



## **Engineering Infrastructure Assessment Report (including DMURS Statement of Consistency)**

FINGAL COUNTY COUNCIL - Residential Development at  
Mooretown, Swords, Co. Dublin

May 2024

**Waterman Moylan Consulting Engineers Limited**

Block S, East Point Business Park, Alfie Byrne Road, Dublin D03 H3F4

[www.waterman-moylan.ie](http://www.waterman-moylan.ie)



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## Quality Assurance – Approval Status

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

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<b>Issue</b>	<b>Date</b>	<b>Prepared by</b>	<b>Checked by</b>	<b>Approved by</b>
1	25 April 2024	Laishan Lai	Richard Miles	Mark Duignan
2	27 May 2024	Laishan Lai	Richard Miles	

## Comments

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# 1. Introduction

## 1.1 Context

This Engineering Assessment Report has been prepared by Waterman Moylan as part of the documentation in support of a section 179A proposed residential development at Mooretown, Swords, Co. Dublin.

The proposed development forms part of the Mooretown lands in Swords, which were previously informed by the Oldtown-Mooretown Local Area Plan 2010-2016 (as extended to 2020) and are now subject to the Fingal development Plan 2020. This phase of developing the lands has been designed and proposed within the spirit of the LAP and in compliance with the Fingal Development Plan.

This report assesses wastewater and surface water drainage, water supply infrastructure and the road and transportation network in the vicinity of the site, and details the criteria used to design the proposed wastewater and surface water drainage, water supply and transport networks to serve the development.

## 1.2 Site Location and Description

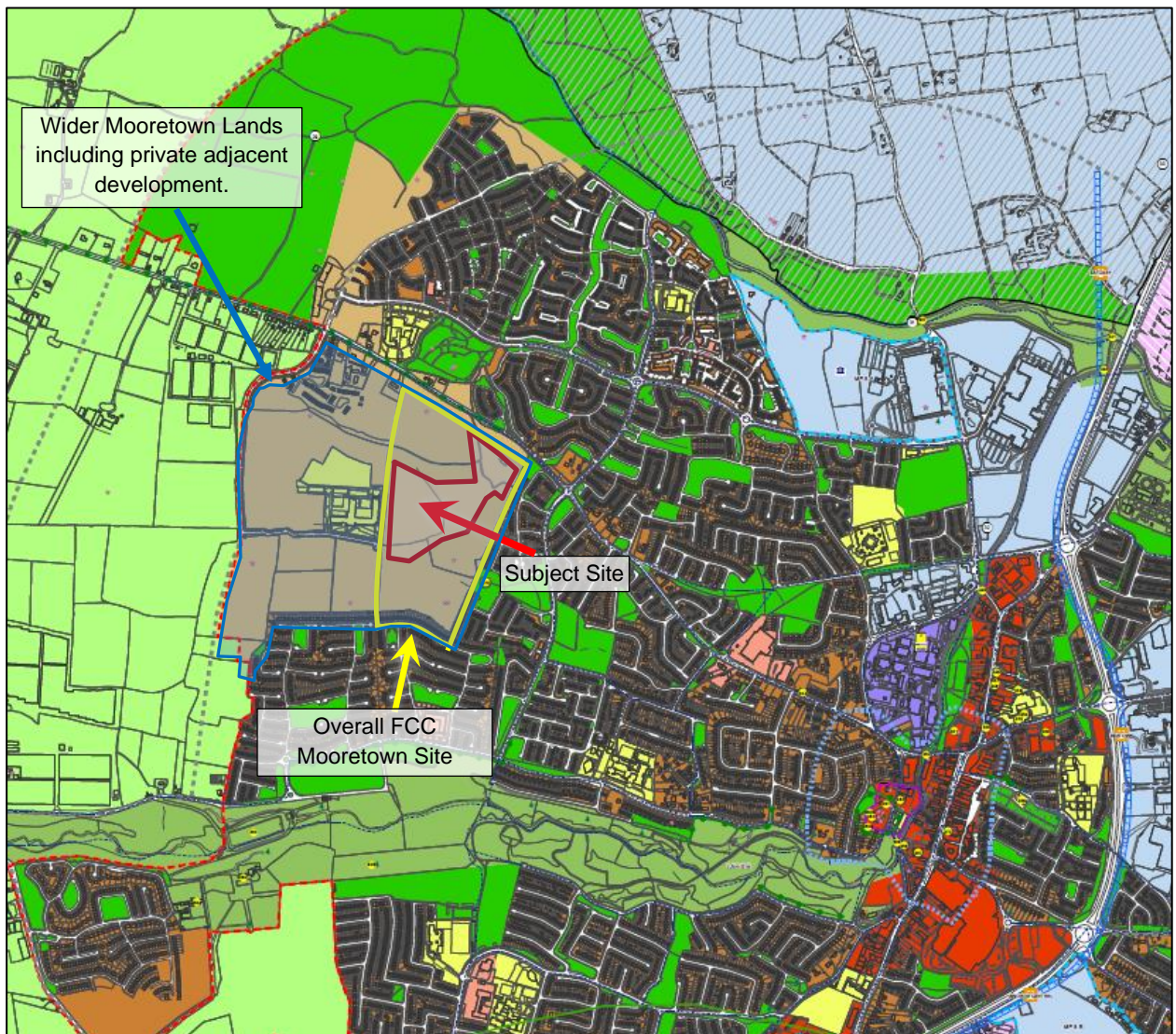
The subject site is in Mooretown, Swords, Co. Dublin, to the south of the Rathbeale Road, as shown in the Figure below:



**Figure 1 | Site Location (Source: Google Earth)**

The site is part of the residentially zoned Oldtown–Mooretown lands, as shown in the Figure 2 extract below, taken from the Fingal Development Plan 2023-2029 Zoning Map – Sheet 8:





**Figure 2 | Extract of the Fingal Development Plan 2023-2029 Zoning Map – Sheet 8**

The Oldtown–Mooretown lands are located at the western development edge of Swords, within the catchment of the Broadmeadow River. The lands cover an area of approximately 111 hectares.

The Oldtown–Mooretown lands are divided by the Rathbeale Road, with Oldtown lands to the north (c. 50 Ha) and Mooretown to the south (c. 61 Ha). This Local Authority Own Housing development, which forms Phase 1 of the Mooretown Fingal Council Mooretown development, is located on the eastern side of the “Mooretown” Lands as indicated in *Figure 2*. The “Mooretown” Lands to the west of the subject lands are under private development.

The Phase 1 development site is currently a greenfield, ~9.35 Ha in size, and is located 2km west of Swords town centre.

The subject site is bounded to the east by the existing Cianlea housing development, to the north by the recently upgraded Rathbeale Road, to the west by the completed Mooretown School Campus and the adjacent privately developed Mooretown Lands.

The Mooretown School Access Road which has been constructed under planning reference number F14A/0012, has been constructed up to the boundary of the proposed subject development facilitating



connection for the subject lands to the adjacent schools and development in accordance with the vision of the expired LAP.

The site generally tends to slope from south-west to north-east, from an elevation of c.34.5m to a low of c.24.0m.

### 1.3 Proposed Development

The subject site for the proposed Phase 1 development is located on Lands at Mooretown, at the northwestern edge of the town of Swords, North County Dublin, approx. 2km from the town centre. The proposed Phase 1 development is 9.35 Ha in size, and seeks the construction of:

- a. A total of 274 no. residential units including 187 no. houses, 37 no. duplex, and 50 no. apartment units, ranging from 2 – 5 storeys in height, in a mixed tenure development (18 no. 1-beds, 109 no. 2-beds, 128 no. 3-beds and 19 no. 4-beds)
- b. Landscaping works including the provision of Class 2 Open Space of c.18,065 sq.m including riparian corridors, 8 no. pocket parks with a total area of c.2,900 sq.m, and new pedestrian and cycle connections into neighbouring residential lands to the west and connecting to the existing school access road along the western boundary.
- c. A total of 415 no. car parking spaces consisting of 357 no. long-stay resident spaces, 58 no. short-stay and visitor spaces.
- d. A total of 1,143 no. bicycle parking spaces consisting of 1,117 no. long-stay resident spaces and 26 no. short-stay visitor spaces.
- e. Associated site and infrastructural works including the provision of foul and surface water drainage and associated connections, Sustainable Urban Drainage Systems including permeable paving, greens roofs, bio-retention planting and below ground tank storage.
- f. The proposed development includes for all site enabling and development works, landscaping works, plant, PV panels, storage, boundary treatments, ESB substations, lighting, servicing, signage, and all site development works above and below ground.

The detailed breakdown of the proposed residential scheme is as follows:

Typology	1Bed	2Bed	3Bed	4Bed	Total
<b>Houses</b>		54	114	19	187
<b>Duplexes</b>	14	20	3		37
<b>Apartments</b>	4	35	11		50
<b>Total</b>	18	109	128	19	274

**Table 1 | Schedule of Accommodation**

## 2. Foul Water Network

### 2.1 Existing Foul Water Network

Foul drainage records were obtained for the site, there are no foul drainage networks located within the site boundary in the greenfield areas. Networks have been constructed to the west as part of adjacent privately constructed Mooretown development, and to the east as part of the constructed Cianlea Development.

The Mooretown foul drainage strategy envisages that the majority of the subject Mooretown site will drain in a northerly and westerly direction to the existing 450mmØ constructed sewer in the privately developed “Mooretown Lands”. This 450mmØ sewer drains north and ultimately connects to 500mmØ foul sewer that crosses the Rathbeale Road. This public sewer flows northwards through Oldtown, to the Glen Ellan Road, from where it flows in an easterly direction to Swords Wastewater Treatment Plant. A small portion of the site in the northeastern corner is proposed to drain to the eastern existing Cianlea development.

### 2.2 Proposed Foul Water Network

It is proposed to drain wastewater for the majority of the in a north-westerly direction through a series of 225mm sewers and a section of 300mm sewer near the outfall, as shown on the accompanying Drainage Layout drawings P1200-P1202. The northeastern corner is proposed to drain to the adjacent Cianlea development.

There is 1 No. proposed connection point to the foul network in the adjacent “Mooretown” lands to the west as detailed in drainage layout P1202. It is noted that this development is currently still private and services etc have not been Taking-in-Charge. The foul network flows north ultimately outfalling to the 500mmØ foul sewer crossing the Rathbeale Road as discussed in Section 2.1. There is also 1 No. proposed connection point to the foul network in the adjacent Cianlea Development for a small portion of the development site in the northern eastern corner of site, as detailed in drainage layout P1201.

A pre-connection enquiry was submitted to Uisce Eireann. The subsequent confirmation of feasibility (CoF) letter (CDS23007520) dated 6 February 2024, is included as Appendix A, which confirms that the development is feasible subject to wastewater upgrades. The CoF letter notes that here are two separate options for wastewater connection. The preferred option, is option 2 (connection via private infrastructure), given that Option 1 is requiring of a pumping station on the subject development lands, due to the invert level of the network to which Option 1 connects.

To accommodate the proposed connection, a proposed storage tank at the junction of Glen Ellan Road and the Balheary road will be required to be delivered.

In this regard, the required storage tank has been designed in conjunction with Uisce Eireann and was lodged as a planning application to Fingal County Council as part of the adjacent private development. The application was registered under planning Reg. Ref. F21A/0476 and granted permission by An Bord Pleanála (ABP-313835-2) on 28 March 2023. The storage tank shall be delivered in advance of connection of the subject Phase 1 lands (maximum 300 units), as requested within the above referred confirmation of feasibility.

It is further noted that an Uisce Eireann project, to divert 450mm sewer downstream of the connection point at the junction of Castlegrange Road and Balheary Road, has to be completed prior to the connection, however an initial 300 domestic units can be accommodated in advance of these diversion work being completed, once the storage tank is completed and all necessary permissions, consents and agreements are in place to connect via private infrastructure.

A Statement of Design Acceptance has also been issued by Uisce Eireann for the proposed development and is included in Appendix B. The letter states that Uisce Eireann has no objections to the foul water design proposals for the site.

### 2.3 Foul Water Drainage Calculations

The calculated foul water flows at the subject development are set out in the Table below. Domestic wastewater loads have been calculated based on 2.7 persons per unit with a per capita wastewater flow of 150 litres per head per day along with a 10% unit-consumption allowance, in line with Section 3.6 of the Uisce Eireann Code of Practice for Wastewater Infrastructure. Note that the Uisce Eireann Code of Practice assumes 2.7 residents per unit regardless of the unit type. A peak flow multiplier of 6 has been used, as per Section 2.2.5 of Appendix B of the Code of Practice.

Description	Total Population	Load per Capita	Daily Load	Total DWF	Peak Flow
	No. People	l/day	l/day	l/s	l/s
Houses/Duplexes	605	150	99,825	1.16	6.96
Apartments	135	150	22,275	0.26	1.56
<b>Total</b>	<b>740</b>	<b>-</b>	<b>122,100</b>	<b>1.42</b>	<b>8.52</b>

**Table 2** | Calculation of Total Foul Water Flow from the Development

The total dry weather flow from the development is 1.42 l/s, with a peak flow of 8.52 l/s.

### 2.4 Foul Water Drainage – General

Foul water sewers will be constructed strictly in accordance with Uisce Eireann requirements. No private drainage will be located within public areas.

Drains will be laid to comply with the requirements of the latest Building Regulations, and in accordance with the recommendations contained in the Technical Guidance Document H.

## 3. Surface Water Network

### 3.1 Existing Surface Water Network

The subject site is greenfield in nature and slopes from a height of 34.5m in the southwest corner to 24.0m in the north. The site lies within the catchment of the Broadmeadow River which outfalls to the Malahide estuary. The estuary is a Special Protection Area (SPA), a candidate Special Area of Conservation (cSAC) a proposed National Heritage Area (pNHA) and a RAMSAR site.

The site drains towards the Mill Stream that traverses the northern portion of the site, west to east and exits the eastern border of the wider Mooretown lands. This Mill Stream flows north to the Rathbeale Road where it is culverted by 1200mmØ pipes which traverses the eastern boundary of the Oldtown lands before ultimately discharging to the Broadmeadow River.

The Mooretown Lands nor the Broadmeadow River are part of the SPA or SAC site, however, any development immediately upstream is required to maintain, or improve the quality of surface water to status objectives, as set out in the Water Framework Directive (WFD). These requirements are in place in order to protect and enhance the status of the aquatic ecosystems of the SAC or SPA site. This will require the implementation of SuDS, which are intended to be utilised as part of the development.

### 3.2 Proposed Surface Water Network and SuDS Strategy

The proposed strategy substantially aligns with the permitted adjacent Mooretown development whereby the surface water for the development drains to suitably sized storage adjacent the Mill Stream before discharge at restricted greenfield rates. The Mill Stream traverses the Mooretown site, west to east.

As is identified in *Figure 4* below, this full development site is split across four separate surface water catchments, **Catchments A, B, C and D**. Each of these catchments are proposed to be attenuated adjacent the Mill Stream. Site topography, development density requirements and site constraints including archaeology has resulted in a site layout where units are proposed close to stream edge, where topography falls away to the stream. For the largest Catchment (Catchment D), it is proposed to provide above ground storage in combination with a below ground tank storage. For the smaller catchments (A-C), the profile of the lands adjacent the stream does not allow for above ground detention, so below ground tank storage is proposed. The storage volumes cater for a 1 in 100-year event, allowing for 20% climate change, within the Mooretown Mill Stream Park before discharging at greenfield rates to the Mill Stream. The discharge rate will be restricted to the greenfield equivalent runoff rate, as calculated in Section 3.3 below, by a Hydrobrake or similar approved flow control device. Catchments B,C & D form part of this Phase 1 application and the calculations provided below are specific to these. Catchment A falls outside of the Phase 1 development and will require a separate design at that stage.

There are two ditches/streams that currently drain through the subject site, and in turn connect into the Mill Stream discussed in Section 3.1 above, and as shown *Figure 3* overleaf. These two ditches contain nominal flows, with "Ditch 2" shown to have 0.3m<sup>3</sup>/second (OPW FEMFRAM Node 4Bae1386) flow during a 1 in 100-year event, and "Ditch 1" not recorded but considered to have a similar flow to the adjacent ditch (OPW FEMFRAM Node 4Baeab240), which is also at the head of the catchment and has a recorded flow of 0.2m<sup>3</sup>/second. Where these ditches are proposed to be crossed by roads and pedestrian connections, a 600mm pipe culvert pipe shall cater for these ditch flows.

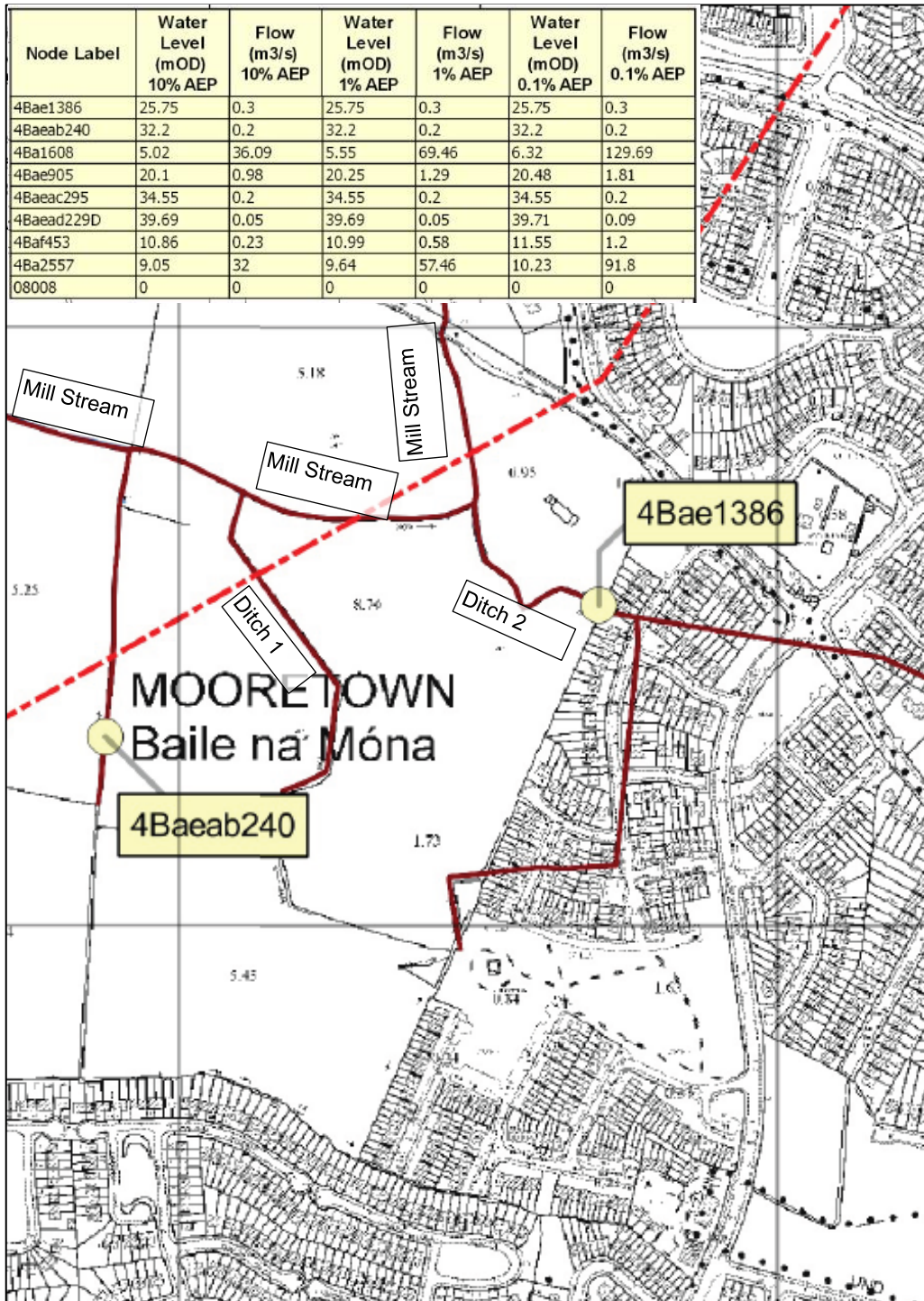
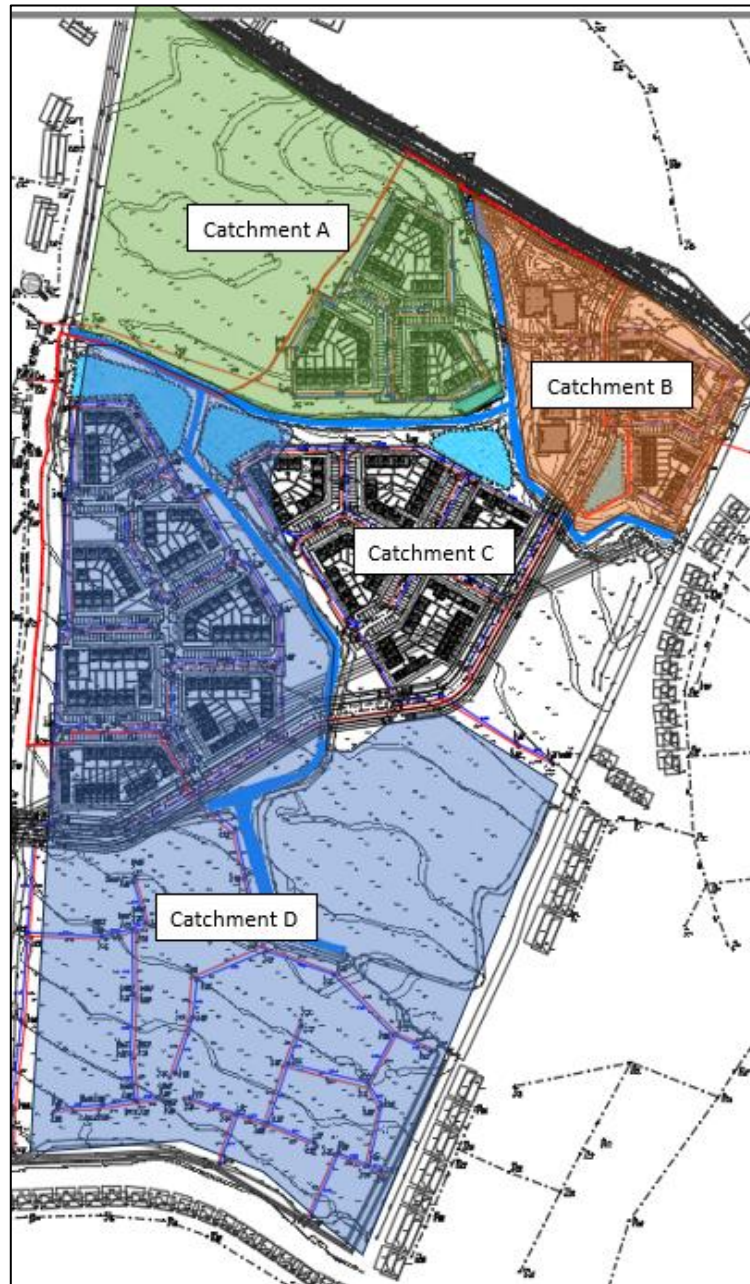


Figure 3 | Extract from OPW FEMFRAM Map BRO/HPW/EXT/CRS/009





**Figure 4 | Overall Mooretown Site Surface Water Catchment Division**

We refer you to the GSDSDS Calculations (including 1 in 100-year event plus 20% climate change attenuation calculation) for each sub catchment, included as part of Annex E

The local surface water piped network will be designed to accommodate flows from the 1 in 5-year storm. As noted above, the 1 in 100 storm events (plus 20% to accommodate climate change) shall be catered for in the permitted Mill Stream Park. A soil type (Type 4) has been used to form the basis of calculation of the surface water attenuation design. This assessment is based upon site investigations, where soil conditions have been confirmed by "Site Investigations Limited" to be brown over black sandy gravelly silty CLAY with very poor permeability rates. At the time of writing, Site Investigations Ltd. had completed all 10 No. BRE365 soak tests. All tests had failed the specification as no fall in the water level occurred. The site investigation results are included as part of Annex E.

The proposed development is designed to incorporate best drainage practice. Section 3.3, below, sets out the methodology used in determining the existing greenfield runoff rates and calculating attenuation storage requirements for the site. The relevant calculations are included in full in Appendix E.

This strategy is based upon recommendations in the Greater Dublin Strategic Drainage Study (GDSDS) and in the Ciria SuDS Manual and takes account of the Fingal Guidance Document – Green Blue Infrastructure for Development, as amended. The design incorporates a storm water management approach across the entire development through the use of various SuDS techniques. Typical proposed Mooretown SuDS details have been provided on accompanying drainage details drawing P1220.

FCC's SuDS checklist, is also included as Appendix D to this report.

Based on four key elements and in accord with Fingal's Green/Blue Infrastructure for Development Guidance Document; 1 - Water Quantity, 2 - Water Quality, 3 - Amenity and 4 - Biodiversity, the targets of the Mooretown SuDS Strategy are:-

- Water Quality Protection – in receiving watercourses and groundwater.
- Stream Regime Protection – minimisation of ecological/physical impacts on receiving streams.
- Level of Service Protection – protection of the site from flooding of the drainage system.
- Stream Flood Protection – minimising the risk of downstream flooding.
- Site Flood Protection – control of flooding of the site during extreme events.
- Amenity & Biodiversity – Ponds/wetlands can be visually attractive & add to the character of developments as well as create and sustain better places for nature.

A SUDS train concept has been implemented in the design of the storm water systems for the subject development as a whole:

- Source Control - Individual house or structure.
- Site Control - A site or phase within the subject lands.
- Regional Control – An entire catchment, i.e. Mooretown full site.

The SUDS train consists of a selection of the following drainage structures and features:-

#### Source Control

##### *Filter Drains:*

It is proposed to install 225mm diameter filter drains, consisting of perforated pipes surrounded in filter stone around the perimeter of each apartment block and beneath permeable parking bays. The filter drains will provide infiltration, optimise the retention time, and provide quality improvement to the storm water runoff, in particular the first flush from hardstanding areas. The proposed perforated pipes connect to the proposed surface water sewer network.

##### *Permeable Paving:*

It is proposed to introduce permeable paving at all parking bays throughout the development.

The goal of permeable paving is to control stormwater at the source to reduce runoff. In addition to reducing surface runoff, permeable paving has the dual benefit of improving water quality by trapping suspended solids and filtering pollutants in the substrata layers.

##### *Bio-retention Systems/Raingardens:*

Bio-retention planted areas will be provided within the private domain around apartment/duplexes blocks. Planted boxes will intercept down pipes from the apartment blocks.

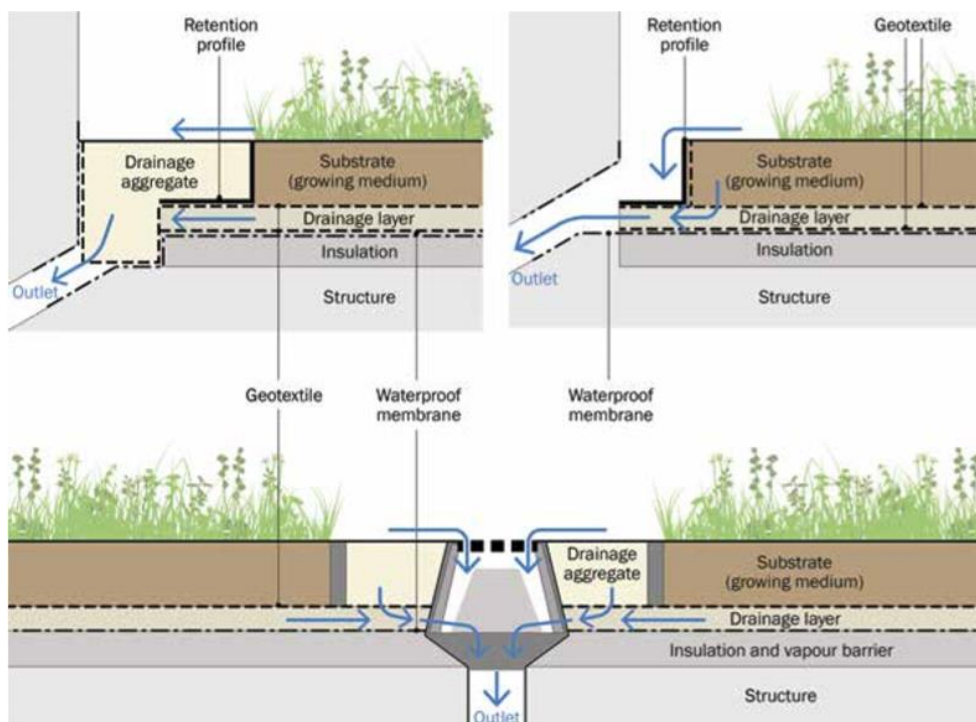
## Green Roof:

Green Roofs have been considered and incorporated into the development proposals atop the apartment blocks.

As well as providing ecological benefits, green roofs contribute the following positive effects to surface water drainage design:

- The retention of water, through storage in the growing medium and evapotranspiration from the roof's plants and substrate, reducing run-off volumes and the burden on the drainage network.
- Due to the time for water to infiltrate and permeate the substrate, there is also a reduction in peak rates of run-off, helping to reduce the risk of flooding.
- They improve water quality through the filtration of pollutants during the process of water infiltration. This provides treatment in line with CIRIA SUDS Manual management train.

Although green roof space can reduce peak flow rates in the small storm events and aid in reducing the volume of run-off from the site, they operate as conventional roofs in higher storm events. Therefore, green roofs cannot be considered in the surface water drainage run-off calculations for the development. As stated in CIRIA C697 *“although green roofs absorb most of the rainfall that they receive during ordinary events, there is still the need to discharge excess water to the building’s drainage system. This is because their hydraulic performance during extreme events tends to be fairly similar to standard roofs.”*



**Figure 5** | Example Details of outlets from a green roof (CIRIA C697)

The substrate and the plant layers in a sedum roof absorb large amounts of rainwater and release it back into the atmosphere by transpiration and evaporation. They also filter water as it passes through the layers, so the run-off, when it is produced, has fewer pollutants. Rainfall not retained by green roofs is detained, effectively increasing the time to peak and reducing peak flows.

A green roof can reduce annual percentage runoff by between 40% and 80% through this retention and evapotranspiration, with the impact dependent on a range of factors including the depth of substrate, the

saturation of substrate at the onset of a rain event, the angle of the roof, the range of vegetation growing, intensity of rainfall and the time of year.

#### Site Control

##### *Roadside Trees:*

It is proposed to provide roadside trees throughout the development. Trees can help control storm water runoff because their leaves, stems, and roots slow rain from reaching the ground and capture and store rainfall to be released later. Trees help to attenuate flows, trap silts and pollutants, promote infiltration and prevent erosion. Incorporating tree planting offers multiple benefits, including attractive planting features, improved air quality and increased biodiversity whilst helping to ensure adaptation to climate change.

##### *Bio-retention Systems/Raingardens:*

Rain gardens are proposed at open spaces around the site. Rain gardens are gardens of native shrubs, perennials, and flowers planted in a small depression, designed to temporarily hold and soak in rainwater runoff that flows from roofs, driveways, patios, or lawns.

#### Regional Control –Fingal Council Mooretown Phase 1 Lands

##### *Dry Detention Basins/Below Ground Tank Storage (Stormtech or similar):*

A dry detention basin in combination with a below ground storage tank shall be provided to accommodate attenuation for up to the 100-year rainfall event for Catchment D. The detention basin is a vegetated depression along the Mill Stream catering for the 1 in 100-year volume of surface water, before discharging to the Mill Stream.

Owing to site topography, smaller catchments A-C shall be catered for via below ground storage tanks, to accommodate attenuation for up to the 100-year rainfall event.

Flows will be controlled by a Hydrobrake or similar approved flow control device, limited to the greenfield equivalent runoff rate (as calculated in Section 3.3 below), with excess flows being attenuated in the detention basins and tanks before outfalling by gravity to the Mill stream.

##### *Petrol Interceptors:*

A Petrol interceptor is to be installed before the surface water outfall to the existing stream. Petrol Interceptors will remove hydrocarbons from surface flows, protecting the natural watercourse.

Petrol interceptors work on the premise that some hydrocarbons, such as petroleum and diesel, are less dense than water and float on the top of surface water flows. Typically, it is runoff from roads and other trafficked areas that are contaminated with hydrocarbons. The petrol interceptor will prevent a layer of hydrocarbons and other light pollutants in contaminated waters from entering the water course.

Note that all the other SuDS features described above are upstream of the proposed petrol interceptor and will serve to slow and treat surface water runoff.

### **3.2.1 Treatment Train Summary**

The SuDS treatment train at the site includes open green spaces and permeable paving to slow and intercept rainwater. Tree pits will further slow and reduce the runoff rate, while providing treatment of runoff, particularly from the roads. The use of these SuDS measures will encourage infiltration of surface water into the ground, with rainwater from roads will be directed towards tree pits. During large storm events, there is a high-level overflow from these tree pits into an adjacent gully, which discharges to the below-ground sewer network.



After these SuDS devices, rainwater will make its way into the below ground sewer network, The runoff is restricted to the greenfield equivalent rate, and excess storm water above this rate is directed to the proposed below and above attenuation. Finally, a petrol interceptor is proposed as a final measure, but as noted above, all of the other SuDS features described are upstream of the proposed petrol interceptor and will serve to slow and treat surface water runoff before it reaches the interceptor or the outfall to the existing stream.

### 3.3 Interception or Treatment Storage and Attenuation Storage

As noted above, the methodology involved in developing the Storm Water Management Plan for the subject site is based on recommendations set out in the Greater Dublin Strategic Drainage Study (GSDSDS) and in the SuDS Manual (Ciria C753). Appendix E of the Greater Dublin Strategic Drainage Study (GSDSDS) sets out criteria for determining the provision of interception or treatment storage, attenuation storage and long-term storage at a development site for each sub catchment. These calculations are included in full in Appendix E and are summarised for the entire Mooretown site below:

#### 3.3.1 Criterion 1: River Water Quality Protection

##### Criterion 1.1: Interception

The Greater Dublin Strategic Drainage Study (GSDSDS) states that approximately 30% to 40% of rainfall events are sufficiently small that there is no measurable runoff from greenfield areas into the receiving waters. These events are generally considered as the first 5mm of rainfall. Assuming 80% runoff from paved surfaces and 0% from pervious surfaces for the first 5mm of rainfall yields the following:

Paved surfaces connected to drainage system (Catchments B-D)	$92,244m^2 \times 0.5 \times 1 =$ <b>46,122m<sup>2</sup></b>	<i>92,244m<sup>2</sup> site area</i> <i>50% of the site is paved</i>
Volume of Interception Storage	$46,122m^2 \times 5mm \times 0.8$ <b>184m<sup>3</sup></b>	<i>Paved area directly drained</i> <i>5mm rainfall depth</i> <i>80% paved runoff factor</i>

**Table 3 | Interception Calculation**

For this site, interception storage is achieved using green roofs, permeable paving, tree pits and filter drains in various locations throughout the site, however this is assumed to be quite small due to the nature of the sub-soils.

##### Criterion 1.2: Treatment Volume

For events larger than 5mm, and in situations where interception storage cannot be provided, surface water runoff treatment is provided.

Assuming 80% runoff from paved surfaces and 0% from pervious surfaces for the first 15mm of rainfall:

**Table 4 | Treatment Volume Calculation**

Paved surfaces draining to river	$92,244m^2 \times 0.5 \times 1 =$ <b>46,122m<sup>2</sup></b>	<i>9.029m<sup>2</sup> site area</i> <i>60% of the site is paved</i> <i>100% of the paved area</i>
Volume of Treatment Storage	$46,122m^2 \times 15mm =$ <b>691m<sup>3</sup></b>	<i>Paved area directly drained</i> <i>15mm rainfall depth</i>



The proposed green roofing amounts to a cumulative area of approximately 1,000m<sup>2</sup>. The sedum roofing shall consist of 100mm substrate with a sedum blanket. Assuming a 30% water volume retention, this amounts to approximately 30m<sup>3</sup> of treatment storage volume.

The proposed permeable paving provides approximately 0.1m<sup>3</sup> of treatment volume square metre area. This amounts to approximately 598m<sup>3</sup> of treatment volume when the external parking areas are considered.

Furthermore, the proposed tree pit area totalling 2,200m<sup>2</sup>, and the 300mm layer of voided stone within similarly affords approximately 0.1m<sup>3</sup> of treatment volume square metre area. This amounts to approximately 66m<sup>3</sup>. The proposed filter drains provision of stone surround similarly affords approximately 0.1m<sup>3</sup> of treatment volume per linear metre.

The treatment volume afforded by the above measures is therefore more than sufficient to meet the required treatment volume for the respective hardstanding areas.

### 3.3.2 Criterion 2: River Regime Protection

Attenuation storage is provided to limit the discharge rate from the site into the public network. As per the GDSDS, the required attenuation volume is calculated assuming 100% runoff from paved areas, and has been calculated for the 1-year, 30-year and 100-year return periods, identifying the critical storm for each – refer to the calculations included in Appendix E.

Based on these calculations, the 1-in-100-year critical storm for the full development of Catchments B,C & D, requires attenuation storage volume of 3,104m<sup>3</sup>. This volume is sufficient for the 1-in-100-year storm, accounting for a 20% increase due to climate change.

The required attenuation storage is to be provided in the above ground detention and below ground storage tanks located in the open space adjacent the Mill Stream and within the apartment car parking courts.

As noted above, surface water runoff from the catchment will be restricted via a Hydro-brake or similar approved flow control device, limited to the calculated greenfield equivalent runoff rate, before discharging to the public network.

### 3.3.3 Criterion 3: Levels of Service

There are four criteria for levels of service. These are:

- Criterion 3.1: No external flooding except where specifically planned (30-year high intensity rainfall event).
- Criterion 3.2: No internal flooding (100-year high intensity rainfall event).
- Criterion 3.3: No internal flooding (100-year river event and critical duration for site storage).
- Criterion 3.4: No flood routing off site except where specifically planned (100-year high intensity rainfall event).

Both internal and external flooding have been assessed in the Flood Risk Assessment report which accompanies this Engineering Assessment Report. The Flood Risk Assessment has been carried out in accordance with the *DEHLG/OPW Guidelines on the Planning Process and Flood Risk Management* published in November 2009.

The assessment identifies the risk of both internal and external flooding at the site from various sources and sets out mitigation measures against the potential risks of flooding. The sources of possible flooding assessed in the report include coastal, fluvial, pluvial (direct heavy rain), groundwater and human/mechanical errors.

As a result of the flood risk management and mitigation measures proposed, the residual risk of internal or external flooding for the 30-year and 100-year flood events is low, and accordingly all four of the above criteria have been met. Please refer to the accompanying Flood Risk Assessment report for the full analysis of the flood risk at the subject site.

### 3.3.4 Criterion 4: River Flood Protection

The long-term storage volume is a comparison of pre- and post-development runoff volumes. The objective is to limit the runoff discharged after development to the same as that which occurred prior to development.

Of the three methods described in the GSDSDS for establishing River Flood Protection by comparison of the pre- and post-development runoff volumes, (Criteria 4.1, 4.2 and 4.3 respectively), Criteria 4.3 is selected for use as the most practical criteria at this stage in the design.

The Criteria 4.3 approach is for all runoff to be limited to either  $Q_{BAR}$  or to 2 l/s/Ha, whichever is the greater. The proposed drainage system includes a flow control device to ensure that the discharge rate is limited to the greenfield equivalent and ample attenuation is provided for the 1-in-100-year storm, accounting for a 20% increase due to climate change.

The extra runoff volume of the development runoff over greenfield runoff,  $Vol_{XS}$ , as calculated in Appendix E is 200m<sup>3</sup>. Note that as stated in the GSDSDS, this volume is not additional to the attenuation storage volume but is effectively an element of it.

## 3.4 Surface Water – General

Surface water sewers will generally consist of PVC (to IS 123) or concrete socket and spigot pipes (to IS 6) and laid strictly in accordance with Fingal County Council requirements for taking in charge. It is intended that all sewers within the public domain will be handed over to Fingal County Council for taking in charge.

Any instream works such as outfall headwall construction will only be carried out only during dry weather. The precast headwall will be constructed “in the dry” and isolated from the watercourse using sandbags. The headwall will be installed on cement blinding (50mm minimum) on well compacted clean hardcore (300mm minimum). Ready mix concrete will be brought to the site and no concrete batching will occur at the headwall location. The cement will be allowed to fully cure before the removal of the sandbag bund. Under no circumstances will concrete-contaminated water or effluent be permitted to escape to the stream. Respective catchment stream outfall headwalls are identified on drainage layout drawings P1201 & P1202.

All works will be carried out in accordance with accepted best practice methodologies, and where appropriate will have regard to the following guidance documentation:

*-Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (Inland Fisheries Ireland, 2016);*

*-Planning for Watercourses in the Urban Environment (Inland Fisheries Ireland, 2020);*

All private outfall manholes will be built in accordance with the Greater Dublin Regional Code of Practice for Drainage Works. No private drainage will be located within public areas.

Drains will be laid in accordance with the requirements of the Building Regulations, Technical Guidance Document H.

## 4. Water Supply

### 4.1 Existing Water Supply

As with the foul water in section 2, watermain records were obtained for the site. There are no networks internal to the site, however networks have been constructed as part of the privately constructed adjacent Mooretown development to the west, refer Figure 2, under their Phase 1, School Campus and Distributor Road projects. Similarly, water provision has been constructed as part of the recent Rathbleale Road Upgrade works fronting the proposed development site.

The Mooretown Lands will connect to the existing 180mmØ PE watermain spurs that have been installed to service the subject lands, at the Rathbeale Road development entrance and as part of the privately constructed adjacent Mooretown Lands.

### 4.2 Proposed Water Supply

A pre-connection enquiry was submitted to Uisce Eireann. The subsequent confirmation of feasibility letter (CDS23007520) dated 6 February 2024, is included as Appendix A, which confirms that the development is feasible without upgrade for water supply.

It is proposed to serve the site by utilising a series of 100mm and 150mm diameter mains. The network routing and connection points have been shown on water layout drawing P1300.

A Statement of Design Acceptance has also been issued by Uisce Eireann for the proposed development and is included in Appendix B. The letter states that Uisce Eireann has no objections to the water design proposals for the site. Two number of connections are proposed; one off the existing network within the Rathbeale Road to the north, and one off the existing Mooretown development adjacent to the west. It is noted that this development is currently still private and services etc have not been Taking-in-Charge. As such third part landowner consent is required.

### 4.3 Water Supply Calculations

The calculated water demand at the subject development is set out in the table overleaf. The average domestic demand has been established based on an average occupancy ratio of 2.7 persons per dwelling with a daily domestic per capita consumption of 150 litres and with a 10% allowance factor. The average day/peak week demand has been taken as 1.25 times the average daily domestic demand, while the peak demand has been taken as 5 times the average day/peak week demand, as per Section 3.7.2 of the Uisce Eireann Code of Practice for Water Infrastructure.

Description	Total Population	Water Demand	Average Demand	Average Peak Demand	Peak Demand
	No. People	l/day	l/s	l/s	l/s
Houses	605	99,825	1.16	1.45	7.25
Apartments	135	22,275	0.26	0.32	1.60
<b>Total</b>	<b>740</b>	<b>122,550</b>	<b>1.42</b>	<b>1.77</b>	<b>8.85</b>

**Table 5** | Calculation of Water Demand for the Development

The average demand for the development is 1.77l/s, with a peak demand of 8.85 l/s. This water demand will come online as the development is built out and occupied.

#### **4.4 Water Supply – General**

All watermains will be laid strictly in accordance with Uisce Eireann requirements for taking in charge.

Valves, hydrants, scour and sluice valves and bulk water meters will be provided in accordance with the requirements of Uisce Eireann and Fingal County Council Water Services Department.

## 5. Roads and Transport Network

This section provides an overview of the existing and proposed road and transportation network in the vicinity of the site. A comprehensive Traffic and Transport Assessment and Travel Plan have also been prepared by Waterman Moylan in accordance with the requirements of the Traffic and Transport Assessment Guidelines published by National Roads Authority in May 2014 and accompanies this submission under separate covers.

### 5.1 Existing Road Network

The site is to be accessed from the Rathbeale Road via a new signalised junction to the Rathbeale Road. The Rathbeale Road (R125), has recently undergone extensive upgrade works, completed in 2020, to ensure its suitability for the increase in usage due to additional residents and construction works being undertaken as part of the LAP (now expired). It has a posted speed limit of 50 km/hr and is comprised of a 5m wide, 2-lane carriageway, a 1.8m wide pedestrian footpath & 2.25m cycleway on the northern side and a 3.5m shared surface for pedestrians/cyclists on the southern side. The upgraded Rathbeale Road offers a vastly improved and safer connection for the Oldtown / Mooretown development lands with the town of Swords and local schools in the area.

The Western Distributor Link Road (WDLR) at the western extent of the wider Mooretown development has been designed in accordance with the requirements envisaged in the expired Oldtown Mooretown LAP. It is envisaged that this road will later connect to the Brackenstown Road (L2030) to the south as part of future LAPs to neighbouring areas. The WDLR has been constructed to just south of the Mooretown School Access Road junction and has received a grant of planning by Fingal County Council for an extension to the southern ownership of the Applicants lands.

The Mooretown School Access Road, accessed via the WDLR extends to the boundary of the subject Mooretown Lands, facilitating future connection in accord with the spirit of the expired Oldtown Mooretown LAP.

The nearest motorway is the M1, which can be joined at Junction 3, near Feltrim, is approximately 3.75km southeast of the site.

### 5.2 Proposed Road Layout

It is proposed to provide a vehicular entrance to the development from the existing Rathbeale Road via a signalised junction. The link distributor road that traverses the southern extent of the subject application site proposes to link the Rathbeale Road with the Mooretown School Access Road discussed in section 3.1, in accordance with the spirit of expired LAP. The link road will 30kph design speed and is proposed to be 6.5m wide with a 2m footpath and 3m two-way off-road cycle track on the northern side, linking in with the 2-way cycle and footpath at the western extent. There is also proposed to be a 1-way off road cycle track and footpath on the southern side of the link road with raised table crossing points providing linkage to the north. The internal road network will be 6m wide roads with typically 2.3m minimum width footway,

All road design has been cognisant of the requirements of Road Safety Audit recommendations and the requirement of DMURS, typical of all other stages of the adjacent Oldtown/Mooretown development and as discussed in the following sections. We refer you to the accompanying Road Layout Drawing P1100, which also shows the road network and how the site links in with the surrounding development and school site, and the Road Layout Drawings P1101-P1102, supplied as part of this submission identifying the proposed road hierarchy and network within and around the site. As noted above, the site is to be accessed from the Rathbeale Road. Internal primary and secondary link roads as allow access to the development units.



The development units are in proximity to an extensive and high-quality cycle network that links the proposed units to the local schools and amenities (Broadmeadow Community National School, Swords Community College, Gaelscoil Bhrian Bóroimhe and Applewood Community Centre) as further developed upon in the accompanying Travel Plan. We refer you to the cycle track layout drawing P1003 in this regard. As can be seen, the cycle and path network through the subject application link with the WDLR and then Rathbeale Road cycle and path network, which in turn links with the Glen Ellen Road via the Archaeology Park. Cycle linkage through the open spaces is proposed to accord with the spirit and objectives of the expired LAP. As discussed above, It is proposed that off-road cycle track shall be supplied on either side of the link road that traverses the subject development, linking the Mooretown School Access Road to the Rathbeale Road, in the form of a 2-way track on the northern side of the road and a one-way track on the southern side. Cycle tracks are proposed to be finished in red SMA, with high friction surfacing where they are at carriageway level through junctions.

There are two more schools within Swords to the East of the proposed development, there are St Finian's Community College to the northeast and Fingal Community College.

There are several retail facilities within the catchment, the most significant being Pavilion Shopping centre to the southeast of the proposed development. Directly east and closest to the proposed development is a large supermarket and to the north of this is a small area of shops and restaurants in Applewood.

There are several leisure and sports facilities in the area. There are two parks in the area, one to the south called Windmill lands and has Ward River following through it. St. Colmcilles GAA club is to the east of the proposed development. Directly north of the site is the Applewood Community Centre which can offer leisure and sporting activities for the area.

To the northeast of the proposed development at the edge of the catchment, there is a small business park which offers employment opportunities.

A Swept Path Analysis has been undertaken for the entirety of the site, refer to drawing number: P1001. This has not indicated any access issues for a refuse vehicle.

### 5.2.1 Proposed Pedestrian Facilities

The proposed development will include a network of footpaths throughout the site, connecting with Mooretown private development to the west and the Rathbeale Road to the north. The proposed development provides efficient, high quality pedestrian routes along anticipated desire lines and in accord with the spirit of the expired LAP. These pedestrian linkages through and around the proposed development have been considered in the context of desire lines, particularly in the context of facilitating connections to the Rathbleale Road, the School Access Link Road and the open spaces.

A 2m shared path is proposed to be supplied around each cluster of cells to provide access to the front of each block facing the stream.

An active frontage along routes within the development is achieved with frequent entrances and openings that ensure the street is overlooked and that generate pedestrian activity as people come and go from buildings. All footpaths will be a minimum 2.0m in accordance with the requirements of DMURS.

### 5.2.2 Proposed Cycle Facilities

The proposed layout achieves a high level of pedestrian and cyclist permeability, with sustainable transport modes central to the design principles.

Cycle facilities will typically be on street facilities, in line with the principles set out in the National Cycle Manual and reinforced within DMURS. The design of the streets as self-regulating with a low 20km/hr

design speed with low volumes of vehicular traffic is central to the safe provision of the shared street cycle regime.

Cycle tracks are proposed be provided with a red SMA surface which will provide a high quality, long lasting, surface for cyclists. For cycle lanes at carriageway level through junctions, the red colour shall be provided using High Friction Surfacing with approved PrTrait in Accordance with Road Pavements – Bituminous Materials (CC-SPW-00900).

### 5.2.3 Proposed Car & Cycle Parking Facilities

The proposed car parking for the site is summarised in the below schedule. Save for 3 bed-units, house/duplex/apartment types are proposed to be afforded in accord with FCC Development Plan “norms” in FCC “Zone 2.” For 3 bed houses, which a reduced car parking provision is proposed (1.5 spaces/unit), bike sheds in front of these houses are proposed, providing high quality and safe bicycle storage for 5 bicycles in accord with Table 14.17 of the Fingal Development Plan. Similarly, for 3-bed duplexes/apartments, a reduced provision is proposed (~1 space/unit), taking into consideration the recommendations set out in the ‘Sustainable Urban Housing Design Standards for New Apartments Guidelines for Planning Authorities (2022)’ and ‘Sustainable Residential Development and Compact Settlements Guidelines for Planning Authorities’, as further developed upon in section 10 of the accompanying Traffic and Transport Assessment.

It is considered that the Mobility Management Travel Plan that shall accompany the subject development submission demonstrates that a high percentage of modal shift in favour of sustainable modes, will be achieved through its implementation, and justifies the reduction from the “norm” car parking ratios. It is further noted that recently permitted Mooretown Phase 3 of the adjacent private Mooretown development (SHD Reference ABP-313362-22) has been granted with a similarly reduced level of parking from the FCC development plan “norms” and the nearby Oldtown Phase 2C (F23A/0676) likewise.

The proposed development is located in an area served by good public transport which, as planned under BusConnects programme, is projected to be upgraded with more frequent and reliable routes. Cycle and pedestrian facilities in the locality are new (along R125 Rathbeale Road, Western Distributor Road and Glen Ellan Road) with excellent connections to bus stops and local amenities. Within the 15-minute cycle band from the site there are several retail, leisure, sports, and employment facilities available. The provision of high-quality bicycle parking can serve to negate the need for excessive car parking spaces and all the associated impacts that such provision can entail.

Taking into consideration the recommendations set out in the Design Standards for New Apartments and National Transport Authority Greater Dublin Area Transport Strategy 2022-2042, the proposed development meets criteria for the provision of a reduced car parking for the duplexes/apartments due to its *Intermediate Urban Locations* as there is a proposed high frequency bus service with a bus stop less than 500m away.

It is also proposed that 3 No. GoCar spaces shall be afforded throughout the development. Each car sharing vehicle that is placed in a community has the potential to replace the journeys of up to 15 private cars.

Furthermore, assessing Table 3.8: Accessibility of the ‘Sustainable Residential Development and Compact Settlements Guidelines for Planning Authorities’, the subject lands are in an “intermediate location”, with the site entrance 450m from the planned A4 bus connects route stop located on Murrough Road, which will operate at a frequency of 12-15 minute during the week.

SPPR 3 of the compact settlement guidelines calls for a maximum provision 2 spaces per dwelling. This 2 No. spaces/dwelling allowance includes provision for visitor parking, but excludes car share, short stay, EV and accessible spaces.

In this regard, for the 274 units in this first Phase of development, it is proposed to afford a cumulative total of 412 (357 resident parking spaces / 55 visitor), as summarised in the below table. This equates to an overall rate of 1.5 spaces per unit.

We have outlined in the below summary table a breakdown of proposed parking provision for the subject lands. For the calculation of the SPPR3 provision, we have used a rate of 1.5 spaces/unit. It is noted that the proposed parking provision for this development is lower than the SPPR3 calculated rates, however, we consider that the provision outlined can be supported as above.

The proposed level of provision is further supported via consultation carried out during the Census 2022. The census survey found that for the population of 11,631 people living in the local areas, there is a car ownership of 5,426 vehicles, which equates to 1 car per 2.14 persons or 1.51 cars per dwelling unit.

Land Use	No. of Units	FDP Requirements		Compact settlement Guidelines SPPR3	Car Parking Proposed	
		Resident	Visitor (1 per 5 units)	Max 2/unit (incl visitor) (1.5 / unit used here)	Resident	Visitor
1-Bed Apartments	4	4		274 units x 1.5 = 411	4	
2-Bed Apartments	35	35			35	
3 – Bed Apartments	11	22			17 (1.5 unit)	
1-Bed Duplexes	14	14			14	
2-Bed Duplexes	20	20			20	
3-Bed Duplexes	3	6			4 (1.5/unit)	
2-Bed Houses	54	54			54	
3-Bed Houses	114	228			171 (1.5/unit)	
4-Bed Houses	19	38			38	
Accessible Spaces (5%)						
EV (20%)		(20% of above)		100	(20% of above)	
<b>Total</b>		<b>421</b>	<b>55</b>	<b>511</b>	<b>357</b>	<b>55</b>
Go Car					3	

**Table 6 | Proposed Car Parking**

## 5.2.4 Refuse, Delivery and Emergency Vehicle Access

Refuse collection and deliveries will be facilitated via the vehicular access from the Rathbeale Road. The streets throughout the development have been designed to accommodate a refuse truck, with swept path analysis confirming that a refuse vehicle can safely navigate the streets.

Swept path analysis has been carried out for a fire tender using AutoTrack software, confirming that a fire tender can safely navigate the site if required. The design incorporates appropriate access on all streets for fire tender and refuse vehicles, including fire tender access afforded to the units facing the stream via the active travel footway, which is proposed to be afforded with a suitable heavy vehicle loading pavement build up.

## 5.3 Road Safety/Quality Audit

A Stage 1 Road Safety Audit was carried out by Bruton Consulting Engineers and the final report is included in full as Appendix C. The Road Safety Audit comprised an examination of draft development drawings provided by Waterman Moylan and a site visit by the Audit Team, findings of the report have been addressed as part of the revised submission package and are summarised as follows, including a summary of the agreed solutions:

Problem 1: Provision of Toucan Crossing at Development Entrance

Agreed Solution: FCC have agreed to supply a Toucan crossing across the Rathbeale Road separately to these works, to enable a safe pedestrian/cyclist crossing point from the northern side of the Rathbeale Road.

Problem 2: Entrance to Road 1.1 has potential to cause vehicular queue out to the Rathbeale Road

Agreed Solution: Suitable sightlines and yellow box to be incorporated into the design.

Problem 3-5: Spine Road Speed design to be agreed and suitable sightlines to be afforded.

Agreed Solution: Spine road designed as 30kph road. Road speed to be posted and parking positions to be suitably adjusted to ensure Safe Stopping Distances are achieved.

Problem 6: Internal Yields lines and signs to be replaced with Stop lines and signs

Agreed Solution: Stops incorporated in lieu of Yields.

## 5.4 DMURS and Statement of Design Consistency

### 5.4.1 Background

The stated objective of DMURS is to achieve better street design in urban areas. This will encourage more people to choose to walk, cycle or use public transport by making the experience safer and more pleasant. It will lower traffic speeds, reduce unnecessary car use, and create a built environment that promotes healthy lifestyles and responds more sympathetically to the distinctive nature of individual communities and places. The implementation of DMURS is intended to enhance how we go about our business, how we interact with each other, and have a positive impact on our enjoyment of the places to and through which we travel.

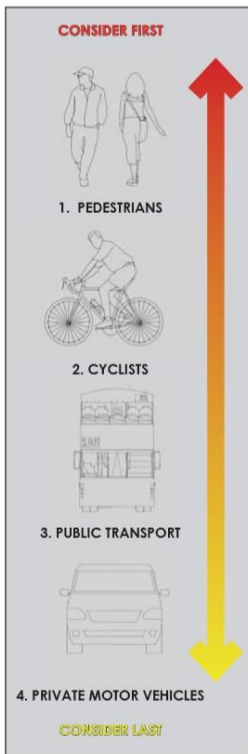
### 5.4.2 DMURS: Statement of Design Consistency

Waterman Moylan Consulting Engineers considers that the proposed road and street design is consistent with the principles and guidance outlined in the Design Manual for Urban Roads and Streets (DMURS).

Outlined below are some of the specific design features that have been incorporated within the proposed scheme with the objective of delivering a design that is in compliance with DMURS.

### 5.4.3 Creating a Sense of Place

Four characteristics represent the basic measures that should be established in order to create people friendly streets that facilitate more sustainable neighbourhoods. These characteristics are connectivity, enclosure, active edges, and pedestrian activities/facilities.



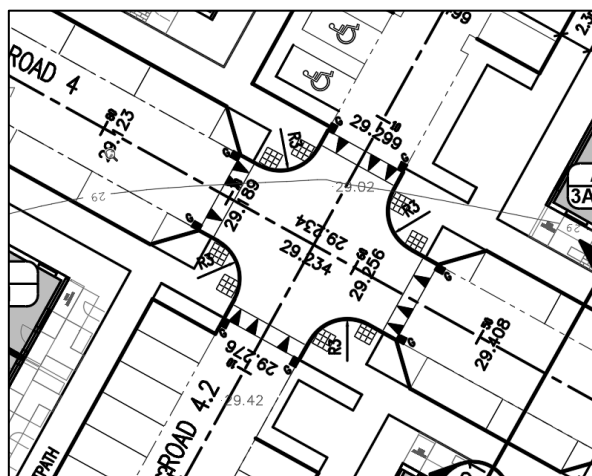
#### Connectivity:

*“The creation of vibrant and active places requires pedestrian activity. This in turn requires walkable street networks that can be easily navigated and are well connected.”*

In order of importance, DMURS prioritises pedestrians, cyclists, public transport and private cars. This is illustrated in the adjacent image extracted from DMURS.

The proposed development has been designed with pedestrians and cyclists taking precedence over other modes of transport. In this regard, footpaths are provided throughout the development with regular pedestrian crossings along anticipated desire lines. Footpaths within the development will generally be minimum 2.3m in width.

Pedestrian crossings have been designed to allow pedestrians to cross the street at grade. The crossings will utilise tactile paving and drop kerbing to facilitate safe crossings at grade and have also been located on elevated road surfaces where possible, such as raised tables. Refer *Figure 5* example supplied below. These elevated road surfaces can only be accessed by car via a ramp, which is one of many safety measures implemented throughout the development, and in line with the recommendations of DMURS, to reduce the speed of vehicles. These elevated road surfaces will be of a different colour, and potentially texture, the exact composition of which is to be agreed with FCC, to further make motorists aware of the change of user priority, this being a change from a vehicle priority road to a pedestrian priority surface such as a crossing etc.



**Figure 6 | Raised Ramp Pedestrian Crossing**



DMURS notes that cul-de-sacs should not dominate residential layouts, and their use should be limited. In particular, the number of walkable/cyclable routes between destinations should be maximised. Section 3.3.2 of DMURS notes that cul-de-sacs may be used to serve a small number of dwellings, to enable more compact/efficient forms of development. The proposed development does include cul-de-sacs but places emphasis on pedestrian and cyclist movements, with shared cycle pedestrian active travel pathway proposed to afford suitable filtered permeability throughout the development and surrounding each cluster of houses at the end of each road end. In this regard, we also refer you to the cycle infrastructure drawing and Landscape Architecture layout drawings that identify proposed pedestrian and cycle routes throughout the wider Oldtown and Mooretown development.

Enclosure:

*“A sense of enclosure spatially defines streets and creates a more intimate and supervised environment. A sense of enclosure is achieved by orientating buildings towards the street and placing them along its edge. The use of street trees can also enhance the feeling of enclosure.”*

The proposed development has been designed with residential units overlooking streets and pedestrian routes throughout. High quality landscaping and tree planting are proposed throughout the scheme which creates a definitive sense of place. Road widths are generally 6m (2-way) throughout the development and ensure that a strong sense of enclosure is achieved on residential roads.

Active Edge:

*“An active frontage enlivens the edge of the street creating a more interesting and engaging environment. An active frontage is achieved with frequent entrances and openings that ensure the street is overlooked and generate pedestrian activity as people come and go from buildings.”*

As stated in Section 2.2.1 of DMURS, an active frontage enlivens the edge of the street, creating a more interesting and engaging environment. An active frontage is achieved with frequent entrances and openings.

Vehicular entrances have been provided and are well dispersed along the overall development. The provision of pedestrian crossings will encourage and facilitate pedestrian and cyclist activity. The proposal includes strategically placed raised tables, which will promote lower vehicular speeds while enabling pedestrians to cross the street at grade, in accordance with Section 4.4.7 of DMURS.

There are a number of advantages to more permeable networks in regard to the management of traffic and vehicle speeds. Drivers are more likely to maintain lower speeds over shorter distances than over longer ones. Since drivers are able to access individual properties more directly from Access/Link streets (where speeds are more moderate), they are more likely to comply with lower speed limits on Local streets, as stated in Section 3.4.1 of DMURS.

Section 4.4.7 of DMURS recommends the use of horizontal and vertical deflections (Refer *Figure 6* below) on straights where there is more than 70m between junctions. The internal road network of the proposed development has been designed by the Civil Engineers in conjunction with the Architects so as to ensure that this distance of 70m has generally not been exceeded through the development, and that in cases where a reduction in straight length was not possible, that appropriate traffic calming measures such as raised tables (vertical deflections) and regular junctions have been incorporated to the design.

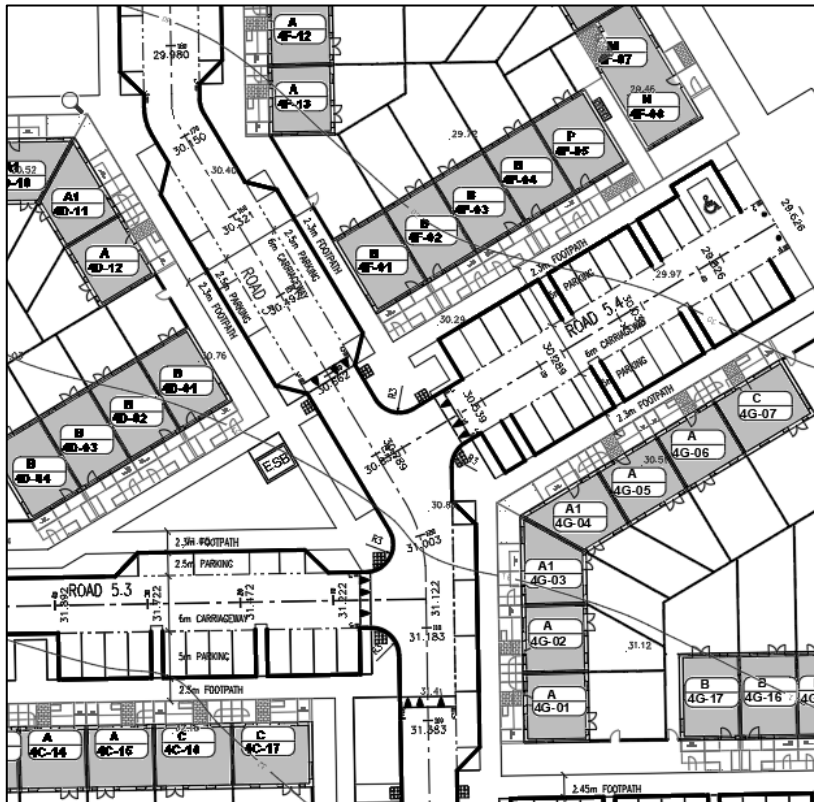


Figure 7 | Horizontal Road Deflection

On-street parking separates pedestrians from the vehicle carriageway and, as per DMURS Section 4.4.9, can calm traffic by increasing driver caution, contribute to pedestrian comfort by providing a buffer between the vehicular carriageway and footpath and provide good levels of passive security. On-street parking has been designed throughout to implement the DMURS recommendation.

Suitable sightlines have been provided throughout the development, ensuring that localised planting does not obscure visibility as cars make turning manoeuvres, improving the pedestrian safety at crossing points. Turning radii throughout the site are minimised where possible, generally 3m-6m to induce lower vehicle speeds, but suitably sized to ensure that refuse vehicles and emergency vehicles do not overhang the kerb lines and pedestrian domain.

#### Pedestrian Activities/Facilities:

*“The sense of intimacy, interest and overlooking that is created by a street that is enclosed and lined with active frontages enhances a pedestrian’s feeling of security and well-being. Good pedestrian facilities (such as wide footpaths and well-designed crossings) also make walking a more convenient and pleasurable experience that will further encourage pedestrian activity.”*

As outlined in the items above, the proposed development has been designed to provide excellent pedestrian connectivity, with footpaths providing permeability throughout the site.

Throughout the site, pedestrian routes are generally 2.3m wide or greater which, as mentioned previously, provides adequate space for two wheelchairs to pass one another. DMURS identifies a 1.8m wide footpath as being suitable for areas of low pedestrian activity and a 2.5m footpath as being suitable for low to moderate pedestrian activity. In order to create pedestrian friendly environment, wider footpaths (refer Figure 6 below) have been considered throughout, and adopted along the spine routes wherever possible, encouraging a pedestrian focused network.

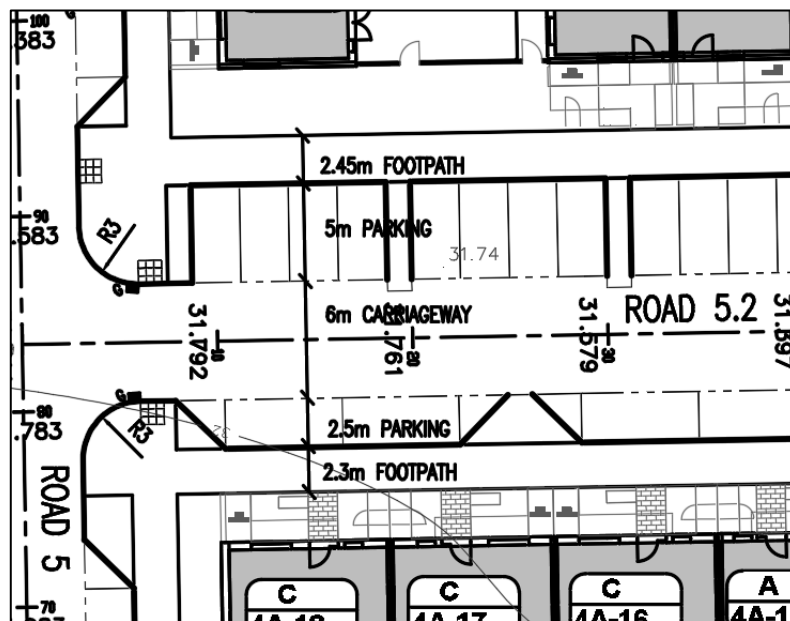


Figure 8 | Wider pedestrian routes

#### 5.4.4 Key Design Principles

DMURS sets out four core design principles which designers must have regard to when designing roads and streets. These four core principles are set out below together with a commentary establishing how these design principles have been incorporated into the design of the proposed development.

##### **Design Principle 1: Pedestrian Activity/Facilities:**

*“To support the creation of integrated street networks which promote higher levels of permeability and legibility for all users and in particular more sustainable forms of transport.”*

Streets have been designed in accordance with the alignment and curvature recommendations set out in DMURS Section 4.4.6. Staggered junctions along with raised pedestrian tables/crossings at main pedestrian desire lines will encourage reduced driving speeds, and wide footpaths will encourage safe and integrated pedestrian facility.

##### **Design Principle 2: Multi-Functional Streets:**

*“The promotion of multi-functional, place-based streets that balance the needs of all users within a self-regulating environment.”*

The road hierarchy comprises primary and secondary Local Access roads. The local access streets comprise of 6.0m wide carriageways with a self-regulating systems in operation to encourage lower speeds, in the form of road curvature, raised tables and on-street parking to name a few. Footpaths range in size from 2m to 2.5m (as shown in Figure 7 above), balancing the needs of vehicles and vulnerable road users within the proposed development.

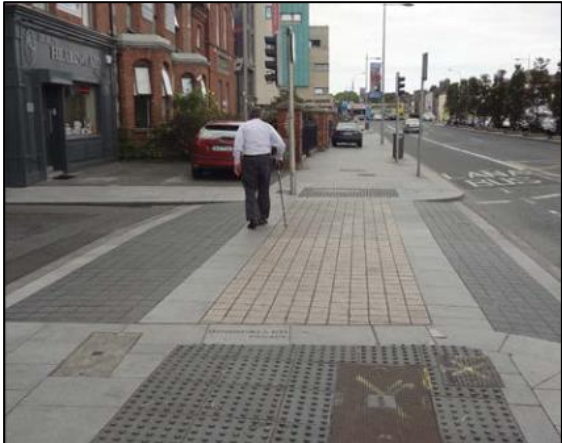
##### **Design Principle 3: Pedestrian Focus:**

*“The quality of the street is measured by the quality of the pedestrian environment.”*

The design of the scheme has placed a particular focus on the pedestrian. Connectivity throughout the scheme is heavily weighted towards the pedestrian and cyclist. There are excellent pedestrian and cycle links to the Mooretown School Access Road (proposed to be a Safe Schools Street, as part of the planning

permitted Phase 3 development to the south), and also to the Rathbeale Road and its associated public transport services and amenities, for residents of the development.

Raised tables are provided at the internal junctions, which allow pedestrians and cyclists to continue at grade. The raised tables also promote lower vehicle speeds. Stop signs and road markings will be provided prior to the raised table, to give pedestrians priority. Wider footpaths throughout the phase ensure there is a clear pedestrian focus and priority.



**Figure 9** | Extract from DMURS Figure 4.69

**Design Principle 4: Multi-Disciplinary Approach:**

*“Greater communication and co-operation between design professionals through promotion plan led multidisciplinary approach to design.”*

The design of the proposed scheme has been developed through the design team working closely together. The proposed development design is led by OBB Architects working together with multiple disciplines including Waterman Moylan Consulting Engineers, Brady Shipman Martin Planning Consultants and Landscape Architects.

Public areas fronting and within the proposed development have been designed by a multidisciplinary design team to accommodate pedestrians and cyclists in accordance with the appropriate principles and guidelines set out in DMURS. In particular the vehicular access and public footways within the remit of the development will incorporate the relevant DMURS requirements and guidelines as set out above.

**5.5 Traffic and Transport Assessment**

As noted above, a comprehensive Traffic and Transport Assessment and Travel Plan have also been prepared by Waterman Moylan and accompanies this submission under separate covers.

## **Appendices**

### **A. Uisce Eireann Confirmation of Feasibility Letter**

## CONFIRMATION OF FEASIBILITY

Richard Miles  
Waterman Moylan  
Bock S  
EastPoint Business park  
Aflie 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](http://www.water.ie)

6 February 2024

**Our Ref: CDS23007520 Pre-Connection Enquiry  
Mooretown, Swords, 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 600 unit(s) at Mooretown, Swords, Swords, Dublin, (the **Development**).

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

- **Water Connection** - Feasible without infrastructure upgrade by Irish Water
  - Primary connection main is to be a new 200mm ID pipe with installation of a meter on the line and connected to the existing 180mm HDPE main. As the connection is via private land/s, please be advised that at connection application stage you have to provide evidence of consent from the Third Party Landowner/s.
  - Secondary connection is to be a new 200mm ID pipe connected to the existing 180mm uPVC on Rathbeale Road. A control valve is to be installed on this main and set to closed during normal operations.





- **Wastewater Connection** - Feasible Subject to upgrades

*Option 1 (connection to the existing Uisce Éireann network on Rathbeale Road)*

- In order to accommodate the connection, following will be required:
  - Uisce Éireann wastewater network has to be extended for approximately 180m, from junction of Murrough Road and Rathbeale Road up to the site. The works will be funded by the Developer. The fee will be calculated at a connection application stage.
  - An Uisce Éireann project, to divert 450mm sewer downstream of this connection point at the junction of Castlegrange Road and Balheary Road, has to be completed prior the connection. Estimated completion date for the works is Q2/27 (this may be subject to change)

*Option 2 (connection via the adjacent Gannon Moortown Lands)*

- In order to accommodate the connection, following will be required:
  - An Uisce Éireann project, to divert 450mm sewer downstream of this connection point at the junction of Castlegrange Road and Balheary Road, has to be completed prior the connection. Estimated completion date for the works is Q2/27 (this may be subject to change)
  - A storage tank will be required to manage the impact of excessive rainfall in the existing network downstream of the Development (Glen Ellan Road). These upgrade works are not currently on the Uisce Éireann investment plan therefore, the Developer will be required to fund a relevant portion of these local network upgrades in conjunction with other developments in this contributing area. The fee will be calculated at connection application stage.
  - As the connection is proposed via a private infrastructure (including the proposed storage tank), at a connection application stage, the Developer is to provide a legal permission to connect to and written confirmation that the infrastructure is fit for purpose and has capacity to cater for the additional load.
  - Initial phases (maximum 300 domestic units) can be accommodated in advance of the diversion being completed, once the storage tank is completed and all necessary permissions, consents and agreements are in place to connect via private infrastructure.

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/](http://www.water.ie/connections/get-connected/)

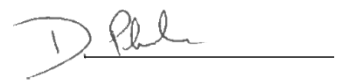
### Where can you find more information?

- **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](http://www.water.ie/connections), email [newconnections@water.ie](mailto:newconnections@water.ie) or contact 1800 278 278.

Yours sincerely,

A handwritten signature in blue ink, appearing to read 'D. Phelan', is written over a horizontal line.

**Dermot Phelan**  
**Connections Delivery Manager**

## Section A - What is important to know?

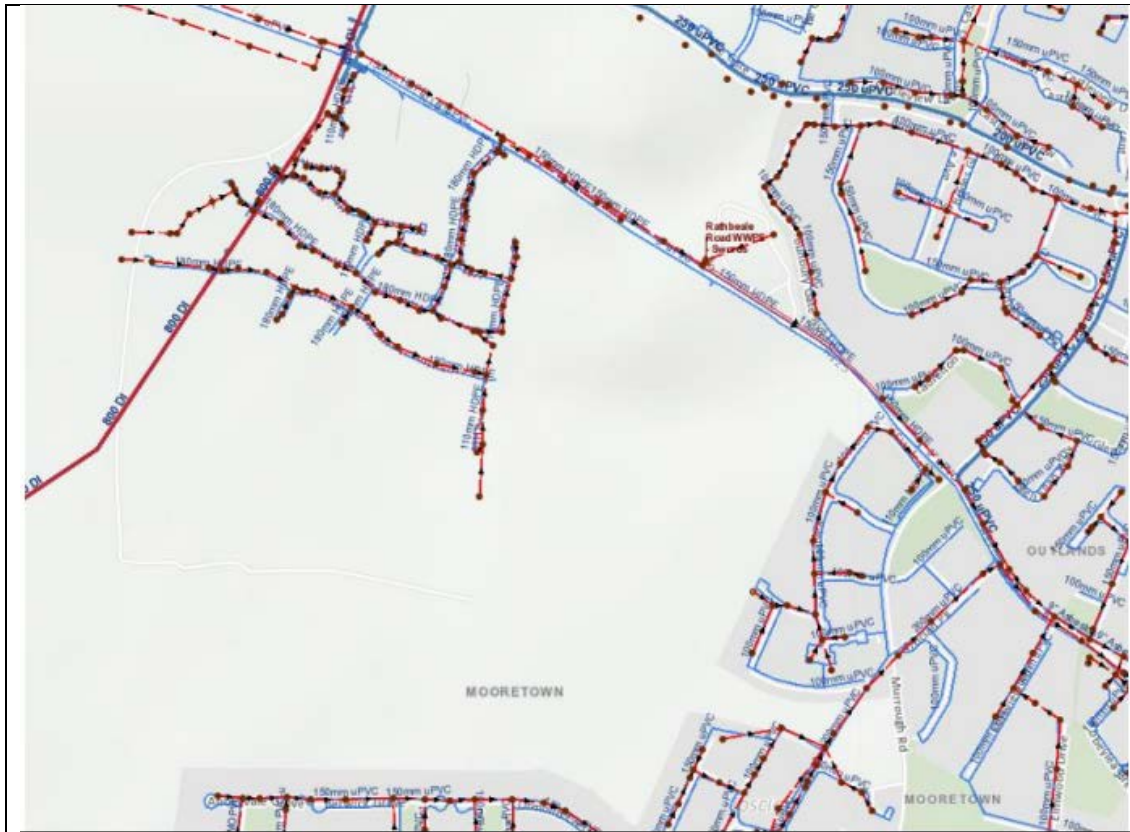
What is important to know?	Why is this important?
<b>Do you need a contract to connect?</b>	<ul style="list-style-type: none"> <li>• Yes, a contract is required to connect. This letter does not constitute a contract or an offer in whole or in part to provide a connection to Uisce Éireann's network(s).</li> <li>• Before the Development can connect to Uisce Éireann's network(s), you must submit a connection application <u>and be granted and sign</u> a connection agreement with Uisce Éireann.</li> </ul>
<b>When should I submit a Connection Application?</b>	<ul style="list-style-type: none"> <li>• A connection application should only be submitted after planning permission has been granted.</li> </ul>
<b>Where can I find information on connection charges?</b>	<ul style="list-style-type: none"> <li>• Uisce Éireann connection charges can be found at: <a href="https://www.water.ie/connections/information/charges/">https://www.water.ie/connections/information/charges/</a></li> </ul>
<b>Who will carry out the connection work?</b>	<ul style="list-style-type: none"> <li>• All works to Uisce Éireann's network(s), including works in the public space, must be carried out by Uisce Éireann*.</li> </ul> <p>*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</p>
<b>Fire flow Requirements</b>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• <b>What to do?</b> - Contact the relevant Local Fire Authority</li> </ul>
<b>Plan for disposal of storm water</b>	<ul style="list-style-type: none"> <li>• The Confirmation of Feasibility does not extend to the management or disposal of storm water or ground waters.</li> <li>• <b>What to do?</b> - Contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges.</li> </ul>
<b>Where do I find details of Uisce Éireann's network(s)?</b>	<ul style="list-style-type: none"> <li>• Requests for maps showing Uisce Éireann's network(s) can be submitted to: <a href="mailto:datarequests@water.ie">datarequests@water.ie</a></li> </ul>

<p><b>What are the design requirements for the connection(s)?</b></p>	<ul style="list-style-type: none"> <li>The design and construction of the Water &amp; Wastewater pipes and related infrastructure to be installed in this Development shall comply with <b><i>the Uisce Éireann Connections and Developer Services Standard Details and Codes of Practice</i></b>, available at <a href="http://www.water.ie/connections">www.water.ie/connections</a></li> </ul>
<p><b>Trade Effluent Licensing</b></p>	<ul style="list-style-type: none"> <li>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).</li> <li>More information and an application form for a Trade Effluent License can be found at the following link: <a href="https://www.water.ie/business/trade-effluent/about/">https://www.water.ie/business/trade-effluent/about/</a></li> </ul> <p>**trade effluent is defined in the Local Government (Water Pollution) Act, 1977 (as amended)</p>

## 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](mailto: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.



**B. Uisce Eireann Statement of Design**

Richard Miles  
Waterman Moylan  
Bock S  
EastPoint Business park  
Aflie Byrne Road  
Dublin  
D03H3F4

25 April 2024

**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](http://www.water.ie)

**Re: Design Submission for Mooretown, Swords, Swords, Dublin (the “Development”)  
(the “Design Submission”) / Connection Reference No: CDS23007520**

Dear Richard Miles,

Many thanks for your recent Design Submission.

We have reviewed your proposal for the connection(s) at the Development. Based on the information provided, which included the documents outlined in Appendix A to this letter, Uisce Éireann has no objection to your proposals.

This letter does not constitute an offer, in whole or in part, to provide a connection to any Uisce Éireann infrastructure. Before you can connect to our network you must sign a connection agreement with Uisce Éireann. This can be applied for by completing the connection application form at [www.water.ie/connections](http://www.water.ie/connections). Uisce Éireann’s current charges for water and wastewater connections are set out in the Water Charges Plan as approved by the Commission for Regulation of Utilities (CRU)([https://www.cru.ie/document\\_group/irish-waters-water-charges-plan-2018/](https://www.cru.ie/document_group/irish-waters-water-charges-plan-2018/)).

You the Customer (including any designers/contractors or other related parties appointed by you) is entirely responsible for the design and construction of all water and/or wastewater infrastructure within the Development which is necessary to facilitate connection(s) from the boundary of the Development to Uisce Éireann’s network(s) (the “**Self-Lay Works**”), as reflected in your Design Submission. Acceptance of the Design Submission by Uisce Éireann does not, in any way, render Uisce Éireann liable for any elements of the design and/or construction of the Self-Lay Works.

If you have any further questions, please contact your Uisce Éireann representative:

Name: Antonio Garzón Mielgo

Email: [antonio.garzonmielgo@water.ie](mailto:antonio.garzonmielgo@water.ie)

Yours sincerely,



**Dermot Phelan**  
**Connections Delivery Manager**

**Stiúirtheoirí / Directors:** Tony Keohane (Cathaoirleach / Chairman), Niall Gleeson (POF / CEO), Christopher Banks, Fred Barry, Gerard Britchfield, Liz Joyce, Patricia King, Eileen Maher, Cathy Mannion, 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 design activity company, limited by shares. Cláraithe in Éirinn Uimh.: 530363 / Registered in Ireland No.: 530363.

## Appendix A

### Document Title & Revision

- MTN-WMC-PH1-GF-DR-C-P1200 Drainage General Arrangement
- MTN-WMC-PH1-GF-DR-C-P1201 Drainage Layout, Sheet 1 of 2
- MTN-WMC-PH1-GF-DR-C-P1202 Drainage Layout, Sheet 2 of 2
- MTN-WMC-PH1-GF-DR-C-P1300 Watermain General Arrangement
- MTN-WMC-PH1-GF-DR-C-P1301 Watermain Layout, Sheet 1 of 2
- MTN-WMC-PH1-GF-DR-C-P1302 Watermain Layout, Sheet 2 of 2
- MTN-WMC-PH1-ZZ-DR-C-P1251 Foul Long Sections Sheet 1 of 3
- MTN-WMC-PH1-ZZ-DR-C-P1252 Foul Long Sections Sheet 2 of 3
- MTN-WMC-PH1-ZZ-DR-C-P1253 Foul Long Sections Sheet 3 of 3

### Additional Comments

The design submission will be subject to further technical review at connection application stage.

Uisce Éireann cannot guarantee that its Network in any location will have the capacity to deliver a particular flow rate and associated residual pressure to meet the requirements of the relevant Fire Authority, see Section 1.17 of Water Code of Practice.

For further information, visit [www.water.ie/connections](http://www.water.ie/connections)

*Notwithstanding any matters listed above, the Customer (including any appointed designers/contractors, etc.) is entirely responsible for the design and construction of the Self-Lay Works. Acceptance of the Design Submission by Uisce Éireann will not, in any way, render Uisce Éireann liable for any elements of the design and/or construction of the Self-Lay Works.*

**C. External Stage 1 Road Safety Audit**

Title: **STAGE 1 ROAD SAFETY AUDIT**

For;

**Proposed Residential Development, Phase 1 Mooretown,  
Swords.**

Client: **Waterman Moylan Consulting Engineers**

Date: **April 2024**

Report reference: **2231R01**

VERSION: **FINAL (25-4-2024)**

Prepared By:

**Bruton Consulting Engineers Ltd**

Glaspistol

Clogherhead

Drogheda

Co. Louth.

Tel: 041 9881456

Mob: 086 8067075

E: [admin@brutonceng.ie](mailto:admin@brutonceng.ie)

W: [www.brutonceng.ie](http://www.brutonceng.ie)



**ST 1 RSA – Proposed Residential Development , Mooretown , Phase 1.**

**WM**

**CONTENTS SHEET**

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- 1.0 Introduction ..... 2
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- 3.0 Items Raised in This Stage 1 Road Safety Audit. .... 4
  - 3.1 Problem ..... 4
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## ST 1 RSA – Proposed Residential Development , Mooretown , Phase 1.

WM

### 1.0 Introduction

This report was prepared in response to a request from Mr. Richard Miles of Waterman Moylan Consulting Engineers, for a Stage 1 Road Safety Audit for a Proposed Residential Development at Mooretown, Swords, Co. Dublin.

The Road Safety Audit Team comprised of;

Team Leader: **Norman Bruton**, BE CEng FIEI, Cert Comp RSA.

TII Auditor Approval no. NB 168446

Team Member: **Owen O'Reilly**, B.SC. Eng Dip Struct. Eng NCEA Civil Dip Civil. Eng CEng MIEI

TII Auditor Approval no. OO1291756

The Road Safety Audit involved the examination of drawings and other material provided by Waterman Moylan and a site visit by the Audit Team, together, on the 19<sup>th</sup> of March 2024.

The weather at the time of the site visit was dry and the road surface was also dry.

This Stage 1 Road Safety Audit has been carried out in accordance with the requirements of TII Publication Number GE-STY-01024, dated December 2017.

The scheme has been examined and this report compiled in respect of the consideration of those matters that have an adverse effect on road safety. It has not been examined or verified for compliance with any other standards or criteria.

The problems identified in this report are considered to require action in order to improve the safety of the scheme for road users.

If any of the recommendations within this safety audit report are not accepted, a written response is required, stating reasons for non-acceptance. Comments made within the report under the heading of Observation are intended to be for information only. Written responses to Observations are not required.

The information supplied to the Audit Team is listed in **Appendix A**.

The feedback form is contained in **Appendix B**.

A plan drawing showing the problem locations is contained in **Appendix C**.

**ST 1 RSA – Proposed Residential Development , Moortown , Phase 1.**

**WM**

**2.0 Background**

It is proposed to construct a large residential scheme off Rathbeale Road, Moortown, Swords, Co. Dublin.

A vehicular access would be provided off Rathbeale Road which would connect with the Moortown Western Distributor Link Road at the current cul-de-sac/turning area at Swords Community College.

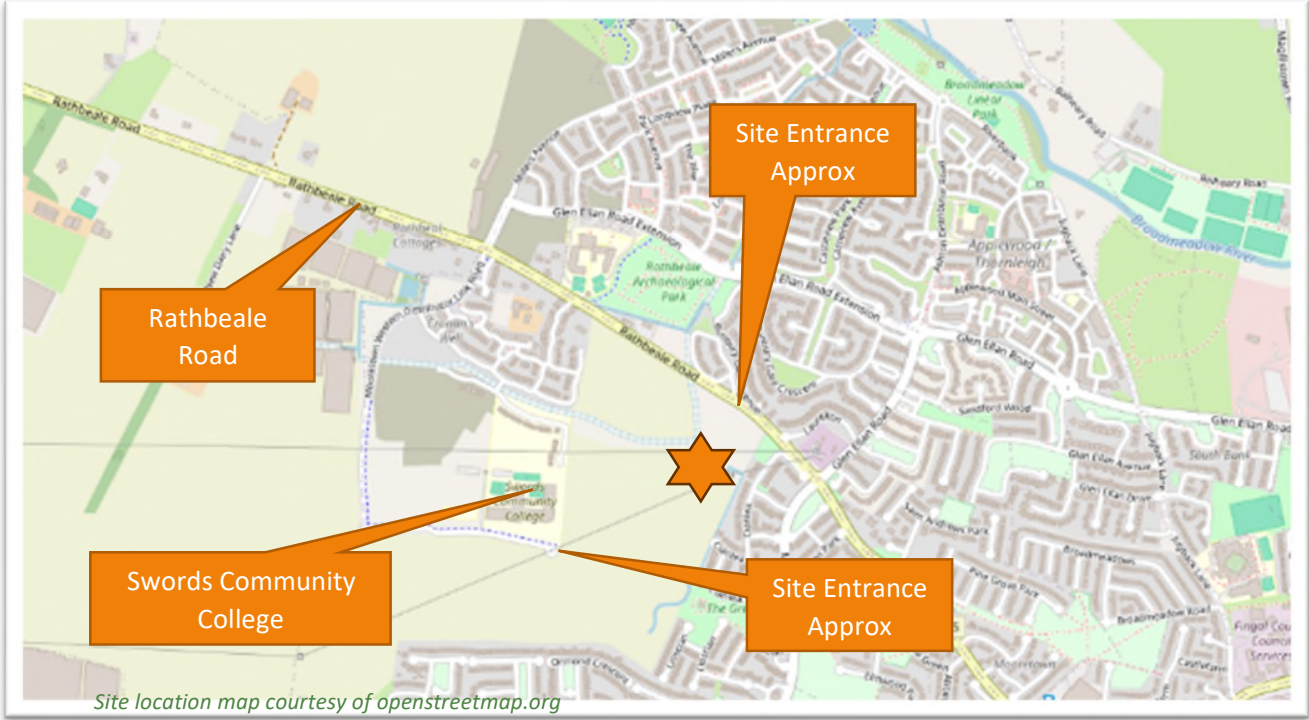
The junction on Rathbeale Road will be a signalised junction including the northern arm to the existing Holymount residential development which is currently a priority junction.

Rathbeale Road has a shared use pedestrian cyclists track on the southern side and a footway and two-way cycle track on the northern side. It is lit.

The Moortown Western distributor Road has a footpath and two -way cycle track along its entire length.

The speed limit on Rathbeale Road is 50km/hr. The speed limit within the residential areas will be 30km/hr.

The site location map is shown below.



ST 1 RSA – Proposed Residential Development , Mooretown , Phase 1.

WM

3.0 Items Raised in This Stage 1 Road Safety Audit.

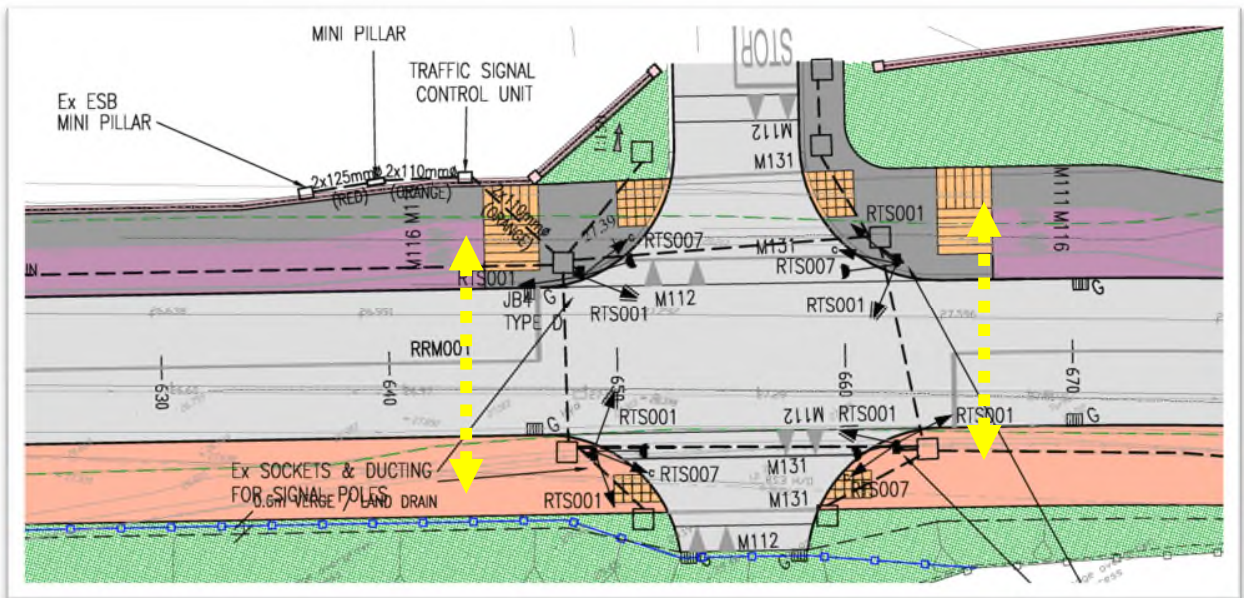
3.1 Problem

LOCATION

Drawing MTN-WMC-PH1-ZZ-DR-C-P1110, Rathbeale Road junction.

PROBLEM

The proposed Rathbeale Road junction does not have any crossings for pedestrians or cyclists. There will be a large crossing demand for cyclists and pedestrians especially school going children. A lack of crossing facilities could lead to collisions with vehicular traffic on Rathbeale Road.



RECOMMENDATION

It is recommended that toucan crossings be provided on both arms of the Rathbeale Road.

**ST 1 RSA – Proposed Residential Development , Mooretown , Phase 1.****WM****3.2 Problem***LOCATION*

Drawing MTN-WMC-PH1-ZZ-DR-C-P1002, Road 1.1

*PROBLEM*

The junction of Road 1.1 with the distributor Road is very close to the stop line for the signalised junction with Rathbeale Road. Drivers wishing to turn right into Road 1.1 may block traffic onto the Rathbeale Road leading to rear-end collisions.

**RECOMMENDATION**

It is recommended that Road 1.1 be located where it will not lead to queuing into the signalised junction and onto Rathbeale Road.



**ST 1 RSA – Proposed Residential Development , Mooretown , Phase 1.****WM****3.3 Problem***LOCATION*

Drawing MTN-WMC-PH1-ZZ-DR-C-P1140, Development Road.

*PROBLEM*

The sightlines at the side road junctions of the development road are based on a 30km/hr design speed for the development Road. As this is a through route linked to Rathbeale Road at both ends and carrying a lot of non-residential traffic including school commuting traffic it may operate at 50km/hr. If this is the case then the sightlines may not be sufficient leading to side-impact or rear-end collisions.

It is noted that there is no proposed 30km/hr speed limit signs shown for the proposed development road.

**RECOMMENDATION**

It is recommended that the final posted speed and expected operational speed/design speed of the development road be confirmed and that suitable sightlines be provided to match.

ST 1 RSA – Proposed Residential Development , Mooretown , Phase 1.

WM

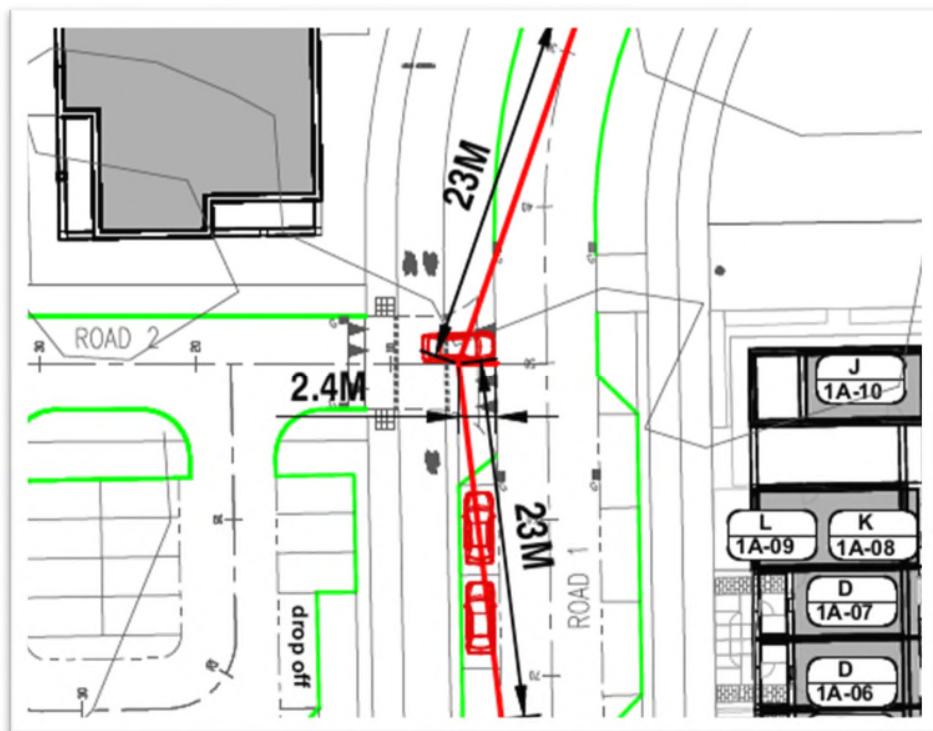
3.4 Problem

LOCATION

Drawing MTN-WMC-PH1-ZZ-DR-C-P1140, Development Road.

PROBLEM

Some sightlines on the development road are shown through parked vehicles. The extent of the obstruction may lead to a lack of visibility for exiting drivers resulting in side-impact or rear end collisions.



*Example only*

RECOMMENDATION

It is recommended that adequate sightlines be provided.

**ST 1 RSA – Proposed Residential Development , Mooretown , Phase 1.**

**WM**

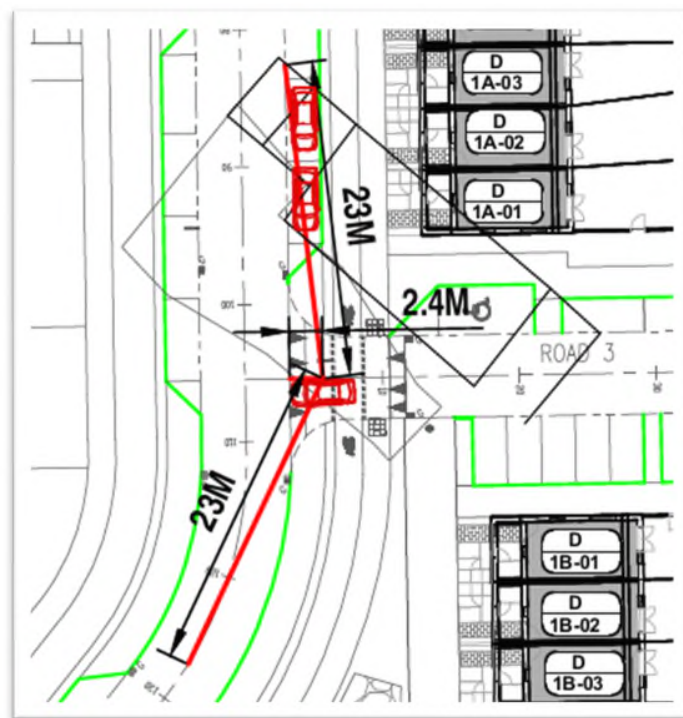
**3.5 Problem**

*LOCATION*

Drawing MTN-WMC-PH1-ZZ-DR-C-P1140, Development Road.

*PROBLEM*

The sightlines from the side roads are based on a 30km/hr road design speed without overtaking and without being a bus route. It is unclear what type of centre road markings will be provided and whether local buses will use the route including school buses. This may require greater sightlines without which drivers may not adequately see some oncoming vehicles resulting in side-impact or rear end collisions.



*Example only*

*RECOMMENDATION*

It is recommended that adequate, unobstructed sightlines be provided.

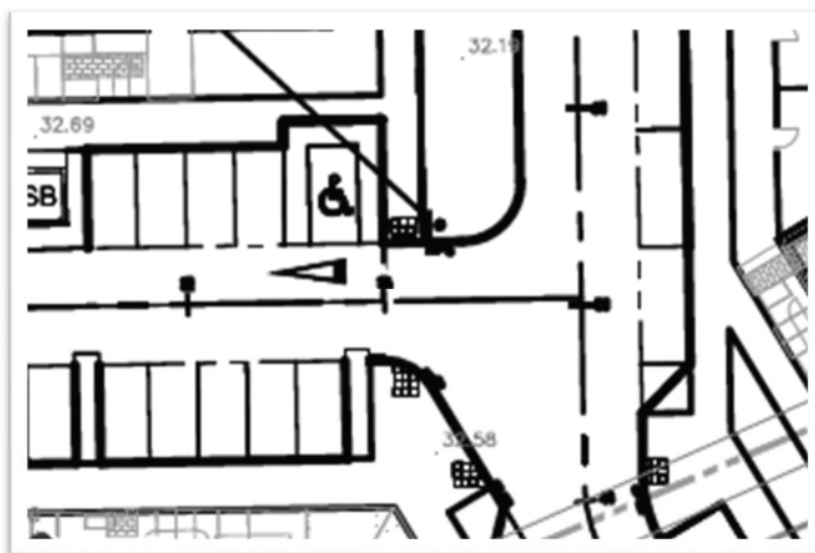
**ST 1 RSA – Proposed Residential Development , Mooretown , Phase 1.****WM****3.6 Problem***LOCATION*

Drawing MTN-WMC-PH1-ZZ-DR-C-P1002, Internal junctions.

*PROBLEM*

The internal junctions are shown to have yield control. This could lead to higher turning speeds and higher risk of collisions with vulnerable road users.

*Example only*



*Example only*

*RECOMMENDATION*

It is recommended that 'stop' control be used instead of 'yield' control.

**ST 1 RSA – Proposed Residential Development , Mooretown , Phase 1.****WM**

## 4.0 Observations

### 4.1

Design drawings for have not been provided to the Audit Team on the following

- Drainage design.
- Long Sections





**ST 1 RSA – Proposed Residential Development , Mooretown , Phase 1.**

WM

## Appendix A

**List of Material Supplied for this Road Safety Audit;**

- Drawing MTN-WMC-PH1-GF-DR-C-P1110 Existing Junction & Traffic Signals Rathbeale Road
- Drawing MTN-WMC-PH1-GF-DR-C-P1130 Vehicle Swept Path Analysis using a Refuse Vehicle
- Drawing MTN-WMC-PH1-GF-DR-C-P1140 Road Junction Sightlines
- Drawing MTN-WMC-PH1-GF-DR-C-P1002 Road Markings & Signage
- Drawing MTN-WMC-PH1-GF-DR-C-P1100 Road General Arrangement
- Drawing MTN-WMC-PH1-GF-DR-C-P1101 Road Layout, Sheet 1 of 2
- Drawing MTN-WMC-PH1-GF-DR-C-P1102 Road Layout, Sheet 2 of 2

## Appendix B

### Feedback Form

## AUDIT FORM – FEEDBACK ON ROAD SAFETY AUDIT REPORT

Scheme: Mooretown , Phase 1

Stage Audit: Stage 1

Date Audit (site visit) Completed: 19-3-2024

Paragraph No. in Road Safety Audit Report	Problem accepted (yes/no)	Recommended measure accepted (yes/no)	Alternative measures (describe)	Alternative measures accepted by Auditors (Yes/No)
3.1	Yes	Yes	Note: These Toucan crossing works to the existing Rathbeale Road junction are proposed to be carried out separately by Fingal County Council, to this development works	Yes
3.2	Partial	No	Sightlines shall be maintained between the Rathbeale traffic stopped at the signals entering the Mooretown site and the vehicles entering Road 1.1. The traffic entering the subject site at the Rathbeale junction will do so at low speeds (20kph for turn movement considered appropriate for the purposes of this assessment) into the 30kph designed/posted spine road. The DMURS SSD forward visibility for 20kph is 14m, which we achieve in this location. To ensure that there won't be a queue of vehicles entering Road 1.1 from the north, it is proposed to provide a yellow box to the carriageway at the entrance so that vehicles can freely enter road 1.1 without blockage. This will also assist vehicles exiting Road 1.1. This Road 1.1 caters for an apartment block of 24 units, so will have a low AM & PM trip count.	Yes
3.3	Partial	Yes	The link road has been designed as a 30kph operational school access road, linking the 50kph Rathbeale Road and the 50kph Western Distributor Link Road. The constructed section of this road in the Gannon site is a school link road which will become a "Safe	Yes


**ST 1 RSA – Proposed Residential Development , Mooretown , Phase 1.**

**WM**


			Schools Street" as part of the Gannon Mooretown Phase 3 permitted development. This road has been designed as a 30kph road and will be posted as 30kph. Signage drawings will be amended to reflect this. On road parking shall be adjusted to ensure sightlines are suitably afforded for a 30kph road.	
3.4	Yes	Yes		
3.5	Yes	Yes		
3.6	Yes	Yes		

  
 Signed.....  
**Design Team Leader**

**Date 24-04-24**

  
 Signed.....  
**Audit Team Leader**

**Date: 24-4-2024**

  
 Signed.....  
**Employer**

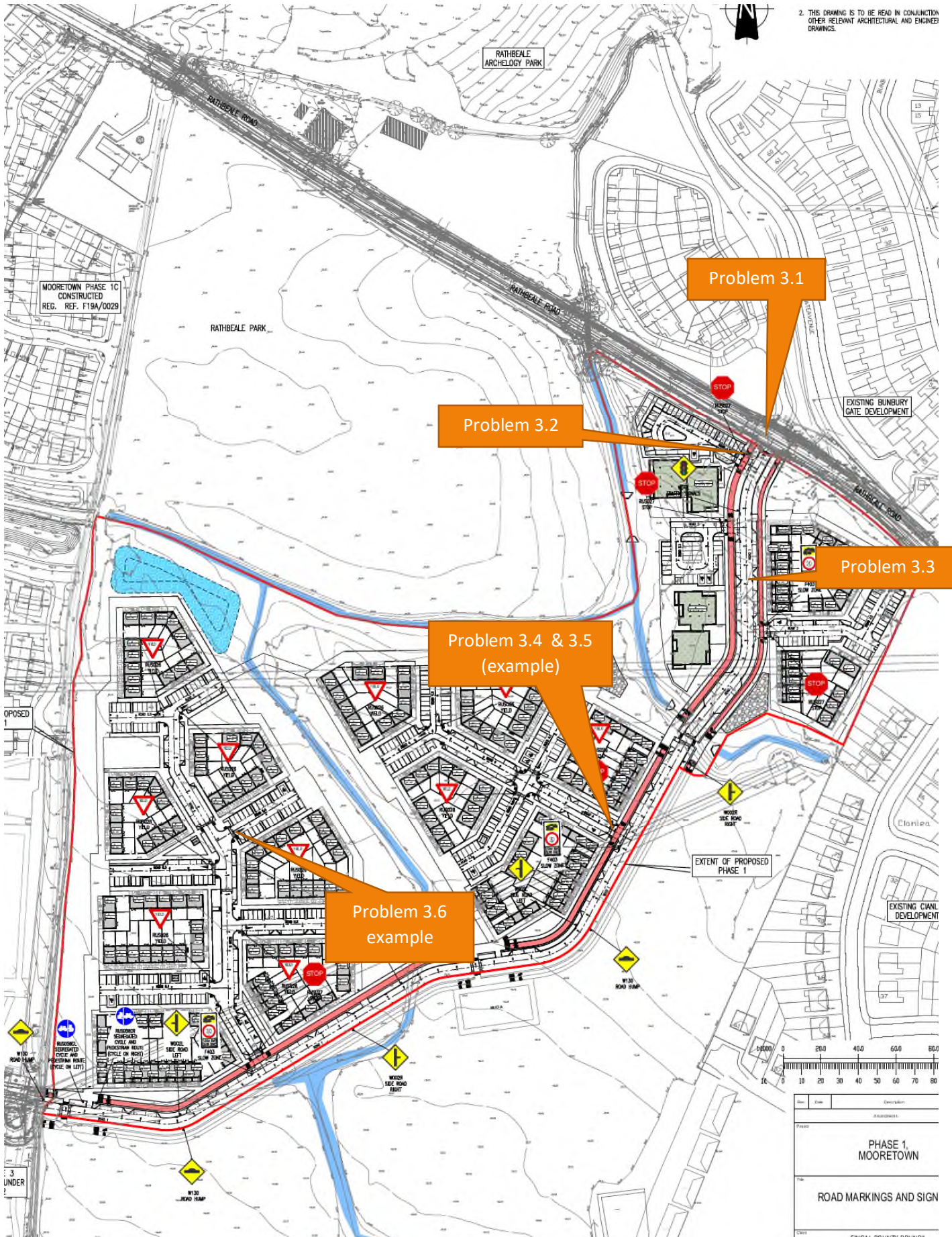
**Date: 25/04/24**

## Appendix C

### Problem Location Plan.



2. THIS DRAWING IS TO BE READ IN CONJUNCTION  
OTHER RELEVANT ARCHITECTURAL AND ENGINEER  
DRAWINGS.





**D. FCC SuDS Selection Checklist**

**SUDS/Green Infrastructure selection checklist –To be submitted in planning submission**

Suds Measures	Measures to be used on this site	Rationale for selecting/not selecting measure	Checklist submitted? See no. 8 below
<b>Source Control</b>			
Swales	✓	Swales are proposed through the open spaces of the development. Swales attenuate flows, trap silts and pollutants, promote infiltration	
Tree Pits	✓	Roadside tree pits are to be provided throughout the development. Trees help to attenuate flows, trap silts and pollutants, promote infiltration and prevent erosion.	
Rainwater Butts			
Rainwater harvesting			
Soakaways			
Infiltration trenches			
Permeable pavement (Grasscrete, Block paving, Porous Asphalt etc.)	✓	All parking bays are to be permeable paving with underlying filter drains.	
Green Roofs	✓	60% minimum of the roof area of the apartment blocks to be green roof, in line with FCC document: Green/Blue infrastructure for development – Guidance note.	
Filter strips	✓	Roadside filter strips are to be provided along the edge of the open spaces to capture adjacent road gullies. Filter drains help to attenuate flows, trap silts and pollutants, promote infiltration and prevent erosion.	
Bio-retention systems/Raingardens	✓	Rain gardens are proposed at open spaces around the site. Rain gardens are gardens of native shrubs, perennials, and flowers planted in a small depression, designed to temporarily hold and soak in rainwater runoff that flows from roofs, driveways, patios or lawns.	
Blue Roofs			
Filter Drain	✓	Filter drains are to be incorporated underneath permeable paving utilised on all parking bays to facilitate infiltration of surface water.	
<b>Site Control</b>			
Detention Basins	✓	Detention Ponds are proposed as part and have been sized to accommodate volumes from the subject Planning application.	
Retention's basins			
<b>Regional Control</b>			
Ponds			
Wetlands			
<b>Other</b>			

Petrol/Oil interceptor	✓	Class 1 petrol interceptors shall be provided before discharge to the Mill Stream	
Attenuation tank – only as a last resort where other measures are not feasible	✓	Stormtech tanks are proposed where site topography and constraints do not permit above ground storage.	
Oversized pipes– only as a last resort where other measures are not feasible			

**Note:**

1. Fingal has a preference for above ground Green Infrastructure rather than tanks or oversized pipes. Above ground flows through swales, basins etc are encouraged.
2. Demonstrate SUDS system will have sufficient Pollutant removal efficiency in accordance with Ciria Suds Manual C753
3. Basins sides should be no steeper than 1:4 and no deeper than 1.2m in the 1%AEP
4. Culverting shall be avoided where possible
5. De-culverting is encouraged.
6. Please submit evidence of infiltration rates
7. To account for climate change in the design of the drainage system rainfall intensities should be factored up by 20%
8. The Applicant must provide Suds checklists in accordance with the Appendix B of the Ciria Suds manual C753

Appendix	Name
B3	Full planning
B4	Scheme design
B5	Health and safety
B6	Infiltration assessment
B7	Proprietary treatment
B9	filter strip
B11	filter drain
B13	swale
B15	bioretention
B16	pervious pavement
B17	attenuation tank
B19	basin
B21	pond wetland

**E. GSDSDS Calculations & SI Soaktest Results**



Block S, EastPoint Business Park,  
Alfie Byrne Road, Dublin D03 H3F4  
t 01 664 8900 f 01 661 3618 e info@waterman-moylan.ie

## Project Data - CATCHMENT B - North East

Calculation By: RM

MD

Approved by:

MD

Project Name: Mooretown

Project Number: 23-102

Client: Fingal County Council

Architect: OBB Architects

Status: Section 179

Date: 06/03/2024

Description	%	Area
Total Site Area	-	22,057m <sup>2</sup>
Paved Area	Total	45%
	Drained	100%
Soil Area	Total	55%
	Drained	0%

Soil Type:	Type 4
SPR Index (from FSR):	0.47
SAAR:	806mm
Rain Data:	Met Éireann
Climate Change Factor:	20%

### Greenfield Runoff:

$$Q_{BARrural} = 0.00108 \times Area^{0.89} \times SAAR^{1.17} \times Soil^{2.17}$$

Area = 0.02206km<sup>2</sup> ... Total site area in km<sup>2</sup>

SAAR = 806mm ... Standard Average Annual Rainfall in mm

SOIL = 0.47 ... The "SPR" index from FSR

*Note: Where a site is <0.5km<sup>2</sup>, the Q<sub>BARrural</sub> formula should be applied for 0.5km<sup>2</sup> and the result factored based on the ratio of the actual site area and the applied area.*

$$Q_{BARrural} = 0.013m^3/s$$

$$Q_{BARrural} = 12.559 \text{ l/s}$$

$$Q_{BARrural} = 5.694 \text{ l/s/Ha}$$

Return Period	1-year	30-year	100-year
Growth Factor	0.85	2.10	2.60
Q <sub>BAR</sub> (l/s)	10.67	26.37	32.65
Q <sub>BAR</sub> (l/s/Ha)	4.84	11.96	14.80
Allowable Discharge	12.56	12.56	12.56

### Rainfall Data:

Rain Data From: Met Éireann Archive

Climate Change Factor: 20%

Duration (Hours)	Return Period (Years)						
	1	5	10	20	30	50	100
0.5	8.8	14.6	18.4	22.4	25.2	29.0	35.0
1	11.4	18.7	23.2	28.2	31.4	36.1	43.3
2	14.8	24.0	29.4	35.4	39.4	44.9	53.5
4	19.3	30.6	37.2	44.5	49.2	55.9	66.1
6	22.6	35.4	42.7	50.9	56.2	63.5	74.9
12	29.4	45.1	54.1	64.0	70.3	79.0	92.4
24	43.0	57.7	68.5	80.4	88.0	98.3	114.2
48	46.6	67.8	79.3	91.8	99.6	110.3	126.5



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t 01 664 8900 f 01 661 3618 e info@waterman-moylan.ie

## Summary - CATCHMENT B - North East

Project Name	Mooretown
Project Number	23-102
Client	Fingal County Council
Architect	OBB Architects
Status	Section 179
Date	06/03/2024

Calculation By:	RM
Approved by:	MD

### Summary of GSDS Calculations:

#### Criterion 1: River Protection Volume

Interception Volume	39.70m <sup>3</sup>
Treatment Volume	119.11m <sup>3</sup>

#### Criterion 2: River Regime Protection

Critical Storm:	4-hour 1-in-100-year storm
Volume Required	475.44m <sup>3</sup>

#### Criterion 4: River Flood Protection

Long Term Storage (no interception provided)	74.49m <sup>3</sup>
Long Term Storage (Interception provided)	34.79m <sup>3</sup>

### Attenuation Volume Requirement for Various Storm Events:

1-in-1-Year Storm	67.94m <sup>3</sup>
1-in-5-Year Storm	147.79m <sup>3</sup>
1-in-10-Year Storm	201.39m <sup>3</sup>
1-in-20-Year Storm	261.04m <sup>3</sup>
1-in-30-Year Storm	307.50m <sup>3</sup>
1-in-50-Year Storm	374.20m <sup>3</sup>
1-in-100-Year Storm	475.44m <sup>3</sup>
<b>Maximum Volume Requirement</b>	<b>475.44m<sup>3</sup></b>





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## Project Data - CATCHMENT C - Middle

Calculation By: RM

Approved by: MD

Project Name: Mooretown

Project Number: 23-102

Client: Fingal County Council

Architect: OBB Architects

Status: Section 179a

Date: 06/03/2024

Description	%	Area
Total Site Area	-	30,405m <sup>2</sup>
Paved Area	Total	40%
	Drained	100%
Soil Area	Total	60%
	Drained	0%

Soil Type:	Type 4
SPR Index (from FSR):	0.47
SAAR:	806mm
Rain Data:	Met Éireann
Climate Change Factor:	20%

### Greenfield Runoff:

$$Q_{BARrural} = 0.00108 \times Area^{0.89} \times SAAR^{1.17} \times Soil^{2.17}$$

Area = 0.03041km<sup>2</sup> ... Total site area in km<sup>2</sup>

SAAR = 806mm ... Standard Average Annual Rainfall in mm

SOIL = 0.47 ... The "SPR" index from FSR

*Note: Where a site is <0.5km<sup>2</sup>, the Q<sub>BARrural</sub> formula should be applied for 0.5km<sup>2</sup> and the result factored based on the ratio of the actual site area and the applied area.*

$$Q_{BARrural} = 0.017m^3/s$$

$$Q_{BARrural} = 17.312 \text{ l/s}$$

$$Q_{BARrural} = 5.694 \text{ l/s/Ha}$$

Return Period	1-year	30-year	100-year
Growth Factor	0.85	2.10	2.60
Q <sub>BAR</sub> (l/s)	14.72	36.36	45.01
Q <sub>BAR</sub> (l/s/Ha)	4.84	11.96	14.80
Allowable Discharge	17.31	17.31	17.31

### Rainfall Data:

Rain Data From: Met Éireann Archive

Climate Change Factor: 20%

Duration (Hours)	Return Period (Years)						
	1	5	10	20	30	50	100
0.5	8.8	14.6	18.4	22.4	25.2	29.0	35.0
1	11.4	18.7	23.2	28.2	31.4	36.1	43.3
2	14.8	24.0	29.4	35.4	39.4	44.9	53.5
4	19.3	30.6	37.2	44.5	49.2	55.9	66.1
6	22.6	35.4	42.7	50.9	56.2	63.5	74.9
12	29.4	45.1	54.1	64.0	70.3	79.0	92.4
24	43.0	57.7	68.5	80.4	88.0	98.3	114.2
48	46.6	67.8	79.3	91.8	99.6	110.3	126.5



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## Summary - CATCHMENT C - Middle

<b>Project Name</b>	Mooretown
<b>Project Number</b>	23-102
<b>Client</b>	Fingal County Council
<b>Architect</b>	OBB Architects
<b>Status</b>	Section 179a
<b>Date</b>	06/03/2024
<b>Calculation By:</b>	RM
<b>Approved by:</b>	MD

### Summary of GSDS Calculations:

#### Criterion 1: River Protection Volume

Interception Volume	48.65m <sup>3</sup>
Treatment Volume	145.94m <sup>3</sup>

#### Criterion 2: River Regime Protection

Critical Storm:	4-hour 1-in-100-year storm
<b>Volume Required</b>	<b>554.86m<sup>3</sup></b>

#### Criterion 4: River Flood Protection

Long Term Storage (no interception provided)	43.71m <sup>3</sup>
Long Term Storage (Interception provided)	-4.93m <sup>3</sup>

### Attenuation Volume Requirement for Various Storm Events:

1-in-1-Year Storm	76.32m <sup>3</sup>
1-in-5-Year Storm	167.24m <sup>3</sup>
1-in-10-Year Storm	232.92m <sup>3</sup>
1-in-20-Year Storm	305.89m <sup>3</sup>
1-in-30-Year Storm	354.05m <sup>3</sup>
1-in-50-Year Storm	430.81m <sup>3</sup>
1-in-100-Year Storm	554.86m <sup>3</sup>
<b>Maximum Volume Requirement</b>	<b>554.86m<sup>3</sup></b>



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## Project Data - CATCHMENT D - South and West

Calculation By:

RM

Approved by:

MD

Project Name: Mooretown

Project Number: 23-102

Client: Fingal County Council

Architect: OBB Architects

Status: Section 179a

Date: 06/03/2024

Description	%	Area
Total Site Area	-	122,567m <sup>2</sup>
Paved Area	Total	38% 46,575m <sup>2</sup>
	Drained	100% 46,575m <sup>2</sup>
Soil Area	Total	62% 75,992m <sup>2</sup>
	Drained	0% 0m <sup>2</sup>

Soil Type:	Type 4
SPR Index (from FSR):	0.47
SAAR:	806mm
Rain Data:	Met Éireann
Climate Change Factor:	20%

### Greenfield Runoff:

$$Q_{BARrural} = 0.00108 \times Area^{0.89} \times SAAR^{1.17} \times Soil^{2.17}$$

Area = 0.12257km<sup>2</sup> ... Total site area in km<sup>2</sup>

SAAR = 806mm ... Standard Average Annual Rainfall in mm

SOIL = 0.47 ... The "SPR" index from FSR

*Note: Where a site is <0.5km<sup>2</sup>, the Q<sub>BARrural</sub> formula should be applied for 0.5km<sup>2</sup> and the result factored based on the ratio of the actual site area and the applied area.*

$$Q_{BARrural} = 0.070m^3/s$$

$$Q_{BARrural} = 69.787 \text{ l/s}$$

$$Q_{BARrural} = 5.694 \text{ l/s/Ha}$$

Return Period	1-year	30-year	100-year
Growth Factor	0.85	2.10	2.60
Q <sub>BAR</sub> (l/s)	59.32	146.55	181.45
Q <sub>BAR</sub> (l/s/Ha)	4.84	11.96	14.80
Allowable Discharge	69.79	69.79	69.79

### Rainfall Data:

Rain Data From: Met Éireann Archive

Climate Change Factor: 20%

Duration (Hours)	Return Period (Years)						
	1	5	10	20	30	50	100
0.5	8.8	14.6	18.4	22.4	25.2	29.0	35.0
1	11.4	18.7	23.2	28.2	31.4	36.1	43.3
2	14.8	24.0	29.4	35.4	39.4	44.9	53.5
4	19.3	30.6	37.2	44.5	49.2	55.9	66.1
6	22.6	35.4	42.7	50.9	56.2	63.5	74.9
12	29.4	45.1	54.1	64.0	70.3	79.0	92.4
24	43.0	57.7	68.5	80.4	88.0	98.3	114.2
48	46.6	67.8	79.3	91.8	99.6	110.3	126.5



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## Summary - CATCHMENT D - South and West

Project Name	Mooretown
Project Number	23-102
Client	Fingal County Council
Architect	OBB Architects
Status	Section 179a
Date	06/03/2024

Calculation By:	RM
Approved by:	MD

### Summary of GSDS Calculations:

#### Criterion 1: River Protection Volume

Interception Volume	186.30m <sup>3</sup>
Treatment Volume	558.91m <sup>3</sup>

#### Criterion 2: River Regime Protection

Critical Storm:	4-hour 1-in-100-year storm
Volume Required	2,074.64m <sup>3</sup>

#### Criterion 4: River Flood Protection

Long Term Storage (no interception provided)	81.13m <sup>3</sup>
Long Term Storage (Interception provided)	-105.17m <sup>3</sup>

### Attenuation Volume Requirement for Various Storm Events:

1-in-1-Year Storm	282.38m <sup>3</sup>
1-in-5-Year Storm	620.66m <sup>3</sup>
1-in-10-Year Storm	866.85m <sup>3</sup>
1-in-20-Year Storm	1,146.30m <sup>3</sup>
1-in-30-Year Storm	1,330.74m <sup>3</sup>
1-in-50-Year Storm	1,599.57m <sup>3</sup>
1-in-100-Year Storm	2,074.64m <sup>3</sup>
<b>Maximum Volume Requirement</b>	<b>2,074.64m<sup>3</sup></b>

# SOAKAWAY TEST

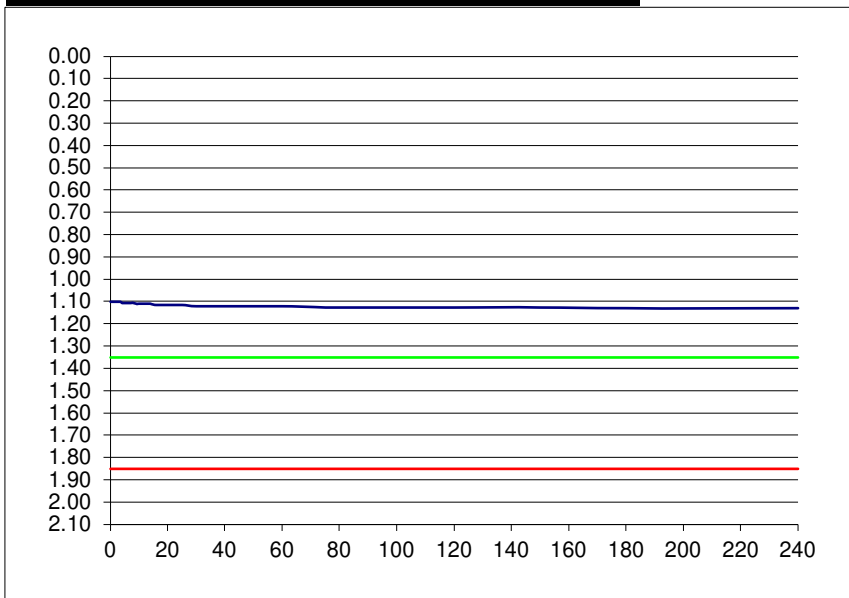


<b>Project Reference:</b>	6269
<b>Contract name:</b>	Mooretown
<b>Location:</b>	Swords, Co. Dublin
<b>Test No:</b>	SA01
<b>Date:</b>	02/04/2024

<b>Ground Conditions</b>		
From	To	
0.00	0.30	TOPSOIL.
0.30	1.80	Firm brown slightly sandy slightly gravelly silty CLAY with low cobble content.
1.80	2.10	Stiff black slightly sandy slightly gravelly silty CLAY with medium cobble and low boulder content.

Elapsed Time (mins)	Fall of Water (m)
0	1.10
0.5	1.10
1	1.10
1.5	1.10
2	1.10
2.5	1.10
3	1.10
3.5	1.10
4	1.11
4.5	1.11
5	1.11
6	1.11
7	1.11
8	1.11
9	1.11
10	1.11
12	1.11
14	1.11
16	1.12
18	1.12
20	1.12
25	1.12
30	1.12
40	1.12
50	1.12
60	1.12
75	1.13
90	1.13
120	1.13
150	1.13
180	1.13
240	1.13

<b>Pit Dimensions (m)</b>	
Length (m)	3.50 m
Width (m)	0.60 m
Depth	2.10 m
<b>Water</b>	
Start Depth of Water	1.10 m
Depth of Water	1.00 m
75% Full	1.35 m
25% Full	1.85 m
75%-25%	0.50 m
Volume of water (75%-25%)	<b>1.05</b> m <sup>3</sup>
Area of Drainage	<b>17.22</b> m <sup>2</sup>
Area of Drainage (75%-25%)	<b>6.20</b> m <sup>2</sup>
<b>Time</b>	
75% Full	N/A min
25% Full	N/A min
Time 75% to 25%	<b>N/A</b> min
Time 75% to 25% (sec)	<b>N/A</b> sec



**f = Fail or Fail**  
m/min
m/s

# SOAKAWAY TEST



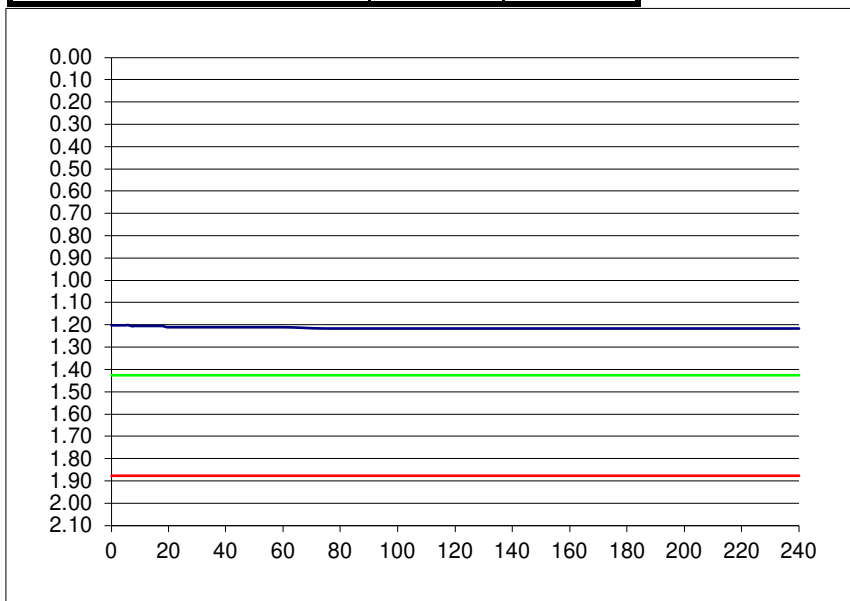
<b>Project Reference:</b>	6269
<b>Contract name:</b>	Mooretown
<b>Location:</b>	Swords, Co. Dublin
<b>Test No:</b>	SA02
<b>Date:</b>	23/04/2024

**Ground Conditions**

From	To	Description
0.00	0.30	TOPSOIL.
0.30	1.40	Firm light brown slightly sandy slightly gravelly silty CLAY with low cobble content.
1.40	2.10	Firm brown grey slightly sandy slightly gravelly silty CLAY with medium cobble content.

Elapsed Time (mins)	Fall of Water (m)
0	1.20
0.5	1.20
1	1.20
1.5	1.20
2	1.20
2.5	1.20
3	1.20
3.5	1.20
4	1.20
4.5	1.20
5	1.20
6	1.20
7	1.21
8	1.21
9	1.21
10	1.21
12	1.21
14	1.21
16	1.21
18	1.21
20	1.21
25	1.21
30	1.21
40	1.21
50	1.21
60	1.21
75	1.22
90	1.22
120	1.22
150	1.22
180	1.22
240	1.22

<b>Pit Dimensions (m)</b>	
Length (m)	3.80 m
Width (m)	0.60 m
Depth	2.10 m
<b>Water</b>	
Start Depth of Water	1.20 m
Depth of Water	0.90 m
75% Full	1.43 m
25% Full	1.88 m
75%-25%	0.45 m
Volume of water (75%-25%)	<b>1.03</b> m <sup>3</sup>
Area of Drainage	<b>18.48</b> m <sup>2</sup>
Area of Drainage (75%-25%)	<b>6.24</b> m <sup>2</sup>
<b>Time</b>	
75% Full	N/A min
25% Full	N/A min
Time 75% to 25%	<b>N/A</b> min
Time 75% to 25% (sec)	<b>N/A</b> sec



**f = Fail or**  
m/min

**Fail**  
m/s



# SOAKAWAY TEST



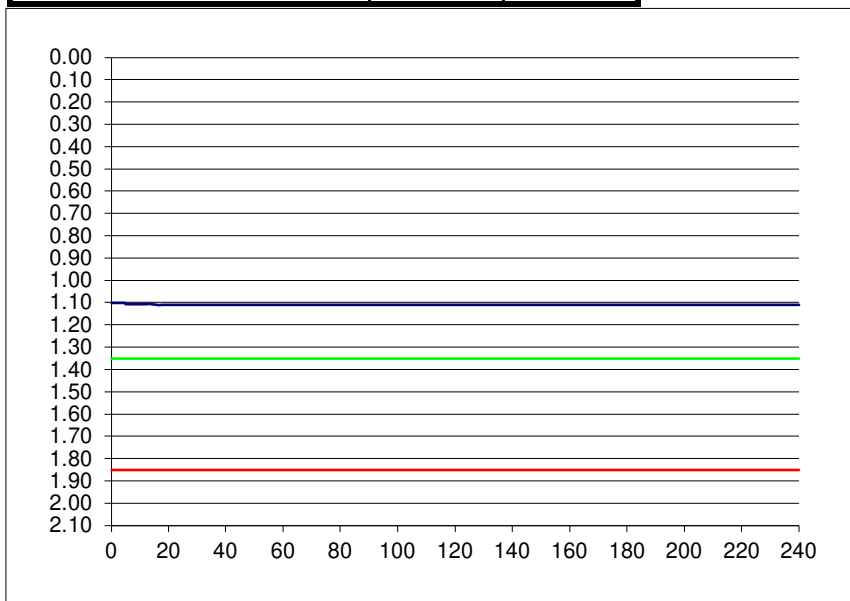
<b>Project Reference:</b>	6269
<b>Contract name:</b>	Mooretown
<b>Location:</b>	Swords, Co. Dublin
<b>Test No:</b>	SA03
<b>Date:</b>	23/04/2024

**Ground Conditions**

From	To	Description
0.00	0.30	TOPSOIL.
0.30	1.50	Firm brown grey slightly sandy slightly gravelly silty CLAY with low cobble content.
1.50	2.10	Firm brown grey slightly sandy slightly gravelly silty CLAY with medium cobble content.

Elapsed Time (mins)	Fall of Water (m)
0	1.10
0.5	1.10
1	1.10
1.5	1.10
2	1.10
2.5	1.10
3	1.10
3.5	1.10
4	1.10
4.5	1.10
5	1.11
6	1.11
7	1.11
8	1.11
9	1.11
10	1.11
12	1.11
14	1.11
16	1.11
18	1.11
20	1.11
25	1.11
30	1.11
40	1.11
50	1.11
60	1.11
75	1.11
90	1.11
120	1.11
150	1.11
180	1.11
240	1.11

<b>Pit Dimensions (m)</b>	
Length (m)	3.50 m
Width (m)	0.60 m
Depth	2.10 m
<b>Water</b>	
Start Depth of Water	1.10 m
Depth of Water	1.00 m
75% Full	1.35 m
25% Full	1.85 m
75%-25%	0.50 m
Volume of water (75%-25%)	<b>1.05</b> m <sup>3</sup>
Area of Drainage	<b>17.22</b> m <sup>2</sup>
Area of Drainage (75%-25%)	<b>6.20</b> m <sup>2</sup>
<b>Time</b>	
75% Full	N/A min
25% Full	N/A min
Time 75% to 25%	<b>N/A</b> min
Time 75% to 25% (sec)	<b>N/A</b> sec



**f = Fail** or  
m/min

**Fail**  
m/s

# SOAKAWAY TEST



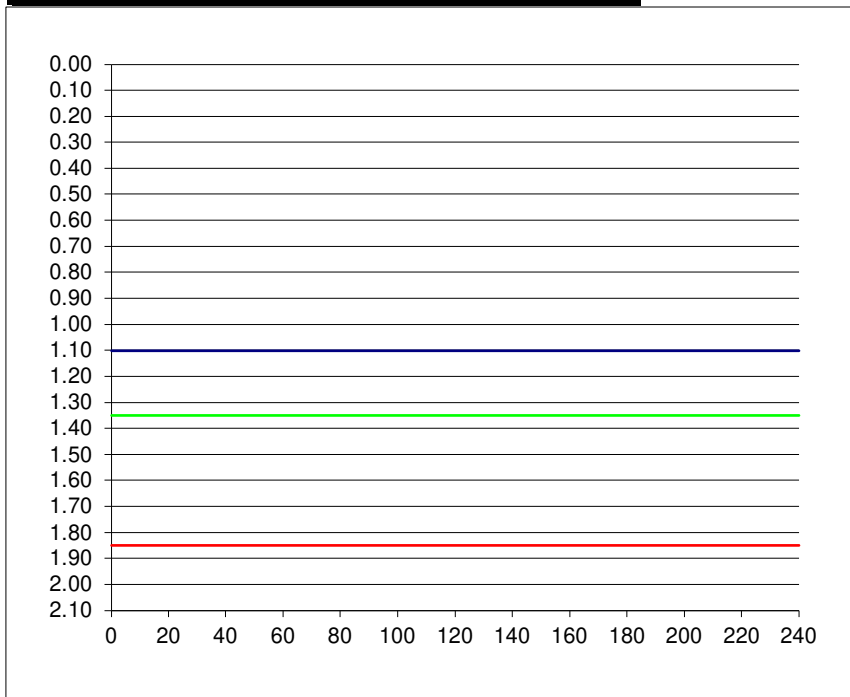
<b>Project Reference:</b>	6269
<b>Contract name:</b>	Mooretown
<b>Location:</b>	Swords, Co. Dublin
<b>Test No:</b>	SA04
<b>Date:</b>	29/03/2024

**Ground Conditions**

From	To	Description
0.00	0.30	TOPSOIL.
0.30	2.10	Firm brown slightly sandy slightly gravelly silty CLAY with medium cobble content.

Elapsed Time (mins)	Fall of Water (m)
0	1.10
0.5	1.10
1	1.10
1.5	1.10
2	1.10
2.5	1.10
3	1.10
3.5	1.10
4	1.10
4.5	1.10
5	1.10
6	1.10
7	1.10
8	1.10
9	1.10
10	1.10
12	1.10
14	1.10
16	1.10
18	1.10
20	1.10
25	1.10
30	1.10
40	1.10
50	1.10
60	1.10
75	1.10
90	1.10
120	1.10
150	1.10
180	1.10
240	1.10

<b>Pit Dimensions (m)</b>	
Length (m)	3.50 m
Width (m)	0.60 m
Depth	2.10 m
<b>Water</b>	
Start Depth of Water	1.10 m
Depth of Water	1.00 m
75% Full	1.35 m
25% Full	1.85 m
75%-25%	0.50 m
Volume of water (75%-25%)	<b>1.05</b> m <sup>3</sup>
Area of Drainage	<b>17.22</b> m <sup>2</sup>
Area of Drainage (75%-25%)	<b>6.20</b> m <sup>2</sup>
<b>Time</b>	
75% Full	N/A min
25% Full	N/A min
Time 75% to 25%	<b>N/A</b> min
Time 75% to 25% (sec)	<b>N/A</b> sec



**f = Fail or Fail**  
m/min m/s

# SOAKAWAY TEST



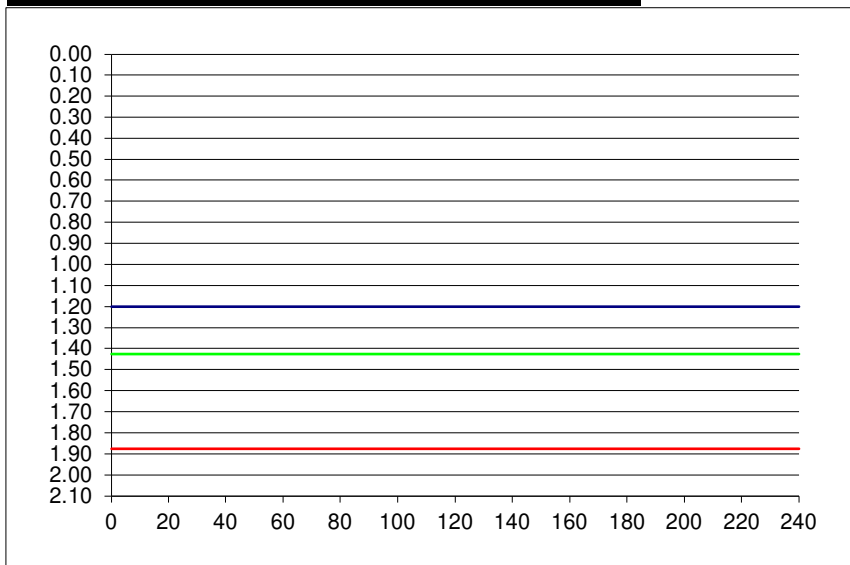
<b>Project Reference:</b>	6269
<b>Contract name:</b>	Mooretown
<b>Location:</b>	Swords, Co. Dublin
<b>Test No:</b>	SA05
<b>Date:</b>	23/04/2024

### Ground Conditions

From	To	Description
0.00	0.30	TOPSOIL.
0.30	1.10	Firm brown slightly sandy slightly gravelly silty CLAY with low cobble content.
1.10	1.50	Firm brown grey slightly sandy slightly gravelly silty CLAY with low cobble content.
1.50	2.10	Firm light brown slightly sandy slightly gravelly silty CLAY with low cobble content.

Elapsed Time (mins)	Fall of Water (m)
0	1.20
0.5	1.20
1	1.20
1.5	1.20
2	1.20
2.5	1.20
3	1.20
3.5	1.20
4	1.20
4.5	1.20
5	1.20
6	1.20
7	1.20
8	1.20
9	1.20
10	1.20
12	1.20
14	1.20
16	1.20
18	1.20
20	1.20
25	1.20
30	1.20
40	1.20
50	1.20
60	1.20
75	1.20
90	1.20
120	1.20
150	1.20
180	1.20
240	1.20

Pit Dimensions (m)	
Length (m)	3.80 m
Width (m)	0.60 m
Depth	2.10 m
Water	
Start Depth of Water	1.20 m
Depth of Water	0.90 m
75% Full	1.43 m
25% Full	1.88 m
75%-25%	0.45 m
Volume of water (75%-25%)	<b>1.03</b> m <sup>3</sup>
Area of Drainage	<b>18.48</b> m <sup>2</sup>
Area of Drainage (75%-25%)	<b>6.24</b> m <sup>2</sup>
Time	
75% Full	N/A min
25% Full	N/A min
Time 75% to 25%	<b>N/A</b> min
Time 75% to 25% (sec)	<b>N/A</b> sec



**f =** Fail or  
m/min

Fail  
m/s

# SOAKAWAY TEST

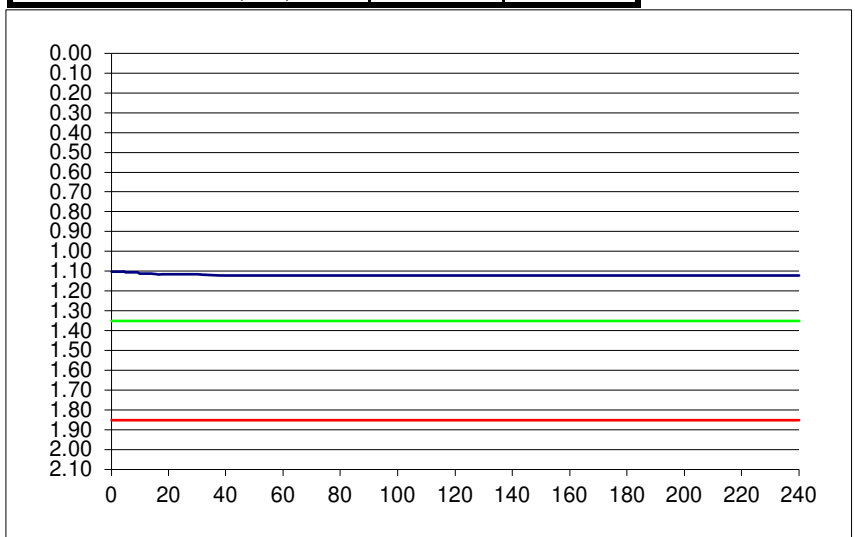


<b>Project Reference:</b>	6269
<b>Contract name:</b>	Mooretown
<b>Location:</b>	Swords, Co. Dublin
<b>Test No:</b>	SA06
<b>Date:</b>	22/04/2024

<b>Ground Conditions</b>		
From	To	Description
0.00	0.30	TOPSOIL.
0.30	0.80	Firm light brown slightly sandy slightly gravelly silty CLAY with low cobble content.
0.80	1.80	Firm brown grey slightly sandy slightly gravelly silty CLAY with medium cobble content.
1.80	2.10	Stiff black slightly sandy slightly gravelly silty CLAY with medium cobble and low boulder content.

Elapsed Time (mins)	Fall of Water (m)
0	1.10
0.5	1.10
1	1.10
1.5	1.10
2	1.10
2.5	1.10
3	1.10
3.5	1.10
4	1.10
4.5	1.10
5	1.11
6	1.11
7	1.11
8	1.11
9	1.11
10	1.11
12	1.11
14	1.11
16	1.12
18	1.12
20	1.12
25	1.12
30	1.12
40	1.12
50	1.12
60	1.12
75	1.12
90	1.12
120	1.12
150	1.12
180	1.12
240	1.12

<b>Pit Dimensions (m)</b>		
Length (m)	3.20	m
Width (m)	0.60	m
Depth	2.10	m
<b>Water</b>		
Start Depth of Water	1.10	m
Depth of Water	1.00	m
75% Full	1.35	m
25% Full	1.85	m
75%-25%	0.50	m
Volume of water (75%-25%)	<b>0.96</b>	m <sup>3</sup>
Area of Drainage	<b>15.96</b>	m <sup>2</sup>
Area of Drainage (75%-25%)	<b>5.72</b>	m <sup>2</sup>
<b>Time</b>		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	<b>N/A</b>	min
Time 75% to 25% (sec)	<b>N/A</b>	sec



**f = Fail or Fail**  
**m/min**
**m/s**

# SOAKAWAY TEST

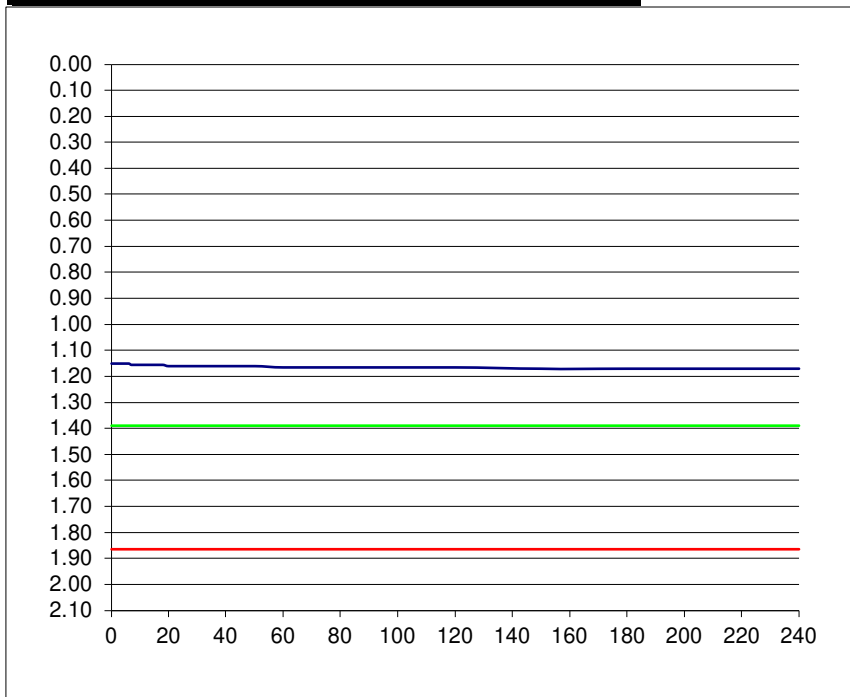


<b>Project Reference:</b>	6269
<b>Contract name:</b>	Mooretown
<b>Location:</b>	Swords, Co. Dublin
<b>Test No:</b>	SA07
<b>Date:</b>	05/04/2024

<b>Ground Conditions</b>		
From	To	Description
0.00	0.30	TOPSOIL.
0.30	2.10	Firm brown slightly sandy slightly gravelly silty CLAY with medium cobble content.

Elapsed Time (mins)	Fall of Water (m)
0	1.15
0.5	1.15
1	1.15
1.5	1.15
2	1.15
2.5	1.15
3	1.15
3.5	1.15
4	1.15
4.5	1.15
5	1.15
6	1.15
7	1.16
8	1.16
9	1.16
10	1.16
12	1.16
14	1.16
16	1.16
18	1.16
20	1.16
25	1.16
30	1.16
40	1.16
50	1.16
60	1.17
75	1.17
90	1.17
120	1.17
150	1.17
180	1.17
240	1.17

<b>Pit Dimensions (m)</b>	
Length (m)	3.50 m
Width (m)	0.60 m
Depth	2.10 m
<b>Water</b>	
Start Depth of Water	1.15 m
Depth of Water	0.95 m
75% Full	1.39 m
25% Full	1.86 m
75%-25%	0.48 m
Volume of water (75%-25%)	<b>1.00</b> m <sup>3</sup>
Area of Drainage	<b>17.22</b> m <sup>2</sup>
Area of Drainage (75%-25%)	<b>6.00</b> m <sup>2</sup>
<b>Time</b>	
75% Full	N/A min
25% Full	N/A min
Time 75% to 25%	<b>N/A</b> min
Time 75% to 25% (sec)	<b>N/A</b> sec



**f = Fail or Fail**  
m/min m/s

# SOAKAWAY TEST

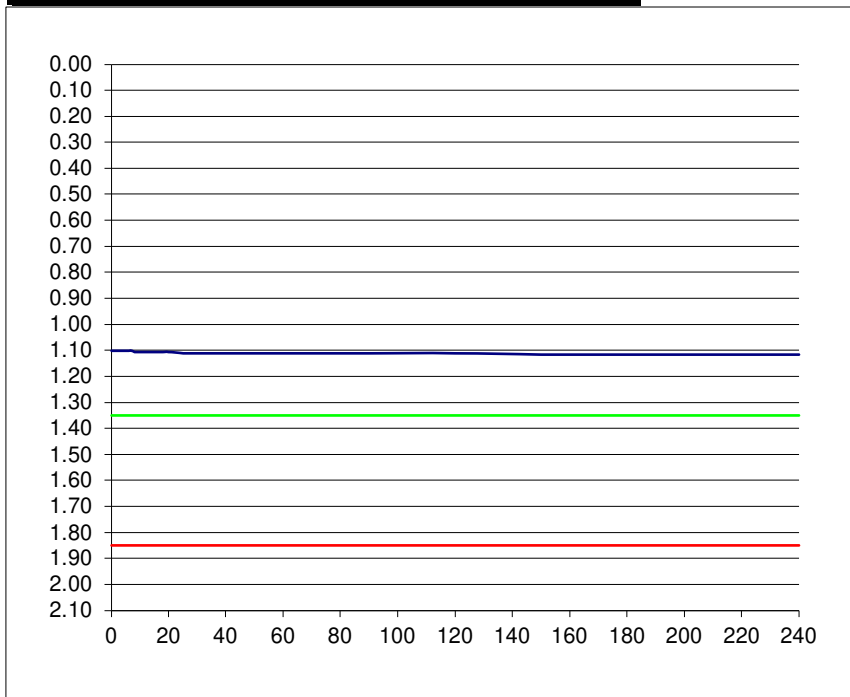


<b>Project Reference:</b>	6269
<b>Contract name:</b>	Mooretown
<b>Location:</b>	Swords, Co. Dublin
<b>Test No:</b>	SA08
<b>Date:</b>	19/04/2024

<b>Ground Conditions</b>		
From	To	Description
0.00	0.30	TOPSOIL.
0.30	2.10	Firm brown slightly sandy slightly gravelly silty CLAY with medium cobble content.

Elapsed Time (mins)	Fall of Water (m)
0	1.10
0.5	1.10
1	1.10
1.5	1.10
2	1.10
2.5	1.10
3	1.10
3.5	1.10
4	1.10
4.5	1.10
5	1.10
6	1.10
7	1.10
8	1.11
9	1.11
10	1.11
12	1.11
14	1.11
16	1.11
18	1.11
20	1.11
25	1.11
30	1.11
40	1.11
50	1.11
60	1.11
75	1.11
90	1.11
120	1.11
150	1.12
180	1.12
240	1.12

<b>Pit Dimensions (m)</b>	
Length (m)	3.40 m
Width (m)	0.60 m
Depth	2.10 m
<b>Water</b>	
Start Depth of Water	1.10 m
Depth of Water	1.00 m
75% Full	1.35 m
25% Full	1.85 m
75%-25%	0.50 m
Volume of water (75%-25%)	<b>1.02</b> m <sup>3</sup>
Area of Drainage	<b>16.8</b> m <sup>2</sup>
Area of Drainage (75%-25%)	<b>6.04</b> m <sup>2</sup>
<b>Time</b>	
75% Full	N/A min
25% Full	N/A min
Time 75% to 25%	<b>N/A</b> min
Time 75% to 25% (sec)	<b>N/A</b> sec



**f = Fail m/min    or    Fail m/s**

# SOAKAWAY TEST



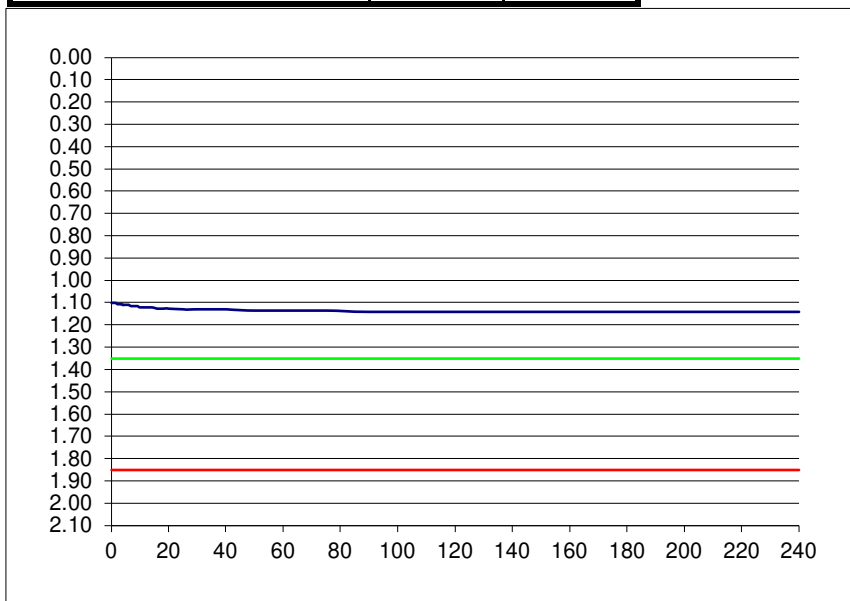
<b>Project Reference:</b>	6269
<b>Contract name:</b>	Mooretown
<b>Location:</b>	Swords, Co. Dublin
<b>Test No:</b>	SA09
<b>Date:</b>	22/04/2024

### Ground Conditions

From	To	
0.00	0.20	TOPSOIL.
0.20	0.50	Firm light brown slightly sandy slightly gravelly silty CLAY with low cobble content.
0.50	2.10	Firm brown grey slightly sandy slightly gravelly silty CLAY with medium cobble content.

Elapsed Time (mins)	Fall of Water (m)
0	1.10
0.5	1.10
1	1.10
1.5	1.10
2	1.11
2.5	1.11
3	1.11
3.5	1.11
4	1.11
4.5	1.11
5	1.11
6	1.11
7	1.12
8	1.12
9	1.12
10	1.12
12	1.12
14	1.12
16	1.13
18	1.13
20	1.13
25	1.13
30	1.13
40	1.13
50	1.14
60	1.14
75	1.14
90	1.14
120	1.14
150	1.14
180	1.14
240	1.14

Pit Dimensions (m)	
Length (m)	3.80 m
Width (m)	0.60 m
Depth	2.10 m
Water	
Start Depth of Water	1.10 m
Depth of Water	1.00 m
75% Full	1.35 m
25% Full	1.85 m
75%-25%	0.50 m
Volume of water (75%-25%)	<b>1.14</b> m <sup>3</sup>
Area of Drainage	<b>18.48</b> m <sup>2</sup>
Area of Drainage (75%-25%)	<b>6.68</b> m <sup>2</sup>
Time	
75% Full	N/A min
25% Full	N/A min
Time 75% to 25%	<b>N/A</b> min
Time 75% to 25% (sec)	<b>N/A</b> sec



**f = Fail** or  
m/min

**Fail**  
m/s



# SOAKAWAY TEST



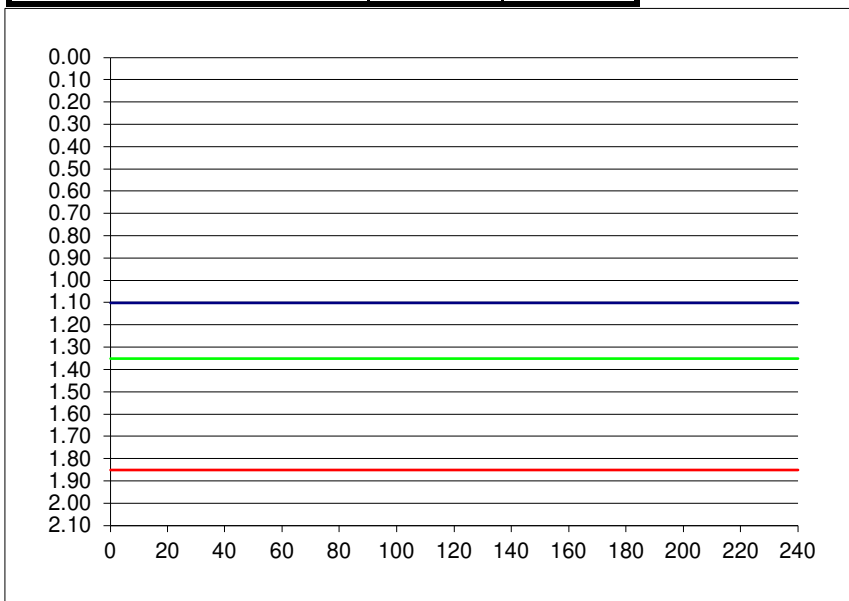
<b>Project Reference:</b>	6269
<b>Contract name:</b>	Mooretown
<b>Location:</b>	Swords, Co. Dublin
<b>Test No:</b>	SA10
<b>Date:</b>	11/04/2024

**Ground Conditions**

From	To	Description
0.00	0.30	TOPSOIL.
0.30	1.70	Firm brown grey slightly sandy slightly gravelly silty CLAY with medium cobble content.
1.70	2.10	Stiff black slightly sandy slightly gravelly silty CLAY with medium cobble and low boulder content.

Elapsed Time (mins)	Fall of Water (m)
0	1.10
0.5	1.10
1	1.10
1.5	1.10
2	1.10
2.5	1.10
3	1.10
3.5	1.10
4	1.10
4.5	1.10
5	1.10
6	1.10
7	1.10
8	1.10
9	1.10
10	1.10
12	1.10
14	1.10
16	1.10
18	1.10
20	1.10
25	1.10
30	1.10
40	1.10
50	1.10
60	1.10
75	1.10
90	1.10
120	1.10
150	1.10
180	1.10
240	1.10

<b>Pit Dimensions (m)</b>	
Length (m)	3.50 m
Width (m)	0.60 m
Depth	2.10 m
<b>Water</b>	
Start Depth of Water	1.10 m
Depth of Water	1.00 m
75% Full	1.35 m
25% Full	1.85 m
75%-25%	0.50 m
Volume of water (75%-25%)	<b>1.05</b> m <sup>3</sup>
Area of Drainage	<b>17.22</b> m <sup>2</sup>
Area of Drainage (75%-25%)	<b>6.20</b> m <sup>2</sup>
<b>Time</b>	
75% Full	N/A min
25% Full	N/A min
Time 75% to 25%	<b>N/A</b> min
Time 75% to 25% (sec)	<b>N/A</b> sec



**f = Fail** or  
m/min

**Fail**  
m/s

# SOAKAWAY TEST

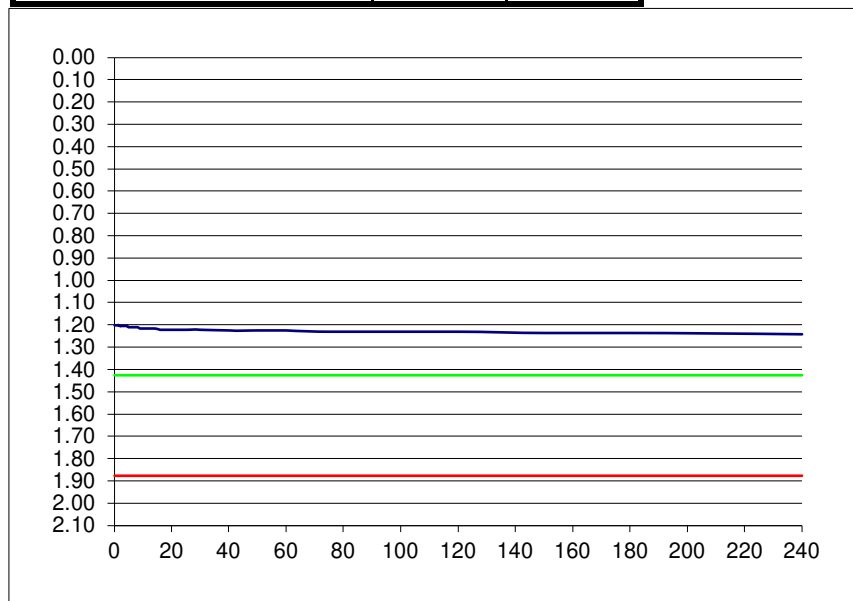


<b>Project Reference:</b>	6269
<b>Contract name:</b>	Mooretown
<b>Location:</b>	Swords, Co. Dublin
<b>Test No:</b>	SA11
<b>Date:</b>	11/04/2024

### Ground Conditions

From	To	Description
0.00	0.30	TOPSOIL.
0.30	2.00	Firm brown slightly sandy slightly gravelly silty CLAY with medium cobble content.
2.00	2.10	Stiff black slightly sandy slightly gravelly silty CLAY with medium cobble and low boulder content.

Elapsed Time (mins)	Fall of Water (m)	Pit Dimensions (m)
0	1.20	Length (m) 3.30 m
0.5	1.20	Width (m) 0.60 m
1	1.20	Depth 2.10 m
1.5	1.20	<b>Water</b>
2	1.21	Start Depth of Water 1.20 m
2.5	1.21	Depth of Water 0.90 m
3	1.21	75% Full 1.43 m
3.5	1.21	25% Full 1.88 m
4	1.21	75%-25% 0.45 m
4.5	1.21	Volume of water (75%-25%) <b>0.89</b> m <sup>3</sup>
5	1.21	Area of Drainage <b>16.38</b> m <sup>2</sup>
6	1.21	Area of Drainage (75%-25%) <b>5.49</b> m <sup>2</sup>
7	1.21	<b>Time</b>
8	1.21	75% Full N/A min
9	1.22	25% Full N/A min
10	1.22	Time 75% to 25% <b>N/A</b> min
12	1.22	Time 75% to 25% (sec) <b>N/A</b> sec
14	1.22	
16	1.22	
18	1.22	
20	1.22	
25	1.22	
30	1.22	
40	1.23	
50	1.23	
60	1.23	
75	1.23	
90	1.23	
120	1.23	
150	1.24	
180	1.24	
240	1.24	



**f = Fail** or  
m/min

**Fail**  
m/s

# SOAKAWAY TEST

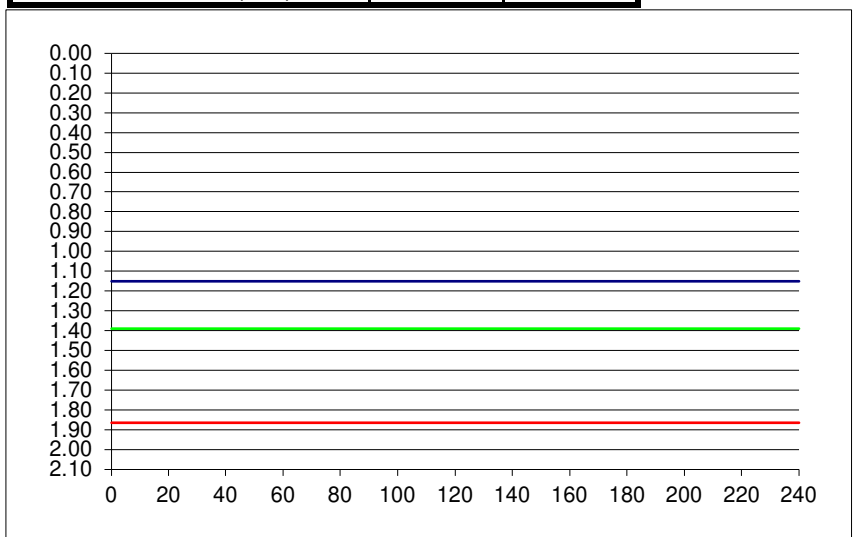


<b>Project Reference:</b>	6269
<b>Contract name:</b>	Mooretown
<b>Location:</b>	Swords, Co. Dublin
<b>Test No:</b>	SA12
<b>Date:</b>	15/04/2024

<b>Ground Conditions</b>		
From	To	Description
0.00	0.20	TOPSOIL.
0.20	1.00	Firm light brown slightly sandy slightly gravelly silty CLAY with low cobble content.
1.00	1.80	Firm brown grey slightly sandy slightly gravelly silty CLAY with medium cobble content.
1.80	2.10	Stiff black slightly sandy slightly gravelly silty CLAY with medium cobble and low boulder content.

Elapsed Time (mins)	Fall of Water (m)
0	1.15
0.5	1.15
1	1.15
1.5	1.15
2	1.15
2.5	1.15
3	1.15
3.5	1.15
4	1.15
4.5	1.15
5	1.15
6	1.15
7	1.15
8	1.15
9	1.15
10	1.15
12	1.15
14	1.15
16	1.15
18	1.15
20	1.15
25	1.15
30	1.15
40	1.15
50	1.15
60	1.15
75	1.15
90	1.15
120	1.15
150	1.15
180	1.15
240	1.15

<b>Pit Dimensions (m)</b>		
Length (m)	3.60	m
Width (m)	0.60	m
Depth	2.10	m
<b>Water</b>		
Start Depth of Water	1.15	m
Depth of Water	0.95	m
75% Full	1.39	m
25% Full	1.86	m
75%-25%	0.48	m
Volume of water (75%-25%)	<b>1.03</b>	m <sup>3</sup>
Area of Drainage	<b>17.64</b>	m <sup>2</sup>
Area of Drainage (75%-25%)	<b>6.15</b>	m <sup>2</sup>
<b>Time</b>		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	<b>N/A</b>	min
Time 75% to 25% (sec)	<b>N/A</b>	sec



**f = Fail or Fail**  
**m/min**
**m/s**

# UK and Ireland Office Locations

