for the subject development. This facility is proposed to capture surface water runoff during an extreme storm event.
	Below Ground	This SuDS feature will comprise a free-draining stone void storage layer	2-no. below ground stone void storage areas are proposed below

SUDS Stage	SUDS Measure	Measure Outline	Use on site
	Stone Void Storage	providing temporary storage of surface water runoff as part of the site-wide SuDS strategy. The stone storage layer will be surrounded by an appropriate geotextile to prevent migration of fines into the storage medium, with the system designed to provide the required effective storage volume. Surface water runoff will enter the storage area via the proposed drainage network and will be released at a controlled rate through the downstream flow control arrangement.	attenuation areas no. 1 and 2. This SuDS feature is proposed to attenuation surface water from catchment 1 within the proposed development.
	Petrol Interceptor	A petrol interceptor is a below-ground treatment unit designed to separate and retain hydrocarbons, oils and petrol from surface water runoff. It typically comprises a chamber with a coalescing filter that separates hydrocarbons from the incoming flow, allowing treated water to pass downstream.	A petrol interceptor will be provided upstream of attenuation areas to remove hydrocarbons and other pollutants from surface water runoff from vehicular areas prior to discharge to the downstream drainage network. The interceptor will be suitably sized and accessible for routine inspection and maintenance.
	Hydro-Brake	Hydro-Brake structures are used to restrict the outfall from the attenuation facilities to the equivalent of the existing greenfield run-off. This ensures the development will not give rise to any impact downstream of the site.	4-no. Hydro-Brake flow control devices have been included in the design and are proposed to be installed upstream of the mainline connection, to ensure the outfall flow is restricted to the Greenfield Runoff Rate (a total of 8.60 ℓ/s).

In accordance with The SuDS Manual (CIRIA C753) the pollution prevention guidelines have been followed to ensure appropriate levels of treatment are provided before attenuated run-off from the site is discharged into the ordinary watercourse, the Irish sea.

Refer to Waterman Moylan Drawing-no. FLE-WMC-ZZ-ZZ-DR-C-P0200 for the proposed drainage and SUDS details.

5.2 SUDS Maintenance

For the SUDS strategy to work as designed the entire drainage system must be well maintained. It will be the responsibility of the landowners and site management team to ensure the drainage system is maintained. Maintenance and cleaning of gullies, and manholes will ensure adequate performance.

Maintenance schedules for the various SUDS features have been sourced from The SuDS Manual (CIRIA C753) and summarised in the tables to follow.

Table 5-2: Permeable Surfacing / Pavement Maintenance Schedule

	Maintenance Period	Maintenance Task	Frequency
Permeable Surfacing	Regular	Brushing and vacuuming (standard cosmetic sweep over the whole surface)	Once a year, after autumn leaf fall, or as required, based on site specific observations of clogging or manufacturer's recommendations.
	Occasional	Removal of weeds	As required
	Remedial actions	Remediation work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users	As required
	Monitoring	Inspect silt accumulation rates and establish appropriate brushing frequencies. Monitor inspection chambers.	Annually

Table 5-3: Bio-Retention Tree Pit Maintenance Schedule

	Maintenance Period	Maintenance Task	Frequency
Bio-Retention Tree Pits	Regular	Remove the litter and debris	Monthly, or as required
		Cut grass (if applicable) – to retain height within specified design range.	Monthly (during growing season), or as required
		Manage other vegetation and remove nuisance plants.	Monthly at start, then as required
		Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly
		Inspect infiltration coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
		Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Half yearly
	Occasional	Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required	As required or if soil is exposed over 10% or more of the swale treatment area
	Remedial actions	Repair erosion or other damage by re-turfing or re-seeding	As required
		Re-level uneven surfaces and reinstate design levels	As required
		Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip	As required
		Remove and dispose of oils or petrol residues using safe standards practices	As required

Table 5-4: Swale Maintenance Schedule

	Maintenance Period	Maintenance Task	Frequency
Swales	Regular	Remove the litter and debris	Monthly, or as required
		Cut grass – to retain height within specified design range.	Monthly (during growing season), or as required
		Manage other vegetation and remove nuisance plants.	Monthly at start, then as required
		Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly
		Inspect infiltration coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
		Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Half yearly
	Occasional	Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required	As required or if soil is exposed over 10% or more of the swale treatment area
	Remedial actions	Repair erosion or other damage by re-turfing or re-seeding	As required
		Re-level uneven surfaces and reinstate design levels	As required
		Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip	As required
		Remove and dispose of oils or petrol residues using safe standards practices	As required

Table 5-5: Detention / Retention Basin Maintenance Schedule

	Maintenance Period	Maintenance Task	Frequency
Detention / Retention Basin	Regular	Remove the litter and debris	Monthly
		Cut grass – for spillways and access routes	Monthly (during growing season), or as required
		Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
		Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly
		Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
		Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Monthly (for first year), then annually or as required
		Check any penstocks and other mechanical devices	Annually
		Tidy all dead growth before start of growing season	Annually
		Remove sediment from inlets, outlet and forebay	Annually (or as required)
		Manage wetland plants in outlet pool – where provided	Annually
	Occasional	Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required	As required or if soil is exposed over 10% or more of the swale treatment area
		Prune and trim any trees and remove cuttings	Every 2 years, or as required
		Remove sediment from inlets, outlets, forebay and main basin when required	Every 5 years, or as required
	Remedial actions	Repair erosion or other damage by re-turfing or re-seeding	As required
		Realignment of rip-rap	As required
		Repair/rehabilitation of inlets, outlets and overflows	As required
		Relevel uneven surfaces and reinstate design levels	As required

Table 5-6: Rain Garden Maintenance Schedule

	Maintenance Period	Maintenance Task	Frequency
Rain Garden	Regular	Check operation of underdrains by inspection of flows after rain	Annually
	Regular	Remove litter and surface debris and weeds	As required
	Occasional	Replace any plants, to maintain planting density	As required
	Remedial actions	Infill any holes or scour in the filter medium, improve erosion protection if required	As required
	Monitoring	Remove and replace filter medium and vegetation above	As required

Table 5-7: Hydro-brake Maintenance Schedule

	Maintenance Period	Maintenance Task	Frequency
Hydro-brake	Regular	Inspect for blockages (silt, debris, or rags)	Quarterly, or after major storm events
		Clean debris and sediment from around and within the unit	Quarterly, or as required
		Check for corrosion or physical damage	Quarterly
		Verify correct operation (flow restriction and bypass, if any	Bi-annually
	Occasional	Full system inspection during low-flow periods	Annually, or as required
	Remedial actions	Repair or replace damaged components	As required
		Reseal or recoat to prevent corrosion (if applicable)	Every 5 years or as needed

6. Water Supply

6.1 Introduction

The surrounding area in Balbriggan is serviced by Uisce Éireann with water supply infrastructure, the water supply network for which the site will connect into two locations east and south of the subject site.

A Pre-Connection Enquiry (PCE) form with the proposed LAP development (including the subject development) water demand requirements was submitted by Waterman Moylan to Uisce Éireann in January of 2026 for an estimated 700-no. residential units. A response in the form of a Confirmation of Feasibility (COF) Letter, with ref. CDS25008619, was received from Uisce Éireann on the 26th of January 2026. The COF stated the following regarding the water supply connection for the proposed LAP development:-

"Feasible subject to upgrades"

The requested upgrade works relate to the full LAP development, with the identified connection points for these upgrades located outside the boundary of the subject development. The specific connection location required to serve the subject site, within the LAP development, will be determined through the Uisce Éireann connection application and subsequent agreement.

The Confirmation of Feasibility for the LAP development including details of the requested water supply upgrades is attached in Appendix B.

6.2 Existing Infrastructure

Information pertaining to the existing water supply infrastructure in the vicinity of the subject development is retrieved from the Uisce Éireann COF Letter and the Uisce Éireann Data requests.

According to the Uisce Éireann COF an existing 400mm MOPVC watermain is located within Flemington Lane, west of the development, and an existing 102mm uPVC watermain is located within R132, east of the development.

Refer to Figure 6-1 for an indicative sketch of the existing water supply is in the vicinity of the subject development.

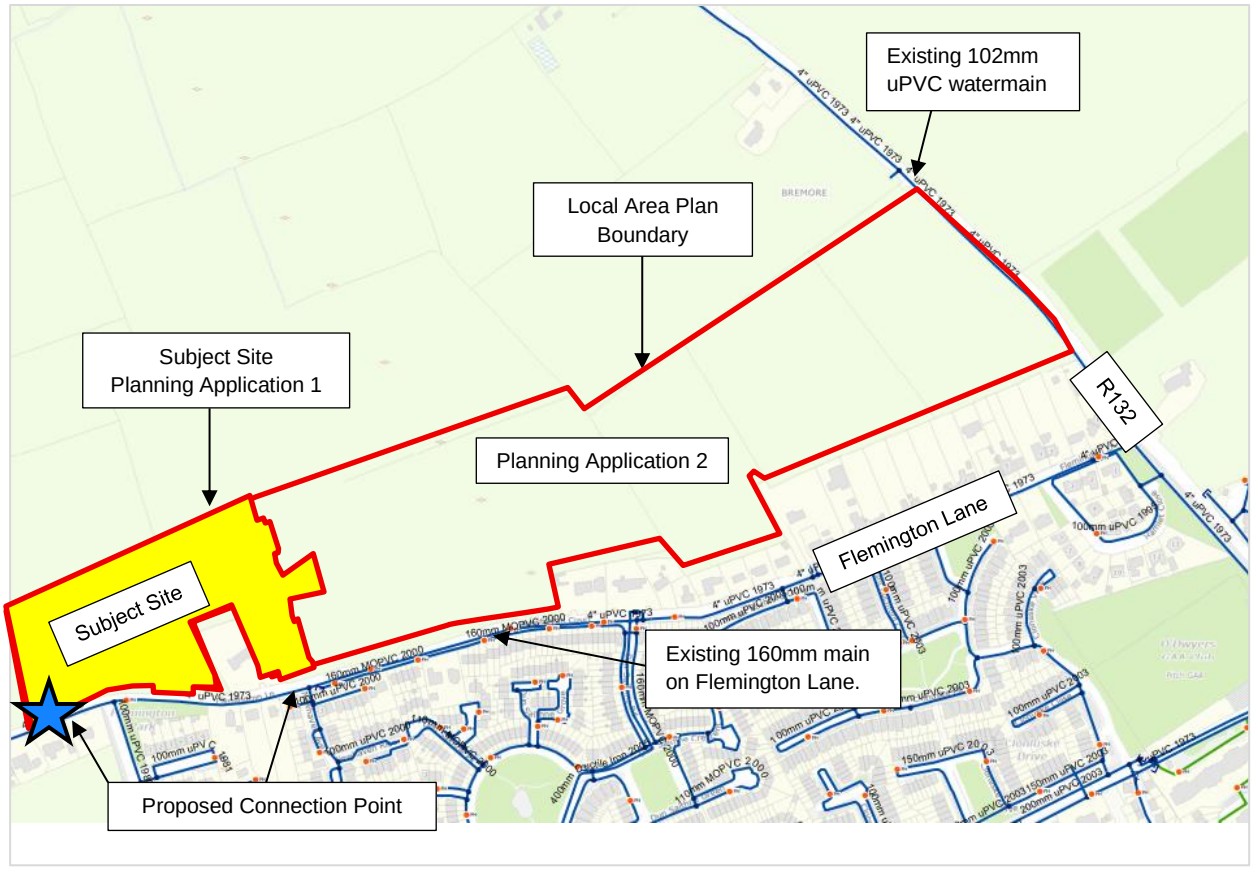

Figure 6-1 Indicative Sketch – Existing Uisce Éireann Water Supply Infrastructure near Subject Lands

6.3 Proposed Water Supply Network and Demand Calculation

It is proposed to connect the subject site's water supply into existing water supply networks to the south of the site within Flemington Lane, as shown above. The extension and connection main will be 101.6mm uPVC pipes.

A water meter in accordance with the Uisce Éireann's Water Code of Practice will be installed on the proposed network before connecting into the existing 101.6 mm uPVC diameter watermain.

The proposed connection location of the subject developments water supply network is proposed at the subject development's access points on Flemington Lane. Refer to Figure 6-1 for which shows the proposed location with an indicative orange star.

Refer to Waterman Moylan Drawing-no. FLE-WMC-ZZ-XX-DR-C-P0300 for the proposed water supply layout.

Based on the Uisce Éireann Code of Practice and the current schedule of accommodation received from the architect, the water supply demand for the proposed development will be as outlined in Table 6-1.

The schedule of accommodation outlines 146-no. residential units within the subject development and 106-no. individuals at the proposed creche (87-no. children and 19-no. staff).

Table 6-1: Total Water Demand Calculation

Description	No. of Units	Flow (ℓ/h/day)	Population per Unit	Average Daily Domestic Demand (ℓ/d)
Residential Development	146-no.	150	2.7	59,130
Creche	1-no.	90	106	9,540
				68,670
Average Daily Domestic Demand (from above)				68,670 ℓ/d
Average Daily Domestic Demand				0.795 ℓ/s
Average Day/Peak Week Demand (x1.25)				1.00 ℓ/s
Daily Peak Demand (x5)				4.97 ℓ/s

As can be seen from the above table, the total daily peak water supply demand for the development is 4.97 ℓ/s. The total water requirement, from the public supply, for the development, is estimated at 68.67 m^3/day.

6.4 Watermain Network Design

Water Mains suitable for works and approved by Uisce Éireann shall be polyethylene (PE), with PE80 or PE100 rating (MDPE, HDPE or HPPE).

Refer to Figure 6-1 for an indicative sketch of the existing water supply network for the subject site. All water infrastructure will be designed in strict accordance with Uisce Éireann's Standards and Code of Practice.

Refer to Waterman Moylan Drawing-no. FLE-WMC-ZZ-XX-DR-C-P0300 for details of the existing and proposed watermain to serve the subject lands.

6.5 Water Conservation

The water demand for the development can be subdivided as follows:

- Potable / Non-potable Breakdown

Detailed studies have quantified the breakdown between potable and non-potable uses for residential uses. According to the guideline: Promoting Sustainable Household Water Consumption, issued by Irish Water in September 2019, Figure 2.3 of the document (shown in Figure 6-2 below) illustrates the water use patterns that have been documented for a three-person household in the UK (insufficient data is available from Ireland households).

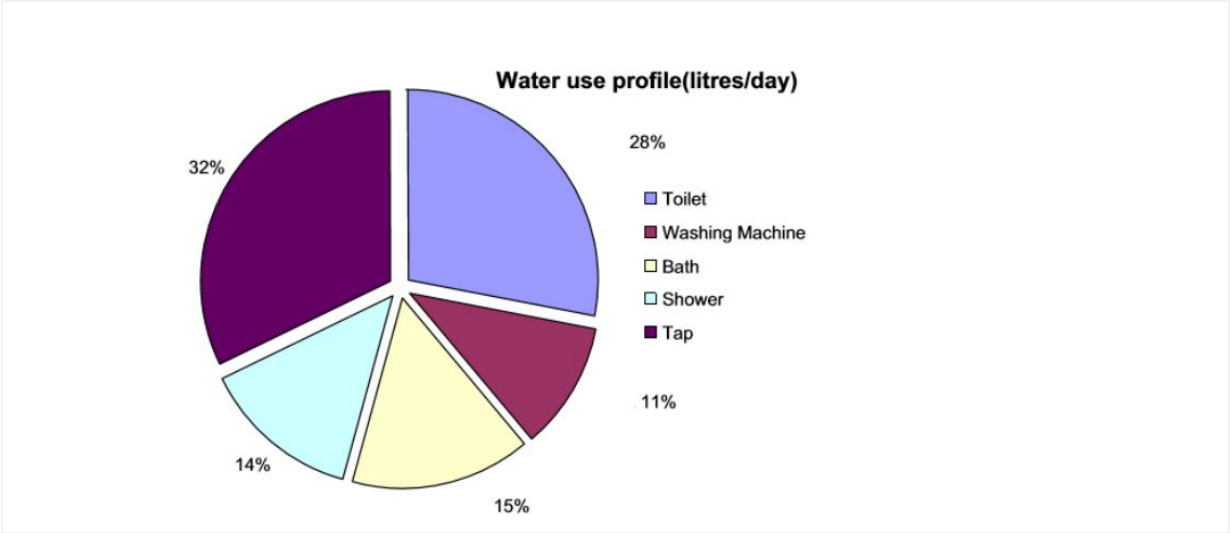

Figure 6-2: Water use patterns for 3-person households

The following water conservation measures will be used, to reduce overall water demand – water saving device installations including:

- Kitchen tap swivel aerator
- Water saving shower heads
- Spray taps
- Low volume flush / dual flush WC's
- Draw off tap controls
- Leak detection measures – through the metering of supply

7. Transportation

A number of supporting transportation and mobility documents have been prepared by Waterman Moylan Consulting Engineers under separate cover in support of the proposed development. These documents provide further detail on the existing and proposed transportation, parking, cycling, servicing and mobility arrangements and should be read in conjunction with the relevant application documentation.

The supporting documents comprise of the following:

- 25-107r.004Traffic and Transport Assessment
- 25-107r.007 Mobility Management Plan
- 25-107r.008 DMURS Statement of Consistency

7.1 Traffic and Transport Assessment

A Traffic and Transport Assessment, with reference 25-107r.004, has been prepared by Waterman Moylan Consulting Engineers, which will be implemented and developed on an ongoing basis with the triple objectives of promoting sustainability, enhancing public transport, and reducing dependency on the use of the private car.

7.2 Mobility Management Plan

A Mobility Management Plan has been prepared by Waterman Moylan Consulting Engineers, which will be implemented and developed on an ongoing basis with the triple objectives of promoting sustainability, enhancing public transport, and reducing dependency on the use of the private car.

The Mobility Management Plan is designed to address the typical day-to-day operational requirements at the site. It will be implemented and managed by the Mobility Management Plan Coordinator, who will be responsible for overseeing the implementation and management of the Mobility Management Plan.

The Mobility Management Plan is detailed in the Waterman Moylan Consulting Engineers report No. 25-107r.007 Mobility Management Plan, which is included in the documentation package.

7.3 DMURS Statement of Consistency

Waterman Moylan Consulting Engineers considers that the proposed development is consistent with the principles and guidance outlined in the Design Manual for Urban Roads and Streets (DMURS), details of the specific design features are set out in the Waterman Moylan Consulting Engineers Report No. 25-107r.008 DMURS Statement of Consistency, which is included in the documentation package.

7.4 Quality Audit

Furthermore, a Quality Audit undertaken by RoadPlan is submitted under a separate cover as part of this application. A Quality Audit is a comprehensive assessment of the proposed development's transportation and street design arrangements, undertaken to review the quality, safety and functionality of the proposed movement network for all road users. The assessment considers the needs of pedestrians, cyclists and vehicular traffic, including road safety, accessibility, permeability, connectivity, DMURS principles and the interaction between different modes of transport. The Quality Audit incorporates the relevant Road Safety

Audit and provides recommendations to ensure that the proposed development facilitates a safe, accessible and well-connected environment for all users.

All recommendations within the audit have been incorporated into the development's site design.

A copy of the Quality Audit can be found under Appendix E of this report.

APPENDICES

A. Stingray Infiltration Test Results

Infiltration Test
BRE Digest 365

Reference Number: SEE-S1005
Address: Flemington Lane, Balbriggan, Co.Dublin
Project: Waterman Moylan 25-107 Flemington, Balbriggan

April 2026

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GDPR

The new data protection laws, GDPR, effective 25th May 2018.

A main principle of our data protection policy:

- Personal data will be processed lawfully, fairly and in a transparent manner in relation to the data subject.
- Personal data will be collected for specified, explicit and legitimate purposes and not further processed in a manner that is incompatible with those purposes.
- Personal data will be adequate, relevant, and limited to what is necessary in relation to the purposes for which they are processed.
- Personal data will be accurate and where necessary kept up to date.
- Personal data will be kept in a from which permits identification of data subjects for no longer than is necessary for the purposes for which the personal date is processed.
- Personal data will be processed in a manner that ensures appropriate security of the personal data, including protection against unauthorised or unlawful processing and against accidental loss, destruction, or damage, using appropriate technical or organisational measures.

We would like to continue to correspond with you by email and text. If you wish to continue, you need take no further action. Otherwise simply forward the email, letter or text message and confirm if you no longer wish to receive correspondence via email or SMS.

Stingray Environmental Engineering Ltd. Registered Office: 2 Forgehill Close, Stamullen, Co. Meath, K32 VK76, Registered in Ireland. Company Reg. No.639965, A private company limited by shares having a share capital. Directors: Waldemar Debowski
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3. Hydrogeological setting 23
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Stingray Environmental
Engineering
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Introduction

This report is based on the findings of a soil infiltration examination, carried out by Stingray Environmental Engineering Ltd. on the 13th of March 2026 and provides calculations for soil infiltration rate in line with test requirements of BRE365 and Fingal County Council.

1. Site Specific Information

- Site Location: **Flemington Lane, Balbriggan, Co.Dublin**

Figure 1. Site Location

Figure 2. Site Location; Flemington Lane

Figure 3. BRE365 Test Locations

Figure 4. Test Pit A; X318442, Y264596

Figure 5. Test Pit B; X318838, Y264694

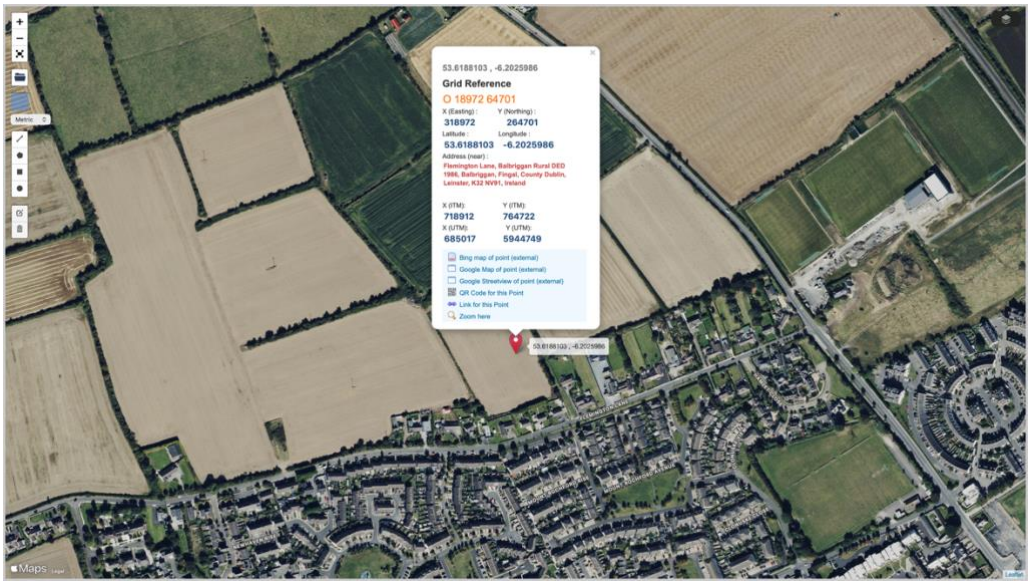

Figure 6. Test Pit C; X318972, Y264701

Figure 7. Test Pit D; X319072, Y264777

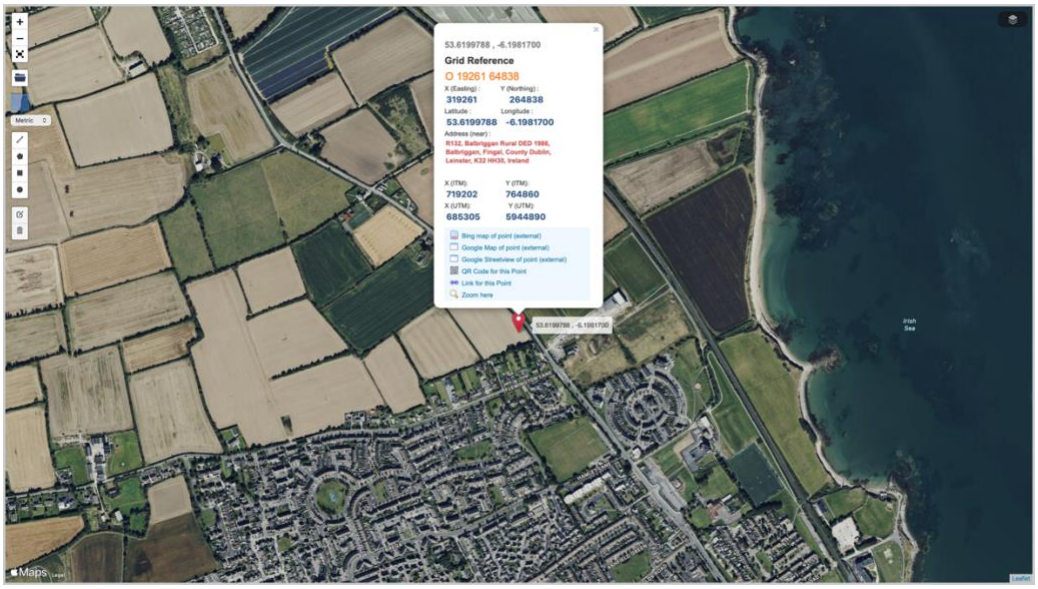

Figure 8. Test Pit E; X319261, Y264838

2. Infiltration Test BRE Digest 365

Test Pit A:

- **Dimensions**: L 1000mm x W 400mm x D1200mm
- **Effective Depth adopted**: 1000mm BCL
- **Rock:** not encountered at 1.20m BCL
- **Groundwater ingress:** encountered at 1.10m BCL
- $f=V_{75-25}/ (a_{50}*t_{75-25})$ = unable to calculate as water level has risen
- $V_{75-25}=1.0m*0.4m*0.5m=0.2m^3$
- $A_{50\,base}=(2*1.0m*0.5m) +(2*0.4m*0.5m) +(1*1.0m*0.4m) =1.8m^2$
- Calculated t_{75-25}=RISE 200mm unable to calculate

Date	13-03-2026	13-03-2026	Drop/Rise [mm]
Time	10:00	12:15	
Water Level	CL-200mm	CL-0mm	Rise 200mm

Figure 9. Site View 13-03-2026

Figure 10. Site View 13-03-2026

Figure 11. Site View 13-03-2026

Figure 12. Site View West 13-03-2026

Figure 13. Infiltration Test A 13-03-2026. Ground water ingress at 1.1m

Figure 14. Infiltration Test A 13-03-2026. Water ingress 1.2m

Figure 15. Infiltration Test A 13-03-2026

Figure 16. Infiltration Test A 13-03-2026

Figure 17. Infiltration Test A 13-03-2026 excavated soil

Test Pit B:

- **Dimensions**: L 1000mm x W 400mm x D1200mm
- **Effective Depth adopted**: 1000mm BCL
- **Rock:** not encountered at 1.20m BCL
- **Groundwater ingress:** not encountered at 1.20m BCL
- $f=V_{75-25}/ (a_{50}*t_{75-25})$ = **2.84900E-6=0.00000284900m/sec**
- $V_{75-25}=1.0m*0.4m*0.5m=0.2m^3$
- $A_{50\,base}=(2*1.0m*0.5m) +(2*0.4m*0.5m) +(1*1.0m*0.4m) =1.8m^2$
- Calculated $t_{75-25}=650min=39000sec$

Date	13-03-2026	13-03-2026	Drop/Rise [mm]
Time	10:30	12:40	
Water Level	CL-200mm	CL-300mm	Drop 100mm

Figure 18. Site View 13-03-2026

Figure 19. Site View 13-03-2026

Figure 20. Site View 13-03-2026

Figure 21. Site View 13-03-2026

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Figure 22. Infiltration Test B 13-03-2026

Figure 23. Infiltration Test B 13-03-2026

Figure 24. Infiltration Test B 13-03-2026

Figure 25. Infiltration Test B 13-03-2026

Figure 26. Infiltration Test B 13-03-2026

Figure 27. Infiltration Test B 13-03-2026 excavated soil

Test Pit C:

- **Dimensions**: L 1000mm x W 400mm x D1200mm
- **Effective Depth adopted**: 1000mm BCL
- **Rock:** not encountered at 1.20m BCL
- **Groundwater ingress:** not encountered at 1.20m BCL
- $f=V_{75-25}/ (a_{50}*t_{75-25})$ = **3.52734 E-6=0.00000352734m/sec**
- $V_{75-25}=1.0m*0.4m*0.5m=0.2m^3$
- $A_{50\,base}=(2*1.0m*0.5m) +(2*0.4m*0.5m) +(1*1.0m*0.4m) =1.80m^2$
- Calculated $t_{75-25}=525min=31500sec$

Date	13-03-2026	13-03-2026	Drop/Rise [mm]
Time	11:00	12:45	
Water Level	CL-200mm	CL-300mm	Drop 100mm

Figure 28. Site View 13-03-2026

Figure 29. Site View 13-03-2026

Figure 30. Site View 13-03-2026

Figure 31. Site View 13-03-2026

Figure 32. Infiltration Test C 13-03-2026

Figure 33. Infiltration Test C 13-03-2026

Figure 34. Infiltration Test C 13-03-2026

Figure 35. Infiltration Test C 13-03-2026

Figure 36. Infiltration Test C 13-03-2026

Figure 37. Infiltration Test C 13-03-2026 excavated soil

Test Pit D:

- **Dimensions**: L 1000mm x W 400mm x D1200mm
- **Effective Depth adopted**: 1000mm BCL
- **Rock:** not encountered at 1.20m BCL
- **Groundwater ingress:** encountered at 1.10m BCL
- $f=V_{75-25}/ (a_{50}*t_{75-25})$ = **8.23045 E-6=0.00000823045m/sec**
- $V_{75-25}=1.0m*0.4m*0.5m=0.2m^3$
- $A_{50\,base}=(2*1.0m*0.5m) +(2*0.4m*0.5m) +(1*1.0m*0.4m) =1.80m^2$
- Calculated t_{75-25}=225min=13500sec

Date	13-03-2026	13-03-2026	Drop/Rise [mm]
Time	11:15	13:30	
Water Level	CL-200mm	CL-500mm	Drop 300mm

Figure 38. Site View 13-03-2026

Figure 39. Site View 13-03-2026

Figure 40. Site View 13-03-2026

Figure 41. Site View 13-03-2026

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Figure 42. Infiltration Test D 13-03-2026

Figure 43. Infiltration Test D 13-03-2026. Water ingress 1.1m BGL

Figure 44. Infiltration Test D 13-03-2026

Figure 45. Infiltration Test D 13-03-2026

Figure 46. Infiltration Test D 13-03-2026

Figure 47. Infiltration Test D 13-03-2026 Excavated soil

Test Pit E:

- **Dimensions**: L 1000mm x W 400mm x D1200mm
- **Effective Depth adopted**: 1000mm BCL
- **Rock:** not encountered at 1.20m
- **Groundwater ingress:** not encountered at 1.20m
- $f=V_{75-25}/ (a_{50}*t_{75-25})$ = **1.78348 E-5=0.0000178348m/sec**
- $V_{75-25}=1.0m*0.4m*0.5m=0.2m^3$
- $A_{50\,base}=(2*1.0m*0.5m) +(2*0.4m*0.5m) +(1*1.0m*0.4m) =1.80m^2$
- Calculated $t_{75-25}=104min=6230sec$

Date	13-03-2026	13-03-2026	Drop/Rise [mm]
Time	11:30	13:45	
Water Level	CL-200mm	CL-850	Drop 650mm

Figure 48. Site View 13-03-2026

Figure 49. Site View 13-03-2026

Figure 50. Site View 13-03-2026

Figure 51. Site View 13-03-2026

Figure 52. Infiltration test E 13-03-2026

Figure 53. Infiltration test E 13-03-2026

Figure 54. Infiltration test E 13-03-2026

Figure 55. Infiltration test E 13-03-2026

Figure 56. Infiltration test E 13-03-2026. Excavated soil

3. Hydrogeological Setting

- Vulnerability Rating Moderate which would normally indicate bedrock in the area >2m BCL.
- Aquifer classified as Lm Locally Important
- Soil in the area classified as IrSTLPSsS (sandstone and shale till) with Surface and Ground Water Gleys ; Amin PD mineral poorly drained (mainly acidic).

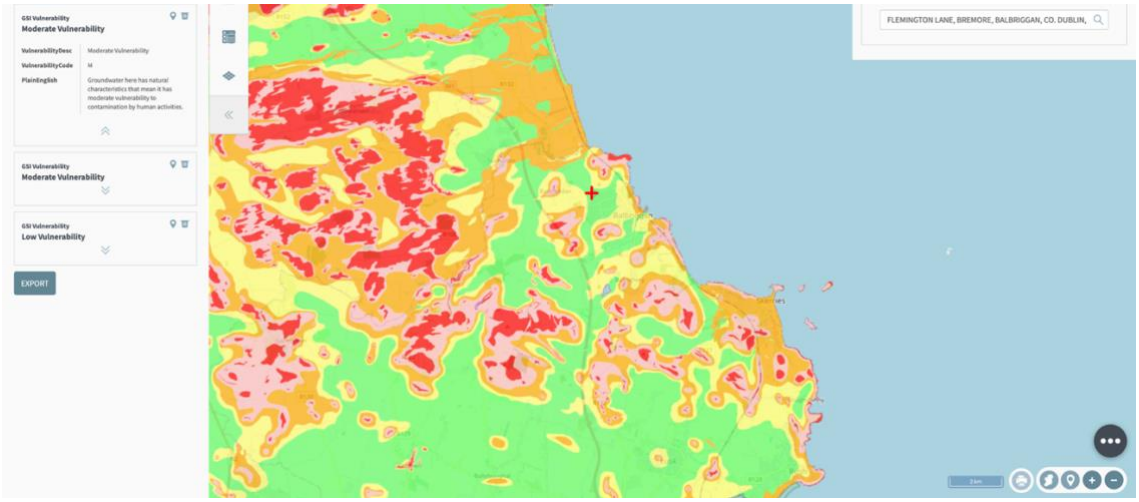


Figure 57. Vulnerability Moderate (source EPA)

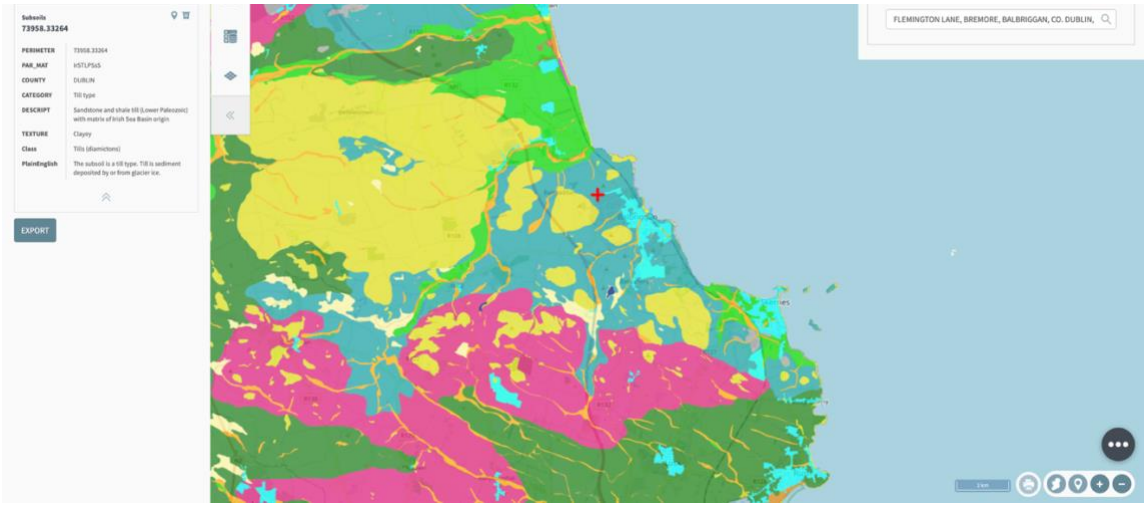


Figure 58. Subsoil (source EPA)

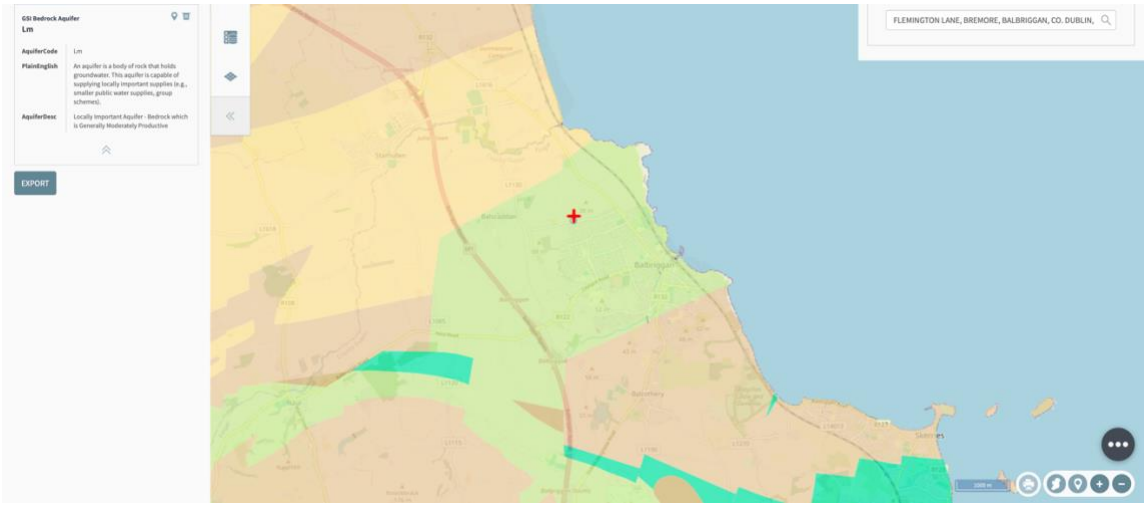


Figure 59. Aquifer Locally Important (source EPA)

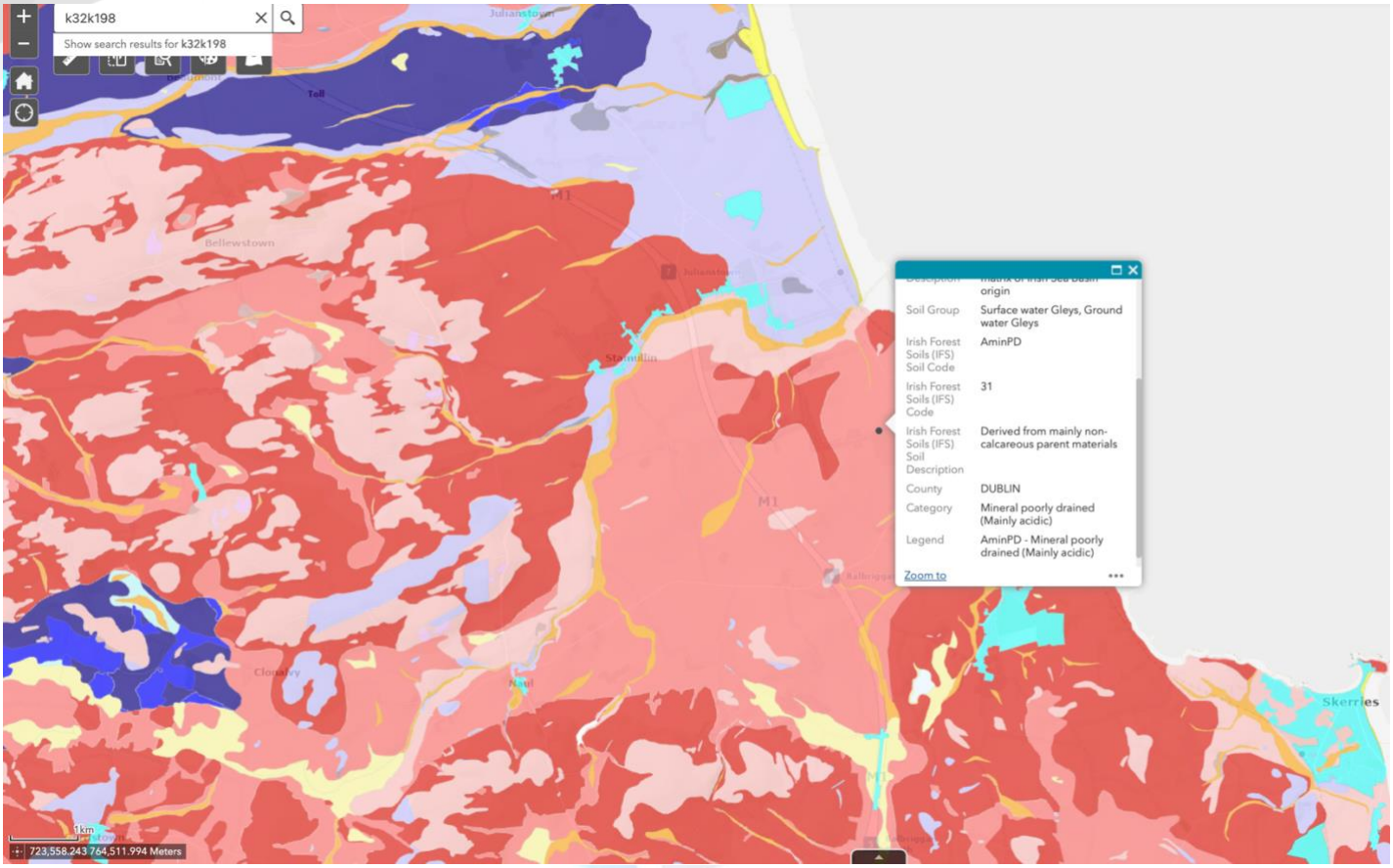


Figure 60. TEAGASC subsoil (source GSI)

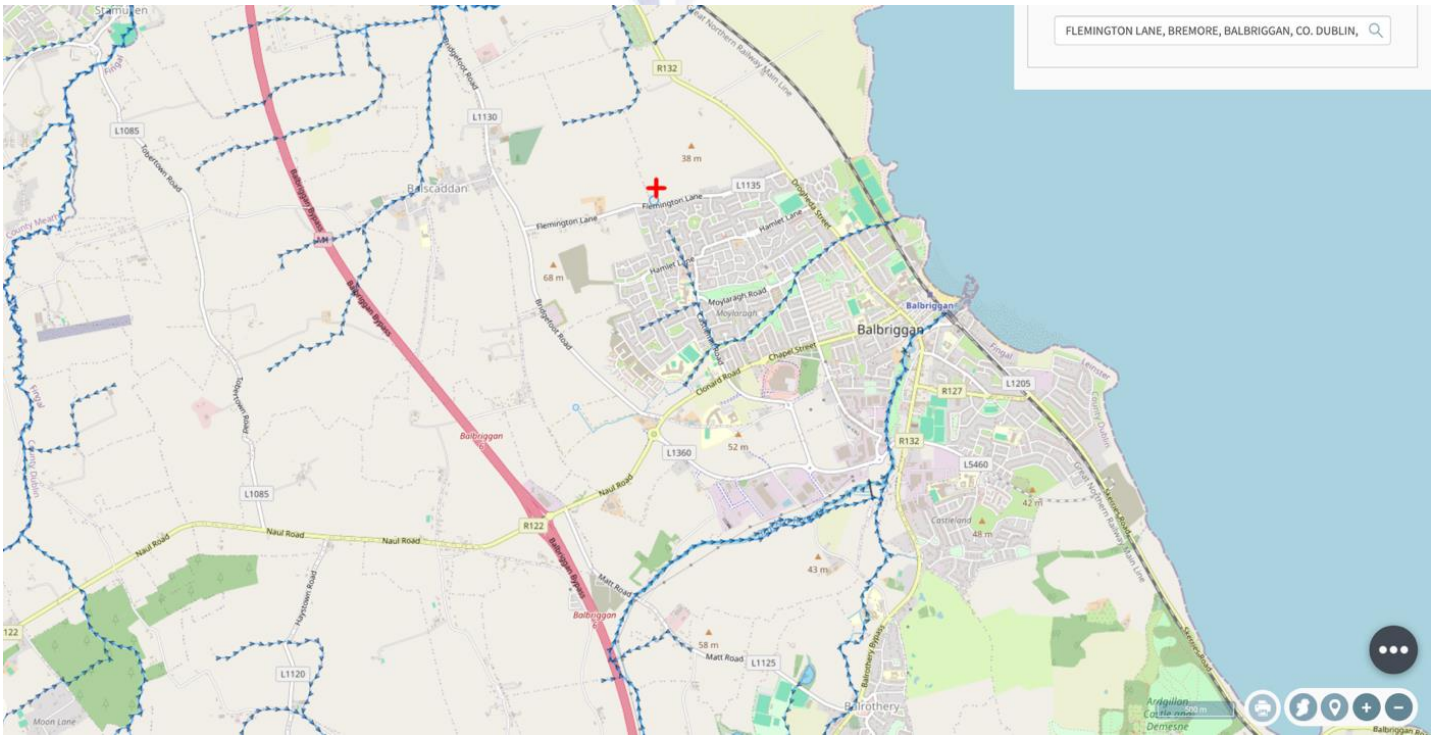


Figure 61. Surface water (source EPA)

4. Summary

	Inspection Date	Infiltration value	Inspection Date	Water Ingress BCL	Rock BCL
F1	13-03-2026	Unable to calculate	13-03-2026	1.10m	None at 1.20m
F2	13-03-2026	0.00000284900m/sec	13-03-2026	None at 1.20m	None at 1.20m
F3	13-03-2026	0.00000352734m/sec	13-03-2026	None at 1.20m	None at 1.20m
F4	13-03-2026	0.00000823045m/sec	13-03-2026	1.10m	None at 1.20m
F5	13-03-2026	0.0000178348m/sec	13-03-2026	None at 1.20m	None at 1.20m

Important Note

This report is only valid on the time of site inspection. The author cannot be responsible for any changes that could occur as result of construction, remediation, adjustment works completed afterwards. Additional ground investigation works may still be needed if further required by local authorities or any other governing bodies.

Signed: *Waldemar Debowski* Date: 10 April 2026

Qualifications: B.Eng. P.Grad.Dips. FETAC Cert MIEI MIAH

B. LAP Development Uisce Éireann Confirmation of Feasibility Letter

CONFIRMATION OF FEASIBILITY

Louis Song

Waterman Moylan
Block S, Eastpoint Business Park,
Alfie Byrne Road
Dublin
D03H3F4

Uisce Éireann
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Uisce Éireann
PO Box 448
South City
Delivery Office
Cork City

www.water.ie

26 January 2026

Our Ref: CDS25008619 Pre-Connection Enquiry
Site At, Flemington, Balbriggan, Dublin

Dear Applicant/Agent,

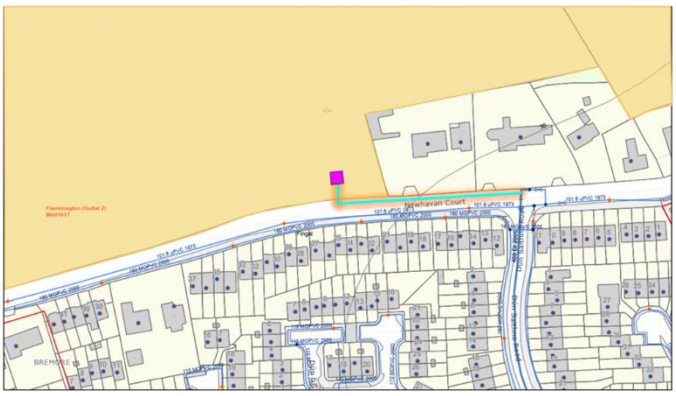
We have completed the review of the Pre-Connection Enquiry.

Uisce Éireann has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Housing Development of 700 unit(s) at Site At, Flemington, Balbriggan, Dublin, (the **Development)**.

Based upon the details provided we can advise the following regarding connecting to the networks;

- **Water Connection** - Feasible Subject to upgrades

- In order to accommodate the proposed Development, approximately 75m of network extension is required, from the end of the 400mm main on Dun Saithne Rd. to the development site (as shown on the Figure below).



Stiúrthóirí / Directors: Niall Gleeson (POF / CEO), Jerry Grant (Cathaoirleach / Chairperson), Gerard Britchfield, Liz Joyce, Michael Nolan, Patricia King, Eileen Maher, Cathy Mannion, Paul Reid, Michael Walsh.
Oifig Chláraithe / Registered Office: Teach Colvill, 24-26 Sráid Thalbóid, Baile Átha Cliath 1, D01 NP86 / Colvill House, 24-26 Talbot Street, Dublin, Ireland D01NP86
Is cuideachta ghníomhaíochta ainmnithe atá faoi theorainn scaireanna é Uisce Éireann / Uisce Éireann is a designated activity company, limited by shares.
Cláraithe in Éirinn Uimh.: 530363 / Registered in Ireland No.: 530363.

- The extension and connection main should be 225mm ID pipes. A meter with associated telemetry system is required to be installed on the connection main. The Developer will be required to fund the extension works. The fee will be calculated at a connection application stage.
- Secondary connection should be a 100mm ID main connected to the existing 4'' uPVC (as shown on the Figure below), with installed meter and associated telemetry system on the line. The connection must be closed during normal operation time.

- Both (primary and secondary) connections will be permitted to be opened, only during the build out phase of the Development. Once the development has been completed the secondary connection must be closed and the primary connection should operate as a single connection point for the whole Development. If any feed is required from the east side (secondary connection) over the long term, then significant upgrade requirements are likely.

- **Wastewater Connection** - Feasible without infrastructure upgrade by Uisce Éireann

This letter does not constitute an offer, in whole or in part, to provide a connection to any Uisce Éireann infrastructure. Before the Development can be connected to our network(s) you must submit a connection application and be granted and sign a connection agreement with Uisce Éireann.

As the network capacity changes constantly, this review is only valid at the time of its completion. As soon as planning permission has been granted for the Development, a completed connection application should be submitted. The connection application is available at www.water.ie/connections/get-connected/

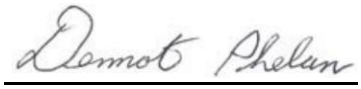
Where can you find more information?

- **Section A -** What is important to know?
- **Section B -** Details of Uisce Éireann's Network(s)

This letter is issued to provide information about the current feasibility of the proposed connection(s) to Uisce Éireann's network(s). This is not a connection offer and capacity in Uisce Éireann's network(s) may only be secured by entering into a connection agreement with Uisce Éireann.

For any further information, visit **www.water.ie/connections, email newconnections@water.ie** or contact 1800 278 278**.**

Yours sincerely,



Dermot Phelan
Connections and Developer Services

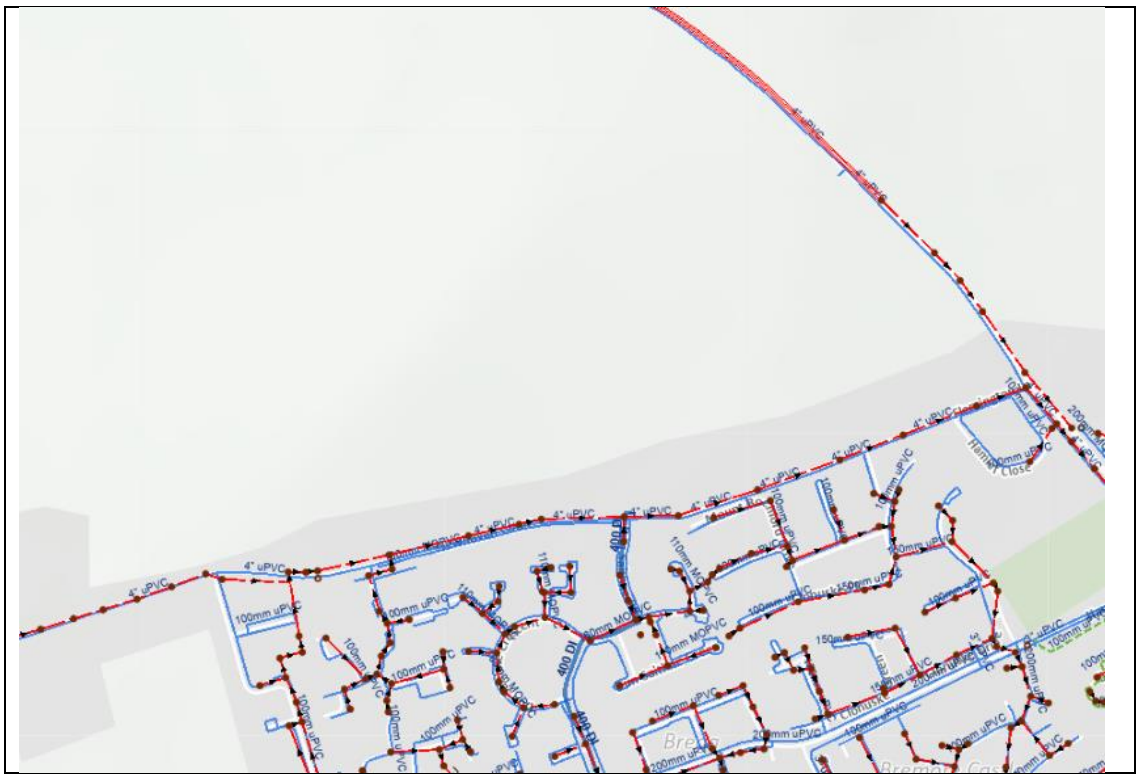
Section A - What is important to know?

What is important to know?	Why is this important?
Do you need a contract to connect?	• Yes, a contract is required to connect. This letter does not constitute a contract or an offer in whole or in part to provide a connection to Uisce Éireann's network(s). • Before the Development can connect to Uisce Éireann's network(s), you must submit a connection application and be granted and sign a connection agreement with Uisce Éireann.
When should I submit a Connection Application?	• A connection application should only be submitted after planning permission has been granted.
Where can I find information on connection charges?	• Uisce Éireann connection charges can be found at: https://www.water.ie/connections/information/charges/
Who will carry out the connection work?	• All works to Uisce Éireann's network(s), including works in the public space, must be carried out by Uisce Éireann*. *Where a Developer has been granted specific permission and has been issued a connection offer for Self-Lay in the Public Road/Area, they may complete the relevant connection works
Fire flow Requirements	• The Confirmation of Feasibility does not extend to fire flow requirements for the Development. Fire flow requirements are a matter for the Developer to determine. • **What to do?** - Contact the relevant Local Fire Authority
Plan for disposal of storm water	• The Confirmation of Feasibility does not extend to the management or disposal of storm water or ground waters. • **What to do?** - Contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges.
Where do I find details of Uisce Éireann's network(s)?	• Requests for maps showing Uisce Éireann's network(s) can be submitted to: datarequests@water.ie

What are the design requirements for the connection(s)?	• The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this Development shall comply with ***the Uisce Éireann Connections and Developer Services Standard Details and Codes of Practice,*** available at www.water.ie/connections
Trade Effluent Licensing	• Any person discharging trade effluent** to a sewer, must have a Trade Effluent Licence issued pursuant to section 16 of the Local Government (Water Pollution) Act, 1977 (as amended). • More information and an application form for a Trade Effluent License can be found at the following link: https://www.water.ie/business/trade-effluent/about/ **trade effluent is defined in the Local Government (Water Pollution) Act, 1977 (as amended)

Section B – Details of Uisce Éireann's Network(s)

The map included below outlines the current Uisce Éireann infrastructure adjacent the Development: To access Uisce Éireann Maps email datarequests@water.ie



Reproduced from the Ordnance Survey of Ireland by Permission of the Government. License No. 3-3-34

Note: The information provided on the included maps as to the position of Uisce Éireann's underground network(s) is provided as a general guide only. The information is based on the best available information provided by each Local Authority in Ireland to Uisce Éireann.

Whilst every care has been taken in respect of the information on Uisce Éireann's network(s), Uisce Éireann assumes no responsibility for and gives no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided, nor does it accept any liability whatsoever arising from or out of any errors or omissions. This information should not be solely relied upon in the event of excavations or any other works being carried out in the vicinity of Uisce Éireann's underground network(s). The onus is on the parties carrying out excavations or any other works to ensure the exact location of Uisce Éireann's underground network(s) is identified prior to excavations or any other works being carried out. Service connection pipes are not generally shown but their presence should be anticipated.

C. Surface Water Model for Subject Development (FLOW Causeway)

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	5	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	Scotland and Ireland	Connection Type	Level Soffits
M5-60 (mm)	16.800	Minimum Backdrop Height (m)	0.200
Ratio-R	0.390	Preferred Cover Depth (m)	1.200
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	x

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
Rainfall Events	Singular	Drain Down Time (mins)	240
FSR Region	Scotland and Ireland	Additional Storage (m³/ha)	20.0
M5-60 (mm)	16.800	Starting Level (m)	
Ratio-R	0.390	Check Discharge Rate(s)	x
Summer CV	1.000	Check Discharge Volume	x
Analysis Speed	Normal		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	20	0	0

Node HB MH1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	33.497	Product Number	CTL-SHE-0241-3300-1450-3300
Design Depth (m)	1.450	Min Outlet Diameter (m)	0.300
Design Flow (l/s)	33.0	Min Node Diameter (mm)	2100

Node HB MH2 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	33.058	Product Number	CTL-SHE-0154-1600-2800-1600
Design Depth (m)	2.800	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	16.0	Min Node Diameter (mm)	1800

Node HB MH3 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	31.391	Product Number	CTL-SHE-0135-1000-1700-1000
Design Depth (m)	1.700	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	10.0	Min Node Diameter (mm)	1500

Node OUTFALL MH Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	32	Sump Available	✓
Replaces Downstream Link	x	Product Number	CTL-SHE-0123-8600-1885-8600
Invert Level (m)	30.945	Min Outlet Diameter (m)	0.150
Design Depth (m)	1.885	Min Node Diameter (mm)	1500
Design Flow (l/s)	8.6		

Flow+ v17.0 Copyright © 1988-2026 Causeway Technologies Ltd

Node Park 12 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	3.0		
Invert Level (m)	35.000	Diameter (m)	0.046		

Node Rain Garden 2 Online Orifice Control

Flap Valve	x	Design Depth (m)	1.000	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.2		
Invert Level (m)	36.000	Diameter (m)	0.024		

Node Park 1 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	3.0		
Invert Level (m)	40.100	Diameter (m)	0.046		

Node Park 2 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	2.0		
Invert Level (m)	40.000	Diameter (m)	0.038		

Node Park 3 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.0		
Invert Level (m)	38.300	Diameter (m)	0.026		

Node Park 4 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.0		
Invert Level (m)	36.700	Diameter (m)	0.026		

Node Park 5 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	10.0		
Invert Level (m)	36.200	Diameter (m)	0.086		

Node Park 6 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	10.0		
Invert Level (m)	35.292	Diameter (m)	0.086		

Node Park 7 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	3.0		
Invert Level (m)	35.200	Diameter (m)	0.046		

Node Park 8 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	7.5		
Invert Level (m)	34.600	Diameter (m)	0.074		

Node Park 9 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	5.0		
Invert Level (m)	33.500	Diameter (m)	0.060		

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Node Park 10 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	8.0		
Invert Level (m)	33.200	Diameter (m)	0.077		

Node Rain Garden Online Orifice Control

Flap Valve	x	Design Depth (m)	0.800	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.0		
Invert Level (m)	38.350	Diameter (m)	0.023		

Node Swale 1 Online Orifice Control

Flap Valve	x	Design Depth (m)	1.000	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.2		
Invert Level (m)	36.800	Diameter (m)	0.024		

Node Swale 2 Online Orifice Control

Flap Valve	x	Design Depth (m)	1.000	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.2		
Invert Level (m)	35.044	Diameter (m)	0.024		

Node Swale 3 Online Orifice Control

Flap Valve	x	Design Depth (m)	1.000	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.3		
Invert Level (m)	34.000	Diameter (m)	0.025		

Node Swale 4 Online Orifice Control

Flap Valve	x	Design Depth (m)	1.000	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.3		
Invert Level (m)	33.200	Diameter (m)	0.025		

Node Rain Garden 3 Online Orifice Control

Flap Valve	x	Design Depth (m)	1.000	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.2		
Invert Level (m)	38.000	Diameter (m)	0.024		

Node Park 11 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	5.0		
Invert Level (m)	36.900	Diameter (m)	0.060		

Node ATT 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	34.600
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	118

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	269.0	269.0	0.500	542.0	544.3	0.501	0.0	544.3

Node ATT 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	33.650
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.40	Time to half empty (mins)	

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Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	550.0	550.0	0.500	550.0	591.6	0.501	0.0	591.6

Node ATT 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	33.150
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.40	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	600.0	600.0	1.500	600.0	730.2	1.501	0.0	730.2

Node ATT 3 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	31.400
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	540.0	540.0	1.700	910.0	943.5	1.710	0.0	943.5

Node Park 1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	40.100	Slope (1:X)	40.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	140	Depth (m)	0.450
Safety Factor	2.0	Width (m)	110.000	Inf Depth (m)	
Porosity	0.30	Length (m)	2.500		

Node Park 2 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	40.000	Slope (1:X)	40.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	114	Depth (m)	0.450
Safety Factor	2.0	Width (m)	80.000	Inf Depth (m)	
Porosity	0.30	Length (m)	2.500		

Node Park 3 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	38.300	Slope (1:X)	40.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.450
Safety Factor	2.0	Width (m)	180.000	Inf Depth (m)	
Porosity	0.30	Length (m)	2.400		

Node Rain Garden 3 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	38.000	Depth (m)	0.800
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Inf Depth (m)	0.800
Safety Factor	2.0	Pit Width (m)	1.000	Number Required	1
Porosity	0.35	Pit Length (m)	90.000		

Node Rain Garden Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	38.350	Depth (m)	0.800
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	152	Inf Depth (m)	0.800
Safety Factor	2.0	Pit Width (m)	2.500	Number Required	1
Porosity	0.35	Pit Length (m)	20.000		

Node Swale 1 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	36.800	Depth (m)	0.200
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	68	Inf Depth (m)	0.200
Safety Factor	2.0	Pit Width (m)	1.000	Number Required	1
Porosity	0.35	Pit Length (m)	48.000		

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Node Park 4 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	36.700	Slope (1:X)	40.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.450
Safety Factor	2.0	Width (m)	120.000	Inf Depth (m)	
Porosity	0.30	Length (m)	2.500		

Node Swale 2 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	35.044	Depth (m)	0.200
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	49	Inf Depth (m)	0.200
Safety Factor	2.0	Pit Width (m)	1.000	Number Required	1
Porosity	0.35	Pit Length (m)	50.000		

Node Park 6 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	35.292	Slope (1:X)	40.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.450
Safety Factor	2.0	Width (m)	80.000	Inf Depth (m)	
Porosity	0.30	Length (m)	2.400		

Node Park 5 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	36.200	Slope (1:X)	40.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.450
Safety Factor	2.0	Width (m)	75.000	Inf Depth (m)	
Porosity	0.30	Length (m)	3.600		

Node Park 7 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	35.200	Slope (1:X)	40.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	94	Depth (m)	0.450
Safety Factor	2.0	Width (m)	70.000	Inf Depth (m)	
Porosity	0.30	Length (m)	2.500		

Node Park 8 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	34.600	Slope (1:X)	40.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.450
Safety Factor	2.0	Width (m)	80.000	Inf Depth (m)	
Porosity	0.30	Length (m)	2.400		

Node Swale 3 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	34.000	Depth (m)	0.200
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	70	Inf Depth (m)	0.200
Safety Factor	2.0	Pit Width (m)	1.000	Number Required	1
Porosity	0.35	Pit Length (m)	50.000		

Node Swale 4 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	33.200	Depth (m)	0.200
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Inf Depth (m)	0.200
Safety Factor	2.0	Pit Width (m)	1.000	Number Required	1
Porosity	0.35	Pit Length (m)	30.000		

Node Park 9 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	33.500	Slope (1:X)	40.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.450
Safety Factor	2.0	Width (m)	155.000	Inf Depth (m)	
Porosity	0.30	Length (m)	2.400		

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Node Park 10 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	33.200	Slope (1:X)	40.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	12	Depth (m)	0.450
Safety Factor	2.0	Width (m)	145.000	Inf Depth (m)	
Porosity	0.30	Length (m)	2.400		

Node Park 11 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	36.900	Slope (1:X)	40.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.450
Safety Factor	2.0	Width (m)	20.000	Inf Depth (m)	
Porosity	0.30	Length (m)	3.600		

Node Park 12 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	35.000	Slope (1:X)	40.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.450
Safety Factor	2.0	Width (m)	100.000	Inf Depth (m)	
Porosity	0.30	Length (m)	2.500		

Node Rain Garden 2 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	36.000	Depth (m)	0.800
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	20	Inf Depth (m)	0.800
Safety Factor	2.0	Pit Width (m)	2.500	Number Required	1
Porosity	0.35	Pit Length (m)	20.000		

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Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 98.58%

Node Event	US Node	Level (m)	Depth (m)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	ATT 1	35.066	1.556	294.9725	0.0000	FLOOD RISK
480 minute summer	ATT 2	34.749	1.599	360.5772	0.0000	SURCHARGED
2160 minute summer	ATT 3	32.969	1.569	1115.0000	0.0000	SURCHARGED
120 minute summer	HB MH1	35.065	1.568	5.4312	0.0000	FLOOD RISK
480 minute summer	HB MH2	34.748	1.690	4.6027	0.0000	SURCHARGED
2160 minute summer	HB MH3	32.969	1.578	2.7879	0.0000	SURCHARGED
2160 minute summer	OUTFALL MH	32.794	1.849	3.2681	0.0000	SURCHARGED
120 minute summer	Swale 1	36.959	0.159	2.7050	0.0000	SURCHARGED
60 minute summer	Swale 2	35.197	0.153	2.6922	0.0000	SURCHARGED
120 minute summer	Swale 3	34.170	0.170	3.0169	0.0000	SURCHARGED
15 minute summer	Swale 4	33.217	0.017	0.1808	0.0000	OK
120 minute summer	Petrol Interceptor 1	35.069	1.469	2.5951	0.0000	FLOOD RISK
2160 minute summer	Petrol Interceptor 2	32.969	1.482	2.6187	0.0000	SURCHARGED
120 minute summer	Park 1	40.549	0.449	35.5584	0.0000	SURCHARGED
120 minute summer	Park 2	40.391	0.391	22.1222	0.0000	SURCHARGED
480 minute summer	Park 3	38.595	0.295	35.1424	0.0000	SURCHARGED
360 minute summer	Park 4	37.009	0.309	25.7642	0.0000	FLOOD RISK
30 minute summer	Park 5	36.388	0.188	11.7078	0.0000	SURCHARGED
30 minute summer	Park 6	35.379	0.087	3.3038	0.0000	OK
60 minute summer	Park 7	35.435	0.235	11.0463	0.0000	FLOOD RISK
60 minute summer	Park 8	34.813	0.213	10.7954	0.0000	SURCHARGED
60 minute summer	Park 9	33.663	0.163	15.0194	0.0000	SURCHARGED
60 minute summer	Park 10	33.449	0.249	23.2766	0.0000	SURCHARGED
15 minute summer	Park 11	37.052	0.152	2.3949	0.0000	SURCHARGED
60 minute summer	Park 12	35.076	0.076	3.3908	0.0000	OK

US Node	DS Node	Outflow (l/s)	Velocity (m/s)
ATT 1	HB MH1	107.4	0.678
ATT 2	8	12.5	0.278
ATT 3	HB MH3	10.1	0.100
HB MH1	5	33.0	0.818
HB MH2	10	14.5	0.748
HB MH3	30	9.5	0.569
OUTFALL MH	32	8.4	0.538
Swale 1	39	0.5	0.543
Swale 2	1	-4.0	-0.565
Swale 3	18	0.5	0.562
Swale 4	18	-5.5	-0.707
Petrol Interceptor 1	ATT 1	221.7	1.399
Petrol Interceptor 2	ATT 3	31.9	0.558
Park 1	48	2.8	0.701
Park 2	48	1.8	0.645
Park 3	57	0.7	0.595
Park 4	39	0.8	0.599
Park 5	53	-11.0	-0.627
Park 6	1	3.3	1.080
Park 7	44	2.0	0.662
Park 8	12	4.7	1.011
Park 9	18	2.7	0.920
Park 10	10	5.5	1.043
Park 11	54	3.7	1.034
Park 12	11	1.0	0.703

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Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 98.58%

Node Event	US Node	Level (m)	Depth (m)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	Rain Garden	38.681	0.331	6.0039	0.0000	FLOOD RISK
120 minute summer	Rain Garden 2	36.157	0.157	2.7872	0.0000	SURCHARGED
120 minute summer	Rain Garden 3	38.141	0.141	4.4766	0.0000	SURCHARGED
60 minute summer	3	35.110	1.449	2.5602	0.0000	SURCHARGED
480 minute summer	4	34.749	0.591	0.6682	0.0000	SURCHARGED
30 minute summer	6	35.506	0.331	0.3741	0.0000	SURCHARGED
30 minute summer	1	35.367	1.095	3.2454	0.0000	SURCHARGED
30 minute summer	2	35.254	1.519	2.8060	0.0000	SURCHARGED
480 minute summer	8	34.749	1.653	5.7245	0.0000	SURCHARGED
480 minute summer	5	34.749	1.296	1.9140	0.0000	SURCHARGED
2160 minute summer	10	32.969	0.256	0.4249	0.0000	OK
15 minute summer	11	34.447	0.392	0.7585	0.0000	SURCHARGED
15 minute summer	12	34.400	0.663	1.2054	0.0000	SURCHARGED
15 minute summer	16	33.625	0.884	1.0189	0.0000	SURCHARGED
15 minute summer	18	33.628	1.078	2.2526	0.0000	SURCHARGED
15 minute summer	19	33.271	1.093	1.4341	0.0000	SURCHARGED
15 minute summer	20	33.145	1.031	1.8184	0.0000	SURCHARGED
2160 minute summer	21	32.969	0.924	1.1742	0.0000	SURCHARGED
2160 minute summer	22	32.969	0.992	1.1217	0.0000	SURCHARGED
15 minute summer	23	33.256	1.006	2.0753	0.0000	FLOOD RISK
15 minute summer	24	33.154	0.528	0.7653	0.0000	SURCHARGED
15 minute summer	25	33.144	1.032	2.0293	0.0000	SURCHARGED
2160 minute summer	26	32.969	1.407	2.8051	0.0000	SURCHARGED
2160 minute summer	30	32.794	1.416	2.5022	0.0000	SURCHARGED
2160 minute summer	31	32.794	1.619	3.0816	0.0000	SURCHARGED
15 minute summer	32	30.989	0.061	0.1079	0.0000	OK
15 minute summer	33	30.873	0.057	0.0000	0.0000	OK

US Node	DS Node	Outflow (l/s)	Velocity (m/s)
Rain Garden	35	0.6	0.495
Rain Garden 2	44	0.5	0.514
Rain Garden 3	58	0.4	0.532
3	Petrol Interceptor 1	292.4	1.354
4	8	11.8	0.813
6	7	-16.4	-0.415
1	2	383.1	1.774
2	3	387.6	1.794
8	HB MH2	13.7	0.179
5	ATT 2	32.7	0.881
10	26	17.1	0.828
11	12	36.1	1.835
12	18	63.1	1.920
16	18	8.4	0.432
18	19	102.1	1.451
19	20	112.5	1.598
20	21	148.9	2.115
21	22	11.3	0.912
22	26	11.7	0.910
23	25	30.3	0.763
24	25	16.8	0.987
25	26	82.7	2.080
26	Petrol Interceptor 2	32.2	0.469
30	31	9.2	0.604
31	OUTFALL MH	8.8	0.156
32	33	8.4	0.594

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Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 98.58%

Node Event	US Node	Level (m)	Depth (m)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	35	38.797	1.338	2.1320	0.0000	SURCHARGED
15 minute summer	36	37.693	1.500	4.1821	0.0000	FLOOD RISK
15 minute summer	39	35.827	0.696	1.8076	0.0000	SURCHARGED
30 minute summer	42	35.496	0.566	1.0313	0.0000	SURCHARGED
15 minute summer	43	34.938	0.731	1.1238	0.0000	SURCHARGED
15 minute summer	44	35.133	0.803	1.7186	0.0000	SURCHARGED
15 minute summer	46	39.388	0.158	0.3228	0.0000	OK
15 minute summer	48	39.301	0.446	0.6465	0.0000	SURCHARGED
15 minute summer	49	39.024	1.353	2.4244	0.0000	SURCHARGED
15 minute summer	53	37.013	1.375	3.5941	0.0000	SURCHARGED
15 minute summer	54	37.025	1.050	1.4968	0.0000	SURCHARGED
15 minute summer	57	37.968	1.342	1.8172	0.0000	SURCHARGED
15 minute summer	58	38.164	0.837	1.9101	0.0000	SURCHARGED
15 minute summer	61	34.424	0.218	0.3208	0.0000	OK
30 minute summer	7	35.503	0.419	0.4741	0.0000	SURCHARGED

US Node	DS Node	Outflow (l/s)	Velocity (m/s)
35	36	86.7	2.180
36	39	193.1	2.742
39	1	338.1	2.268
42	1	28.0	0.855
43	4	66.0	1.660
44	43	41.9	1.053
46	48	41.6	1.476
48	49	50.6	1.420
49	35	66.2	1.664
53	39	63.2	1.590
54	53	18.5	0.466
57	36	51.5	1.294
58	57	44.7	1.455
61	12	17.5	0.547
7	42	-19.8	-0.497

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D. Fingal Surface Water Management Design Statement; SuDS Selection Hierarchy Sheet; and Statement of Areas

Fingal Green / Blue Infrastructure Guidance (As per Section 3.1)

Surface Water Management Design Statement

Summary: This surface water management design statement summarises the existing and proposed scenarios for the subject development in accordance with Section 3.1 of the Appendix 11 Fingal Green Blue Infrastructure Guidance Document.

Existing Scenario: Surface Water Statement (250 words max)

Description of existing site outlining the drainage characteristics i.e. topography, ground conditions, suitability for infiltration, natural directions and paths for water movement, existing surface water flood risk: -

The existing site extends to approximately 4.40 ha and generally slopes from west to east. The site is currently greenfield in nature.

An infiltration assessment was undertaken for the wider LAP lands as part of this application. Infiltration testing was carried out at five trial pit locations, including one within the subject site (Trial Pit A). Groundwater was encountered at approximately 1.10 m below existing ground level at this location, indicating that the site is not suitable for infiltration.

As illustrated in the existing flow route analysis figure presented in Chapter 4 of the Engineering Assessment Report prepared by Waterman Moylan, surface water runoff across the LAP lands and subject site predominantly flows from west to east, with a general southerly conveyance towards Flemington Lane.

According to the Flood Risk Assessment (FRA) prepared by Waterman Moylan and submitted as part of this application under separate cover, the subject site is located within Flood Zone C, where the probability of flooding from rivers and the sea is low.

Pluvial flood risk (from heavy rainfall) is also assessed within the FRA, with mitigation measures outlined to ensure appropriate exceedance flow routes are maintained and additional flood protection measures are implemented.

Proposed Scenario: Surface Water Management Design Statement (250 words max)

This shall be a clear concise summary of the surface water design proposal.

Applicants shall provide a brief explanation of how they have responded to the principles of Sustainable Drainage Systems (SuDS) Design contained in the policy. This could include implications of SuDS on design of other aspects of the development and price comparisons. We encourage that proposals are mindful of future implications from the beginning and present outline designs based on realistic options including maintenance activities and how they are resourced.

Applicants shall be required to clearly demonstrate how the design makes a significant and positive contribution to the amenity value of the open space provision and shall state how the usability of these areas by the public has been addressed. Reference shall also be made on how the design considered the access

and use of maintenance machinery in terms of slopes and any hard structures (e.g. head walls) located within the open space areas: -

The proposed surface water management strategy has been developed in accordance with SuDS principles, with an emphasis on source control, attenuation, and water quality treatment.

Surface water runoff from the development will be managed through a combination of permeable paving, bio-retention tree pits, swales, rain gardens, an above ground detention basin, below ground stone void storage systems and a temporary retention basin. These features are distributed throughout the site to intercept, convey, and attenuate runoff close to source, thereby mimicking the natural hydrological regime of the existing greenfield site.

The site is divided into two contributing catchments, with surface water attenuated on-site and discharged at a restricted greenfield runoff rate of 8.6 l/s via flow control devices. Attenuation storage is provided through three attenuation areas located within open space areas, in combination with distributed storage within permeable paving and other SuDS features, providing a total storage volume in excess of the design requirement for the 1 in 100-year storm event, including a 20% climate change allowance.

The SuDS strategy has been integrated with the landscape design to provide multi-functional open spaces, with detention basins and swales contributing positively to the amenity and biodiversity value of the development. These areas are designed to remain usable during normal conditions, with appropriate side slopes and layouts to ensure public accessibility and safety.

Maintenance has been considered at design stage, with clear access routes and appropriate gradients provided for maintenance machinery. SuDS components have been selected to ensure long-term performance and are supported by established maintenance regimes, to be undertaken by the site management entity.

Overall, the design delivers a robust and sustainable drainage solution that integrates engineering, environmental, and amenity objectives.

SuDS Measures	Measures to be used on this site	Rationale for selecting/not selecting measure	Area of Feature (m^2)	Attenuation Volume of Feature (m^3)
Source Control				
Swales	✓	Appropriate feature within verges allowed for adjacent to internal access road	134	32
Integrated constructed Tree Pits	✓	Appropriate feature within green space areas containing trees between parking spaces and adjacent to access road	29	8.6
Rainwater Butts	×	Permeable paving in all driveways is proposed to facilitate runoff from dwelling roofs	×	×
Downpipe Planters	×	Permeable paving in all driveways is proposed to facilitate runoff from dwelling roofs	×	×
Rainwater Harvesting	×	Permeable paving in all driveways is proposed to facilitate runoff from dwelling roofs	×	×
Soakaways	×	Infiltration rate of the subject site is poor	×	×
Infiltration Trenches	×	Infiltration rate of the subject site is poor	×	×
Permeable pavement (Grasscrete, Block paving, Porous Asphalt etc.)	✓	Can be used widely at all parking spaces to offer temp. storage and treatment of runoff from private areas	2,920	394
Green Roofs	×	Insufficient roof area requirement and incompatible roof profile, other SuDS features offered throughout the site	×	×
Green Wall	×	Would generally be suitable for large buildings such as apartment blocks, community centres or commercial buildings	×	×
Filter Strips	×	An above ground detention	×	×
Bio-retention systems/Raingardens	✓	Systems used throughout the development. Tree pits and raingardens.	450	108
Blue Roofs	×	Not appropriate for a development of this nature	×	×
Filter Drain	×	Infiltration rate of the subject site is poor	×	×
Site Control				
Detention Basins	✓	Open green space design allows for detention basins	542	200
Retention Basins	✓	Open green space design allows for retention basins	910	1,230
Regional Control				
Ponds	×	Retention basins have been implemented within the design	×	×
Wetlands	×	Retention basins have been implemented within the design	×	×
Other				
Petrol/Oil interceptor	✓	Petrol Interceptors have been installed upstream of attenuation areas where required.	N/A	N/A
Attenuation tank- only as a last resort where other measures are not feasible	×	×	×	×
Oversized pipes- only as a last resort where other measures are not feasible	×	×	×	×
Below Ground Stone Void Storage with 40% voids.	✓	2 below ground stone void storage areas are proposed below the (1) detention basin and (2) the MUGA Pitch	1,150	470

Overall Development Site Area (m^2) **% Permeable Areas** (open space, green roofs, permeable surfacing etc)				22,084 m^2								
% Hardstanding Areas (roof areas, road surfaces, concrete paved areas etc.)				23,547 m^2								
Park Type As per Table 12.5 of the Development Plan	**Park Size (m^2)**	**Area of Drainage green infrastructure in park (m^2)**	**Percentage of drainage infrastructure per park (%)**	**Swale (m2)**	**Filter Strip (m2)**	**Bioretention Area (m2)**	**Retention basin (m2)**	**Detention basin (m2)**	**Pond (m2)**	**Wetland (m2)**	**No. of head walls located on open**
Pocket Park (500m^2-0.2ha) **Small Park** (0.2ha to 2 ha)											
	2,944	683	23%	-	-	-	-	542	-	-	0
Local Park (2-20 ha)											
Urban Park Neighbourhood (20ha to 50 ha)											
Regional Park (over 50 ha)											
Other permeable surfaces Grass Margins/ Environmental open space ***Not part of open space provision**	-	-	-	134	-	450	910	542	-	-	-

E. RoadPlan Quality Audit

26164-01-001

PROPOSED HOUSING DEVELOPMENT AT FLEMINGTON LANE, BALBRIGGAN, CO. DUBLIN

Stage 1 Quality Audit

(Incorporating a DMURS Street Design Audit, and Audits of Accessibility, Cycling, Walking and Road Safety)

for

WATERMAN MOYLAN

on behalf of

LAGAN HOMES IRELAND

AUGUST 2026

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DOCUMENT CONTROL SHEET

Project Title	Proposed Development at Flemington Lane, Balbriggan
Project No.	26164-01
Document Title	Stage 1 Quality Audit
Document No.	26164-01-001

Status	Author(s)	Reviewed By	Approved By	Issue Date
Draft 1	AC / GH	AC	AC	19-Aug-2026
Final	AC / GH	AC	AC	27-Aug-2026

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1. INTRODUCTION

1.1 Roadplan Consulting has been commissioned by Waterman Moylan on behalf of Lagan Homes Ireland to carry out a Quality Audit on a proposed development at Flemington Lane, Balbriggan, Co Dublin.

1.2 The proposed development comprises the construction of residential units and a creche space.

1.3 The development is situated on Flemington Lane on the outskirts of Balbriggan Town and is approximately 3 kilometres from Balbriggan Rail Station. The B1 Balbriggan Town bus service is available 1 kilometre away on Hamlet Lane.

1.4 Figure 1 below is a layout drawing of the development. Flemington Lane has a speed limit of 50 km/h.

Figure 1.1– *Site Location Map and Site Layout for the development*

2. QUALITY AUDIT

2.1 Quality Audit is a defined process, independent of, but involving, the design team that, through planning, design, construction and management stages of a project provides a check that high quality places are delivered and maintained by all relevant parties, for the benefit of all end users. Quality Audit is a process, applied to urban roads, traffic management or development schemes, which systematically reviews projects using a series of discrete but linked evaluations and ensures that the broad objectives of place, functionality, maintenance and safety are achieved.

2.2 Quality Audit was introduced in the publication Design Manual for Urban Roads and Streets following concerns that in the design of new streets provisions made for motor vehicles frequently led to a poorly designed public realm. In an urban area there is a high level of competing demand from different classes of road users. A well-balanced street will have minimal visual clutter and obstacles; it will use durable materials and most importantly, will encourage a degree of negotiation between road users as they make their way through it.

2.3 Quality Audit involves various assessments of the impacts of a street scheme in terms of road safety, visual quality and the use of streets by the community. Access for disabled people, pedestrians, cyclists and drivers of motor vehicles is considered.

2.4 In the context of a Quality Audit, road safety assessment is considered to be an appropriate method of examining road safety issues as it incorporates both the hazard identification techniques used in road safety audit and formal risk assessment techniques. This allows the opportunity at an early stage for road safety issues to be considered in a more dynamic way within the design process, and to ensure that safety issues are considered as part of the design rather than after design work is completed.

2.5 The Quality Audit Team reports findings with suggestions for future action. It should be noted that, in a Quality Audit, it is not the intention that suggestions would be binding on the design team; they are offered for detailed consideration in the design process.

2.6 DMURS states that Quality Audits should consist of the following parts:

- DMURS Street Design Audit
- Individual Design Audits
- Quality Audit Report

In the case of this report the individual design audits comprise a Road Safety Audit, an Accessibility audit, a Walking audit and a Cycle audit.

3. METHODOLOGY

3.1 The Audit Team was as follows:

- Aoidín Curran Chartered Engineer MIEI
- Glenn Hingerty Chartered Engineer MIEI

3.2 Road safety, non-motorised users, visual quality, access for disabled and functionality were considered in the Quality Audit. This exercise focused on issues such as:

- the design rationale as it related to vehicle, cycle and pedestrian movements;
- pedestrian desire lines both to and through the site;
- access requirements for all modes of transport;
- access requirements for disabled people and other vulnerable users;
- any road safety concerns associated with the scheme;
- how the scheme is experienced by those entering it and moving around within the street, including how this affects road user behavior; and
- any other issues considered relevant to each constituent element of the Quality Audit process.

3.3 The site visit for this quality audit was carried out on 10th August 2026

The documents provided for the audit were:

Drawing Number	Rev	Drawing Title
25.113.PD1004	A	Site Layout Block Plan
FLE-WMC-CA4-XX-DR-C-P0115	P01	Proposed Visibility Splays
FLE-WMC-CA4-ZZ-DR-C-P0164	P01	Proposed Priority Junction – Phase 1

Copies of these audited drawings are contained in Appendix A.

Details of drainage or road lighting are not provided. It is assumed that adequate layouts will be provided for each.

In accordance with DMURS Advice Note No. 4 May 2019 (contained on https://www.dmurs.ie/supplementary-material) a Quality Audit should always contain a DMURS Street Design Audit and Other Design Audits (as required). Section 4 of this report contains the Street Design Audit and Sections 5, 6, 7 and 8 contain the Other Design Audits (Road Safety, Walking, Cycling, Accessibility). The Street Design Audit is in the format provided as a template on the DMURS website.

STREET DESIGN AUDIT

CONNECTIVITY			
Key Issues	**Key DMURS Reference**	**Audit Suggestion**	**Design Team Response**
Strategic routes/major desire lines been identified and are clearly incorporated into the design.	3.1 – Integrated Street Network 3.2.1 – Movement Function 3.3.1 – Street layouts 3.3.4 - Wayfinding	3.1 Street network is proposed to be integrated with surrounding streets. There are multiple entry and exit points for all modes. Separate entry/exit points for cyclists are also proposed. 3.2.1 – Access priorities are not clear at all interfaces. Unintended vehicular access to pedestrian areas may lead to conflict. Absence of dropped kerbs to facilitate pedestrian and cycle access may lead to drips and falls.	2.2.1 An updated layout has been prepared, with the extents of surfaces accessible to motorists clearly defined. Drawings showing the proposed kerb lines have been included as part of the planning application. Dropped kerbs are also provided throughout the proposed development to facilitate pedestrian and cyclist access.
Multiple points of access are provided to the site/place, in particular for sustainable modes.	3.3.1 – Street Layouts 3.3.3 – Retrofitting [1]	3.3.1 Separate entry/exit points for cyclists are also proposed.	
Accessibility throughout the site is maximised for pedestrians and cyclists, ensuring route choice.	3.3.1 – Street Layouts 3.3.2 – Block Sizes 3.4.1 – Vehicle Permeability	3.3.2 – Pedestrian access and egress is available at all entry points.	

[1] *When connecting with existing communities a detailed analysis and extensive community consultation should be carried out to identify the optimal location for connections (refer also to the NTA Permeability in Existing Urban Areas: Best Practice Guide).*

CONNECTIVITY			
Key Issues	**Key DMURS Reference**	**Audit Suggestion**	**Design Team Response**
Through movements by private vehicles on local streets are discouraged by an appropriate level of traffic calming measures.	3.2.1 – Movement Function 3.2.2 – Place Context 3.4.1 – Vehicle Permeability	3.2.1 – Pedestrian access and egress is available at all entry points.	

SELF-REGULATING STREET ENVIRONMENT			
Key Issues	**Key DMURS Reference**	**Audit Suggestion**	**Design Team Response**
A suitable range of design speeds have been applied with regard to context and function.	3.2.1 – Movement Function 3.2.2 – Place Context 4.1.1 – A Balanced Approach to Speed [2]	4.1.1 – It is assumed that the design speed on the internal road network will be 30 km/h.	
The street environment will facilitate the creation of a traffic calmed environment via the use of 'softer' or passive measures.[3]	4.2.1 – Building Height and Street Width 4.2.2 – Street Trees 4.2.3 – Active Street Edges 4.2.4 – Signage and Line Marking 4.2.7 – Planting 4.4.2 – Carriageway Surfaces 4.4.9 – On-Street Parking Advice Note 1 – Transitions and Gateways	4.2.1 No information has been made available on building height. 4.2.2 Some information on street trees have been made available. Care should be taken to ensure that planting does not obstruct the visibility splay at entrances, driveways and crossing points. 4.2.4 – Limited information has been made available regarding Signage and Line Marking. It is assumed that the entrances to the development would be controlled by a Stop sign. 4.4.2 – Limited information on pavement surfaces is provided within the drawings. Care should be taken to provide appropriate types of pavement surfaces for the	4.2.2. An updated landscape layout has been prepared, incorporating a reduced number of trees within the visibility splay area. 4.2.4. The planning application includes drawings showing the proposed road marking and traffic sign. STOP road markings and associated traffic signage have been incorporated throughout the proposed development to clearly establish vehicular priority at all junctions. 4.4.2 An updated layout has been provided, with the extents of surfaces accessible to motorists clearly defined. In addition, all junctions are provided with appropriate tactile paving to assist visually impaired pedestrians and to clearly prioritise pedestrian movements across the development.

[2] *Refer also to the National Speed Limit Guidelines*
[3] *In retrofit situations a detailed analysis should be carried out to establish what measures exist, what their likely effectiveness is and level of intervention required to achieve the designed design speed.*

SELF-REGULATING STREET ENVIRONMENT			
Key Issues	**Key DMURS Reference**	**Audit Suggestion**	**Design Team Response**
		safe and efficient movement of all user groups, particularly in the private open areas in the development. 4.4.9 – No on-street EV charging spaces have been provided. 4.4.9 – it is unclear if sufficient visitor parking has been provided. Current guidelines would indicate that between 2 and 4 visitor parking places should be provided for a development of 10 dwellings.	4.4.9. The proposed development includes visitor parking at a rate of one space per five apartment units, providing a total of five visitor parking spaces.
A suitable range of design standards/ measures have been applied that are consistent with the applied design speeds.	4.4.1 – Carriageway Widths 4.4.4 – Forward Visibility 4.4.5 – Visibility Splays 4.4.6 – Alignment and curvature 4.4.7 – Horizontal and Vertical Deflections Advice Note 1 – Transitions and Gateways	4.4.1 – Road widths appear large and may facilitate higher speeds than appropriate for the environment 4.4.5 Visibility Splays are shown but they contain proposed trees which may pose viability obstructions.	4.4.1 The proposed vehicular road is intended to be further developed as a Street Link connecting Flemington Lane and the R132, in accordance with the Flemington Local Area Plan. The proposed 6.5-metre road width complies with DMURS requirements, having regard to its anticipated traffic function. In addition, several self-regulating traffic-calming measures have been incorporated, including ramps and horizontal deflections, to reduce vehicle speeds. The shared street has been designed with a 6.0-metre-wide shared surface, comprising a 4.8 m carriageway and a 1.2 m pedestrian refuge. The layout