169-177 Merrion Road Student Accommodation Civil Planning Report

30.08.2024

24042-X-XXX-RP-TNT-CE-0002

TENT ENGINEERING

Site Address:

Gowan Motors Compound Site
169-177 Merrion Road
Dublin 4

Client:

1 Merrion Compound Land Limited

TENT ENGINEERING

Revision and Review

This report has been prepared for the sole benefit, use and information of the client. The liability of Tent Engineering with respect to the information contained in this report will not extend to any third party.

PURPOSE

- [ ] P1 Information
- [ ] P2 Coordination
- [x] P3 Planning
- [ ] P4 Building Control
- [ ] P5 Pre-tender
- [ ] P6 Tender
- [ ] P7 Construction

ACCEPTANCE (BY OTHERS)

- [ ] S Issued
- [ ] A Accepted
- [ ] B Accepted subject to comments
- [ ] C Rejected
- [ ] D Acceptance not required

Accepted by

REVISION(S)

Rev.	Description	Date
00	1st Issue	12.07.2024
01	2nd Issue	14.08.2024
03	3rd Issue	30.08.2024
04	4th Issue	06.09.2024

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Contents

1 Introduction

1.1 Proposals contained or forming part of this report represent the design intent and may be subject to alteration or adjustment in completing the detailed design for this project. Where such adjustments are undertaken as part of the detailed design and are deemed a material deviation from the intent contained in this document, prior approval shall be obtained from the relevant authority in advance of commencing such works.

1.2 Where the proposed works to which this report refers are undertaken more than twelve months following the issue of this report, Tent Engineering shall reserve the right to re-validate the findings and conclusions by undertaking appropriate further investigations and designs at no additional cost to Tent Engineering Ltd.

1.3 This report refers to the Foul and Surface water drainage and fresh Water provisions associated with the proposed development at Gowan Motors Compound site at 169-177 Merrion Road, Dublin 4. The development will be served by the proposed site infrastructure as reflected on civil drawings:

- 24042-X-B01-DR-TNT-CE-3003_PROPOSED DRAINAGE INFRASTRUCURE - BASEMENT
- 24042-X-L00-DR-TNT-CE-3000_PROPOSED DRAINAGE INFRASTRUCTURE - GROUND FLOOR
- 24042-X-L00-DR-TNT-CE-3001_WATERMAIN LAYOUT
- 24042-X-L00-DR-TNT-CE-3002_SURFACE WATER LAYOUT

1.4 The site is brownfield, no demolition works are required, no existing basement is currently present.

1.5 Planning permission is sought for an Large Scale Residential Development delivering no. 200 student residential units within two blocks. The blocks range in height up to 6 storeys. Block A will have a single storey basement. All associated internal and external amenity space, car and cycle parking, landscaping, bin stores, service provision and vehicular and pedestrian accesses are also proposed.

Fig 1.1 - Proposed site location

1.5 No adverse existing infrastructure has been identified on or below our site. A conclusive survey is to confirm cable and pipe positions below and over our site post-planning. No diversions are expected at this stage.

1.6 This report is to be read as supplement to the planning application for the development at 169-177 Merrion Road Student Accommodation, including but not limited to Flood Risk Assessment *24042-X-XXX-RP-TNT-CE-0002*.

1.7 A "Confirmation of Feasibility" and "Statement of Design Acceptance" by Uisce Eireann has been issued for the proposed development, with no adverse comments or conditions. Refer to Appendix D and E.

1.8 Note that it is stipulated that a combined site discharge is to be made for surface water and foul water, as incorporated on our drawings.

A separate connection has been considered and is deemed impractical and not a viable solution to this site. The nearest connection point for storm water is circa 50m away and across a busy main road into city centre. More compounding is that the storm water network would require to cross a live existing foul water brick culvert (1020x800mm). Invert levels have been explored extensively and the SW pipe would clash with the culvert. In scenarios of a potential separate SW connection the brick foul sewer is likely to be disturbed and has a high likelyhood of an adverse effect.

DCC pre-planning comments stated: *Although ideal situation is for separate connections to separate networks - there are concerns around: (1) private connection, public road, sharp bends - MHs are generally provided at any change of direction; (2) potential clash with existing UÉ combined brick culvert & risk of damage; (3) this is a busy road and junction. A* ***combined outfall can be considered*** *if applicant justifies adequately and demonstrates why separate connections are not feasible and Uisce Éireann approve.*

It has been demonstrated that a clash between the surface water pipe and the existing brick culvert exists should a separate sewer be developed (refer to Appendix F). The clash is robust and cannot be simply be avoided. A combined connection omits the need for 2no additional SW manholes in Merrion Rd, compared to a separate discharge strategy.

Acceptance for the proposed combined sewer has been received from Uisce Eireann, confirmed in their Confirmation of Feasibility (refer to Appendix D). They state: *The Development must incorporate Sustainable Drainage Systems/ Attenuation in the management of storm water and to reduce surface water inflow into the receiving* ***combined*** *sewer.*

Sustainable urban Drainage Systems are implemented and designed appropriately, satisfying the UE condition for a combined sewer. Refer to section 4.

Considering that Merrion Road is a busy main street in and out of city centre and supports several bus-routes. A combined sewer strategy reduces and avoids the disturbances around large traffic obstructions, additional SW manholes, a connection point 50m from site and a certain clash with a sensitive existing (live) brick culvert.

For reasons coordinated, justified and demonstrated as noted above, a combined sewer connection is most appropriate and has been designed adequately for the proposed development.

1.9 This report follows the guidelines outlined in the following documents:

- Dublin City Council Development Plan 22-28
- Appendix 12 - Technical Summary of Dublin City Council Sustainable Drainage Design and Evaluation Guide (2021)
- Irish Water Code of Practice for Wastewater and Water Infrastructure
- Greater Dublin Strategic Drainage Study (GDSDS)
- The SuDS Manual (CIRIA C753)

2 Foul Water Drainage

2.1 The foul water drainage system proposed for the site has been designed in accordance with the Irish Water 'Code of Practice for Wastewater Infrastructure'.

2.2 A design peak flow equal to 6 times the calculated discharge volume is applied and 10% for unit consumption volume is added.

2.3 All sewers drain via gravity, unless noted otherwise. Foul sewers and lateral drains should be designed to run at no more than 75% of pipe full conditions.

2.4 No on-site existing foul water network is identified after the interrogation of GIS service maps.

2.5 Our site is bounded by Merrion Road in the Northeast direction. Existing services adjacent to our site offer a tie-in point for our sewer. An existing public combined sewer of ø300mm vitrified clay flows in Southerly direction. GIS maps offer sufficient detail at this stage.

2.6 Student rooms are generally intended for 1no person per unit. However double-beds are provided and due to the possibility of shared student accommodation an allowance of a conservative average 1.8 persons per unit is allowed for.

2.7 The design water consumption for foul flow calculation purposes is taken to be as outlined in the table below, following from the Irish Water 'Waste Water Code of Practice' and specialist confirmations as appropriate.

Description	Daily Discharge
No.200 student rooms	59900 L

2.8 The information of 2.2 and 2.7 results in a peak average daily waste waster discharge determination as outlined below.
(a) 59900 x 6.0 x 1.1 / 86400 = 4.125 L/s.
The above determination results in a typical ø225mm diameter foul water network requirement (refer to Appendix B for full breakdown of foul water discharge).

2.9 The typical foul water gradient to be used is 1:60 U.N.O. Pipe material is uPVC U.N.O.

2.10 The site and Merrion Road have a mild slope, not to the detriment of pipe gradients, self-cleaning velocities, and invert levels. A gravity system is feasible.

2.11 Block A foul water internal discharge (via risers and several small diameter branches) is to be shallow below the basement slab. The block A discharge point to the sites sewer requires a pump, with a head of approximately 0.6m (TBC).

Block B foul water internal discharge (via risers) is to be underslung to the ground floor slab, by M&E engineer during post-planning stages. The block B discharge point to the sites underground sewer network requires a backdrop of approximately 2.25 meters (TBC). No pump required.

2.12 The proposed layout for the foul infrastructure serves the site as shown on the enclosed drawings.

2.13 Prior to construction and installation of connections, a survey is to confirm position and invert levels of the relevant networks and manholes, and further post-planning approvals.

2.14 Foul water designs follow Irish Water approved typical details and specifications.

3 Water Supply

3.1 The water supply system proposed for the site has been designed in accordance with the Irish Water 'Code of Practice for Water Infrastructure'.

3.2 A design peak flow equal to 5 times the calculated demand volume is applied and 25% for dry weather flow volume is added.

3.3 In front of our proposed site there is an existing off-line fire hydrant branching from the existing water main bounding the North of our site. Due to the depth of our site and access to Block B, a new fire hydrant is proposed on our site to provide fire fighting requirements to the entire development.

3.4 Student rooms are generally intended for 1no person per unit. However double-beds are provided and due to the possibility of shared student accommodation an allowance of a conservative average 1.8 persons per unit is allowed for.

3.5 The design water demand for fresh water supply calculation purposes is taken to be as outlined in the table below, following from the Irish Water 'Water Code of Practice' and specialist confirmations.

Description	Daily Demand
No.200 student rooms	54000 L

3.6 The information of 3.2 and 3.5 results in a peak average daily water demand determination as outlined below:
(a) 54000 x 5.0 x 1.25 / 86400 = 3.906 L/s.
The above determination results in a typical 100mm nominal diameter fresh water network requirement (ref. Appendix B for full breakdown of water demand calculation).

3.7 The water pipe material is MDPE (PE -80 rating) U.N.O.

3.7 The proposed layout for the fresh water infrastructure serves the site as shown on the enclosed drawings.

3.8 All on-site water details are to be Irish Water approved typical details and specifications.

4 Surface Water and Management Plan

4.1 All proposed drainage is designed and detailed in accordance with:

- GDSDS
- The SUDS Manual - Ciria C753
- DCC Development Plan 22-28 (App. 12 & 13)

4.2 All surface water from the proposed site area is actively drained and appropriately discharged, ultimately into a combined sewer of the existing network.

4.3 Refer to section 1.8. A combined sewer connection is proposed and deemed feasible.

4.4 The proposed Surface Water Drainage System proposed for the site has been designed using the following parameters:

(a) Rain intensity and return periods specific to our site, obtained from Met Eireann.
(b) Impermeability factor of 1.0 (100%).
(c) Permeability run-off factor of 0.3 (30%).
(d) Climate change factor 1.20 (+20%).
(e) Urban creep factor 1.10 (+10%)
(f) 100 year return period.
(g) 5mm interception rainfall depth.
(h) Site storm water discharge is limited to the higher value of 2L/s/ha or QBAR, but a minimum flow based on a flow control device with an orifice size of 50mm is allowed for.

4.5 The following areas have been considered for the proposed development:

Description	Size
Total site	2890 m^2
Roofs and roads (impermeable)	1821 m^2
Landscape area (open space)	751 m^2
Permeable surface	318 m^2

Refer to 24042-L00-DR-TNT-CE-3002_SURFACE WATER LAYOUT for the site strategy and SuDS measures and corresponding (catchment) areas. A key map is shown with a pie-chart between the different surface permeabilities on site.

4.6 The proposed layout for the storm water drainage system serves the site appropriately as per site specific designs (refer to Appendix A).

4.7 The proposed site is moderately sloped. A gravity system is feasible. No surcharging of the site network occurs during rare storm events.

4.8 Block A and Block B both have external areas at basement level. These areas are drained via gullies and ACO-drains. To ensure discharge at no risk of surcharging or undesired backfilling of the site network, a small SW pump is required, pumping directly into the attenuation tank at high level (inlet above the inlet from Block B with a non-return valve). The pump has a head height of approximately 2.5m (TBC). Pump specification is to be confirmed by the M&E engineer during post-planning stages.

4.9 Soakaways are not feasible due to the anticipated high water table on site. Post-planning surveys are to conclusively identify the depth of the groundwater table. Should a soakaway prove feasible at that stage, every reasonable effort is to be made to include natural infiltration systems as opposed to closed tank attenuation storage.

Due to the anticipated high groundwater table, tree pits do not contribute efficiently to the surface water infrastructure on our site and have therefore not been applied.

4.10 An underground closed (RC) attenuation tank offers a 62.63m^3 storage volume. The contributing blue roofs are to be limited to a maximum discharge rate of 0.16L/s (refer to 4.6).

4.11 The combined contribution of interception and on-site network storage volume results in a restricted (hydrobrake) surface water discharge of 1.89L/s, in accordance with section 4.4(h).

4.12 Sustainable Urban Drainage Systems

A Sustainable Urban Drainage System (SuDS) is a sequence of conveyance systems and control structures designed to manage the drainage of surface water. They offer a more sustainable approach to managing surface water than conventional techniques by providing a system that mimics natural drainage paths.

The development implements several SuDS systems in parallel, which together reduce site run-off rates and reduce on-site storm water storage volumes. The implementation of these measures as proposed offers a vast improvement over the development should no SuDS be used.

The proposed development complies with Dublin City Council's Development Plan 2022-2028 and adheres to the sustainable drainage policies outlined in Appendices 12 and 13. The site incorporates permeable surfaces, raingarden planters, and green/blue roofs, which prioritize surface-based SuDS solutions in line with policy objectives to manage surface water on-site, enhance biodiversity, and improve water quality. Additionally, an underground concrete attenuation tank has been installed, along with a hydrobrake flow control device, ensuring controlled discharge rates to the combined sewer as required. These measures collectively meet the SuDS criteria for water quality treatment, flood risk management, and climate change resilience, supporting a sustainable urban drainage strategy for the development.

The following SuDS have been incorporated:

(a) Green roof (interception storage)
(b) Blue roof (attenuation storage)
(c) Permeable paving (reduced run-off)
(d) Aco-Drains (surface water drainage)
(e) Rainwater Garden Planter (infiltration)

Combined Green Blue roofs have been applied following the 'Green & Blue Roof Guide 2021'.

The following SuDS measures (as noted in the Development Plan 2022-2028 Appendix 12 & 13) have not been introduced and incorporated into the proposed development

Swales, soakaways or infiltration trenches, ponds or wetlands, basins and detention ponds. These systems have been omitted because our site has a high ground water table and is located in an artesian well, meaning that systems reliant on soil infiltration are not suitable for this site. Furthermore the site is limited in its open space and large surface water control features would be to the detriment of the functionality and comfort of the users.

(a) A lightweight green roof cover, as part of a blue roof is proposed for flat roof areas. >70% of the flat roof area between the parapets (intensive). This contributes to the interception storage during storm events and reduces the flow and discharge rates from the impermeable roof surface and blue roof storage requirements (ref. Appendix F for typical Green/Blue Roof detail). Steep and sloped roofs are impractical for green roof application and effectively do not contribute to SuDS as the interception storage volume within the organic build-up does not get utilised due to gravity.

(b) >70% of the flat roof area provides blue roof short-term soak-away storage volume (system does not function on sloped roofs). A storage depth of 80mm is allowed for, offering a combined total volume of circa 23.44m³ of attenuation storage. Blue roof flow rates are limited based on natural flow rates (QBAR) for the relevant catchment areas, with an overflow system that avoids increased accumulation past the 80mm blue roof depth. Refer to Appendix G for the typical Green Blue Roof detail. Each blue roof is limited to a discharge rate of 0.13L/s for a reduced site run-off rate.

(c) The development will feature permeable paving across all foot and cycle paths, roads, and terraced areas. By implementing permeable paving, the site is expected to achieve a reduction in stormwater runoff by approximately 70% compared to conventional hard surfaces. Permeable paving will mitigate the risk of flooding but also promote groundwater recharge and improve water quality by filtering out pollutants.

(d) The site is equipped with Aco-drains strategically placed at entrances. These drains are designed to mitigate potential water accumulation, thereby minimizing the risk of water pooling.

Table 4.1 -Summary of Surface Water Management Requirements

Parameter	Proposed Solution	Requirement Met
Surface Water Discharge	Combined Sewer	Alternative options deemed not viable, discharge into existing network. Refer to 1.8
Rain Intensity and Return Periods	Site-Specific Data (MET Eireann)	Ensures appropriate sizing of drainage systems
Impermeability Factor	1.0 (100%)	Design considers full impermeability for roof and road surfaces
Permeability Run-off Factor	0.3 (30%)	Accounts for permeable surfaces run-off within the site
Climate Change Factor	1.20 (+20%)	Accommodates increased rainfall due to climate change.
Urban Creep Factor	1.10 (+10%)	Accounts for future increases from site run-on and hardstanding surfaces
Design Storm Event	100-Year Return Period	Ensures system can handle extreme weather conditions.
Interception Rainfall Depth	5mm	Provides initial capture of rainfall on landscaped areas to reduce runoff volume
Discharge Limitation	1.89 L/s (Hydrobrake)	Controlled release of surface water as per SuDS guidelines.

(e) Rainwater garden planters, effectively manage stormwater while also enhancing the aesthetic appeal and ecological value of the site. These planters are designed to filter surface water runoff from sloped roof areas, thereby reducing the overall runoff volume. By capturing and treating rainwater, the planters decrease the burden on traditional drainage systems, promote natural infiltration, and improve water quality. The incorporation of rainwater garden planters on the site has reduced the required attenuation storage volume from 79m³ to 62.63m³. This adjustment not only lowers costs but also decreases the use of concrete, a carbon-intensive material.

4.13 Refer to summary table (Table 4.1) showing how surface water requirements are met for the proposed development:

4.14 Refer to summary table (Table 4.2) showing how Sustainable Urban Drainage Systems (SuDS) requirements are met for the proposed development:

Table 4.2 -Summary of Sustainable Urban Drainage Systems Requirements

Parameter	Proposed Solution	Requirement Met
Green Roofs	70% of flat roof area (allowing extensive coverage)	Provides interception storage and reduces run-off
Blue Roofs	70% of flat roof area, 80mm depth	Additional attenuation storage with controlled discharge for specific catchment areas
Permeable Paving	All foot/cycle paths, roads, terraced areas	Reduces runoff by ~70% compared to impermeable surfaces.
Aco-Drains	Placed at strategic entrances	Mitigates water accumulation and reduces pooling risks.
Rainwater Garden Planters	Filtering surface water runoff	Enhances site aesthetics, promotes infiltration, provides additional attenuation volume.

5 Flood Risk Summary

5.1 Refer to report 24042-X-XXX-RP-TNT-CE-0002 for the detailed Flood Risk Assessment.

5.2 The initial flood risk assessment is undertaken by taking cognisance of the guidance given in the Office of Public Works (OPW) and the Department of Environment, Heritage and Local Government (DEHLG) document titled 'The planning system and flood risk management' (2009).

5.3 Flood data has been interrogated via online available flood maps. Relevant Flood Maps are currently available and are not noted to be under review by the governing authority.

5.4 The proposed development lies within an area classified as Flood Zone C "lowest risk of flooding from rivers and sea". This initial flood risk assessment is undertaken by taking cognisance of the guidance given in the Office of Public Works (OPW) and the Department of Environment, Heritage and Local Government (DEHLG) document titled 'The planning system and flood risk management' (2009).

5.5 The project is conservatively considered a '*highly vulnerable development*' as the site contains dwellings.

5.6 A review of all potential sources of flooding at the subject site concludes the following:

Flood Source	**Risk of Flood after development**
On-site drainage system	Low Designed with adequate capacity and allowing for climate change.
Local Authority drainage system	Low Assuming local council and public infrastructure authority continue to maintain and service their networks
Sea and Rivers	Low
Groundwater	Low

5.7 The OPW provides records for predictive and historic flood maps. These land maps have been consulted and interrogated regarding documented flood events in the vicinity of the subject site. Historic flood events more than 50 years ago have been identified. Since then additional flood defences have been installed, mitigating the flood risk to the area and our site.

5.8 The nearest recorded flood is tidal/ coastal, and is of no direct risk to our development. No nearby fluvial flood risks have been identified.

5.9 The site does not require additional flood prevention measures.

5.10 A flood justification test is not needed.

5.11 A stage 2 flood risk assessment is not needed.

6 Appendix A - Rainfall data and site run-off

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 319569, Northing: 231041,

	Interval		Years									
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	120,
5 mins	2.4,	3.5,	4.1,	5.0,	5.6,	6.1,	7.6,	9.4,	10.6,	12.3,	13.9,	15.1,	15.9,
10 mins	3.4,	4.9,	5.7,	6.9,	7.8,	8.4,	10.6,	13.1,	14.8,	17.2,	19.3,	21.0,	22.1,
15 mins	4.0,	5.7,	6.7,	8.1,	9.1,	9.9,	12.5,	15.4,	17.4,	20.2,	22.7,	24.7,	26.0,
30 mins	5.3,	7.5,	8.7,	10.5,	11.7,	12.7,	15.8,	19.4,	21.8,	25.2,	28.2,	30.5,	32.1,
1 hours	6.9,	9.8,	11.3,	13.5,	15.0,	16.2,	20.1,	24.4,	27.3,	31.3,	34.9,	37.7,	39.6,
2 hours	9.2,	12.7,	14.6,	17.4,	19.3,	20.7,	25.4,	30.7,	34.2,	39.0,	43.3,	46.6,	48.9,
3 hours	10.8,	14.9,	17.0,	20.2,	22.3,	23.9,	29.2,	35.1,	39.0,	44.4,	49.1,	52.8,	55.3,
4 hours	12.1,	16.6,	18.9,	22.4,	24.7,	26.5,	32.2,	38.6,	42.8,	48.6,	53.7,	57.7,	60.3,
6 hours	14.3,	19.4,	22.0,	26.0,	28.6,	30.6,	37.0,	44.2,	48.8,	55.3,	60.9,	65.3,	68.2,
9 hours	16.8,	22.6,	25.7,	30.1,	33.0,	35.3,	42.5,	50.5,	55.7,	62.9,	69.1,	73.9,	77.1,
12 hours	18.9,	25.3,	28.6,	33.4,	36.6,	39.1,	46.9,	55.6,	61.2,	68.8,	75.6,	80.7,	84.1,
18 hours	22.2,	29.5,	33.3,	38.7,	42.4,	45.1,	53.9,	63.6,	69.8,	78.3,	85.7,	91.4,	95.1,
24 hours	25.0,	33.0,	37.1,	43.0,	47.0,	50.0,	59.5,	69.9,	76.6,	85.7,	93.7,	99.8,	103.8,
2 days	30.9,	39.8,	44.3,	50.8,	55.1,	58.3,	68.4,	79.3,	86.2,	95.6,	103.7,	109.8,	113.9,
3 days	35.8,	45.6,	50.5,	57.5,	62.0,	65.4,	76.1,	87.6,	94.8,	104.5,	112.9,	119.2,	123.4,
4 days	40.3,	50.8,	56.0,	63.4,	68.2,	71.8,	83.1,	95.0,	102.5,	112.6,	121.3,	127.8,	132.1,
6 days	48.4,	60.1,	65.9,	74.1,	79.3,	83.3,	95.5,	108.4,	116.4,	127.2,	136.4,	143.3,	147.8,
8 days	55.7,	68.5,	74.8,	83.7,	89.3,	93.6,	106.7,	120.4,	128.9,	140.3,	149.9,	157.1,	161.9,
10 days	62.5,	76.3,	83.1,	92.6,	98.6,	103.1,	117.0,	131.4,	140.4,	152.3,	162.4,	170.0,	174.9,
12 days	69.0,	83.8,	90.9,	101.0,	107.3,	112.1,	126.7,	141.8,	151.2,	163.6,	174.1,	182.0,	187.1,
16 days	81.2,	97.7,	105.6,	116.7,	123.7,	128.9,	144.8,	161.2,	171.2,	184.6,	195.9,	204.2,	209.7,
20 days	92.8,	110.8,	119.4,	131.4,	138.9,	144.5,	161.6,	179.1,	189.9,	204.1,	216.0,	224.8,	230.6,
25 days	106.7,	126.4,	135.8,	148.8,	157.0,	163.1,	181.5,	200.3,	211.7,	226.9,	239.6,	249.0,	255.1,

NOTES:
These values are derived from a Depth Duration Frequency (DDF) Model update 2023
For details refer to:
'Mateus C., and Coonan, B. 2023. Estimation of point rainfall frequencies in Ireland. Technical Note No. 68. Met Eireann',
Available for download at:
http://hdl.handle.net/2262/102417

Surface water storage requirements for sites

www.uksuds.com | Storage estimation tool

Calculated by:	Conor Edwards
Site name:	Compound - Total Site
Site location:	Ballsbridge, Dublin 4

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the design of the drainage scheme.

Site Details

Latitude:	53.31617° N
Longitude:	6.20637° W
Reference:	3250576527
Date:	Aug 30 2024 16:52

Site characteristics

Total site area (ha):	0.2890
Significant public open space (ha):	0.0751
Area positively drained (ha):	0.21389999999999998
Impermeable area (ha):	0.1821
Percentage of drained area that is impermeable (%):	85
Impervious area drained via infiltration (ha):	0.0318
Return period for infiltration system design (year):	100
Impervious area drained to rainwater harvesting (ha):	0
Return period for rainwater harvesting system (year):	100
Compliance factor for rainwater harvesting system (%):	100
Net site area for storage volume design (ha):	0.21
Net impermable area for storage volume design (ha):	0.15
Pervious area contribution to runoff (%):	30

* where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50% of the 'area positively drained', the 'net site area' and the estimates of Q_{BAR} and other flow rates will have been reduced accordingly.

Methodology

esti	IH124
Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
SPR:	0.47	0.47

Hydrological characteristics

	Default	Edited
Rainfall 100 yrs 6 hrs:	--	65.3
Rainfall 100 yrs 12 hrs:	--	80.7
FEH / FSR conversion factor:	1	1.11
SAAR (mm):	906	906
M5-60 Rainfall Depth (mm):	17	17
'r' Ratio M5-60/M5-2 day:	0.3	0.3
Hydological region:	12	12
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 10 year:	1.72	1.72
Growth curve factor 30 year:	2.13	2.13

Design criteria

Climate change allowance factor:	1.2		Growth curve factor 100 years:	2.61	2.61
Urban creep allowance factor:	1.1		Q_{BAR} for total site area (l/s):	1.89	1.89
Volume control approach	Flow control to max of 2 l/s/ha or Qbar		Q_{BAR} for net site area (l/s):	1.4	1.4
Interception rainfall depth (mm):	5				
Minimum flow rate (l/s):	2				

Site discharge rates

	Default	Edited
1 in 1 year (l/s):	2	2
1 in 30 years (l/s):	2	2
1 in 100 year (l/s):	2	2

Estimated storage volumes

	Default	Edited
Attenuation storage 1/100 years (m^3):	68	79
Long term storage 1/100 years (m^3):	0	0
Total storage 1/100 years (m^3):	68	79

This report was produced using the storage estimation tool developed by HRWallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at http://uksuds.com/terms-and-conditions.htm. The outputs from this tool have been used to estimate storage volume requirements. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

hrwallingford

Surface water storage requirements for sites

www.uksuds.com | Storage estimation tool

Calculated by:	Edward Heukers
Site name:	Blue Roof
Site location:	Compound - Merrion Rd

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the design of the drainage scheme.

Site Details

Latitude:	53.31635° N
Longitude:	6.20636° W
Reference:	4285026811
Date:	Sep 06 2024 14:52

Site characteristics

Total site area (ha):	0.0247
Significant public open space (ha):	0
Area positively drained (ha):	0.0247
Impermeable area (ha):	0.0247
Percentage of drained area that is impermeable (%):	100
Impervious area drained via infiltration (ha):	0
Return period for infiltration system design (year):	100
Impervious area drained to rainwater harvesting (ha):	0
Return period for rainwater harvesting system (year):	100
Compliance factor for rainwater harvesting system (%):	100
Net site area for storage volume design (ha):	0.02
Net impermable area for storage volume design (ha):	0.02
Pervious area contribution to runoff (%):	30

* where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50% of the 'area positively drained', the 'net site area' and the estimates of Q_{BAR} and other flow rates will have been reduced accordingly.

Methodology

esti	IH124
Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
SPR:	0.47	0.47

Hydrological characteristics

	Default	Edited
Rainfall 100 yrs 6 hrs:	--	65.3
Rainfall 100 yrs 12 hrs:	--	80.7
FEH / FSR conversion factor:	1	1.11
SAAR (mm):	906	906
M5-60 Rainfall Depth (mm):	17	17
'r' Ratio M5-60/M5-2 day:	0.3	0.3
Hydological region:	12	12
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 10 year:	1.72	1.72
Growth curve factor 30 year:	2.13	2.13
Growth curve factor 100 years:	2.61	2.61
Q_{BAR} for total site area (l/s):	0.16	0.16
Q_{BAR} for net site area (l/s):	0.16	0.16

Design criteria

Climate change allowance factor:	1.2
Urban creep allowance factor:	1.1
Volume control approach	Flow control to max of 2 l/s/ha or Qbar

Interception rainfall depth (mm):	5
Minimum flow rate (l/s):	2

Site discharge rates

	Default	Edited
1 in 1 year (l/s):	2	2
1 in 30 years (l/s):	2	2
1 in 100 year (l/s):	2	2

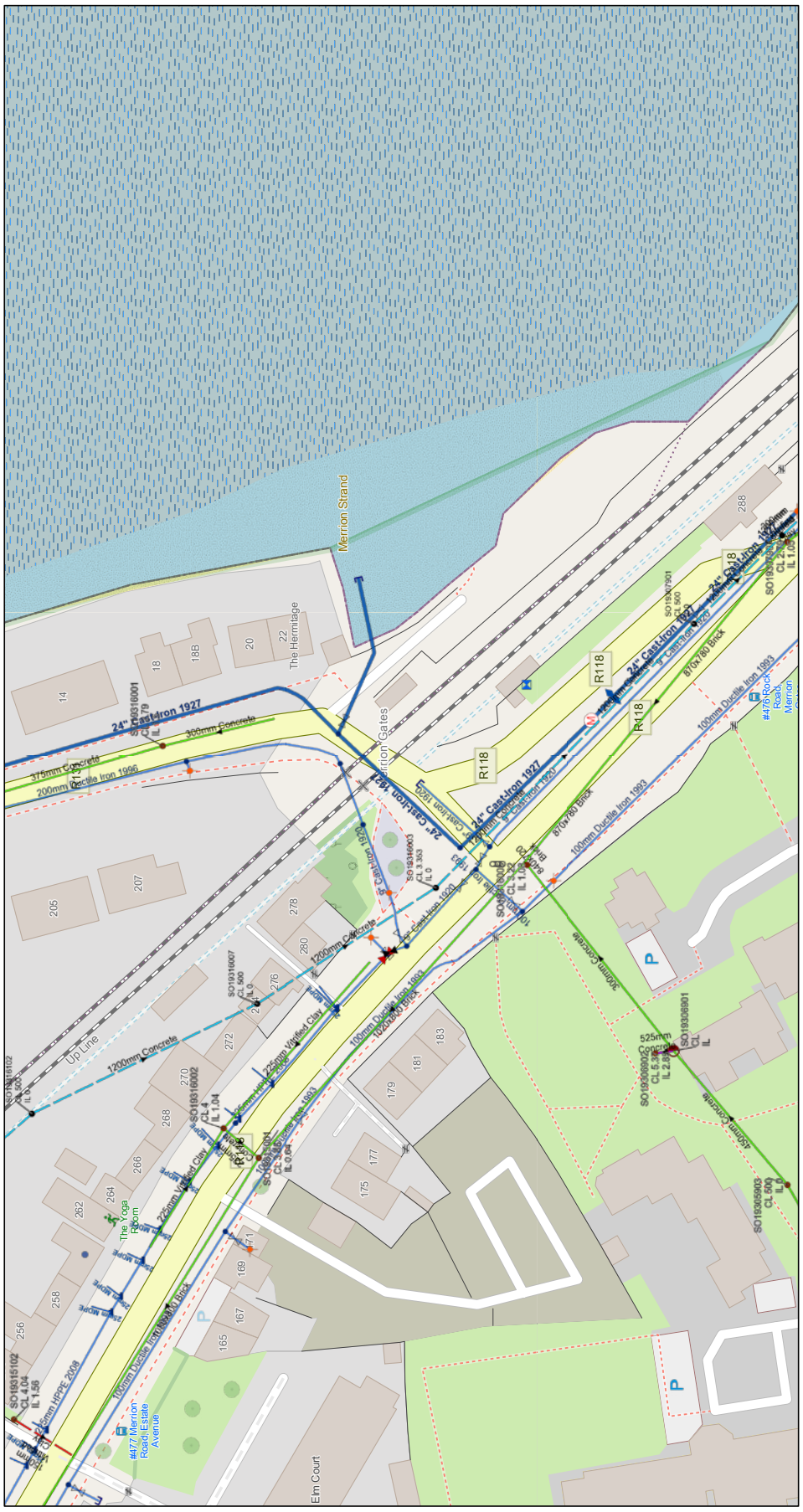
Estimated storage volumes

	Default	Edited
Attenuation storage 1/100 years (m^3):	0	0
Long term storage 1/100 years (m^3):	0	0
Total storage 1/100 years (m^3):	0	0

This report was produced using the storage estimation tool developed by HRWallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at http://uksuds.com/terms-and-conditions.htm. The outputs from this tool have been used to estimate storage volume requirements. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

7 Appendix B - Infrastructure Layouts

Untitled map



1:1,248

0 0.01 0.01 0.03 0.05 km

0 0.01 0.01 0.03 mi

Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri

27/5/2024

Note: The information provided on the included maps as to the position of Uisce Eireann 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 Eireann.

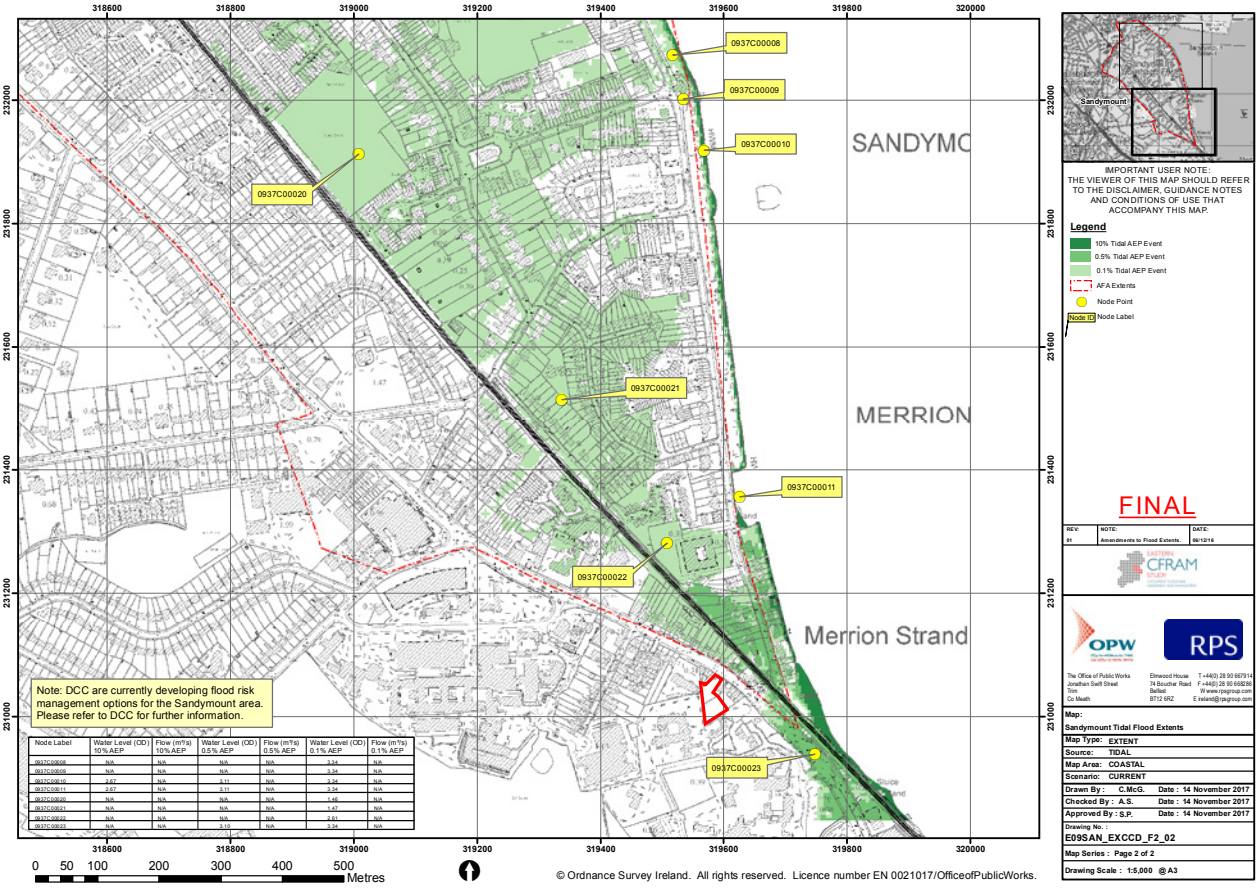
Student rooms

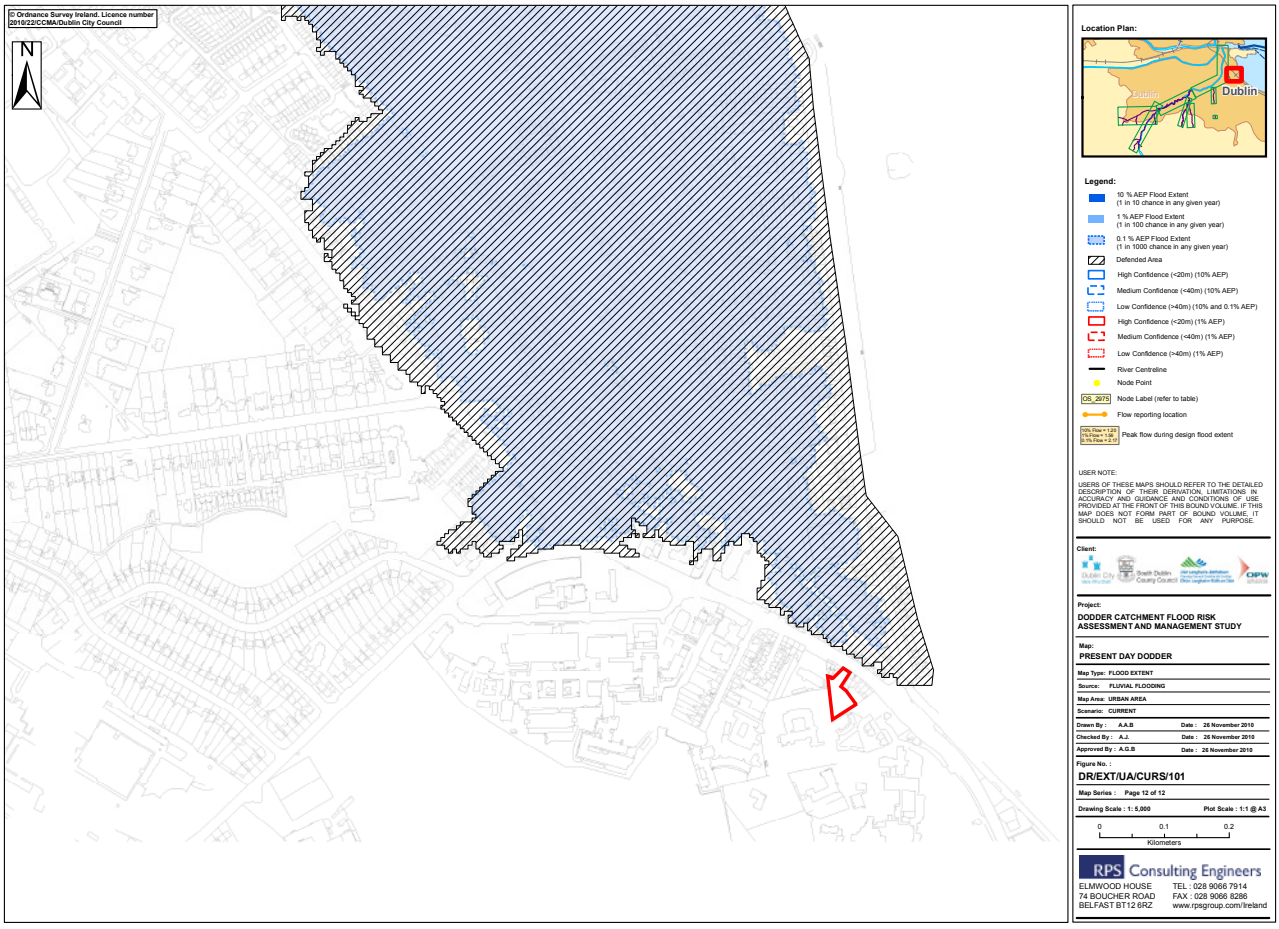
Water Demand					
	Units	**People**	**L/person**	**L**	
	200	1.8	150	54000	
1.25	Dry weather volume		Total	67500	L daily discharge
5.0	Peak factor		Peak	337500	L peak discharge
				3.906	L/s

Student rooms

Wastewater Demand					
	Units	**People**	**L/person**	**L**	
	200	1.8	150	54000	
1.1	Unit consumption		Total	59400	L daily discharge
6.0	Peak factor		Peak	356400	L peak discharge
				4.125	L/s avg peak discharge

8 Appendix C - Flood Data





9 Appendix D - Confirmation of Feasibility

CONFIRMATION OF FEASIBILITY

Edward Heukers

Tent Engineering
32 Francis Street
Dublin 8

D08 NN96

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

11 July 2024

Our Ref: CDS24003463 Pre-Connection Enquiry
169-177, Merrion Road, Dublin 4

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 Business Connection of 202 unit(s) at 169-177, Merrion Road, Dublin 4, (the **Development)**.

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

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

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

- The Development must incorporate Sustainable Drainage Systems/ Attenuation in the management of storm water and to reduce surface water inflow into the receiving combined sewer. Full details of these have to be agreed with the LA Drainage Division.

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

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

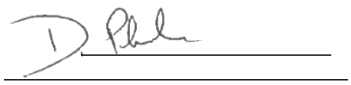
Where can you find more information?

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

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

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

Yours sincerely,



Dermot Phelan
Connections Delivery Manager

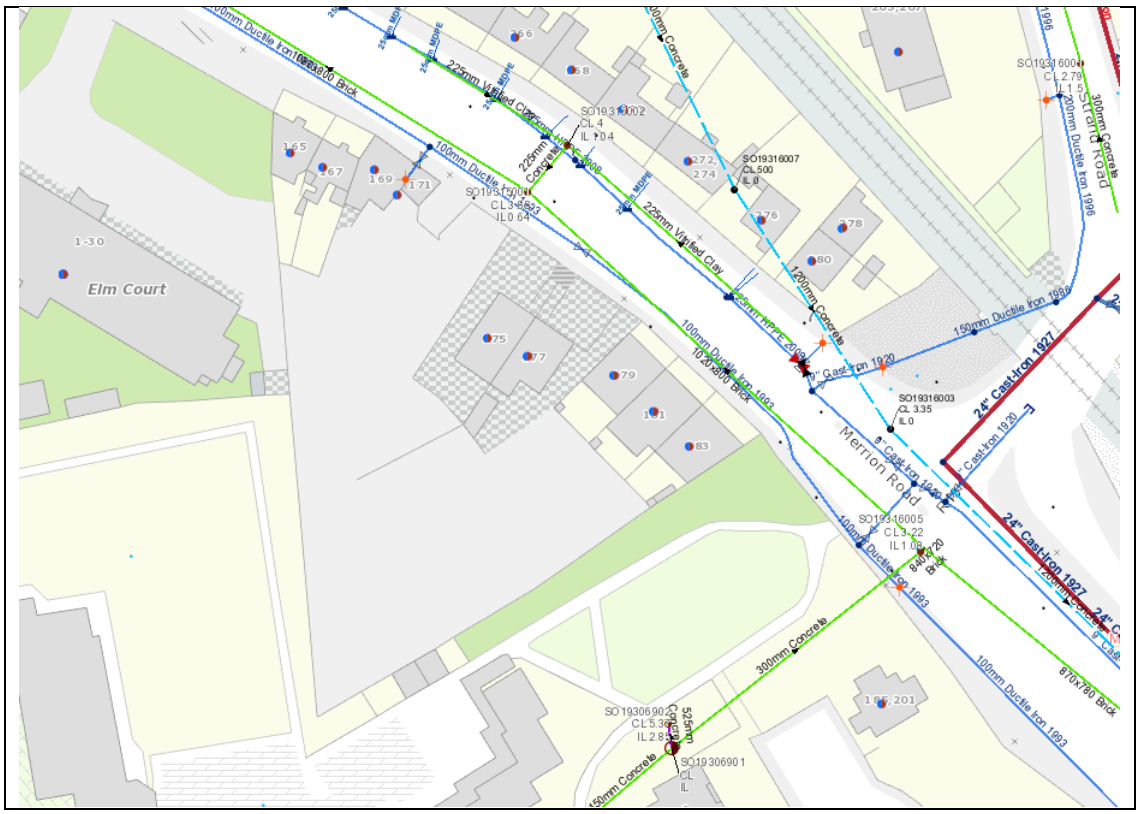
Section A - What is important to know?

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

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

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

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



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

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

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

10 Appendix E - Statement of Design Acceptance

Edward Heukers
Tent Engineering
32 Francis Street
Dublin 8
D08 NN96

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

Uisce Éireann
PO Box 448
South City
Delivery Office
Cork City

www.water.ie

26 August 2024

Re: Design Submission for 169-177, Merrion Road, Dublin 4, Dublin (the "Development")
(the "Design Submission") / Connection Reference No: CDS24003463

Dear Edward Heukers,

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. 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/).

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

Yours sincerely,

Dermot Phelan
Connections Delivery Manager

Appendix A

Document Title & Revision

- 24042-X-L00-DR-TNT-CE-3000_PROPOSED DRAINAGE INFRASTRUCTURE - GROUND FLOOR
- 24042-X-L00-DR-TNT-CE-3001_WATERMAIN LAYOUT

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.

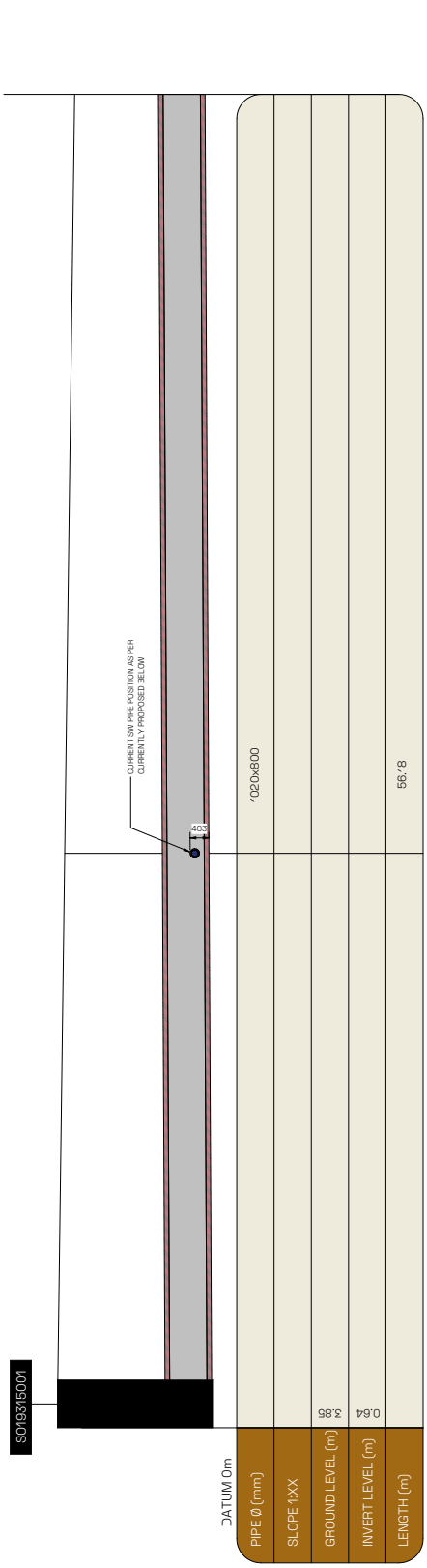
While Uisce Éireann notes that the water and wastewater services infrastructure will remain private and not be vested, we have the following comments: It is recommended that the watermain and foul sewer shall have 3 m clearance from proposed or existing structures.

An external bulk flow meter shall be provided on the supply line at the connection point with the existing Uisce Éireann's network. At Connection Application stage the size and type of meter shall be assessed.

*For further information, visit **www.water.ie/connections***

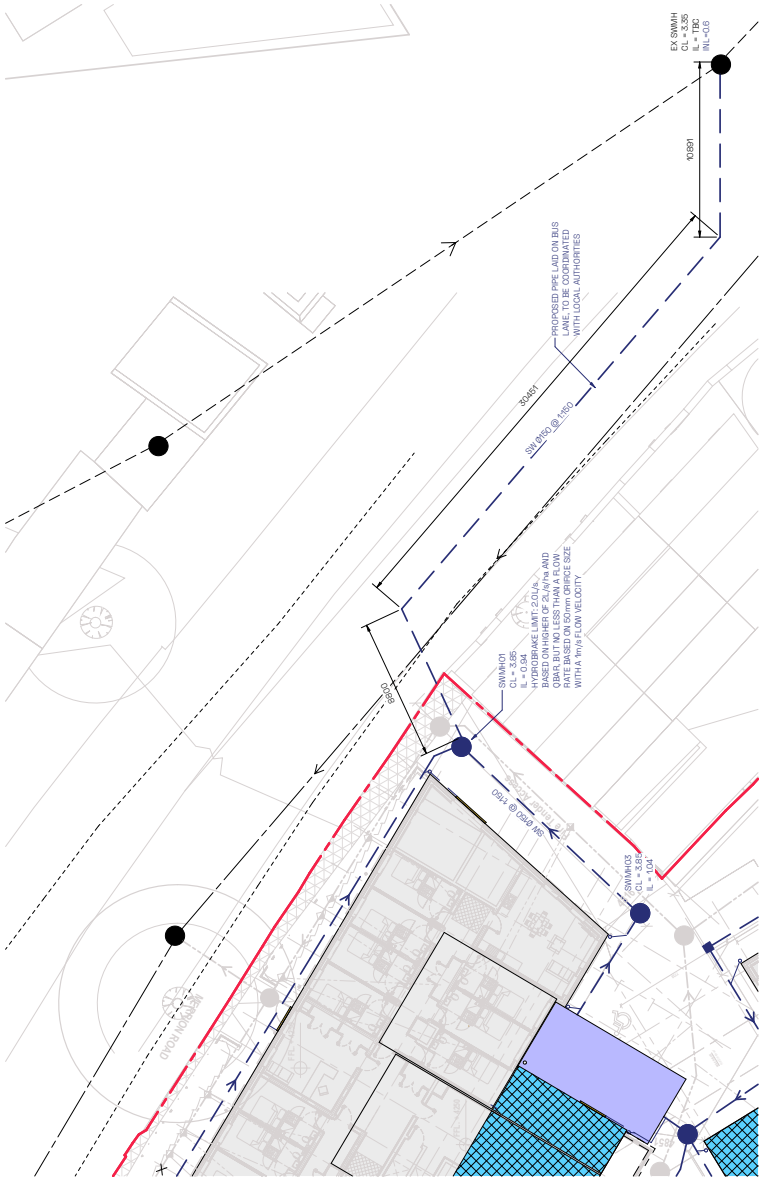
Notwithstanding any matters listed above, the Customer (including any appointed designers/contractors, etc.) is entirely responsible for the design and construction of the Self-Lay Works. Acceptance of the Design Submission by Uisce Éireann will not, in any way, render Uisce Éireann liable for any elements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

11 Appendix F - Existing brick culvert



CULVERT LONG SECTION
HORIZONTAL SCALE 1:100
VERTICAL SCALE 1:50

NOTE:
THE INVERT LEVEL SHOWN FOR THE SURFACE WATER PIPE IS THE HIGHEST POSSIBLE DUE TO THE OUTLET LEVEL OF THE ATTENUATION TANK.
CURRENTLY, THE SURFACE WATER PIPE CLASHES WITH THE CULVERT, BUT IT COULD BE LOWERED TO AVOID THE CONFLICT. HOWEVER, THIS ADJUSTMENT WOULD REQUIRE SIGNIFICANTLY DEEPER EXCAVATION (APPROXIMATELY 1 METER DEEPER) TO PLACE THE PIPE BENEATH THE CULVERT.



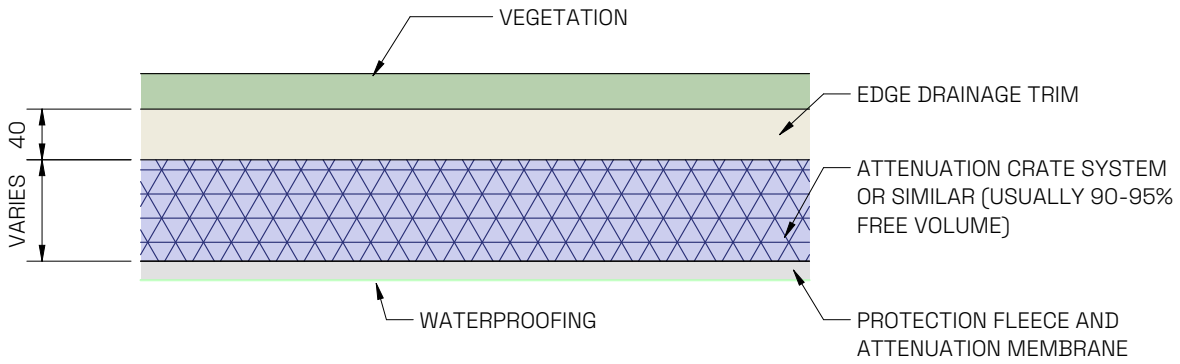
PROPOSED SURFACE WATER DISCHARGE
1 : 150

12 Appendix G - Green/Blue Roof build-up principle

Title: GREEN/BLUE ROOF BUILD-UP Notes:

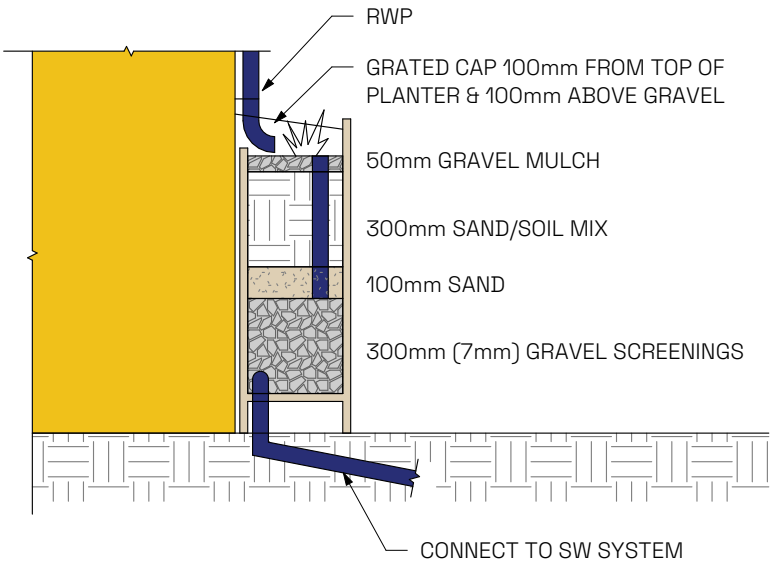
Dwg No: TYP-C-106

Scale@A4: 1 : 5

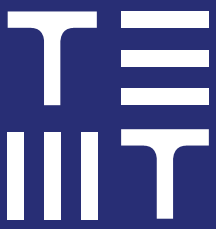


13 Appendix H - Raingarden Planter principle

Title:	RAIN WATER GARDEN DETAIL	Notes:	
Dwg No:	TYP-C-062		
Scale@A4:	1 : 20		



TENT ENGINEERING



TENT ENGINEERING