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Civil Engineering Infrastructure Report & Flood Risk Assessment for Planning

Project:
Goatstown Student Accommodation

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DOCUMENT STATUS

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1. INTRODUCTION

1.1 GENERAL DESCRIPTION

Orchid Residential Limited, intend to apply to An Bord Pleanála for permission for a large-scale residential development (LRD) at this site of approximately 0.34 hectares comprising the car sales premises currently known as Vector Motors (formerly known as Victor Motors), Goatstown Road, Dublin 14, D14FD23.

The development will consist of demolition of the existing building (c.960sqm) and hard surface parking area on site and construction of a purpose built student accommodation development (including use as tourist or visitor accommodation outside the academic term) comprising:

- 220 no. student bedspaces (including 10 no. studios), all within a part single storey, part 4 no. storey and part 6 no. storey 'U'-Shaped building;
- The building is single to 4 no. storeys along the southern boundary, part 5 and 6 storeys along Goatstown Road and northern boundary (with setbacks) and roof terraces at fourth and fifth floor levels fronting onto Goatstown Road;
- Amenity space equating to c. 1,785 sqm is provided across the site consisting of c. 1,247 sqm of external amenity in the form of a central courtyard at ground level and roof terraces at 4th and 5th floor levels;
- Internal amenity space equating to c. 538 sqm is provided in the form of 2 no. ground floor lounge/study areas, kitchen/tearoom, laundry, and concierge/office space;
- Provision of 218 no. bicycle parking spaces distributed across the central courtyard and northern boundary and adjacent to the front boundary of the site (north-west);
- Provision for 6 no. carparking spaces comprising 2 no. disabled parking spaces and 4 no. setdown parking spaces adjacent to the front entrance to the site;
- Vehicular access to the site is via Goatstown Road from 2 no. entrance points [reduction from 3 no. entrances currently];
- Ancillary single storey ESB substation and switch room and refuse store are provided at ground level;
- Provision of surface water and underground attenuation and all ancillary site development works including site wide landscaping works, lighting, planting and boundary treatments.

This report describes the proposed Civil Engineering Infrastructure Design for the development.

The site is located on the Goatstown Road, approximately 600m north of the Goatstown Town centre, and 1km south-west of the UCD Belfield Campus. The total site area is 0.344 ha.

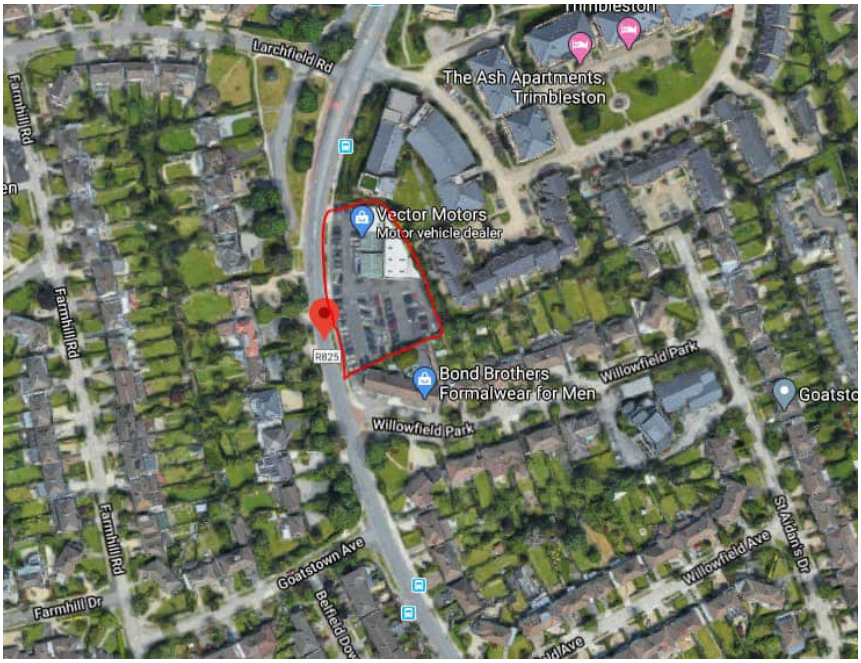


Figure 1: Site Location

1.2 SCOPE OF THIS REPORT

This report describes the proposed civil engineering infrastructure for the development and how it connects to the existing public infrastructure serving the area. In particular, foul and surface water drainage, flood risk, water supply and traffic engineering aspects are considered. This report should be read in conjunction with the following drawings submitted with the Planning Application:

- 19.289-BMD-ZZ-XX-DR- C1010 Access and Surfaces Layout
- 19.289- BMD-ZZ-XX-DR- C1011 Vehicle Tracking – sheet 1
- 19.289- BMD-ZZ-XX-DR- C1012 Vehicle Tracking – sheet 2
- 19.289- BMD-ZZ-XX-DR- C1020 Drainage and Watermains Layout
- 19.289- BMD-ZZ-XX-DR- C1021 Suds Strategy Layout
- 19.289- BMD-ZZ-XX-DR- C1120 Surface Water & Foul Drainage Long Sections
- 19.289- BMD-ZZ-XX-DR- C1200 Standard Drainage Details
- 19.289- BMD-ZZ-XX-DR- C1210 Standard Roads Details
- 19.289- BMD-ZZ-XX-DR- C1215 SuDS Details
- 19.289- BMD-ZZ-XX-DR- C1220 Standard Watermain Details
- 19.289- BMD-ZZ-XX-DR- C1300 Overland Flow Routes
- 19.289- BMD-ZZ-FN-DR- S2000 Foundation Layout Plan

1.3 PRE-PLANNING DISCUSSIONS

An initial meeting regarding the original 239 bed submission was held with DLRCC on Thursday 31st October 2019 to discuss the principles of the scheme and this was followed by a 247 meeting on Tuesday 14th January 2020, at which, inter alia, the drainage and parking proposals were discussed.

A Pre-Application Consultation for the original submission was held via Microsoft Teams on 19th May 2020 with ABP, DLRCC and the Design Team in attendance.

The proposals for the original submission were also submitted on 15/7/2020 to the NTA and TII for their review.

With regard to the current application to be submitted under the LRD process there was a Pre-Application meeting with DLRCC over "Teams" on 12/12/2023. An LRD Stage 2 meeting was held with DLR on 12th of June 2024 and responses to the DLR opinions issued after that meeting are given in Appendix VI of this report.

2. SURFACE WATER DRAINAGE SYSTEM

2.1 EXISTING SURFACE WATER INFRASTRUCTURE

There is an existing car showroom to the north of the site, with the remaining area consisting of tarmac surfacing. Surface water drains via a series of gullies and surface drains to the existing public sewer under the Goatstown road to the west of the site. There is no evidence of flow control devices restricting discharge rates from the site. As the existing site consists entirely of impermeable surfaces the unattenuated outflow has been calculated as follows for a 50mm/hr storm:

$$= \text{Site area x } \frac{50}{1000} x \frac{1000}{60^2}$$
$$= 3437 \text{ x } 0.0139$$
$$= 47.8 \text{ l/s}$$

As will be discussed in Section 2.3.2 below, the proposed drainage system will restrict the peak flow rate during the 100-year storm event to 1.54l/s, representing a very significant improvement on the current situation.

2.2 PROPOSED SURFACE WATER DRAINAGE SYSTEM

The proposed development will receive rainfall onto a mix of surfaces, such as green roofing, harvested roofing, permeable paving and soft landscaping. Infiltration tests carried out on site – see Appendix I – show that the site is underlain by boulder clay of insignificant permeability and so soakaways are not considered feasible. Further soakaway tests will be carried out prior to construction of the drainage infrastructure and if infiltration is found to be available in certain areas it will be utilised as appropriate to minimise the volume of run-off discharged from the site.

Run-off generated will be partially intercepted by the various surface finishes and the overflow will discharge to a concrete attenuation tank or lined stormtech system, with a hydrobrake manhole restricted to the QBAR value for the site. Discharge from the tank will subsequently fall via gravity to the existing public surface water pipe running along the Goatstown road to the west of the site.

The proposed drainage areas for the site (see Drg No C1021) are as follows:

Area Description	Surface Area	Run-off Coeff	Effective Area
Undrained soft landscaping	544m^2	0	0
Drained Soft landscaping (in courtyard)	132m^2	0.37	49
Permeable Paving	931m^2 + 144m^2 under Arch & Roof	0.80	745
Green Roof– Intensive paved (11.4% of total roof area)	186m^2	0.83	154
Green Roof – Intensive Planted (22.8% of total roof area)	367m^2	0.83	305
Green Roof – Extensive Sedum (50.8% of total roof area)	819m^2	0.92	708
Rainwater Harvesting Roof Area (13.8% of total roof area)	222m^2	1.0	282
Standard Roofing (1.2 % of total roof area)	19m^2	1.0	19
Gravel paths	57m^2	0.37	21
Coloured Macadam Path (draining to adjacent grass)	90m^2	0.37	33
Total Site Area for drainage	3,378m^2		
Total Area Discharging into drainage system	2,834m^2		2316m^2

2.3 STORMWATER IMPACT ASSESSMENT AND COMPLIANCE WITH THE PRINCIPLES OF SUSTAINABLE DRAINAGE SYSTEMS

In order to both reduce and attenuate the flow, the proposed development will be designed in accordance with the principles of Sustainable Drainage Systems (SuDS) as embodied in the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS). The GDSDS addresses the issue of sustainability by requiring designs to comply with a set of drainage criteria which aim to minimize the impact of urbanization by replicating the run-off characteristics of a greenfield site. The criteria provide a consistent approach to addressing both rate and volume of run-off as well as ensuring the environment is protected from pollution that is washed off roads and buildings. These drainage design criteria are as follows:

- Criterion 1 – River Water Quality Protection
- Criterion 2 – River Regime Protection
- Criterion 3 – Flood Risk Assessment
- Criterion 4 – River Flood Protection

The requirements of SUDS are typically addressed by provision of the following:

- Interception storage
- Treatment storage (not required if interception storage is provided)
- Attenuation storage
- Long term storage (not required if growth factors are not applied to QBAR when designing attenuation storage i.e. extended attenuation storage design)

In the case of the subject site, full interception storage will be provided, and growth factors will not be applied to the allowable discharge for the 100-year event. This means that both treatment storage and long -term storage (neither of which would be practical on this urban site) are not required. Sections 2.3.1 and 2.3.2 that follow describe how interception storage and attenuation storage have been provided for the subject site.

Appendix I shows the SuDS Management Train for the site and how the various SuDS devices improve the site biodiversity and quality of runoff while also reducing its volume and attenuating its discharge rate. The proposed stormwater management train will replicate the characteristics of greenfield run-off which will result in a positive development impact compared the current situation where stormwater run-off flows unchecked, unfiltered and unattenuated off the existing brownfield site.

2.3.1 Interception Storage

Where provided, interception storage should ensure that, at a minimum, the first 5 mm and preferably the first 10 mm of rainfall on a site should be intercepted so that it does not find its way to the receiving water.

The total area (hardstanding, roofs & permeable paving) discharging to the drainage system is 2,834 m^2 requiring a minimum interception storage volume of 28.3m^3 (10mm over the site). In the context of the subject site interception storage will be provided by the following:

- Permeable Paving is proposed in the courtyard and entrance areas, totalling 1075m^2. The drainage pipe within the gravel bed for these areas will be set at 50mm above the bed formation giving (assumed 30% voids) interception storage equivalent to 15mm storage depth. Total interception volume provided in the permeable paving equals 16.1 m^3. See Drawing 19289-C1215 for details. It should be noted that the permeable paving will be detailed as per a Type B system to BS7533 Part 13 to take advantage of whatever minimal infiltration is available in the sub-soil so the interception storage provided is potentially a little more than the 16.1m^3 calculated.
- Intensive Biodiverse and Extensive Green Roofing is proposed on the amenity areas and terraces at roof level of the residential blocks, over a total area of 1186m^2 which equates to 74% of the roof area as per DLRCC Development Plan requirements. This will include a drainage mat and will provide a minimum of 10mm of interception storage for intensive & 5mm storage for extensive, allowing for a total interception storage of 7.7m^3 at roof level. See Drawing 19289-C1215 for details.
- Intensive paved Green Roofing is proposed on the non- biodiverse amenity areas and terraces at roof level over a total area of 186m^2. This will include a drainage mat which will provide a minimum of 10mm of interception storage per 1 m^2, allowing for a total interception storage of 1.9m^3 at roof level. See Drawing 19289-C1215 for details.

- Rainwater Harvesting is proposed for use by the laundry building. An overflow is to be provided to discharge to the surface water system/attenuation tank when necessary. Rainwater harvesting tanks are to be sized at 5% of the annual rainfall yield of the harvested roof area, or a volume equivalent to 18 days usage. These figures are as follows;

  Roof area harvested: 222m^2
  5% annual rainfall: 0.05 x 0.774 x 222 = 8.6m^3
  Annual Laundry Water for 221 residents: 2708 wash cycles x 75l/wash -see Appendix I
  = 203m^3
  18 days requirement: = 18/365 x 203m3
  = 10.0m^3

As the 18 days usage is the smaller of the two, the rainwater harvesting tank shall therefore have a storage capacity of 8.6m^3.

Required Interception Storage = 0.01m x 2,834 m^2 = 28.3 m^3

Provided Interception Storage:

- 16.1 + 7.7 + 1.9 + 8.6 = 34.3 m^3

The total provided interception storage is 34.3 m^3 which is 20% more than the minimum requirement.
As full interception storage has been provided, treatment storage is not required.

2.3.2 Attenuation Storage

Surface water discharge from the site will be attenuated in a proposed concrete tank or lined stormtech system - ie no infiltration permitted- within the central courtyard of the proposed residential development. The reason for not taking advantage of any infiltration to ground is that the permeability tests – see Appendix I – showed that the ground has insignificant permeability. There is a concern that, if the tank was unlined, the concentration of water in this area could cause softening of the clay substrate below and potentially cause settlement.

This is in accordance with the recommendations of BS7533 Part 13 regarding Type C systems (lined with impermeable membrane) where Clause 4.2.4 states that:
"System C is used in situations where the existing subgrade has a low permeability or low strength and would therefore be damaged by the introduction of additional water. "

The green field run-off for the site is calculated using the IH124 method (Institute of Hydrology, 1994). A QBAR of 1.57l/s was calculated for the proposed site - see calculations in Appendix II. As noted previously, there is no control on discharge from the site in its current condition and so this development will result in a very significant reduction in the outflow to the local network upon completion.

The attenuation tank has been sized at 25x7.5x1.2 = 225m^3 Wavin Aquacell = 0.95 (void ratio for aquacell) x225= 214m^3 available volume. The calculations in Appendix II show that 145m^3 storage is required for the 100year event with 20% allowed for climate change and with discharge limited to the QBAR value for the site. The permeable paving to the front of the development will function as interception storage for run off from this area (see 2.3.1) and (as ground permeability is insignificant) the overflow fin drain from the gravel bed will connect to the same outflow Hydrobrake manhole in-line with the proposed attenuation tank and so no water will be allowed discharge from the site without attenuation.

Using the Aquacell system will allow for crates to be omitted in selected locations to allow Tree landscaping in the courtyard above.

2.3.3 Stormwater Network Sizing

The GDSDS requires that no flooding should occur on site for storms up to and including the 1 in 30-year event. The pipe network should, therefore, be checked for such storms to ensure that no site flooding occurs, although partial surcharging of the system is allowed as long as it does not threaten to flood. For the 1 in 100-year event, the pipe network can fully surcharge and cause site flooding, but the highest water level due to any such flooding must be at least 500mm below any vulnerable internal floor levels, and the flood waters should be contained within the site.

Detailed modelling of the surface water network has been carried out using "FLOW"software to confirm the above criteria are adequately met. The outputs are appended to this report in Appendix II. This shows that the network does not flood for the 1-in-30 and 1-in-100 year storms, and that the highest water level in the tank for the 100 year storm = 43.89mOD which is greater than 0.5m below the lowest FFL = 44.70mOD.

2.3.4 Criterion 2 & 4 GDSDS – River Regime & Flood Protection

The existing site allows unchecked run-off into the public pipe network at rates far in excess of that from a greenfield site. This could cause flash flow in the outfall river/stream that could, in turn, cause flooding, scour and erosion.
The proposed development will provide Extended Attenuation Storage to prevent this occurring by providing enough on-site storage to restrict the outflow using a flow control device to a maximum rate = Qbar without growth factors applied, which is in accordance with GDSDS requirements when long term storage is not provided on site.

2.4 SuDS Audit

A Third-Party SuDS audit was carried out prior to completion of the First planning application documentation in 2020 and any changes agreed with the auditor were included in the submission. The current design is also compliant with the findings of the SuDS Audit as, apart from an increase in the % Green Roof to 74%, there are no significant changes material to Surface water design in this (2024 LRD) Application. It should be noted that the 2020 design included an20% allowance for climate change the same as the current development plan requirement.

The Audit Report is included in Appendix I which includes the agreed responses to the audit comments.

3. FLOOD RISK ASSESSMENT

3.1 INTRODUCTION

The flood risk assessment outlined below is carried out in accordance with the OPW publication "The Planning System and Flood Risk Assessment Guidelines for Planning Authorities".
The stages involved in the assessment of flood risk are listed in these publications as follows:

- Stage 1: Flood Risk Identification
- Stage 2: Initial Flood Risk Assessment
- Stage 3: Detailed Flood Risk Assessment

The OPW publication also outlines a Sequential Approach for determining whether a particular development is appropriate for a specified location in terms of flood risk. The categorization of the subject site in terms of the OPW's sequential approach is further outlined in section 3.2 below.

3.2 STAGE 1: FLOOD RISK IDENTIFICATION

Due to the site's elevation and distance from the coast, tidal flooding does not pose a risk. The nearest watercourse is the River Slang which has a history of flooding but which is approximately 900m to the west and well removed from the site. The extract from the DLRCC Flood Zone Map No 1 presented in Appendix III shows that the nearest significant flood risk is at the Goatstown Road/Larchfield Road junction, approximately 70m North and downhill from the site. The map notes a foul & surface water pluvial area of flood risk concern at this location which presumably refers to possible surcharging of the combined sewer in this area. This location, however, is approximately 1m lower than the proposed development and as such poses no risk to the site. In addition, the attenuation measures proposed for the site will reduce both the quantity and rate of flow of surface water into this sewer and therefore reduce the flood risk at this location post development.
The site can, therefore, be considered an area of low risk of coastal, fluvial or pluvial flooding.

3.2.1 Flood Zones

The sequential approach defines the flood zones as detailed below:

- *Flood Zone A* – where the probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 for river flooding or 0.5% or 1 in 200 for coastal flooding);
- *Flood Zone B* – where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding); and
- *Flood Zone C* – where the probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding). Flood Zone C covers all areas of the plan which are not in zones A or B.

The site is located in Flood Zone C as per Flood Map 1 of the DLRCC Development Plan 2022-2028- see Appendix III. The nearest river is the Slang along Dundrum Road approx. 0.9km west of the site. The map shows that Pluvial Flooding of the public pipe network (both surface water & foul) has occurred at the junction of Trimblestown & Larchfield Road approximately 70m north of the site but the road level in that location is approximately 1m lower than the

northern end of the site and the road falls in a northerly direction so any pluvial floodwaters will flow away from the site down Goatstown road.

3.2.2 Vulnerability Class

The sequential approach describes the vulnerability classes as follows:

- *Highly vulnerable development* – hospitals, schools, houses, student halls of residence etc.;
- *Less vulnerable development* – retail, commercial, industrial, agriculture etc.;

  and
- *Water compatible development* – docks, marinas, amenity open space etc.

The development is a residential development which is classed as 'highly vulnerable'.

3.2.3 Development Classification

The matrix of vulnerability as per "The Planning System and Flood Risk Management – Guidelines for Planning Authorities" is reproduced overleaf in Table 1 below:

Table 1: Matrix of Vulnerability

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water compatible development	Appropriate	Appropriate	Appropriate

This development is therefore deemed appropriate.

3.3 Stage 2: Initial Flood Risk Assessment

The initial flood risk assessment should ensure that all relevant flood risk issues are assessed in relation to the decisions to be made and potential conflicts between flood risk and development are addressed. It should assess the adequacy of existing information and any flood defences.

3.3.1 Examination of potential flooding sources that can affect the site

The possible sources of flood water are assessed in the table below using the "Source – Pathway – Receptor Model".

Table 2: The possible sources of flood water

Source	Pathway	Receptor	Likelihood	Consequence	Risk
Tidal Note	Overtop Breach	People Property	Very Unlikely	High	Very Low
Fluvial Note	Overtop Breach	People Property	Very Unlikely	High	Very Low
Pluvial Surface water	Overflow / Blockage	People Property	Possible	High	Med
Groundwater	Rising groundwater levels	People Property	Very Unlikely	Medium	Very Low

3.3.2 Appraisal of the availability and adequacy of existing information and flood zone maps

Comprehensive data is available on possible flooding of the surrounding area to the site in the Preliminary Flood Risk Assessment (PFRA) by the OPW which is a national screening exercise, based on available and readily-derivable information, to identify areas where there may be a significant risk associated with flooding. The PFRA is a requirement of the EU 'Floods' Directive and considers flood risk arising from any major source of flooding, including natural sources such as river, sea, groundwater, rainfall and tsunami as well as infrastructural sources such as urban drainage systems, reservoirs, water supply systems ESB and Waterways Ireland Infrastructure. Similarly, the County Development plan provides a detailed Flood Risk Assessment for the region. CFRAMS mapping for the site is under review at the time of issue of this report – the relevant map is dodder17.

3.3.3 Determination of what technical studies are appropriate

Given the comprehensive nature of the existing information available regarding flooding, it is not considered necessary to carry out any further analysis of fluvial or tidal flooding or of the surface water network serving the area.

3.3.4 Description of what residual risks will be assessed and how they might be mitigated and potential impacts of development on flooding elsewhere

As stated in Section 3.3.1 the residual risk to the site is from site flooding due to pluvial sources. This risk has been assessed in section 2.3.3 which shows that the network does not flood for the 1:30 and 1:100year events, and that the top water level in the tank is >0.5m below the lowest FFL.

3.4 STAGE 3: DETAILED FLOOD RISK ASSESSMENT

3.4.1 Site Network

As shown in Section 3.3 the only residual risk is due to pluvial flooding and Section 2.3.3 shows that there is no risk of flooding for extreme events such as the 1:100 year storm. One final check is carried out in Appendix II where the attenuation tank is checked for a 50% blockage of the discharge manhole. This shows that no flooding occurs at the Hydrobrake manhole S1.4. for the 50% blockage scenario. The overland flow of floodwaters emanating from this manhole is examined further in Section 3.4.2 below which looks at the 100% blockage scenario.

3.4.2 Possible Overland Flow outside of site

A further exercise was carried out to see what would happen if there was a 100% blockage -see Appendix II and Drawing Number C1300:" Overland Flow Routes". This looks at what would happen where the HYDROBRAKE was fully blocked, and the manhole cover lifted to release floodwater. The drawings show that floodwaters exiting the site would flow northwards downhill along Goatstown road and would be well channelled by the kerbs on the road towards the three road gullies downhill from the site. The properties adjacent to this route are higher than the road carriageway so they would not be at risk of flooding from these waters.

3.5 CONCLUSION

The flood risk assessment has been carried out in accordance with the OPW publication "The Planning System and Flood Risk Assessment Guidelines for Planning Authorities" and it has been shown that there is no significant risk of flooding due to the development. Indeed, given the SuDS measures incorporated in the proposed development, there will be a reduction in both volume and rate of Surface water discharge from the site which will reduce the risk of flooding to public infrastructure post development.

4. FOUL DRAINAGE SYSTEM

4.1 EXISTING FOUL SEWER INFRASTRUCTURE

There is an existing 225mm diameter sewer running along the western boundary of the site, falling northwards along the Goatstown Road.

4.2 PROPOSED FOUL SEWER SYSTEM

It is proposed to connect the foul water network to the existing foul sewer using a 225mm pipe. All foul effluent will leave the site via gravity. As this site is intended solely for student accommodation the wastewater produced per person is reduced to 100l/day, as per Irish Water COP Appendix D.

The proposed total foul effluent is calculated as follows:

a) Daily Discharge:
221 units @ 1 occupant/unit x 100l/person/day = 22,100 l/day

b) Average Discharge:
$\frac{Daily\ Flow}{(Flow\ Duration)(3600)} = \frac{22100}{24x3600}$ = 0.256l/s

c) Infiltration:
10% Average Discharge = 0.0256l/s

d) Peak Flow:
(Peak factor x Average Discharge) + infiltration
(6 x 0.256) + 0.0256 = 1.56 l/s

Foul Sewer Network Pipe Sizes

A 225 mm diameter foul pipe at 1:200 minimum fall has a capacity = 34 l/s, which is sufficient for all foul pipework.

The Foul Drainage system will be in accordance with UE Standard Details & Code of Practice.

A Pre-connection Enquiry was submitted to UE in March 2024 estimating that connection would be required in September 2026 and Confirmation of Feasibility without Infrastructure upgrade was received from UE on 30th September 2024 – see Appendix IV.

5. WATER SUPPLY SYSTEM

5.1 EXISTING WATER SUPPLY

The existing water distribution network adjacent to the development is shown on BMCE drawing 19.289-C1020. There is a 6 inch diameter watermain running along the road to the west of the site.

5.2 PROPOSED WATER SUPPLY

The water supply to the development will be taken from the existing 6-inch diameter watermain located to the west of the site.

The estimated water demand is calculated as follows:

a) Average Daily Demand:
221 units @1 occupant/bed x 100l/person/day = 22,100 l/day

b) Average Day/Peak Week Demand:
Average Daily Demand x 1.25 = 27,625 l/day

c) Peak Demand: $\frac{5 \times 29,875}{24 \times 60 \times 60}$ = 1.60 l/s

Twenty-four-hour cold-water storage will be provided to meet supply during water outages or emergency.

The Water Supply system will be in accordance with UE Standard Details & Code of Practice.

A Pre-connection Enquiry was submitted to UE in March 2024 estimating that connection would be required in September 2026 and Confirmation of Feasibility without Infrastructure upgrade was received from UE on 30th September 2024 – see Appendix IV.

6. TRAFFIC ENGINEERING

6.1 EXISTING SITE ACCESS & CONNECTIVITY

The existing site is a car-show room with limited customer and staff parking and three access points from Goatstown Road along the western boundary.
It is located close to the UCD Belfield Campus to the Northeast and is 800m walking distance from the Roebuck Pedestrian Gate (open 7am to 4pm, Monday to Friday) and 1.2km from the Clonskeagh Gate (open 7am to midnight, Monday to Sunday). The Dundrum and Windy Arbour Luas stops are 1.4 and 2.1 km away respectively. The number 11 bus route runs directly past the site towards the City Centre passing the Clonskeagh Entrance to UCD. Connection with *Go Ahead* Ireland route no's S4 & S6 can be made at UCD with the S4 route running from Liffey Valley Shopping Centre to UCD and the S6 route running from Old bawn to Blackrock Dart Station via UCD.
A 1.5m (approx.) dedicated cycle lane demarcated by bollards runs on both sides of the Goatstown Road.

The local bus network is subject to amendments as part of the BusConnects programme, details of which are outlined in the communications with the NTA given in Appendix V along with the latest Bus Connects Map. These amendments will provide continued access to the destinations outlined above.
Similarly, a wide range of amenities are available in the vicinity for use by residents, again accessible by foot or bicycle, the most significant being Dundrum Shopping Centre which is only 1.8km away.

A Traffic & Transport Report by NRB Consulting Engineers is being submitted with the application under separate cover. This Report concludes that the additional demand for Bus / LUAS trips as a result of the proposed development can be accommodated on the existing and future improved services in the area without any noticeable effect.

6.2 PROPOSED SITE ACCESS, CAR & CYCLE PARKING PROVISION

6.2.1 Proposed Site Access

Separate Access & Egress are proposed for the site to remove any conflicting vehicle movements and to improve sight distance for exiting traffic as shown on Drawing No C1010. Drawing No C 1011 & C1012 show vehicle swept paths for the Standard Car, Refuse Truck and Fire Tender along with pathways for pedestrians and cyclists entering/exiting the site.

6.2.2 Proposed Car parking

A review of the transport connectivity for the site has been carried out -see Appendix V for details- and travel times for the Walking, Cycling and Bus modes are as set out in the table below. This clearly demonstrates the excellent connectivity between the site and surrounding facilities and transport hubs without reliance on car- based modes of transport.

	Travel Times from the site in minutes		
	Walking	Cycling	Bus Route No 11
Dundrum Luas stop	14	5	14
Windy Arbour Luas Stop	18	6	15
UCD Central Campus	13	6	19
Booterstown Dart Station	37	10	31

This planning application proposes that zero standard car parking spaces be provided on the basis that such provision is consistent with the excellent site connectivity and the criteria relating to limiting parking provision set out in the DLRCC Development Plan, and the overarching Sustainable Travel and Transportation policies detailed in that document.

Two disabled parking spaces and four set-down parking bays (6 no. spaces total) will be provided to facilitate arrivals and departures of students at term time, or for use by service vehicles or taxis. The busy times at the start of the academic year will be strictly controlled by the facility Management Company with arrivals staggered to avoid any traffic congestion. There is no room to provide any further parking on site without compromising the amenity value of the rear courtyard which will be an important space for the enjoyment of residents.

6.2.3 Proposed Cycle Parking

Cycle parking will be provided within the development in excess of the requirements of Table 4.1. of DLRCC "Standards for Cycle Parking and associated Cycling Facilities for New Development (January 2018) as recommended by the NTA - see letter Appendix V.

The following Cycle Parking will be provided:

Total Long Stay	**176**
Cargo	4
E-Bike	2
Stacked	85
Long Stay Sheffield	85
Short Stay	**42**
Short Stay Sheffield Front	34
Short Stay Sheffield Courtyard	8
Total Sheffields	**127**
Total Bike Parking	**218**

6.2.4 Proposed Motorcycle Parking.

One motorcycle space will be provided under the archway to the courtyard.

6.3 Mobility Management in the completed development

6.3.1 Mobility Management Plan Administration

Notwithstanding that only 6 car parking spaces (2no. disabled and 4no. set down spaces) are being provided It will be required to prepare and implement a Mobility Management Plan to promote sustainable travel to and from the proposed student residences. The aim of the Mobility Plan will be the minimisation of private car use by all staff, residents and visitors traveling to and from the development and the maximization of travel by soft modes and public transport.

Following the occupation of the development a Mobility Management Plan (MMP) Co-ordinator be appointed by the facility Management Company to administer, implement, monitor and review mobility management issues relevant to the development. The co-ordinator will also liaise with the Local Authority and Public Transport Companies on issues relevant to the reduction of private car-based journeys to and from the development.

6.3.2 Duties of the MMP Co-Ordinator

Initial Travel Survey

Six months after the Residence is fully operational, a travel survey will be carried out to establish travel trends and identify measures to further promote access by more sustainable means. This will allow baseline travel patterns to be established, targets to be set and be a forum for staff and residents to comment on any issues relating to their commute. Following this, a travel survey should be carried out annually to enable changes in travel patterns to be monitored and any issues to be addressed at annual review.

Promotion of Sustainable modes of Transport.

There are a range of recommendations that will be promoted by the facility MMP Co-ordinator in order to aid in the reduction of private car-based journeys. The Co-ordinator will have a vital role in encouraging and enabling all staff, residents and visitors to adopt these recommendations. These recommendations are detailed under the following headings:

- Environmental and health benefits of their travel choices
- Cycling
- Walking
- Bus and rail - based travel

Environmental and health benefits of travel choices

It will be the duty of the co-ordinator to make staff, residents and visitors aware of the environmental and health consequences of their travel choices. Various media should be employed in order to communicate this message. These could include a newsletter and a mobility website, providing information on issues such as available public transport services and where to buy a bike.

Cycling

The MMP Co-ordinator should make staff aware of the benefits of the Tax Saver Cycle to work scheme as well as delivering cycle friendly facilities within the development to complement the cycle parking provided. The co-ordinator can further promote the use of this mode of travel using other measures such as the setting-up of a cycle users group so that experienced cyclists can help encourage newcomers to the mode of travel. The co-ordinator can also help by keeping tool kits and spare parts on site for cyclists to avail of.

Walking

As with cycling, the co-ordinator should promote the health and fitness benefits of walking and its general viability as a method of transport. The co-ordinator can also liaise with the local authority on any work being done in the vicinity of the site to make the local road network more pedestrian friendly.

Rail and Bus - based travel & other non- private car- based modes.

The co-ordinator can use the newsletter and website to provide information on public transport, timetable information, fares and Bus and LUAS / DART stop locations.

6.3.3 Alternative Modes of Public Transport available to residents

There are a variety of public transport options available to visitors and residents at the proposed site. The Alternative Mode route map attached in Appendix V highlights the pedestrian routes, bus routes, cycling paths, Luas and Dart facilities within reach of the

development, providing significant connectivity to major destinations such as UCD, Dundrum Shopping Centre, and the City Centre area.

Marked cycle lanes are provided on the Goatstown Road, Roebuck Road, Fosters Avenue, and the N11, allowing for safe cycle access to several of the main entrances to UCD, as well as to the City Centre and other points of interest such as St. Vincent's Hospital.

In conclusion, the site is well served by public transport links, and major points of interest are within walking and cycling reach, giving a wide variety of transportation alternatives to car usage for staff, residents and guests of the proposed development, in line with DLRCCs aims to promote sustainable transport within the region.

6.4 DMURS Statement

It is a requirement of the regulations that the proposed development is compliant with the requirements of the Design Manual for Urban Roads and Streets. The four key principles of design aim to guide a more place-based/integrated approach to road and street design. Designers must have regard to the four core principles presented below:

Design Principle 1: Connected Networks
Design Principle 2: Multifunctional Streets
Design Principle 3: Pedestrian Focus
Design Principle 4: Multidisciplinary Approach

DMURS Design Principle 1: Connected Networks, aims "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." As described in the preceding sections of this report, the development prioritises more sustainable forms of transport, including walking and cycling, and is well served by public transport links. The access to the development for pedestrians and cyclists will be provided along the boundary with Goatstown Road and will ensure safe dedicated pedestrian and cycle links are provided from the residences to the public domain.

Design Principle 2: Multifunctional Streets requires, "The promotion of multi-functional, place-based streets that balance the needs of all users within a self-regulating environment." The development as such has no internal street network, with the internal courtyard fully pedestrianised to provide amenity value for residents. Raised entry treatments will be provided to the vehicular access and egress points to encourage lower speeds of vehicles entering the development, while also providing pedestrian priority across the entrance aprons for pedestrians travelling north-south on the existing public footpath. The landscape finishes to the internal parking area and vehicular routes will be finished in high quality paving, which will contrast with the standard asphalt public carriageway.

Design Principle 3: Pedestrian Focus notes that "The quality of the street is measured by the quality of the pedestrian environment." The proposed development has been carefully designed to ensure a strong focus on creating a vibrant and sustainable pedestrian environment which supports a sense of place. Segregation and exclusion of vehicular traffic

within the development courtyard also supports the sense of place. As pedestrians' progress into the development, the shared pedestrian and cycle routes are segregated from vehicular traffic.
Pedestrian priority will be provided at the vehicular junctions with Goatstown Road in the form of raised entry treatments which also serve as a traffic calming measure.
To ensure Pedestrian priority the entrance and exit were reviewed in the context of DMURS Advice Note 6 to ensure Pedestrian Priority at both locations. The drawings now show the following at both entrance & exit:

- Footpaths carrying through with gradient unaltered to emphasize pedestrian priority.
- Widths at entrance & exits reduced in so far as possible whilst maintaining maneuverability for refuse & fire tender vehicle.
- Ramp up from carriageway edge to footpath across existing grass verge zone. And ramp down back into site.

These measures will give pedestrian priority and will serve to reduce vehicle speed when entering /exiting to similar to that of pedestrians using the footpath.

Design Principle 4: Multidisciplinary Approach seeks "greater communication and co-operation between design professionals through the promotion of a plan-led, multidisciplinary approach to design." The design of the layouts involved close collaboration and coordination between the Architect, Structural Engineer, Civil Engineer and Landscape Architect. The interaction between the Landscape Architect and the Civil Engineer was of particular importance to design a layout that created attractive pedestrian spaces whilst complying with the key roads design principles for vehicular and non-motorised users.

The above statement of consistency sets out how the proposed development has been designed to achieve the objectives set out in DMURS (2019). Having regard to the above, we are of the opinion that the proposed development is consistent with the key design principles and requirements as set out in DMURS (2019).

6.5 Quality Audit

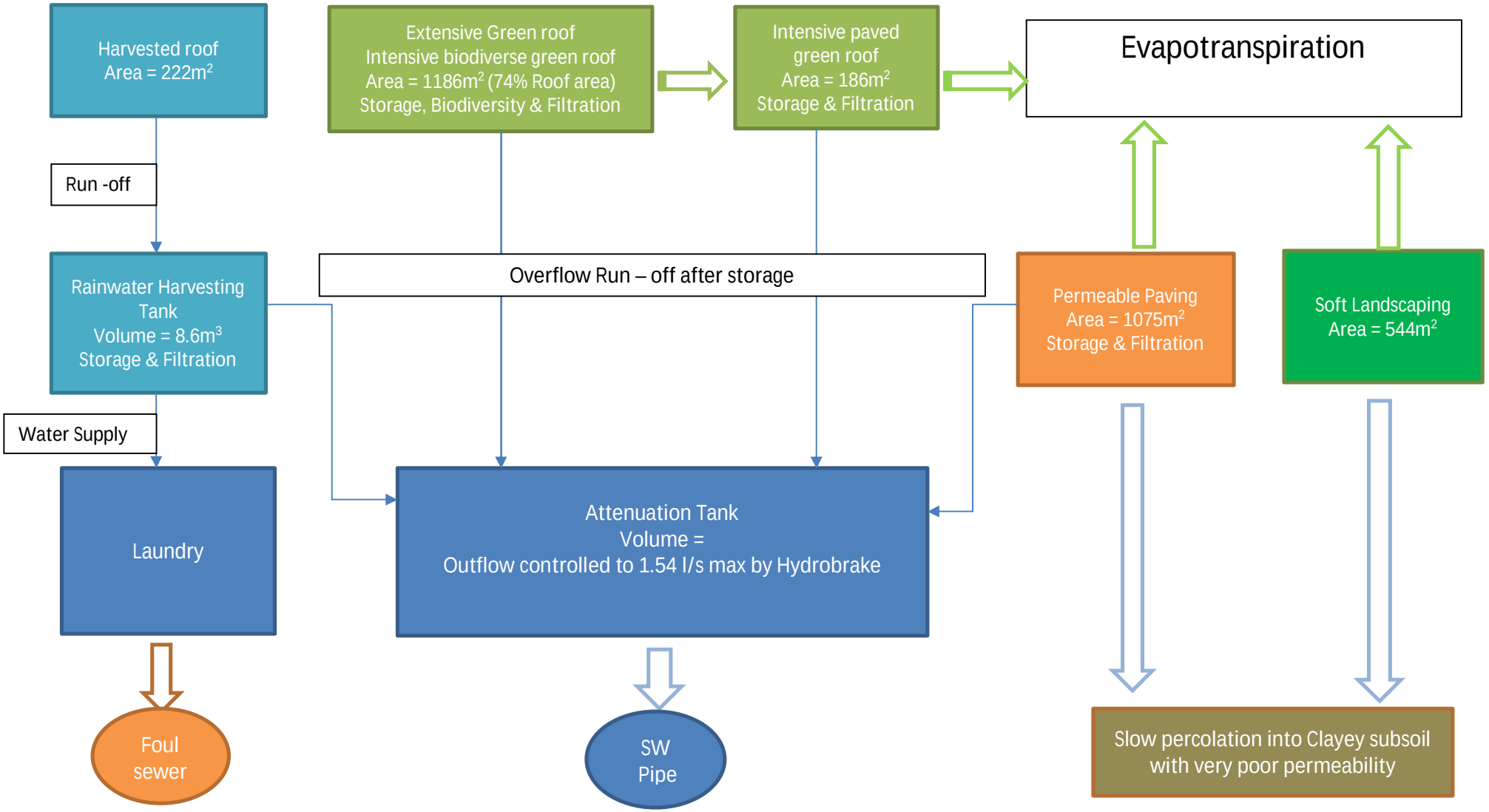
An Independent Quality Audit was carried out prior to completion of the original planning application documentation in 2020 and any changes agreed with the auditor were included in the submission. The current design is also compliant with the findings of the Quality Audit as there are no changes material to Road / Access design in this (2024 LRD) Application.

The Audit Report is included in Appendix V which includes the agreed responses to the audit comments.

APPENDIX I

Suds Management train
Permeability Test Results
Laundry Water Usage Information
Third party SuDS Audit report (2020 Application)

SUDS MANAGEMENT TRAIN



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PROJECT: **Goatstown Student Accommodation**

PROJECT NO. **19.289**

DOCUMENT TITLE: **Report on Infiltration Tests**

DOCUMENT NO: **19.289 – IT – 01**

Issue	Date	Description	Orig.	PE	PD	Issue Check
PL1 PL2	02/03/2020 04/07/20	Issued for Comment Issued for SuDS Audit	TMcH TMcH	TMcH TMcH	BM BM	BM.

GOATSTOWN STUDENT ACCOMMODATION
CIVIL ENGINEERING INFRASTRUCTURE REPORT
& FLOOD RISK ASSESSMENT
FOR PLANNING

Table of Contents

1.0 Introduction

1.1 General

This report outlines the results of infiltration tests carried out for a proposed new student accommodation development in Dublin 14.
The site is located on the Goatstown Road, approximately 600m north of the Goatstown Town centre, and 1km south-west of the UCD Belfield Campus. The development will consist of student accommodation providing 241 beds in total, plus all associated site works including new access and egress, hard & soft landscaping, car and cycle spaces, bin stores etc.

The site is currently used by a car dealership and comprises a showroom and hardstanding surfaces covering all of the remaining site area. The total site area is 0.347 ha.

1.2 Scope

As per best SuDS practice the site was assessed for subsoil permeability in accordance with BRE Digest 365. Two soakaway tests were carried out on site on 4/12/19. The test pits were located in the area of the proposed attenuation tank – see location plan in the Appendix to this document.

The weather was dry, with no rainfall in the preceding days.

The tests were observed by Thomas McHale of Barrett Mahony Consulting Engineers and the findings are recorded in Section 2 below.

2.0 Test Findings

2.1 Test 1

The test pit had dimensions as follows;
Length: 2.4m
Width: 0.9m
Depth: 1.5m
Water was present at a depth of 1m within this trial pit at the beginning of the test, indicative of a high probably perched water table within the clay as there had been no rainfall after the pit was dug.

The infiltration rate, expressed as metres per second, is the volume of water that enters the soil over a unit area and unit time. The pit was filled with water to a depth of 1060mm and the drop in the water level was followed over time is listed in the table below:

Elapsed Time (min)	Depth of Water (mm)
0	1060
15	1020
30	1005
45	1000
60	990
75	980
90	970
105	960
120	950
135	950
150	940
165	935
180	930
195	920
210	920
225	915
245	910
270	895
300	890
330	890
360	885
390	875

The Level drop over 390 mins (6.5hrs) was only 185mm and so the most optimistic time for half volume drain (530mm depth) = 1118mins or 18.6 hrs assuming a linear relationship. Infiltration rate is determined as follows:

Infiltration rate (f) = Volume of water used / unit exposed area / unit time
Volume = pit length (m) x Width (m) x drop in water level (m)
= 2.4 x 0.9 x 0.53m
= 1.145m^3
Exposed area = (Length x Half the effective height x 2) + (Width x Half the effective height x 2) + base area = (2.4 x 0.53 x 2) + (0.9 x 0.53 x 2) + (2.4 x 0.9)
= 5.658 m^2
Time = 1118 min
Infiltration rate (f) = (1.145/5.658)/ (1118x 60)
f = 3.02 E-06m/sec

2.2 Test 2

The test pit had dimensions as follows;

Length: 2.4m
Width: 0.9m
Depth: 1.5m

The trial pit was empty at the beginning of the test, unlike Trial Pit 1. Trial Pit 2 was downslope of Trial Pit 1.

The infiltration rate, expressed as metres per second, is the volume of water that enters the soil over a unit area and unit time. The pit was filled with water to a depth of 1060mm and the drop in the water level was followed over time.

Elapsed Time (min)	Depth of Water (mm)
0	1180
15	1125
30	1100
45	1075
60	1065
75	1055
90	1050
105	1050
120	1045
135	1040
150	1035
165	1035
180	1030
195	1030
210	1030
225	1025
245	1025
270	1025
300	1025
330	1020
360	1020

The Level drop over 360 mins (6.0hrs) was only 160mm and so the most optimistic time for half volume drain (590mm depth) = 1328mins or 22.1 hrs assuming a linear relationship. Infiltration rate is determined as follows:

Infiltration rate (f) = Volume of water used / unit exposed area / unit time
Volume = pit length (m) x Width (m) x drop in water level (m)
= 2.4 x 0.9 x 0.59
= 1.274m^3
Exposed area = (Length x Half the effective height x 2) + (Width x Half the effective height x 2) + base area
= (2.4 x 0.59 x 2) + (0.9 x .59 x 2) + (2.4 x 0.9)
= 6.05m^2
Time = 1328 min
Infiltration rate (f) = (1.274/6.05)/ (1328 x 60)

f = 2.64 E-06m/sec

3.0 Conclusions

The ground at 1.5m deep is classified as Glacial Till in the Causeyway SI Report (submitted under separate cover as part of the Planning application) and, even using the peak infiltration rate f = 3.02 E-06m/sec, the infiltration rate is classified as very poor as per CIRIA Report C753, Table 25.1 – see Appendix.

Further soakaway tests will be carried out prior to construction of the drainage infrastructure and if infiltration is found to be available in certain areas it will be utilized as appropriate to minimise the volume of run-off discharged from the site.

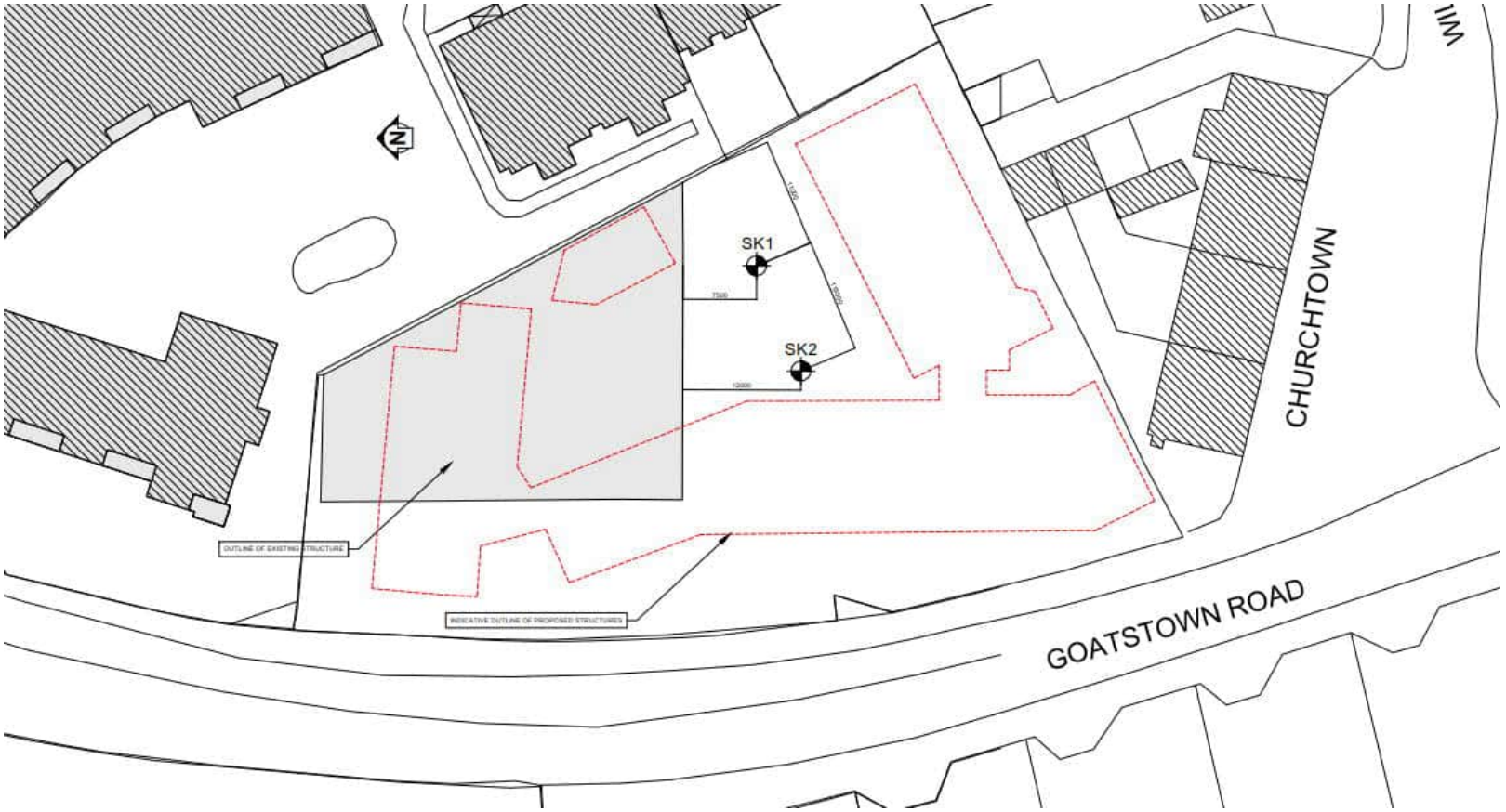
Appendix I

Test Pit Location Plan

Test Pit Photographs

CIRIA Report C753, Table 25.1

3rd Party SuDS Audit



Location Plan for Soakaway Tests

SK 1 Test Pit

SK2 Test Pit

TABLE 25.1 Typical infiltration coefficients based on soil texture (after Bettess, 1996)

Soil type/texture	ISO 14688-1 description (after Blake, 2010)	Typical infiltration coefficients (m/s)
Good infiltration media		
• gravel	Sandy GRAVEL	$3 \times 10^{-4} - 3 \times 10^{-2}$
• sand	Slightly silty slightly clayey SAND	$1 \times 10^{-5} - 5 \times 10^{-5}$
• loamy sand	Silty slightly clayey SAND	$1 \times 10^{-4} - 3 \times 10^{-5}$
• sandy loam	Silty clayey SAND	$1 \times 10^{-7} - 1 \times 10^{-5}$
Poor infiltration media		
• loam	Very silty clayey SAND	$1 \times 10^{-7} - 5 \times 10^{-6}$
• silt loam	Very sandy clayey SILT	$1 \times 10^{-7} - 1 \times 10^{-5}$
• chalk (structureless)	N/A	$3 \times 10^{-8} - 3 \times 10^{-6}$
• sandy clay loam	Very clayey silty SAND	$3 \times 10^{-10} - 3 \times 10^{-7}$
Very poor infiltration media	–	
• silty clay loam	–	$1 \times 10^{-8} - 1 \times 10^{-6}$
• clay	Can be any texture of soil	$< 3 \times 10^{-8}$
• till	described above	$3 \times 10^{-9} - 3 \times 10^{-6}$
Other		
• rock* (note mass infiltration capacity will depend on the type of rock and the extent and nature of discontinuities and any infill)	N/A	$3 \times 10^{-9} - 3 \times 10^{-5}$

Table 25.1 EX CIRIA C753 The SuDS Manual

Brian Mahony

From: Steve Hooper [steve@circuitgroup.com]
Sent: 27 March 2013 13:34
To: Brian Mahony
Cc: Siobhan Clegg; Tim Mitchell; Mike Green; James Childs; Derek Tynan; Simon Arch
Subject: RE: Student Residence Development in Dublin - Message is from an unknown sender

Hi Brian, thanks for the info.

We would expect that 440 students would generate 5,392 wash cycles over a 12 month period. In terms of usage levels, we would expect that this would fluctuate over the year on a month by month basis.

I have phased the usage over a 12 month period for you to give you an idea of demand / volume of water for each specific month over this period. We are basing the projected water usage on the fact that each washer uses 75 litres per cycle when fully loaded.

January - (8.1%) 437 wash cycles - 32,775 litres of water, (1092 litres per day)

February - (10.1%) 544 wash cycles - 40,800 litres of water (1360 litres per day)

March - (11.8%) 636 wash cycles - 47,700 litres of water (1590 litres per day)

April - (8.6%) 463 wash cycles - 34,725 litres of water (1157 litres per day)

May - (9.6%) 517 wash cycles - 38,775 litres of water (1292 litres per day)

June - (8.5%) 458 wash cycles - 34,350 litres of water (1145 litres per day)

July - (5%) 269 wash cycles - 20,175 litres of water (672 litres per day)

August - (2.7%) 145 wash cycles - 10,875 litres of water (362 litres per day)

September - (3.1%) 167 wash cycles - 12,525 litres of water (417 litres per day)

October - (13.1%) 706 wash cycles - 52,950 litres of water (1765 litres per day)

November - (10.9%) 587 wash cycles - 44,025 litres of water (1467 litres per day)

December - (8.6%) 463 wash cycles - 34,725 litres of water (1157 litres per day)

Due to Circuit's revenue / income being dependent on our machines being able to carry out a high standard of wash quality I would request that you could provide me with any more information that you have at this point regarding the design and day to day management of the rain water harvesting system in order to ensure that no wash quality issues arise.

Cheers, Steve

Steve Hooper

Circuit Managed Laundry Systems

Office no: 01422 820360 Mobile no: 07984 801467

PUNCH
consulting engineers

201208 – Proposed Residential Development at Goatstown Road

Stage 1 Surface Water Audit

July 2020

Document Control

Document Number: 201208-R0

Revision	Date	Prepared	Checked	Approved
R0 (Draft)	27/07/2020	D.Moreton Engineer	C. O'Shea Senior Engineer MSc BSc (Hons) MCIWEM C. WEM)	L. Brennan Technical Director BE Dip Hy&Geo Eng PGDipHSC CEng MIEI

Report by: _____ Date: 27th July 2020

Donal Moreton

Engineer

PUNCH Consulting Engineers

Checked by: _____ Date: 27th July 2020

Ciaran O'Shea

Senior Engineer (MSc BSc (Hons) MCIWEM C. WEM)

PUNCH Consulting Engineers

Approved by: _____ Date: 27th July 2020

Leonard Brennan

Technical Director (BE Dip Hy&Geo Eng PGDipHSC CEng MIEI)

PUNCH Consulting Engineers

Table of Contents

1.0 Introduction

1.1 Purpose of Report

This report presents a Stage 1 Surface Water Audit carried out for a proposed student accommodation development and associated infrastructure at Goatstown Road, Dublin 14.

PUNCH Consulting Engineers have been appointed by Barrett Mahony Consulting Engineers to carry out an independent Stage 1 Stormwater Audit on the proposal in line with Dún Laoghaire-Rathdown County Council (DLRCC) requirements. The pre-planning reference number associated with this application is PAC/SHD/367/19.

1.2 Site Details

The site is located on the Goatstown Road, approximately 600m north of the Goatstown Town centre, and 1km south-west of the UCD Belfield Campus. The development will consist of student accommodation providing 241 beds in total, plus all associated site works including new access and egress, hard and soft landscaping, car and cycle spaces, bin stores etc. The site is currently a car dealership and comprise a showroom and hardstanding surfaces covering all of the remaining site area. The total site area is 0.347ha.

1.3 Report Details

The audit was carried out by Donal Moreton, Ciarán O'Shea and Leonard Brennan between the dates of July 23rd and 27th 2020.

This Stage 1 Audit has been carried out in accordance with the Dún Laoghaire-Rathdown County Council (DLRCC) Stormwater Audit Procedure Rev 0 January 2012. The auditor has examined only those issues within the design relating to surface water drainage implications of the scheme and has therefore not examined or verified the compliance of the design to any other criteria.

Appendix A contains copies of drawings and documents examined by the auditor. The drawings in Appendix B correspond to the Stage 1 Audit findings outlined in Section 2 of this report. Appendix C contains the Surface Water Audit Feedback form.

All of the findings outlined in Section 2 of this report are considered by the auditor to require action in order to improve the stormwater credentials of the scheme.

1.4 Drawings & Documents Reviewed

- 19289-BMD-ZZ-XX-DR-C-1021 - SuDS Strategy- Dated 14-07-2020
- 19289-BMD-ZZ-XX-DR-C-1215 - Suds Details- Dated 14-07-2020
- 19289-BMD-ZZ-ZZ-DR-C-1020 - Drainage Layout- Dated 14-07-2020
- 19289-BMD-ZZ-ZZ-DR-C-1120 - Surface Water & Foul Drainage Longsections- Dated 14-07-2020
- Civil Engineering Infrastructure Report & Flood Risk Assessment for Planning- Dated 15-07-2020

2.0 Stage 1 Audit Findings

The following section should be read in tandem with the drawings included in Appendix B.

2.1 Goatstown Student Accomadation

2.1.1 Swales /Filter Drains/Bio-Retention -

Problem: There is potential to reduce the surface water runoff directly to the surface water network, to improve runoff quality, groundwater recharge and amenity opportunities by incorporating bio retention systems, swales or filter drains.

Recommendation: Consider incorporating additional bio-retention systems, swales or filter drains beyond the pavement edge to increase infiltration and promote groundwater recharge in these areas before connection to the surface water network.

2.1.2 Proposed Permeable Paving System – Tanked

Problem: It is noted on drawing 19289-BMD-ZZ-XX-DR-C-1215 that the permeable paving details allow for infiltration however Section 2.3.2 of the Engineering Report states that Site Investigation determined that infiltration was not suitable.

Recommendation: Please confirm if permeable paving proposed is tanked or whether it is designed to allow water infiltration. Note is further mentioned that the attenuation tank does not allow infiltration due to potential that it could *"soften the clay substrate below and potential cause settlement"*. Is this not also an issue if permeable paving allows infiltration?

2.1.3 Roads surfacing/Porous Asphalt

Problem: How are the proposed roads at the access point from Goatstown Road being drained?

Recommendation: It is noted on drawing 19289-BMD-ZZ-XX-DR-C-1021 that a total of 174m2 is tarmac. Consider utilising porous asphalt or porous concrete surfacing throughout this area and as a roads surfacing. This would allow surface water runoff from all areas subject to vehicular traffic to achieve an enhanced environmental quality level as well as a greater opportunity for infiltration.

2.1.4 Ponds/Wetlands/Settlement Ponds

Problem: There is potential to reduce the surface water runoff and to improve runoff quality from the drainage output from the development by incorporating ponds.

Recommendation: Consider incorporating ponds in viable locations on the site; consider replacing the underground attenuation tank with ponds. Incorporating ponds can provide both attenuation and treatment of surface water runoff. It can support aquatic vegetation which further enhances the treatment process, enhances biodiversity and offers aesthetic benefits to the site.

2.1.5 Bypass Interceptor

Problem: Hardstanding surfaces could be a potential pollution source from hydrocarbons as they could enter into the surface water network via gullies, etc.

Recommendation: Consider using a bypass interceptor, based on the drainage area, close to the potential pollution source or in the proximity of the surface water drainage system's discharge point.

2.1.6 Swales/Infiltration Trenches to Path Edges

Problem: There is potential to further reduce surface water runoff from the paths and trails throughout the park by incorporating additional SuDS measures including additional swales and infiltration trenches.

Recommendation: Consider incorporating additional swales and infiltration trenches in areas throughout the development to further reduce the quantity of surface water runoff throughout the development. This in turn will increase filtration and promote groundwater recharge in these areas beyond the path edges.

2.1.7 Sump Manholes

Problem: Silt entering the surface water drainage system including the attenuation tanks has the potential to cause blockages.

Recommendation: Consider utilisation of sump manholes upstream of the attenuation tank to capture any excess silt therefore preventing entry into the tanked systems.

2.1.8 Water Table

Problem: Ground water is encountered at a depth of 1m, the designer should ensure the formation level of the permeable paving is 1000mm above the highest ground water level.

Recommendation: Consider further site investigation to ensure the ground water level is not less than 1000mm below the formation level of the permeable carpark build-up.

2.1.9 Tree Pit Systems

Problem: There is potential to reduce the surface water runoff and to improve runoff quality from the development by providing a greater amount of SuDS measures in the form of tree pit systems.

Recommendation: Consider incorporating tree pit systems in areas in close proximity to the impermeable surfaces. Connect road gullies to these systems rather than directly to the main surface water drainage system.

2.1.10 Hydro-Brake

Problem: Hydrobrake details (make and model) not submitted

Recommendation: Please provide details of the make and model of hydrobrake being proposed. Consider installing a sediment reduction/removal device (such as a Downstream Defender or equivalent) upstream of the Hydro-Brake.

2.1.11 Taking in Charge

Problem: It is not clear which SuDS are proposed to be private and which SuDS devices are proposed to be adopted by DLRCC.

Recommendation: Please confirm which SuDS devices will be proposed to be adopted by DLRCC.

2.1.12 Maintenance

Problem: The report does not make reference to system maintenance relating to blockages.

Recommendation: Set out maintenance/inspection requirements for management of the surface water system. Maintenance management to include lifespan of SuDS measures, inspection/monitoring details, grass and vegetation management, litter removal and excessive sediment removal.

Ensure there are a sufficient amount of inspection chambers/manholes specified for the proposed SuDS measures in order to achieve access for maintenance including rodding, etc.

2.1.13 Utility Survey

Problem: As per Chapter 29.3.6, Section E of The SuDS Manual, the location of all existing utilities and other site infrastructure should be confirmed before locating proposed SuDS measures.

Recommendation: Existing underground services are particularly challenging to locate in construction projects. Asset databases of buried infrastructure should not be considered as definite and should be checked with appropriate utility surveys and on-site checks.

2.1.14 Gradients and ground modelling

Problem: As per Chapter 29.2, Section E of The SuDS Manual, successfully integrating SuDS measures including swales, infiltration trenches and infiltration blankets require areas of ground modelling to ensure proposed SuDS measures are located in appropriate areas to ensure adequate drainage of the site.

Recommendation: It is recommended that the integration of each SuDS component be considered, and its contouring adjusted to allow the levels to flow towards to SuDS measure, in a naturalistic manner that is visually attractive, and accords with the local surrounding landscape.

Appendix C Storm Water Audit Feedback Form

STORM WATER AUDIT FEEDBACK FORM

Scheme: Proposed Residential Development at Goatstown Road, Dublin 14

Area: Student Accommodation

Audit Stage: 1 **Date Audit Completed:** 27/07/2020 **Our Ref :** 201208

Paragraph No. in Audit Report	Problem Accepted (Yes/No)	Recommended Measure Accepted (Yes/No)	Alternative Measures (described) [or reason problem not accepted]	Alternative Measures Accepted by Auditors (Yes/No)
2.1.1	No	No	Due to limited space within the development for the proposed measures it is not intended to provide these in addition to the currently proposed SuDS. Similarly paths within the site are to be gravel, allowing run-off to discharge to surrounding green areas and underlying soil.	Yes
2.1.2	Yes	Yes	Clarification: Permeable paving is designed as a Type B system per BS7533-13, i.e Lined to allow infiltration, but is not fully tanked. This was done to permit limited infiltration + recharge. Note the tank does not allow infiltration due to the concentration of runoff from across the site into a small area, whereas the permeable paving will only handle run off from its own surface area, and as such risk of potential softening is greatly reduced.	
2.1.3	No	No	Tarmac areas indicated are for reinstatement of existing road surface and is to be taken in charge by DLRCC	Yes
2.1.4	No	No	Due to limited space within the development for the proposed measures it is not feasible to provide surface storage ponds.	Yes
2.1.5	Yes	No	All surface level run off is to pass through permeable paving, which permits filtration and cleaning of surface run-off. Similarly parking areas are to be set down only, which will limit potential for hydrocarbons to enter the system.	

STORM WATER AUDIT FEEDBACK FORM

Paragraph No. in Audit Report	Problem Accepted (Yes/No)	Recommended Measure Accepted (Yes/No)	Alternative Measures (described) [or reason problem not accepted]	Alternative Measures Accepted by Auditors (Yes/No)
2.1.6	No	No	Refer to 2.1.1	Yes
2.1.7	Yes	Yes		
2.1.8	Yes	Yes		
2.1.9	Yes	Yes		
2.1.10	Yes	Yes		
2.1.11	Yes	Yes	Clarification: All SuDS measures to be privately managed.	
2.1.12	Yes	Yes		
2.1.13	Yes	Yes		
2.1.14	Yes	Yes		

STORM WATER AUDIT FEEDBACK FORM

Signed: 

Design Team Project Manager

Date:
31/07/20

Please complete and return to the auditor

Auditor Signed Off: 

Date: 04/08/2020

APPENDIX II

QBAR CALCULATION
Network & attenuation Calculation (5, 30 & 100 year) using FLOW software
Network & attenuation Calculation 50% blockage (100 year) using FLOW software
Network & attenuation Calculation 100% blockage (100 year) using FLOW software

PRINT Close Report

hr wallingford

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff too

Calculated by:	Brian Mahony
Site name:	Goatstown
Site location:	Dublin

This is an estimation of the greenfield runoff rates that are used 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). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	53.33026° N
Longitude:	6.28418° W
Reference:	3749745451
Date:	Sep 25 2024 16:20

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 0.283

Methodology

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

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm):	906	774
Hydrological region:	12	12
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.13	2.13
Growth curve factor 100 years:	2.61	2.61
Growth curve factor 200 years:	2.86	2.86

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	1.85	1.54
1 in 1 year (l/s):	1.57	1.31
1 in 30 years (l/s):	3.94	3.27
1 in 100 year (l/s):	4.82	4.01
1 in 200 years (l/s):	5.28	4.4

Qbar =1.54 L/s

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	5	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	Scotland and Ireland	Connection Type	Level Soffits
M5-60 (mm)	18.100	Minimum Backdrop Height (m)	0.200
Ratio-R	0.278	Preferred Cover Depth (m)	1.200
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
S1.0	0.044	4.00	44.750	1200	1.200
S1.1	0.045	4.00	44.840	1200	1.360
S1.2	0.045	4.00	44.590	1200	1.500
S1.3	0.049	4.00	44.590	1200	1.530
S1.4	0.049	4.00	44.540	1200	1.580
EXS790			44.080	1200	1.200

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S1.0	S1.1	11.180	0.600	43.550	43.480	0.070	159.7	225	4.18	50.0
1.001	S1.1	S1.2	28.305	0.600	43.480	43.090	0.390	72.6	225	4.49	50.0
1.002	S1.2	S1.3	4.018	0.600	43.090	43.060	0.030	133.9	225	4.55	50.0
1.003	S1.3	S1.4	14.755	0.600	43.060	42.960	0.100	147.6	225	4.78	50.0
1.004	S1.4	EXS790	12.602	0.600	42.960	42.880	0.080	157.5	300	4.94	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.032	41.0	8.0	0.975	1.135	0.044	0.0	67	0.804
1.001	1.537	61.1	16.1	1.135	1.275	0.089	0.0	79	1.301
1.002	1.128	44.8	24.2	1.275	1.305	0.134	0.0	118	1.150
1.003	1.074	42.7	33.1	1.305	1.355	0.183	0.0	149	1.182
1.004	1.250	88.4	41.9	1.280	0.900	0.232	0.0	146	1.235

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
FSR Region	Scotland and Ireland	Drain Down Time (mins)	240
M5-60 (mm)	18.100	Additional Storage (m³/ha)	20.0
Ratio-R	0.278	Check Discharge Rate(s)	x
Summer CV	1.000	Check Discharge Volume	x
Analysis Speed	Normal		

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	20	0	0
30	20	0	0
100	20	0	0

Node S1.4 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	42.960	Product Number	CTL-SHE-0058-1500-0950-1500
Design Depth (m)	0.950	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.5	Min Node Diameter (mm)	1200

Node S1.2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	43.090
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	187.5	0.0	1.200	187.5	0.0	1.201	0.0	0.0

Results for 1 year +20% CC Critical Storm Duration. Lowest mass balance: 99.64%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1.0	10	43.627	0.077	9.4	0.1434	0.0000	OK
15 minute summer	S1.1	9	43.580	0.100	19.0	0.1795	0.0000	OK
720 minute summer	S1.2	510	43.334	0.244	6.1	43.9073	0.0000	SURCHARGED
720 minute summer	S1.3	510	43.334	0.274	1.7	0.4854	0.0000	SURCHARGED
720 minute summer	S1.4	510	43.334	0.374	1.7	0.6549	0.0000	SURCHARGED
15 minute summer	EXS790	1	42.880	0.000	1.4	0.0000	0.0000	OK

Tank

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1.0	1.000	S1.1	9.4	0.656	0.228	0.1601	
15 minute summer	S1.1	1.001	S1.2	19.5	1.901	0.319	0.3253	
15 minute summer	S1.2	1.002	S1.3	-21.0	-1.130	-0.467	0.0761	
15 minute summer	S1.3	1.003	S1.4	-9.7	-0.253	-0.227	0.5500	
15 minute summer	S1.4	Hydro-Brake®	EXS790	1.4				17.0

Results for 30 year +20% CC Critical Storm Duration. Lowest mass balance: 99.64%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute summer	S1.0	825	43.710	0.160	2.3	0.2975	0.0000	OK
960 minute summer	S1.1	825	43.710	0.230	4.7	0.4117	0.0000	SURCHARGED
960 minute summer	S1.2	825	43.710	0.620	10.8	111.4371	0.0000	SURCHARGED
960 minute summer	S1.3	825	43.710	0.650	3.8	1.1504	0.0000	SURCHARGED
960 minute summer	S1.4	825	43.709	0.749	2.6	1.3124	0.0000	SURCHARGED
15 minute summer	EXS790	1	42.880	0.000	1.4	0.0000	0.0000	OK

Tank

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1.0	1.000	S1.1	20.8	0.812	0.508	0.2877	
15 minute summer	S1.1	1.001	S1.2	42.8	2.007	0.700	0.7306	
15 minute summer	S1.2	1.002	S1.3	-45.0	-1.477	-1.003	0.1586	
15 minute summer	S1.3	1.003	S1.4	-21.8	-0.549	-0.511	0.5868	
15 minute summer	S1.4	Hydro-Brake®	EXS790	1.4				21.2

Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 99.64%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute summer	S1.0	600	43.898	0.348	3.9	0.6484	0.0000	SURCHARGED
600 minute summer	S1.1	600	43.898	0.418	7.9	0.7492	0.0000	SURCHARGED
600 minute summer	S1.2	600	43.898	0.808	18.9	145.2914	0.0000	SURCHARGED
600 minute summer	S1.3	600	43.898	0.838	7.2	1.4838	0.0000	SURCHARGED
600 minute summer	S1.4	600	43.898	0.938	4.3	1.6419	0.0000	SURCHARGED
15 minute summer	EXS790	1	42.880	0.000	1.4	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1.0	1.000	S1.1	27.2	0.845	0.662	0.3604	
15 minute summer	S1.1	1.001	S1.2	55.3	2.027	0.905	0.9419	
15 minute summer	S1.2	1.002	S1.3	-57.5	-1.683	-1.283	0.1598	
15 minute summer	S1.3	1.003	S1.4	-28.5	-0.716	-0.667	0.5868	
600 minute summer	S1.4	Hydro-Brake®	EXS790	1.5				68.2

Tank

Top water level in Tank for 100 year storm + 20% CC= 43.898

145m³ attenuation storage required

50% blockage

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	5	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	Scotland and Ireland	Connection Type	Level Soffits
M5-60 (mm)	18.100	Minimum Backdrop Height (m)	0.200
Ratio-R	0.278	Preferred Cover Depth (m)	1.200
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
S1.0	0.044	4.00	44.750	1200	1.200
S1.1	0.045	4.00	44.840	1200	1.360
S1.2	0.045	4.00	44.590	1200	1.500
S1.3	0.049	4.00	44.590	1200	1.530
S1.4	0.049	4.00	44.540	1200	1.580
EXS790			44.080	1200	1.200

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S1.0	S1.1	11.180	0.600	43.550	43.480	0.070	159.7	225	4.18	50.0
1.001	S1.1	S1.2	28.305	0.600	43.480	43.090	0.390	72.6	225	4.49	50.0
1.002	S1.2	S1.3	4.018	0.600	43.090	43.060	0.030	133.9	225	4.55	50.0
1.003	S1.3	S1.4	14.755	0.600	43.060	42.960	0.100	147.6	225	4.78	50.0
1.004	S1.4	EXS790	12.602	0.600	42.960	42.880	0.080	157.5	300	4.94	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.032	41.0	8.0	0.975	1.135	0.044	0.0	67	0.804
1.001	1.537	61.1	16.1	1.135	1.275	0.089	0.0	79	1.301
1.002	1.128	44.8	24.2	1.275	1.305	0.134	0.0	118	1.150
1.003	1.074	42.7	33.1	1.305	1.355	0.183	0.0	149	1.182
1.004	1.250	88.4	41.9	1.280	0.900	0.232	0.0	146	1.235

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
FSR Region	Scotland and Ireland	Drain Down Time (mins)	240
M5-60 (mm)	18.100	Additional Storage (m³/ha)	20.0
Ratio-R	0.278	Check Discharge Rate(s)	x
Summer CV	1.000	Check Discharge Volume	x
Analysis Speed	Normal		

Storm Durations

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

50% blockage

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	20	0	0
30	20	0	0
100	20	0	0

Discharge rate reduced by 50%

Node S1.4 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	42.960	Product Number	CTL-SHE-0039-7000-0950-7000
Design Depth (m)	0.950	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	0.7	Min Node Diameter (mm)	1200

Node S1.2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	43.090
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	187.5	0.0	1.200	187.5	0.0	1.201	0.0	0.0

50% blockage

Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 99.58%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2160 minute summer	S1.0	2100	44.193	0.643	1.5	1.1988	0.0000	SURCHARGED
2160 minute summer	S1.1	2100	44.193	0.713	3.0	1.2787	0.0000	SURCHARGED
2160 minute summer	S1.2	2100	44.193	1.103	7.1	198.4096	0.0000	SURCHARGED
2160 minute summer	S1.3	2100	44.193	1.133	2.7	2.0068	0.0000	SURCHARGED
2160 minute summer	S1.4	2100	44.193	1.233	1.7	2.1592	0.0000	SURCHARGED
15 minute summer	EXS790	1	42.880	0.000	0.5	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1.0	1.000	S1.1	27.2	0.846	0.662	0.3600	
15 minute summer	S1.1	1.001	S1.2	55.3	2.014	0.905	0.9468	
15 minute summer	S1.2	1.002	S1.3	-58.2	-1.698	-1.298	0.1598	
15 minute summer	S1.3	1.003	S1.4	-29.3	-0.736	-0.685	0.5868	
2160 minute summer	S1.4	Hydro-Brake®	EXS790	0.8				91.5

No Flood for 50% Blockage

100% Blockage Scenario

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	5	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	Scotland and Ireland	Connection Type	Level Soffits
M5-60 (mm)	18.100	Minimum Backdrop Height (m)	0.200
Ratio-R	0.278	Preferred Cover Depth (m)	1.200
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
S1.0	0.044	4.00	44.750	1200	1.200
S1.1	0.045	4.00	44.840	1200	1.360
S1.2	0.045	4.00	44.590	1200	1.500
S1.3	0.049	4.00	44.590	1200	1.530
S1.4	0.049	4.00	44.540	1200	1.580
EXS790			44.080	1200	1.200

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S1.0	S1.1	11.180	0.600	43.550	43.480	0.070	159.7	225	4.18	50.0
1.001	S1.1	S1.2	28.305	0.600	43.480	43.090	0.390	72.6	225	4.49	50.0
1.002	S1.2	S1.3	4.018	0.600	43.090	43.060	0.030	133.9	225	4.55	50.0
1.003	S1.3	S1.4	14.755	0.600	43.060	42.960	0.100	147.6	225	4.78	50.0
1.004	S1.4	EXS790	12.602	0.600	42.960	42.880	0.080	157.5	300	4.94	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.032	41.0	8.0	0.975	1.135	0.044	0.0	67	0.804
1.001	1.537	61.1	16.1	1.135	1.275	0.089	0.0	79	1.301
1.002	1.128	44.8	24.2	1.275	1.305	0.134	0.0	118	1.150
1.003	1.074	42.7	33.1	1.305	1.355	0.183	0.0	149	1.182
1.004	1.250	88.4	41.9	1.280	0.900	0.232	0.0	146	1.235

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
FSR Region	Scotland and Ireland	Drain Down Time (mins)	240
M5-60 (mm)	18.100	Additional Storage (m³/ha)	20.0
Ratio-R	0.278	Check Discharge Rate(s)	x
Summer CV	1.000	Check Discharge Volume	x
Analysis Speed	Normal		

Storm Durations

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

100% Blockage Scenario

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	20	0	0
30	20	0	0
100	20	0	0

Discharge rate reduced by 95%

Node S1.4 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.950	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	0.1		
Invert Level (m)	42.960	Diameter (m)	0.007		

Node S1.2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	43.090
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	187.5	0.0	1.200	187.5	0.0	1.201	0.0	0.0

Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 99.53%

100% Blockage Scenario

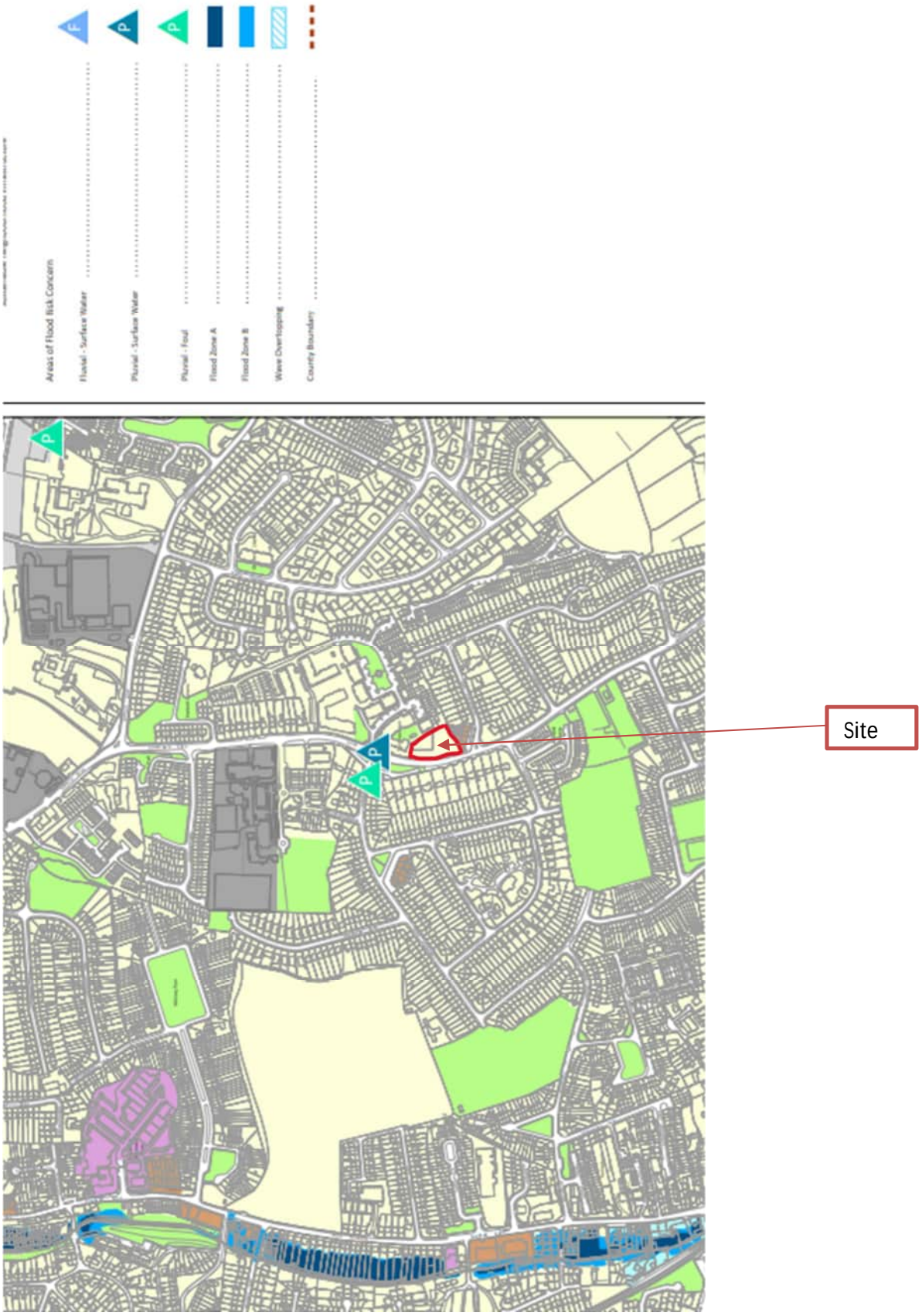
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
8640 minute summer	S1.0	4440	44.541	0.991	0.6	1.8468	0.0000	FLOOD RISK
8640 minute summer	S1.1	4440	44.541	1.061	1.2	1.9019	0.0000	FLOOD RISK
4320 minute summer	S1.2	2460	44.541	1.451	4.9	216.3500	0.0000	FLOOD RISK
4320 minute summer	S1.3	2460	44.540	1.480	2.5	2.6219	0.0000	FLOOD RISK
10080 minute summer	S1.4	5160	44.540	1.580	2.7	2.7666	194.2503	FLOOD
15 minute summer	EXS790	1	42.880	0.000	0.1	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1.0	1.000	S1.1	27.2	0.846	0.662	0.3598	
15 minute summer	S1.1	1.001	S1.2	55.3	2.006	0.905	0.9495	
15 minute summer	S1.2	1.002	S1.3	-58.6	-1.704	-1.306	0.1598	
15 minute summer	S1.3	1.003	S1.4	-29.7	-0.746	-0.695	0.5868	
1440 minute summer	S1.4	Orifice	EXS790	0.1				9.1

Hydrobrake Manhole S1.4 overflows discharging 194 m³ of Floodwater during 100 year storm with 100% blockage.

APPENDIX III

Flood map



Extract from Flood Map 1 DLR Development Plan 2022-2028

APPENDIX IV

IW Confirmation of Feasibility

CONFIRMATION OF FEASIBILITY

Brian Mahony

Barrett Mahony
Sandwith House
52-54 Sandwith House
Sandwith Street Lower
Dublin
D02WR6
Ireland

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

30 September 2024

Our Ref: CDS24002392 Pre-Connection Enquiry
Charles Hurts Site, Friarsland, 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 Business Connection of 221 unit(s) at Charles Hurts Site, Friarsland, 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 Uisce Éireann
- **Wastewater Connection** - Feasible without infrastructure upgrade by Uisce Éireann

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

As the network capacity changes constantly, this review is only valid at the time of its completion. As soon as planning permission has been granted for the

Development, a completed connection application should be submitted. The connection application is available at www.water.ie/connections/get-connected/

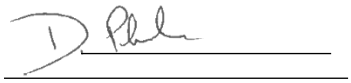
Where can you find more information?

- **Section A -** What is important to know?

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

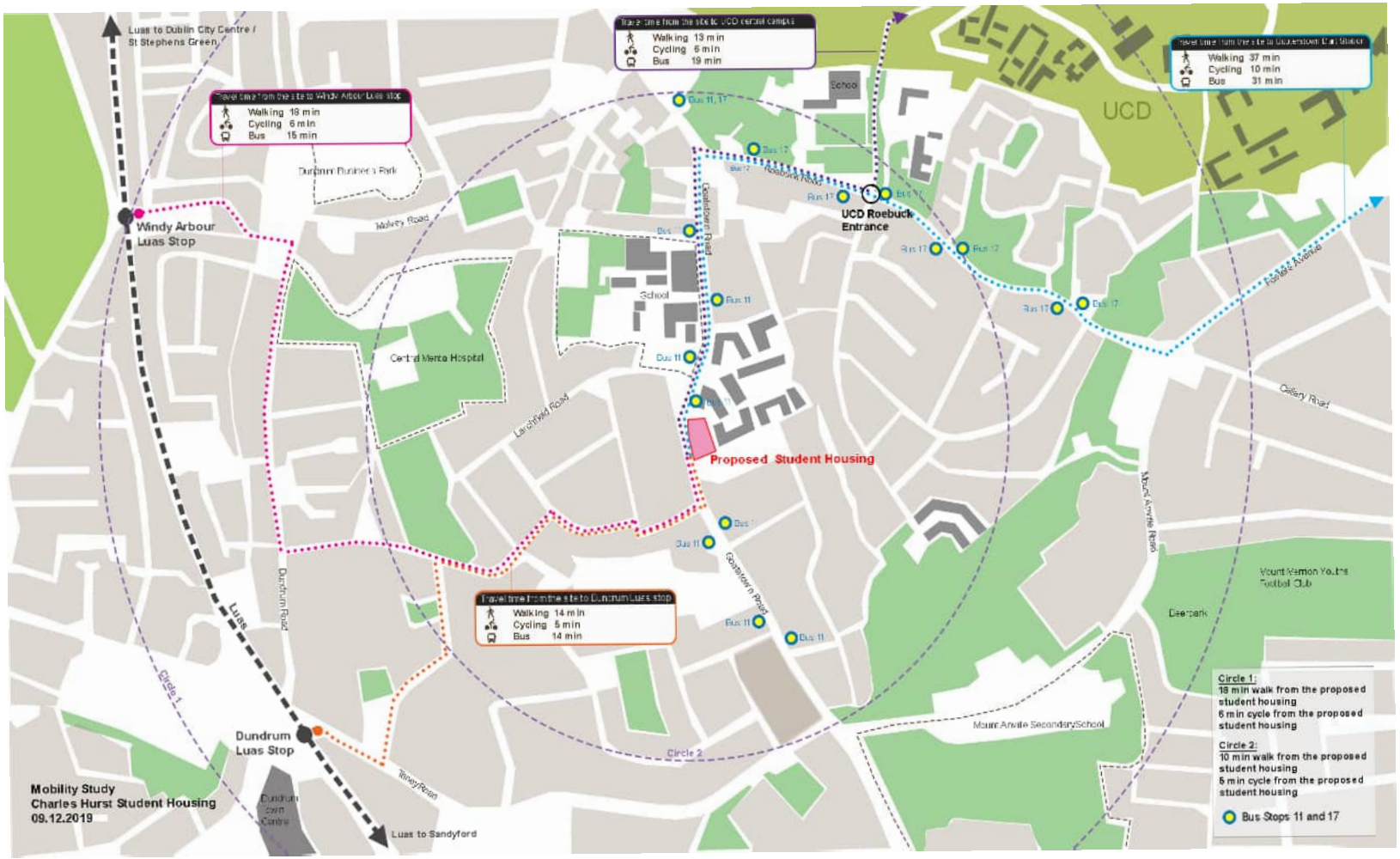
Section A - What is important to know?

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)

APPENDIX V

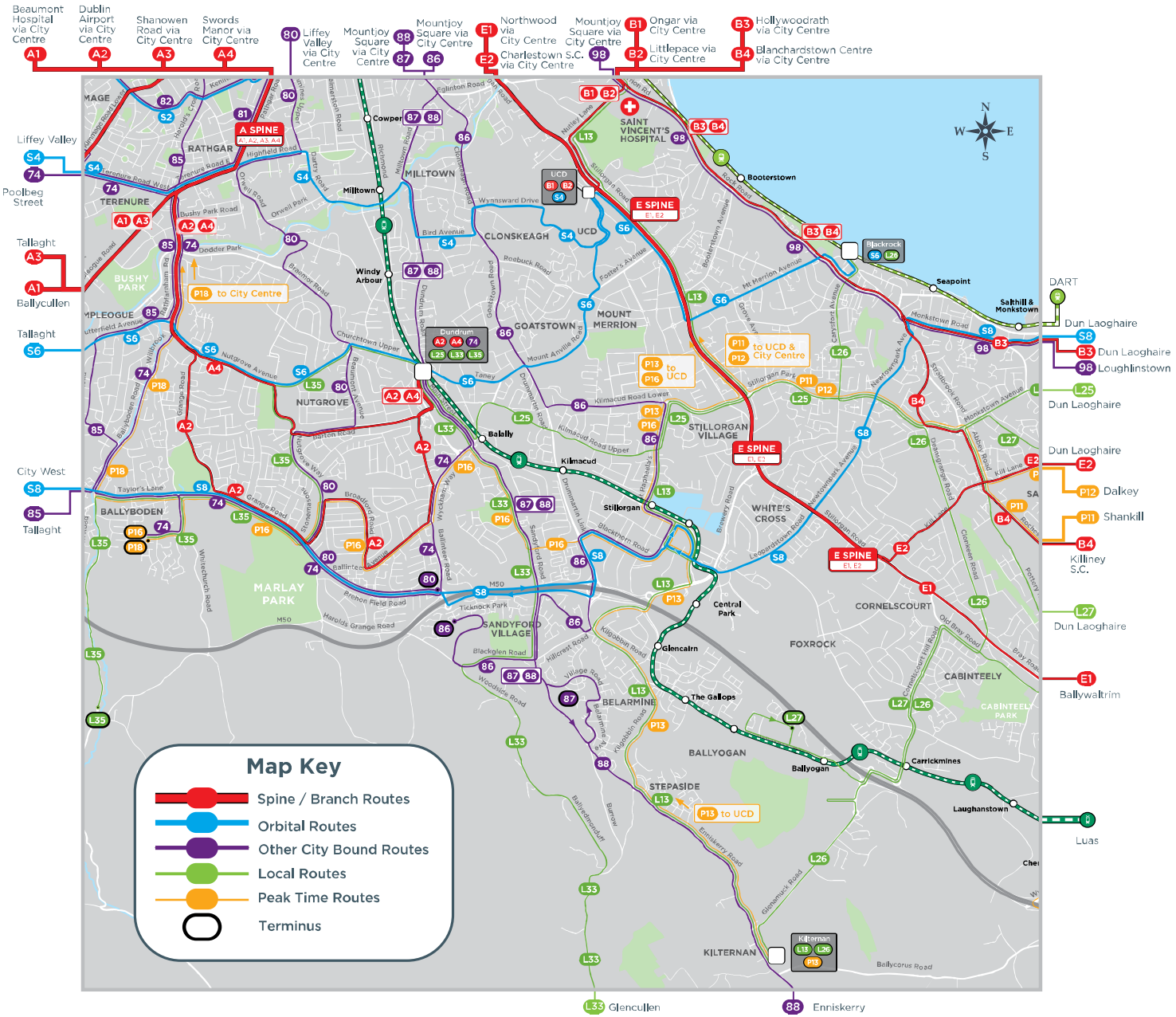
Travel Connectivity Map
Bus Connects Map
Third Party Quality Audit (2020 Application)
NTA letter with comments (2020 Application)


Luas to Dublin City Centre / St Stephens Green
Travel time from the site to Windy Arbour Luas stop
Walking 18 min
Cycling 6 min
Bus 15 min
Windy Arbour Luas Stop
Dunnes Stores Park
Mallery Road
Travel time from the site to UCD central campus
Walking 13 min
Cycling 6 min
Bus 19 min
School
Bus 11, 17
Bus 17
Roebuck Road
UCD Roebuck Entrance
Travel time from the site to Glenageary Train Station
Walking 37 min
Cycling 10 min
Bus 31 min
UCD
Clonskeagh Road
Bus 11
School
Central Mental Hospital
Lansdowne Road
Proposed Student Housing
Foster's Avenue
Gallery Road
Mount Anville Road
Mount Merrion Youths Football Club
Deerpark
Mount Anville Secondary School
Travel time from the site to Dundrum Luas stop
Walking 14 min
Cycling 5 min
Bus 14 min
Dundrum Road
Luas
Circle 1
Circle 2
Dundrum Luas Stop
Taney Road
Dundrum Town Centre
Luas to Sandyford
Mobility Study
Charles Hurst Student Housing
09.12.2019
Circle 1:
18 min walk from the proposed student housing
6 min cycle from the proposed student housing
Circle 2:
10 min walk from the proposed student housing
5 min cycle from the proposed student housing
Bus Stops 11 and 17

Your local area map

How BusConnects gets you where you want to go.

• Balally • Ballinteer • Belfield • Churchtown • Clonskeagh • Dundrum
• Goatstown • Sandyford • Stepaside Village • Windy Arbour



Title: **QUALITY AUDIT (Stage 1)**

For;

Proposed Student Accommodation at Goatstown Road Dublin 14

Client: **Barrett Mahony**

Date: **July 2020**

Report reference: **0821R01**

VERSION: **FINAL**

Prepared By:

Bruton Consulting Engineers Ltd

Glaspistol
Clogherhead
Drogheda
Co. Louth.

Tel: 041 9881456
Mob: 086 8067075
E: admin@brutonceng.ie
W: www.brutonceng.ie

CONTENTS SHEET

Contents

1.0 Introduction

This report was prepared in response to a request from Mr. Thomas Mac Hale, Barrett Mahony, Consulting Engineers, for a Quality Audit of the proposed student accommodation at Goatstown Road, Dublin 14.

The Quality Audit has been carried out in accordance with the guidance in the Design Manual for Urban Roads and Streets (DMURS), produced by Department of Transport Tourism and Sport in March 2013 and as updated in June 2019.

This portion of the Stage 1 Quality Audit includes a Stage 1 road safety audit, an access audit, a walking audit and a cycle audit.

The Road Safety and Quality Audit Team comprised of;

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

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

The Quality Audit involved the examination of drawings and other material provided by Barrett Mahony and a site visit by the Audit Team, together, on the 23rd July 2020.

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

The problems raised in this Quality Audit may belong to more than one of the categories of Audit named above. A table has been provided at the start of Section 3 of this report detailing which category of audit each problem is associated with.

Recommendations have been provided to help improve the quality of the design with regard to the areas described above. A feedback form has also been provided for the designer to complete indicating whether or not he/she will accept those recommendations or provide alternative recommendations for implementation.

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

A feedback form for the Designer to complete is contained in **Appendix B.**

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

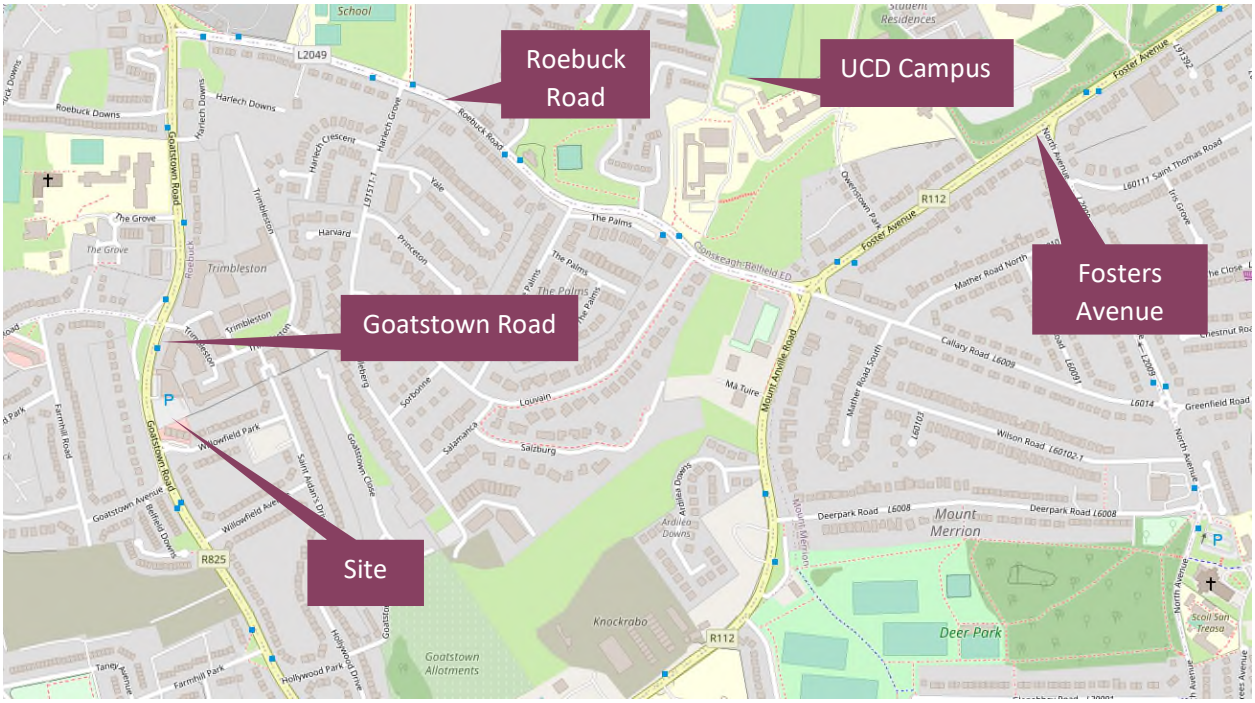
2.0 Background

It is proposed to construct a 239 unit student accommodation at Goatstown Road, Dublin 14 at the site of an existing car dealership.

Goatstown Road (R825) is a single carriageway road with cycle lanes. It is a bus route. There are footpaths on both side of the Road.

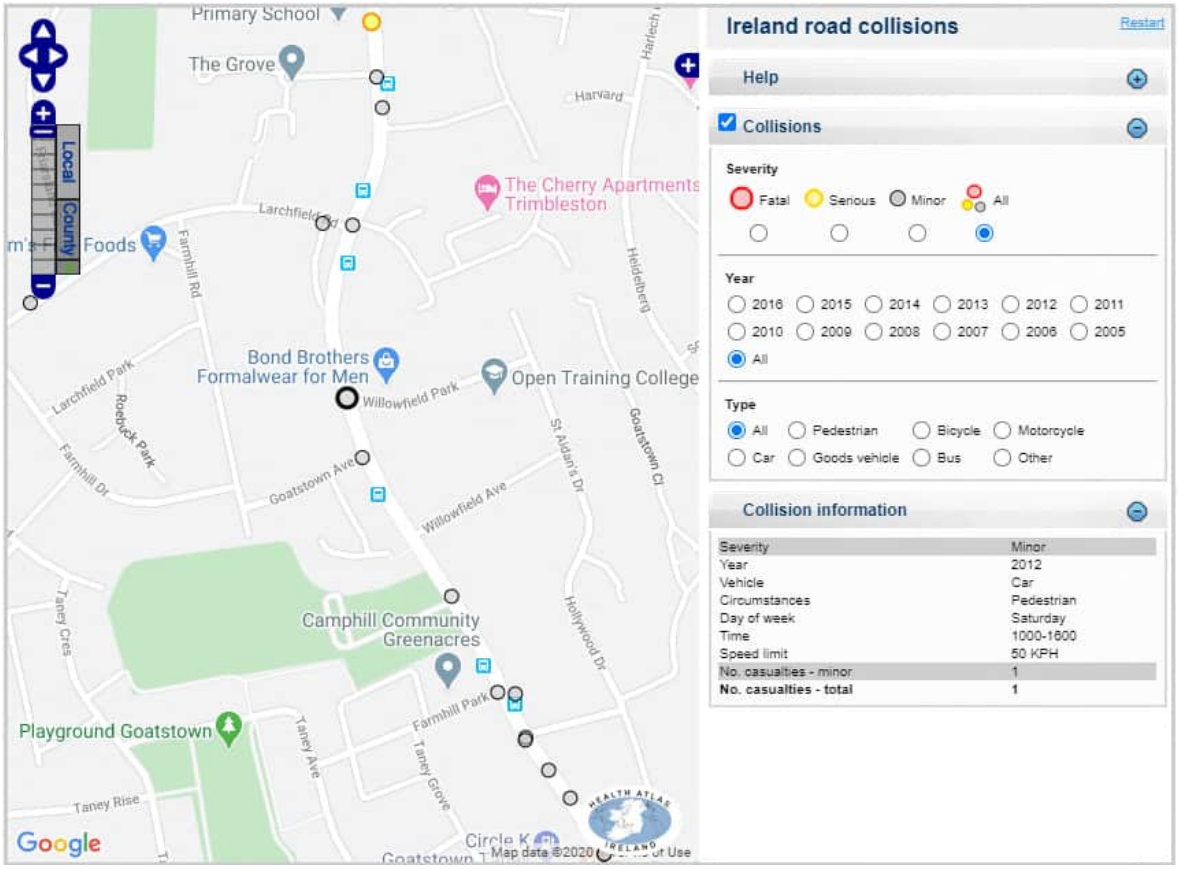
The speed limit is 50km/hr.

The site location is shown below.



Site Location Map (image courtesy of www.maps.openstreetmap.org)

The Road Safety Authority's website shows that there were no recorded collisions at the site access between the years 2005 and 2016. There was one minor collision at the junction of Willowfield Park in 2012 that involved a car and a pedestrian. There was also one minor injury collision at the junction of Larchfield Road in 2016 which involved a car.



3.0 Main Report

Summary Table of Problem Categories

Problem Reference	Access Audit	Walking Audit	Cycling Audit	Road Safety Audit	Quality Audit
3.1			✓		✓
3.2	✓				✓
3.3				✓	✓
3.4				✓	✓
3.5		✓		✓	✓

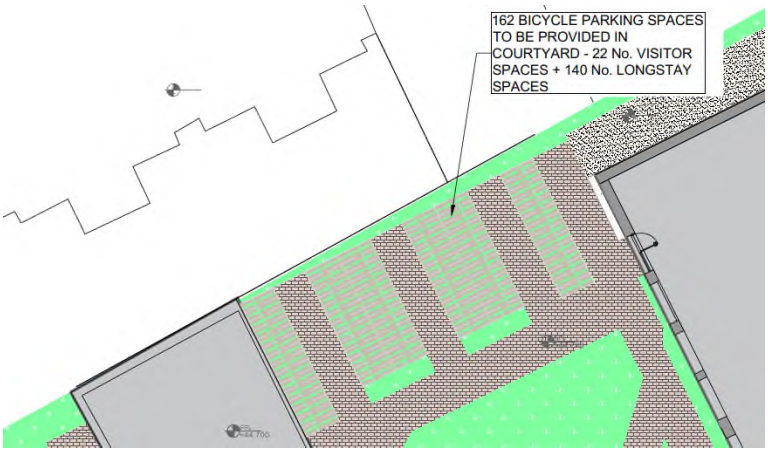
3.1 Problem

LOCATION

Drawing 19289-BMD-ZZ-XX-DR-C-1010 rev PL2

PROBLEM

It is not clear if the bicycle parking is to be sheltered or not. Non sheltered long term parking can lead to bicycles being stolen and to bicycles getting wet. This can lead cyclists to store their bicycles in other areas such as internal stairwells etc. where they can be hazards for pedestrians.



RECOMMENDATION

It is recommended that long term bicycle parking is sheltered and secured.

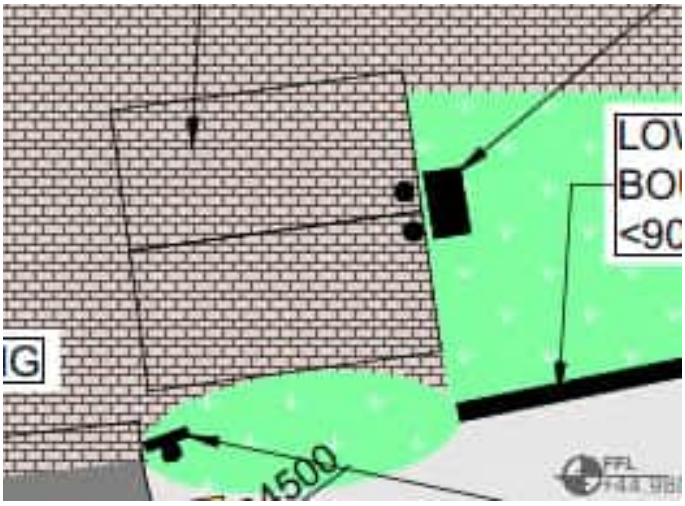
3.2 Problem

LOCATION

Drawing 19289-BMD-ZZ-XX-DR-C-1010 rev PL2

PROBLEM

The proposed electric charging parking spaces appear to be relatively small which could lead to difficulties for users when charging, especially if the vehicles have side entry charging. Cables close to vehicles could lead to trips and falls.



RECOMMENDATION

It is recommended that the electric charging spaces are sized with a buffer zone as outlined in Chapter 7 of the Traffic Signs Manual.

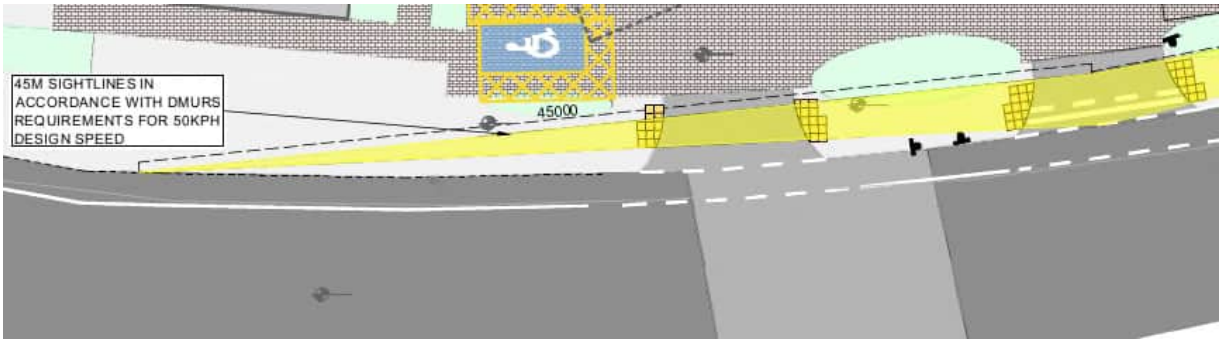
3.3 Problem

LOCATION

Drawing 19289-BMD-ZZ-XX-DR-C-1011 rev PL2

PROBLEM

The sightlines shown on the drawings show a Y- distance of 45m. As the route is a bus route a larger sightline would be required. In addition, the proposed entry to the development is close to a horizontal bend on Goatstown Road. The stopping sight distance for vehicles approaching the access have not been shown. If there is not sufficient stopping sight distance then rear-end collisions could occur should a vehicle be stopped on Goatstown Road, waiting to enter the development.



RECOMMENDATION

It is recommended that the sightlines for the exit and stopping sight distance to the entry be compliant with DMURS.

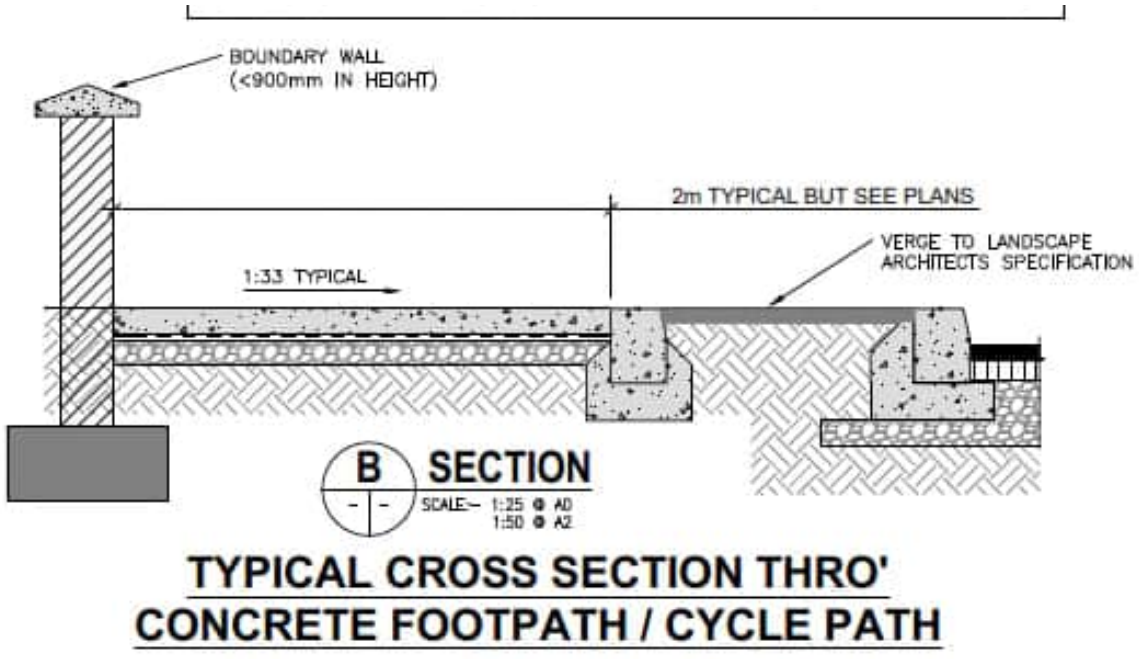
3.4 Problem

LOCATION

Drawing 19289-BMD-ZZ-XX-DR-C-1011 rev PL2

PROBLEM

Detail 'B' footpath Details, states that the verge is to be landscaped to the Landscape Architects specification. There is a risk that planting may obscure sightlines from the development leading to collisions on Goatstown Road.



RECOMMENDATION

It is recommended that the sightlines be kept clear of vegetation other than grass that should be maintained at a low level.

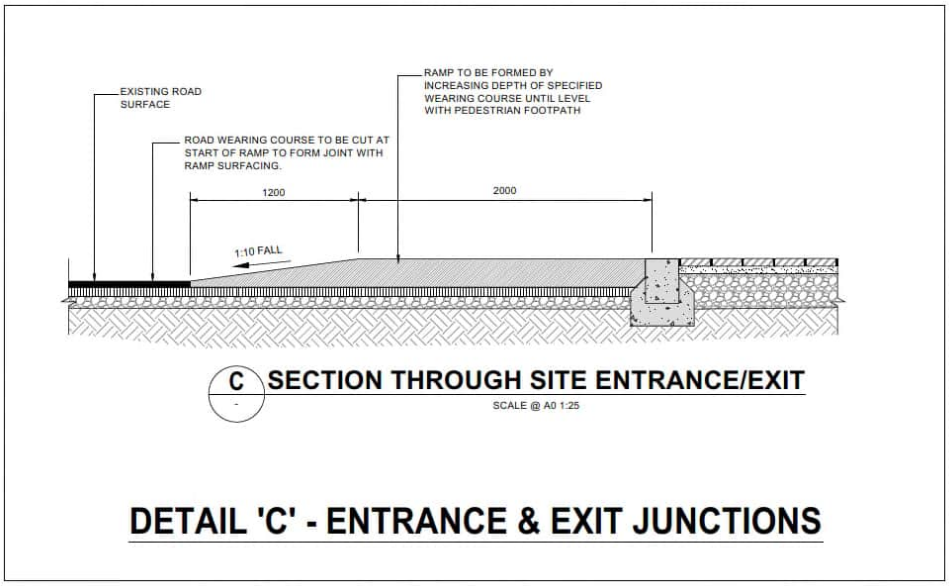
3.5 Problem

LOCATION

Drawing 19289-BMD-ZZ-XX-DR-C-1201 rev PL2

PROBLEM

It is proposed in Detail 'C' Entrance & Exit Junctions to have a 10% gradient on the access adjacent to the carriageway and to have the access/exit flush with the adjacent carriageway at the interface. The 10% gradient could lead to vehicles slipping onto the carriageway. It could also be a hazard for pedestrians crossing the exit as the steep slope could lead to a loss of balance. The flush interface could lead to visually impaired pedestrians inadvertently entering the carriageway.



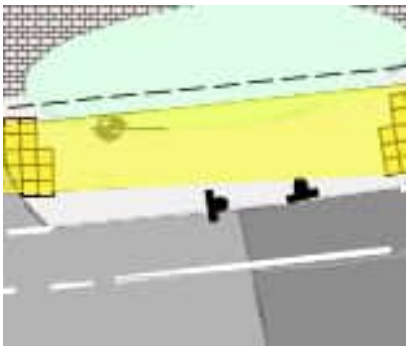
RECOMMENDATION

It is recommended that at least a 25mm upstand be provided at the vehicular entrance and exit and that a suitable dwell area be provided at both.

4.0 Observations

4.1 Observation

It is assumed that the traffic sign locations are indicative and that signs will be placed where they are hot hazards for pedestrians or cyclists.



5.0 Quality Audit Statement

This quality Audit has been carried out in accordance with the guidance given in DMURS and takes into consideration the principles approaches and standards of that Manual.

The quality audit has been carried out by the persons named below who have not been involved in any design work on this scheme as a member of the Design Team.

Norman Bruton **Signed:** _____

(Quality Audit Team Leader) **Dated: 31/7/2020**

Owen O'Reilly **Signed:** _____

(Quality Audit Team Member) **Dated: 31/7/2020**

Appendix A

List of Material Supplied for this Quality Audit;

- Drawing 19289-BMD-ZZ-XX-DR-C-1010 rev PL2
- Drawing 19289-BMD-ZZ-XX-DR-C-1020 rev PL2
- Drawing 19289-BMD-ZZ-XX-DR-C-1300 rev PL1
- Drawing 19289-BMD-ZZ-XX-DR-C-1021 rev PL2
- Drawing 19289-BMD-ZZ-XX-DR-C-1011 rev PL2
- Drawing 19289-BMD-ZZ-XX-DR-C-1120 rev PL1
- Drawing 19289-BMD-ZZ-XX-DR-C-1010 rev PL2
- Drawing 19289-BMD-ZZ-XX-DR-C-1200 rev PL2
- Drawing 19289-BMD-ZZ-XX-DR-C-1210 rev PL2
- Drawing 19289-BMD-ZZ-XX-DR-C-1215 rev PL2
- Drawing 19289-BMD-ZZ-XX-DR-C-1220 rev PL2
- Civil Engineering Infrastructure Report & Flood Risk assessment for Planning – BM PL2 15/7/2020.

Appendix B

Feedback Form

BRUTON CONSULTING ENGINEERS

QUALITY AUDIT FORM – FEEDBACK ON QUALITY AUDIT REPORT

Scheme: Proposed Student Accommodation, Goatstown Road.
Quality Audit- Stage 1
Date Audit Completed: (site visit) 23rd July 2020

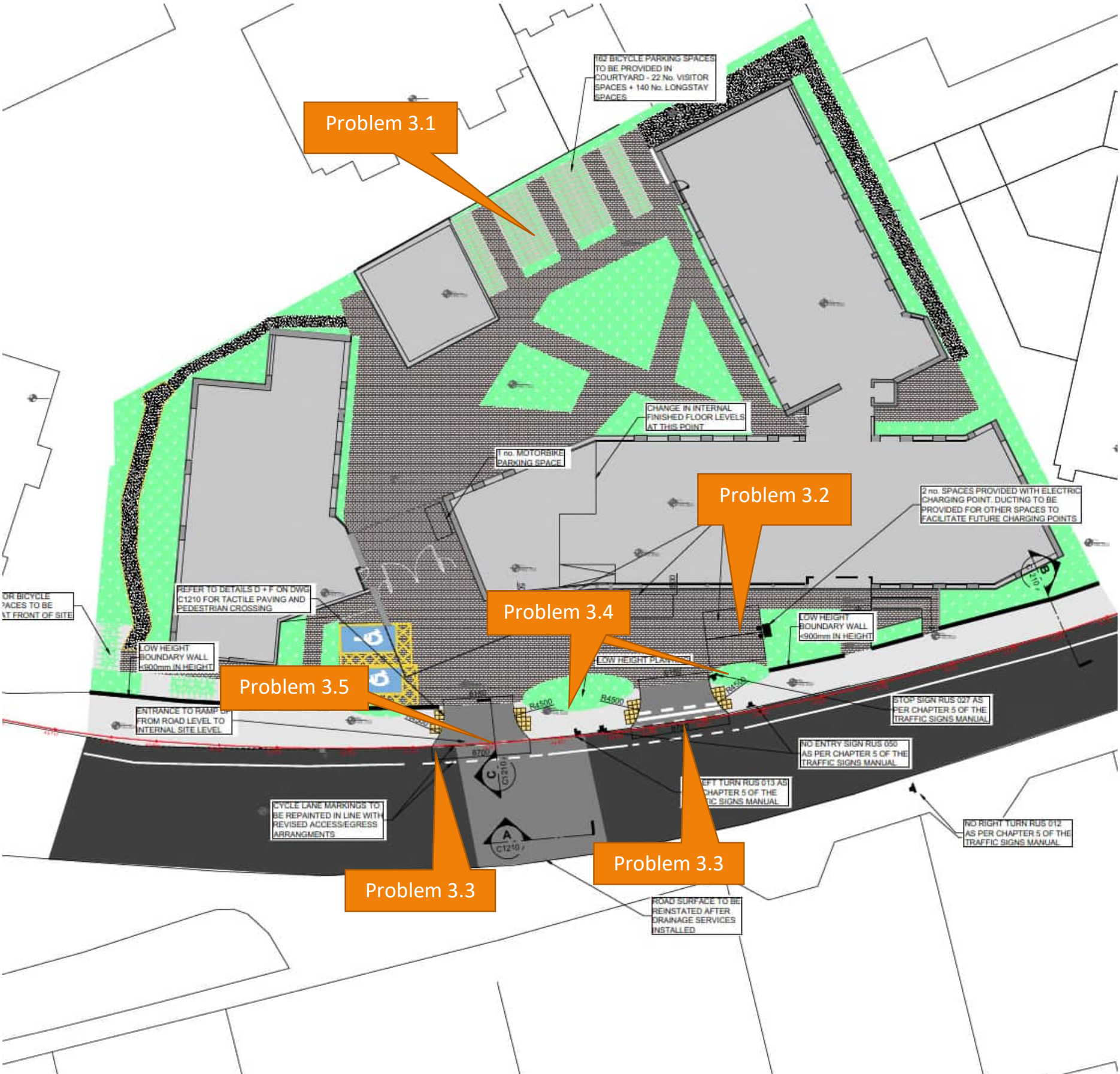
Paragraph No. in Quality Audit Report	Problem accepted (yes/no)	Recommended measure accepted (yes/no)	Alternative measures (describe)	Alternative measures accepted by Auditors (Yes/No)
3.1	Yes	Yes		
3.2	Yes	No	Set down parking spaces are to be privately managed, and are not intended for public use as charging points. As such, and to facilitate provision of pedestrian path between spaces and the building line, the bufferzone and associated markings are to be omitted.	Yes
3.3	Yes	Yes		
3.4	Yes	Yes		
3.5	Yes	Yes		

Signed.....**Date 31/07/20**
Design Team Leader

Signed.....**Date:** 31/7/2020
Audit Team Leader

Appendix C

Problem Location Plan.


Problem 3.1
162 BICYCLE PARKING SPACES TO BE PROVIDED IN COURTYARD - 22 No. VISITOR SPACES + 140 No. LONGSTAY SPACES
CHANGE IN INTERNAL FINISHED FLOOR LEVELS AT THIS POINT
1 no. MOTORBIKE PARKING SPACE
Problem 3.2
2 no. SPACES PROVIDED WITH ELECTRIC CHARGING POINT. DUCTING TO BE PROVIDED FOR OTHER SPACES TO FACILITATE FUTURE CHARGING POINTS
REFER TO DETAILS D + F ON DWG C1210 FOR TACTILE PAVING AND PEDESTRIAN CROSSING
Problem 3.4
LOW HEIGHT BOUNDARY WALL <900mm IN HEIGHT
LOW HEIGHT BOUNDARY WALL <900mm IN HEIGHT
Problem 3.5
ENTRANCE TO RAMP FROM ROAD LEVEL TO INTERNAL SITE LEVEL
STOP SIGN RUS 027 AS PER CHAPTER 5 OF THE TRAFFIC SIGNS MANUAL
NO ENTRY SIGN RUS 050 AS PER CHAPTER 5 OF THE TRAFFIC SIGNS MANUAL
CYCLE LANE MARKINGS TO BE REPAINTED IN LINE WITH REVISED ACCESS/EGRESS ARRANGMENTS
Problem 3.3
Problem 3.3
NO RIGHT TURN RUS 012 AS PER CHAPTER 5 OF THE TRAFFIC SIGNS MANUAL
ROAD SURFACE TO BE REINSTATED AFTER DRAINAGE SERVICES INSTALLED

LAYOUT

Údarás Náisiúnta Iompair
National Transport Authority
Dún Scéine,
Iveagh Court,
Harcourt Lane,
Dublin 2,
D02 WT20.

Thomas Mac Hale,
Barrett Mahony Consulting Engineers,
Sandwith House,
52-54 Lower Sandwith Street,
Dublin 2,
D02 WR26.

Date: 14th, August, 2020

Re. Proposed 241-bed student housing development at Goatstown Road, Dublin 14

Dear Thomas,

The NTA has reviewed the documents itemised below, which were forwarded on 4th August, and welcomes the opportunity to submit the following observations for your consideration in advance of the application to An Bord Pleanála.

- 19289-BMD-ZZ-XX-DR-C-1010
- 19289-BMD-ZZ-XX-DR-C-1011
- 19289-BMD-ZZ-XX-DR-C-1210 - Standard Roads Details
- Goatstown IR Audit Issue Bound (Civil Engineering Infrastructure Report & Flood Risk Assessment for Planning)
- 821 BM Student Accommodation- Goatstown - Stage 1- Quality Audit FINAL

Public Transport

The site is currently served by a number of bus routes in the immediate and wider vicinity, as set out in the applicant's Civil Engineering Infrastructure Report. In 2019, the NTA issued a revised BusConnects Dublin Area Bus Network for public consultation. A summary of the proposed bus routes of relevance to the subject site is set out below:

Route	Location	Distance	Termini	Frequency
10	Goatstown Road	Adjacent to site	Ticknock & Mountjoy Sq.	2/hour
11/12	Dundrum Road	1.1 km	Mountjoy Sq. & Belarmine; Parnell Sq. & Enniskerry	2/hour (combined)
S4	Bird Avenue	850 m	UCD & Liffey Valley	6/hour
S6	Goatstown village	650 m	Blackrock and Tallaght	4/hour
B Spine, E Spine and others	UCD Interchange	2.0/2.5 km	Multiple	Multiple

A2, 24, 225, 235	Dundrum Interchange	1.4 km	Multiple	Multiple

Further detail can be found in the Area Brochure for Dundrum, which is available at the following link: https://busconnects.ie/media/1688/dundrum-accordian-leaflet-260919-fa-web.pdf

The subject site would be relatively well served by bus under the proposed network, providing connections to UCD, Dundrum, Stillorgan, Blackrock, Ranelagh, Dublin city centre and other destinations. (Goatstown Road is not included in the BusConnects Core Bus Corridors project, i.e. dedicated bus lanes are not currently proposed on this road.)

The Civil Engineering Infrastructure Report states that the site is within 1.7 km of the Windy Arbour Luas stop and 1.6 km of the Dundrum Luas stop. It is not clear how these distances were calculated as it would appear that, using the road network, Windy Arbour is 2.1 km and Dundrum is 1.4 km from the site. The site is therefore outside the 1 km catchment for Luas.

Parking

It is proposed to provide no car parking for residents of the development, with the exception of two spaces for disabled users and four spaces for set-down/drop-off. On the basis of the public transport accessibility outlined above, which would provide connections to a range of third level institutions, and the proximity of the development to UCD, which would promote and facilitate walking and particularly cycling, the NTA supports the quantum of car parking proposed.

It is proposed to provide 140 long-stay cycle parking spaces and 48 short-stay visitor cycle parking spaces. While the quantum of visitor cycle parking accords with the minimum standard recommended in Dun Laoghaire-Rathdown County Council's *Standards for Cycle Parking and associated Cycling Facilities for New Developments* (2018), the proposed quantum of long-stay parking exceeds the recommended minimum by 19 spaces. Notwithstanding this, the NTA recommends that consideration should be given to further increasing the number of long-stay cycle parking spaces in order to facilitate the greatest number of residents to cycle to destinations in the immediate and wider vicinity, given that the average urban cycling speed (c.15 km/hr) is three times the average urban walking speed.

Regarding the design and location of cycle parking, the Council's Standards state that '*Cycle parking should be convenient, accessible and be sited as close as possible to the principal destination (including entry and exit doors, lifts etc)* (p.1), and that '*Cycle parking… must not… Be hidden away behind buildings or tucked away in the corner of a car park*' (p.2). The NTA's *National Cycle Manual* (2011) also acknowledges the importance of well-designed cycle parking in its statement that '*The availability of appropriate bicycle parking facilities at either end of a trip will heavily influence the decision to travel by bicycle in the first instance*' (Section 5.5).

As proposed, the main cycle parking cluster is located to the rear of the site, and it is not clear how visitors would reach this facility as it appears to be accessed through a gated archway. In addition, it is not clear how cyclists would access the visitor parking at the western site boundary. While it is noted that a separate entrance for pedestrians and cyclists has been provided in the site boundary adjacent to the cycle parking, no access ramp has been provided from the carriageway to serve this entrance. This would result in cyclists using the main vehicular site entrance, although the route from this entrance to the cycle parking traverses the disabled parking bays. It is therefore recommended that access to both cycle parking locations requires further consideration.

Finally, no detail has been provided on the design of the cycle parking itself regarding rack type, spacing or shelter/security. The NTA recommends that the design of the proposed cycle parking should comply with the Council's *Standards for Cycle Parking and associated Cycling Facilities for New Developments* and with the NTA's *National Cycle Manual,* in order to fully support the use of this mode in a car-free development.

External environment

The design of the site entrance and exit as proposed is not clear. One drawing (19289-BMD-ZZ-XX-DR-C-1210 - Standard Roads Details) shows the ramp running from the outside edge of the footpath to the kerb line, but another drawing (19289-BMD-ZZ-XX-DR-C-1010) states 'Entrance to ramp up from road level to internal site level'. The NTA recommends that the footpath should be level across the site entrances and exits, as shown in the Standard Road Details drawing.

On the adjacent carriageway, the southbound cycle lane is shown as mandatory (solid line) on the drawings issued, but it is currently an advisory (broken line) cycle lane. Sufficient space exists to provide mandatory lanes on carriageway in each direction and the NTA would support this revision to the current arrangement, designed in accordance with the guidance in the *National Cycle Manual*.

Swept Path Analysis

The swept path analysis provided in drawing 19289-BMD-ZZ-XX-DR-C-1011 shows vehicles approaching and leaving in a southbound direction only. The NTA recommends that this analysis should assess all vehicle movements arriving and departing in both directions.

Conclusion

The NTA is supportive in principle of the subject development as it would provide residential use that accords with the Principles of Land Use and Transport Integration set out in the *Transport Strategy for the Greater Dublin Area 2016-2035*. However, certain elements of the proposed layout require further consideration, in particular provision for cycling within the site and in its immediate environs.

I trust these comments will be taken into consideration in the finalisation of the application documentation.

Yours sincerely,

Michael Mac Aree

_____

Michael Mac Aree,
Head of Strategic Planning

APPENDIX VI

DLRCC LRD Opinion Response from meeting 12/6/2024
Comments on Action taken re Same

8. Design of the proposed surface water management system including attenuation features and cross sections of all SuDS features proposed on site in the context of surface water management on the site, discharge rates equal to greenfield sites, integration of appropriate phased works.	The design has been carried out in accordance with the GDSDS & the Suds Manual Ciria Report C753. Details of the SuDS strategy & details are given on BMCE Drg Nos C-1021 &1215
11. A letter from Irish Water (IW/ UE) confirming that there is sufficient capacity in the public infrastructure to facilitate a connection for the proposed development obtained no more than 6 months before the date of lodgement of the LRD Application.	See Appendix IV for current Confirmation of Feasibility from UE
12. <u>Site Layout</u> *The width of the proposed vehicular entrances should be reduced to a maximum of 3.5m. Visibility should be ensured between vehicles and pedestrians/cyclists motorists on Goatstown Road. Pedestrian priority should be maintained across the entrances.* *Details of proposed surface treatments and road markings should be included in any future submission.* *Swept path analysis should be submitted which demonstrates all required vehicular movements to and from the site. Accommodations for set-down and service vehicles shall also be clearly outlined.*	It was not possible to reduce the width of the entrance & exit to 3.5m because this would make access & egress from the site too difficult for refuse vehicles & Fire Tenders. The entrance and exits were reviewed in the context of DMURS Advice Note 6 to ensure Pedestrian Priority at both locations. The drawings now show the following at both entrance & exit: • Footpaths carrying through with gradient unaltered to emphasize pedestrian priority. • Widths at entrance & exits reduced in so far as possible whilst maintaining maneuverability for refuse & fire tender vehicles. • Ramp up from carriageway edge to footpath across existing grass verge zone. And ramp down back into site. These measures will give pedestrian priority and will serve to reduce vehicle speed when entering /exiting to similar to that of pedestrians using the footpath. It should also be noted that these changes will have a positive effect on the compliance with Design Principle 3 of DMURS - Pedestrian Focus - as assessed in Section 6.4 of the Report.

	Details of proposed surface treatments are given on Drg C-1010 & swept path analysis on Drgs C1011 & C1012
13. Information/documentation which address the following concerns of the Drainage Engineer: *Site investigation results have justified SOIL value of 4 being chosen for this application. The* *applicant has proposed an overall flow restriction of 1.57l/s with a total attenuation storage* *volume of 171m3 being provided (capacity 150m3).*	The Attenuation storage volume has been changed to a Wavin Aquacell System 25x7.5x1.2m deep. Which provides 214m^3 available volume well in excess of the 150m^3 required. The Aquacell system will allow for crates to be omitted in selected locations to allow Tree landscaping in the courtyard above.
<u>Surface Water Drainage</u> *a) As standard, the applicant is requested to ensure that all surface water design proposals are in accordance with the requirements of Appendix 7: Sustainable Drainage System Measures of the County Development Plan 2022-2028.* *b) As standard, the applicant is requested to ensure that the proposed surface water design is in accordance with County Development Plan 2022-2028 Section 10.2.2.6 Policy Objective EI4: Sustainable Drainage Systems, such that the proposal meets the requirements of the Greater Dublin Strategic Drainage Study (GDSDS) policies in relation to Sustainable Drainage Systems (SuDS). The design must incorporate SuDS measures appropriate to the scale of the proposed development such as green roofs, bioretention areas, permeable paving, rainwater harvesting, swales, etc. that minimize flows to the public drainage system and maximizes local infiltration potential.* *c) Drawing 1020 (Drainage and Watermain Plan Layout) shows a limited surface water drainage network. The applicant is requested to confirm no surface water will leave the site unattenuated.* *The applicant is requested to show any fin/filter drains or similar proposed on site on the drainage drawings for clarity.* *d) The applicant has indicated that the green roof requirements have been met, with details of the percentage green roof noted. For clarity the applicant is requested to set out in tabular form the total roof*	a) & b): it is confirmed that the design is in accordance with Appendix 7 & Objective E14 of the County Development Plan. c):- it is confirmed that no surface water leaves the site unattenuated. The Fin drains taking any overflow from the permeable paving to the front will discharge into the Hydrobrake manhole and will therefore be attenuated like the rest of the site. Drawing 1020 has been revised to show the fin drains. d) See this report Section 2.2 for table showing green roof percentages. There is

area, along with the various green roof provisions (extensive/intensive/paved). The applicant shall also provide details of maintenance access to the green roofs and should note that, in the absence of a stairwell type access to the roof, provision should be made for alternative maintenance and access arrangements such as external mobile access that will be centrally managed. The applicant should demonstrate that the green roof is designed in accordance with BS EN 12056-3:2000 and The SUDS Manual (CIRIA C753).	also a table on the SuDS strategy Drg No C-1021 giving the same information. All intensive green roofs are accessible by stairs. All extensive green roofs will be accessible by external access with fall arrest systems provided. This will be managed centrally by the management of the Student Residence Facility. Green roof details are given on drg C-1215
e) The appears to be a number of trees on top of the attenuation tank location. The applicant shall ensure that trees shall not be planted in the area over the attenuation tank. Trees shall be placed at a minimum distance of 2m from the edge of attenuation tanks. Tree protection barriers may be required, depending on the tree species and the expected extent of root spread, to be advised by the landscape architect. Alternatively, large scale tree pits should be incorporated into the layout of the attenuation system.	e) The Aquacell system now proposed will allow for crates to be omitted in selected locations to allow Tree landscaping in the courtyard area. There is ample space for the Aquacell to be extended below the bicycle parking area to compensate for any volume lost due to tree planting.
f) As standard, the applicant is requested to ensure that a penstock is provided in the flow control device chambers and that the flow control device provided does not have a bypass door. The applicant shall also ensure a silt trap is being provided in the flow control device chamber.	f) A penstock valve and silt trap will be provided – see Drainage Layout Drg C-1020 & SuDS detail drawing C1215.
g) As standard, the applicant is requested to ensure that any changes to parking and hardstanding areas shall be constructed in accordance with the recommendations of the Greater Dublin Strategic Drainage Study for sustainable urban drainage systems (SuDS) i.e. permeable surfacing, and in accordance with Section 12.4.8.3 *Driveways/Hardstanding Areas of the County Development Plan 2022-2028. Appropriate measures shall be included to prevent runoff from driveways entering onto the public realm as required. Where unbound material is proposed for driveway, parking or hardstanding areas, it shall be contained in such a way to ensure that it does not transfer on to the public road or footpath on road safety grounds.*	g) The permeable paving details are given on Drg C-1215. The front of the development adjacent to the access & egress point is finished in permeable paving and this ,in addition to the ramps at these locations, will ensure no runoff from the site enters the public realm.
h) As standard, the applicant is requested to submit supporting standard details, including cross-sections and long-sections, and commentary that demonstrates	

that all proposed SuDS measures have been designed in accordance with the recommendations of CIRIA C753 (The SuDS manual). *i) As standard, the applicant is requested to submit long-sections of the surface water drainage system, clearly labelling cover levels, invert levels, pipe gradients and pipe diameters, as per this draft submission.* *j) As standard, the applicant is requested to confirm that a utilities clash check has been carried out ensuring all utilities' vertical and horizontal separation distances can be provided throughout the scheme. The applicant should demonstrate this with cross-sections at critical locations such as junctions, site thresholds and connection points to public utilities. Minimum separation distances shall be in accordance with applicable Codes of Practice.* *k) As standard the applicant is requested to ensure that a Stage 1 Stormwater Audit is carried out for the development. The applicant has proposed to reuse a previous audit which was carried out for the previous application. As the design is generally in line with the previous application, the previous Stage 1 Stormwater Audit is acceptable, with the noted exception that the green roof provision has changed, as well as the climate change factor*.	No unbound material is proposed for areas adjacent to the front boundary. The SuDS detail Drg – C-1215 show details complaint with CIRIA C 753. i)-The drainage layout drawing C-1020 and & C-1021 gives plan & section detail for the drainage system including cover & invert levels, pipe gradients and diameters. j)- the system had been drawn using the Civil 3-D Software package which generates the long sections automatically and which also carries out clash checks automatically showing crossing pipework on the long sections. k)- in the current submission the proposed green roof area has been brought into line with the current development plan with the total extensive + intensive green roof coming to 74% of the roof area -see section 2.3.1. The calculations include a 20% allowance for climate change.

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