Residential Development at Riverside, Kilgobbin Road, Stepaside, Co. Dublin

Stage 1: Stormwater Drainage Audit – Pre-Planning Application

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Residential Development at Riverside,
Kilgobbin Road
S3 P02
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1 INTRODUCTION

RPS have been commissioned by Kavco to undertake a Stage 1 Sustainable Urban Drainage System (SuDS) Audit on a proposed Large-scale Residential Development (LRD) application to be submitted to Dún Laoghaire Rathdown County Council (DLRCC). This Stage 1 SuDS Audit has been undertaken to review the surface water drainage design and SuDS proposals for the residential development at Riverside, Kilgobbin Road, Stepaside, Co. Dublin.

1.1 Purpose

The purpose of this audit is to assess the proposed drainage strategy's compliance with the principles and criteria of sustainable Urban Drainage Systems.

The audit has been carried out in advance of the submission of the LRD application being made to DLRCC. This audit is based on the engineering report, associated surface water drainage and SuDS layout drawings, as provided by the Design Engineer for audit purposes. The aim of the audit is to identify any potential issues or omissions and to provide recommendations to ensure the drainage design achieves effective runoff management, water quality improvement and compliance with the Local Authority requirements prior to the submission of the LRD application.

The role of RPS Consulting Engineers in this project is that of an independent reviewer/auditor. RPS hold no design responsibility on this project. All issues raised and comments made by RPS are for the consideration of the Design Engineer. Final design, construction supervision, with sign-off and/or commissioning of the surface water system so that the final product is fit for purpose with a suitable design, capacity and lifespan, remains the responsibility of the Design Engineers.

1.2 Scope of Audit

In accordance with the requirements of Section 7.1.5 Stormwater Audit Procedures of the DLRCC County Development Plan 2022-2028, the scope of the Stormwater Audit process is to assess the drainage proposals for the subject development for conformity with the recommendations of the following:

- Greater Dublin Strategic Drainage Study (GDSDS),
- The SUDs Manual (CIRIA C753),
- Green Roof Policy (Appendix 7.2) of the County Development Plan 2022-2028,
- DLRCC Stormwater Management Policy,
- Greater Dublin Regional Code of Practice for Drainage Works,
- BRE Digest 365.

The Audit will focus on the SuDS management train and will assess whether the applicant has carefully considered all suitable SuDS techniques and applied the most appropriate type(s) for the site that will ensure improved water quality, biodiversity, a reduction of run-off rates, volume storage and volume control.

1.3 Report Structure

Section 2 of this document consists of the critical review and assessment of the SuDS measures as proposed to be integrated within the subject LRD residential planning application. All SuDS comments as raised within this section are shown in italics, with these queries then being included within the Feedback Form as included within **Appendix A**. Each item raised within the Feedback Form is to be responded to by the project Design Engineer, Molony Millar. All returned responses are required to receive a status of “Acceptable”, prior to the SuDS audit being deemed to be closed out.

2 PROPOSED HOUSING DEVELOPMENT AT KILGOBBIN ROAD, STEPASIDE, CO. DUBLIN

2.1 General

The proposed development is located at Riverside, Kilgobbin Road, Stepaside, Co. Dublin. The site is accessed from the west from Belarmine Vale. The Ballyogan Stream is located along the northern boundary, flowing in a west to east direction. The subject site is located near Kilgobbin Castle (in Ruins), Dún Laoghaire, Dublin 18. The total site area is 1.22ha.

Figure 2-1: Site Location

The proposed development is to consist of the following:

- 2no. apartment blocks providing a total of 107no. apartments as follows:
  - Block A, consisting of 40no. apartments,
  - Block B, consisting of 67no. apartments,
- Associated roads and car parking areas.

2.2 Review of Surface Water Drainage Proposals

2.2.1 Audited Documentation

The review is based on the following documents provided by Molony Millar on 7th July 2025.

- 1285-8 C01 Access Road and Parking Layout Plan, Rev M.
- 1285-8 C02 Foul & Surface Water Drainage Layout Plan, Rev Q.
- 1285-8 C03 Watermain Layout Plan, Rev M.
- 1285-8 C04 Road Typical Cross Section & Details, Rev B.
- 1285-8 C04-1 Road Longitudinal Sections, Rev C.
- 1285-8 C04-2 Access Road & Parking Road Markings & Signage, Rev C.
- 1285-8 C05 SW SUDS & Attenuation Related Details, Rev A.
- 1285-8 C06 Foul & Surface Water Drains Longitudinal Sections, Rev A.
- 1285-8 Kilgobbin Road Engineering Report, Rev B
- Site Investigation Report (by Site Investigations Ltd), Rev 0.

2.2.2 Site Characteristics

A detailed site-specific site investigation was conducted at Kilgobbin, Stepaside, Co. Dublin by Site Investigations Ltd, in November 2024. The findings of this site investigation indicate that the ground conditions comprise firm brown and brown-grey sandy, gravelly silty clay with cobbles overlying stiff black silty clay with cobbles, underlain by dense sandy gravel with cobbles, potentially weathered bedrock at depth. Three soakaway tests were also undertaken, all of which failed to meet infiltration criteria, indicating poor infiltration consistent with Soil Type 4 classification. Groundwater was encountered in most boreholes and one of the trial pits, at depths ranging from 0.80 m to 3.20 m below ground level.

The proposed detention pond is in an area characterized by deep clay and boulders, confirming poor to moderate infiltration capacity at this location. As such, the pond is designed as a lined detention basin with controlled discharge. The sites poor infiltration and variable groundwater levels will necessitate impermeable lining of SuDS features in vulnerable areas, larger attenuation volumes, and careful construction management including dewatering. Overall, infiltration is limited across the majority of the site. The general site gradient falls from south to north, influencing runoff flow paths and drainage design.

2.3 Key Considerations and Benefits of SuDS

The key benefits and objectives of SuDS considered as part of this audit are listed below:

- Water Quantity: managing flows and volumes to match the rainfall characteristics before development. Aiding in the prevention of flooding from outside the development, within the site and downstream of the development,
- Water Quality: preventing and treating pollution to ensure the clean water is available as soon as possible to provide amenity and biodiversity benefits,
- Amenity: enhancing people's quality of life through an integrated design that provides useful and attractive multi-functional spaces.
- Biodiversity: maximizing the potential for wildlife through design and management of SuDS.

These various benefits and objectives can be achieved by:

- Storing runoff and releasing it slowly (attenuation),
- Harvesting and using the rain close to where it falls,
- Allowing water to soak into the ground (infiltration),
- Slowly transporting (conveying) water on the surface,
- Filtering out pollutants,
- Allowing sediments to settle out by controlling the flow of the water.

2.4 Design Parameters

2.4.1 Rainfall Based Parameters

Rainfall parameters can be estimated using Met Eireann data, the Flood Studies Report (FSR) values and / or the values in the GDSDS. The Met Eireann method can be more representative of a site when selected correctly. The design values used by the client, and audited by RPS are shown in **Table 2-1** below:

Table 2-1: Design Meteorological and Hydrological Parameters

Rainfall Parameters	Client Values	RPS Comment
M5_60	18.10 mm	OK, conforms with Met Eireann Data
Ratio R	0.271	OK, conforms with Met Eireann Data
SAAR (mm)	1116 mm	Client value appears high, a value of 870mm is obtained from latest OPW Flood estimation package. Source Floodinfo.ie
Qbar l/s	3.40 l/s	3.38l/s output from UK SuDS. However, see comments below.
Climate Change	20%	OK, GDSDS recommends incorporating a minimum 10% adjustable factor, but CDP recommends an allowance of 20%.

According to the requirements of the GDSDS, the maximum allowable discharge rate for attenuation storage, where separate long-term storage is not feasible, should be the greater of Qbar or 2 litres/sec/ha. This conservative criterion supports the GDSDS's aim to reduce flood risk and environmental impact by ensuring that post-development runoff does not exceed, and ideally remains close to, natural greenfield runoff rates.

The Molony Millar engineering report cites a Qbar of 3.4l/s, which has been calculated using the HR Wallingford UKSuDS Greenfield runoff tool, which is a recognized method consistent with GDSDS. Outputs from this calculation are included in Appendix IV of the Molony Millar report. From interrogation of the value of 3.4l/s as proposed by Molony Millar, the following comments are provided:

2.4.1.1 Standard Average Annual Rainfall

The Molony Millar engineering report sites a SAAR value of 1116mm. This value seems inconsistent when compared to data from the latest flood estimate package released by the Office of Public Works (OPW). Under the latest revision of the Flood Study Update programme (FSU). An inaccurate assumption of SAAR value has a direct impact on the sites QBAR estimate, especially when coupled to that of incorrect WRAP soil type used as discussed in **Section 2.4.1.3** below.

Comment: *Molony Millar to justify the use of a proposed SAAR value of 1116mm. It is recommended that this value is revised as per the latest SAAR figures in close proximity of the proposed development.*

2.4.1.2 Contributing Area Assessment

Within the UK SuDS output as included in Appendix IV, a total site area of 1.22ha has been used to calculate the site's equivalent greenfield runoff rate. This total site area appears to include both the positively drained areas, and also the areas that will remain as greenfield and continue to contribute towards the Ballyogan Stream as greenfield runoff. The calculation for the allowable Qbar rate of runoff from the detention pond should be based on the positively drained contributing area only. If the site positively drained area is less than 1.22ha, then runoff for the developed site should be limited based on this reduced area. The use of the total site area in the Qbar calculation will overestimate the allowable rate of run-off from the development. From the engineering drawings and report provided, it is not clear what the contributing catchment area to the positively drained area is.

Comment: *Molony Millar is to clarify if the entire site area of 1.22ha is positively drained, or if a lesser area of the proposed site positively drained. It is also recommended that a catchment area drawing should be provided to clearly indicate the contributing area, for ease of visualization.*

2.4.1.3 Soil Classification

The Qbar calculated within the UK SuDS assessment utilizes a WRAP Soil Type 2. Soil type 2 is the default soil type allowed to the site area, when using the UK SuDS greenfield calculator. However, from the site-specific site investigation as undertaken, the SI would indicate the presence of silty clay material present in the area, which is indicative of WRAP Soil Type 4. The use of the WRAP Soil Type 2 results in a conservative estimate of Qbar.

Table 2-2 below is extracted from GDSDS Volume 2.

Table 2-2: Different Classes of Soil

SOIL	WRAP	Runoff	SOIL Value	Soil Characteristics
1	Very high	Very low	0.15	Sandy, well drained
2	High	Low	0.30	Intermediate soils (sandy)
3	Moderate	Moderate	0.40	Intermediate soils (silty)
4	Low	High	0.45	Clayey, poorly drained
5	Very low	Very high	0.50	Steep, rocky areas

Comment: *Molony Millar is to review the Soil WRAP type selected for the design, to ensure that it is consistent with the findings from the site-specific site investigation.*

2.4.2 Run-Off Coefficients

The engineering report highlights that runoff is derived using a sub-catchment approach, with runoff coefficients applied to discrete land use areas, aligning with GDSDS and CIRIA best practice. This methodology allows for more accurate estimation of runoff volumes and peak flows by accounting for the hydrological variability across the development site. **Table 2-3** below outlines the runoff coefficients as used within the design, with comments provided on same.

Table 2-3: Run-Off Coefficients used by Applicant

Surface Type	Client Values	RPS Comment
Green Roof	65%	Section 3 of Appendix 7.2 of the CDP recommends the following runoff factors: • Extensive Roof: 0.917 • Intensive Roof: 0.834
Roads	80%	OK, CIRIA C753 SUDS Manual recommends a runoff factor of 0.75 for roads and pavements
Landscaping	15%	Would appear low, based on the ground conditions encountered

The engineering report applies reasonable but simplified runoff coefficients compared to CIRIA C753 guidance to which the GDSDS refers to. For enhanced accuracy and optimal design, it is recommended that a larger variety of runoff coefficients should be used, as generalization can lead to oversimplifications or risk of overestimation of peak flow.

The Molony Millar report does not differentiate between the runoff coefficients as required for both the extensive and intensive green roofs as provided within the design. The coefficient as used would appear to be less onerous than those as set out within the CDP requirements. The landscaping (grass) value of 0.3 might seem low for a SPR value of 0.47 and it could be expected that the SPR value would be applied to contributing grassed areas. No specific runoff coefficient is provided for the permeable paving provided.

Comment: *Molony Millar to review the runoff coefficients employed within the design to ensure they are consistent with the requirements of the CDP and CIRIA guidance documents. Molony Millar to confirm if a Cv value of 0.3 for grassed areas is adequate for this site with SPR of 0.47.*

2.4.3 Application of Climate Change Growth Factor

The engineering report indicates that a 20% climate change factor has been applied to drainage calculations. The application of a 20% allowance for climate change is in line with the requirements for Section 7.1.1 of Appendix 7.1 Stormwater Management Policy - Including Stormwater Audit Procedure of the CDP, which states that *"All developments must apply a minimum factor of 1.2 to their drainage design and attenuation volumes to accommodate climate change."* However, this allowance has been applied directly to the storage volume, post the completion of the design assessment for same.

Comment: *It is recommended that the climate change allowance is factored into meteorological rainfall inputs rather than calculated storage volumes as the engineering report would suggest.*

2.4.4 Application of Urban Creep Requirement

The CDP requires all developments to apply a factor of 1.1 to their drainage design and attenuation volumes to account for urban creep. The application of an urban creep allowance is to accommodate potential future increases in impervious surfaces. The application of a 10% allowance for urban creep is set out in Section 7.1.1 of Appendix 7.1 Stormwater Management Policy - Including Stormwater Audit Procedure of the CDP, which states that *"All developments must apply a factor of 1.1 to their drainage design and attenuation volumes to accommodate urban creep."* No evidence of the application of this requirement is seen within the submitted calculations.

Comment: *Molony Millar is to review the requirements to allow for urban creep within the design, to ensure that it is consistent with the requirements of the County Development Plan.*

2.5 Surface Water Drainage Strategy

The Surface Water Management Strategy for the proposed development is divided into three distinct sub-catchments, each with its own individual discharge limit based on contributing area. This allows for more precise control and attenuation sizing targeted to specific drainage areas, only given that the modelling inputs are correctly applied. The sub-catchments included are as follows:

- Roof Attenuation Block A,
- Roof Attenuation Block B,
- Ground Floor External Attenuation.

These three sub-catchments are attenuated separately to the surface water network. The proposed maximum outflow from Roof Attenuation Block A, Roof Attenuation Block B and the Ground Floor External; Attenuation catchments is 0.5l/s, 0.5l/s and 2.4l/s respectively. Accordingly, the combined outlet discharge value from the final detention pond to the outfall to the Ballyogan Stream sums to 3.4l/s, which is equal to the Molony Millar estimated Qbar value for the site. However, further to the findings outlined in **Section 2.4** above, it is recommended that these values be revisited by Molony Millar.

A SuDS management system has been proposed by Molony Millar, but it is lacking in potential additional SuDS measures that could be provided to improve the ability of the scheme to achieve the general principles and aims of SuDS. A pollutant analysis has not been undertaken. A review of the proposals is considered in more detail in **Section 2.5.2** below.

Pipe size calculations have been provided for the surface water sewer pipe, in the form of a simple hydraulic model to validate network performance. The sizing is broadly consistent with best practice guidance from GDSDS, CIRIA, and DLRCC. Pipe diameters, cover depths, and initial runoff assumptions conform to regional criteria. However, the presence of some pipe reaches with velocities below the recommended self-cleansing threshold (1.0 m/s) indicates a potential risk for sediment accumulation, which may necessitate design refinement or enhanced maintenance regimes. No simulation type calculations have been provided to demonstrate how the surface water network will perform in storms of 5, 30 and 100 year return periods.

In line with the poor infiltration properties as encountered in the site investigation, no infiltration properties have been included in the drainage design.

A HydroBrake flow control device is incorporated to limit peak discharge rates to greenfield runoff rates consistent with local and national guidance policies.

2.5.1 SuDs Management Train

A SuDs Management Train is a robust pollutant removal strategy. The treatment train comprises of four stages in series designed to effectively manage and treat runoff, listed as follows:

1. Prevention,
2. Source Control,
3. Site Control,
4. Regional Control.

In the engineering report, a SuDS management train approach has been generally incorporated, with multiple SuDS components addressing the majority of runoff, including green/blue roofs, permeable paving and retention pond. However, the report does not explicitly demonstrate the full management train coverage for all runoff areas. Additionally, a formal pollutant hazard analysis, such as a 'Simple Index Approach' has not been clearly presented.

Comment: *Further clarification is recommended to confirm comprehensive application of the SuDS management train and appropriate pollutant hazard assessment consistent with best practice.*

2.5.2 SuDS Measures Considered

SuDS Technology	Comments
Green/Blue Roofs	A drawing detailing the green roof coverage has been provided by Molony Millar. However, the coverage percentage is not clear. It is recommended that a calculation is submitted demonstrating the percentage coverage of the roof area noting the minimum coverage requirement of Appendix 7.2: Green Roof Policy of the County Development Plan 2022-2028. Which states that the minimum coverage in terms of percentage total roof area should be minimum 70% for extensive green roof and 50% for intensive green roof.
Swale, Filter Drain, Infiltration Trench	No swales, filter drains or infiltration trenches are proposed. Instead, surface water runoff from roads is managed primarily through conventional gullies and drainage pipes connected to attenuation storage. Filter drains alongside roads and landscaped areas should be considered as a standard SuDS element for first-flush interception across the site.
Tree Pits, Bioretention Areas, Rain Gardens	No tree pits, bioretention or rain garden areas are proposed. Instead, the site relies primarily on a detention basin for stormwater attenuation complemented by green/blue roofs and permeable paving. These technologies should be considered for use across the site where feasible.
Permeable Paving	Permeable paving is proposed for the car parking areas.
Soakaways	No soakaways are proposed, following failed infiltration tests indicating poor soil permeability.
Detention Basins, Retention Ponds, Stormwater Wetlands	A detention basin is proposed on site, designed to accommodate the 100-Year storm event including a climate change allowance. The basin incorporates a Hydro Brake flow control device to limit discharge rates, functioning primarily as an attenuation storage facility rather than relying on infiltration.
Rainwater Harvesting	None proposed.
Petrol Interceptor	Impermeable asphalt roads are provided with road gullies, discharging via a bypass petrol interceptor located upstream of the detention basin.
Attenuation	The attenuation strategy relies primarily on a detention basin sized for the 100-Year storm plus climate change, with a Hydro Brake flow control device to limit discharge rates to adequate greenfield runoff levels.
Other	None Identified.

The SuDS management train for the proposed development relies on the provision of blue/green roofs and a detention basin. The current proposal lacks in sufficient soft SuDS measures, particularly along road sections. It is considered that there is potential to include for additional SuDS measures within the scheme to supplement the SuDS management train, such as tree pits, rain gardens or swales.

Comment: *Molony Millar to consider the provision of additional SuDS measures within the scheme, such as swales, tree pits, bioretention areas and rain gardens where feasible.*

2.5.3 Review of Drainage Drawing 1285-8-C02 and SuDS Drawing 0285-8-C05

Permeable paving is proposed for the car parking areas. No subsurface drainage arrangement or overflow connections to the proposed surface water network are shown. Given the site's poor soil permeability and variable, sometimes high, groundwater table, it is unclear how these areas can drain. Given these subsurface conditions, the permeable paved areas adjacent to buildings or sensitive zones are likely to require impermeable lining to prevent potential contamination of

groundwater. A filter underdrain system that conveys collected runoff to the centralized stormwater management facility should be considered to ensure effective drainage and water quality protection.

Comment: *Molony Millar to consider the practicalities of draining the subbase of the impermeable hardstanding, given the impermeable nature of the subsoil under and the lack of a positive drainage system.*

While the location and size of the detention pond is shown on the drainage drawing, no information in relation to the top water level (TWL) anticipated in a 100 Year storm event is proposed. No levels on the top and bottom levels of the edge slopes are provided. It is therefore not possible to consider the level of freeboard provided by the detention pond during a 100 Year storm event, to assess the suitability of the FFLs as provided.

Comment: *Molony Millar to provide a specific drawing outlining the proposed details of the detention pond, which should include all structural levels along with details of the estimated TWL during a 100 Year storm event.*

While the detention pond has been designed for the 100 Year storm event, there are no details shown as to an overflow structure to be utilised in the event of an exceedance of the provided tank storage volume.

Comment: *Molony Millar to clarify the proposal for any potential overflow event that may occur, should the 100 Year pond capacity be exceeded during extreme events.*

The natural direction of watershed of the finished surface is indicated on the drainage drawing. While the lands to the north-east of the pond are shown to drain away from the pond and adjacent buildings towards the receiving waterbody, the flow path to the south-east, towards the adjacent private property is unclear. There, it is not clear that any blockage in the outlet pipework, or indeed any exceedances in the capacity of the pond will not result in overland flow towards this adjacent, private property.

Comment: *Molony Millar to clarify the level of protection as provided to the adjacent private residence, should there be an incidence of overland flow from the detention pond.*

Drawing 1285-8-C05 Surface Water SuDS & Attenuation Related Details includes a detail of a filter drain. However, no filter drain is shown on the corresponding plan drawing.

Comment: *Molony Millar to clarify the provision, if any, of filter drains within the scheme.*

2.5.4 Review of Engineering Report

Section 3.3 of the report notes that treatment storage is not required, if interception storage is required. While Section 3.3.1 advises that interception storage is provided via the green/blue roofs, permeable paving and the grassed unlined detention basin, no supporting calculations are provided to indicate that sufficient interception storage is provide within the design.

Comment: *Molony Millar to confirm volume of interception storage as provided within the various measures proposed to ensure they meet the requirements for interception storage.*

The design uses a Qbar value of 3.4l/s. As per the comments made in **Section 2.4** above, it is recommended that this value be revisited to reflect the contributing area and the site-specific soil type as encountered in the site investigation.

Comment: *Molony Millar to review and confirm Qbar calculations for the proposed site.*

No site-specific HydroBrake details or flow/depth curve has been included within the engineering report. The orifice sizing must balance between sufficiently restricting flows to prevent downstream flooding while avoiding upstream surcharge or basin overtopping, while also ensuring it is suitably sized to limit the potential, for blockages occurring.

Comment: *Molony Millar to consider including site specific HydroBrake performance characteristics within the hydraulic model. Full details of proposed HydroBrake are required, including orifice diameters, design head, material and maintenance access.*

2.5.5 Review of Hydraulic Model

Hydraulic design results are provided in the Appendix III and IV of the Molony Millar engineering report. An area summary includes for surface type breakdown with Cv value applied:

- 20% climate change allowed for in volume predictions for 100–year storm.
- A Hydro Brake is proposed to limit site discharge to Qbar.

Comment: *Some queries for Molony Millar to address are listed below:*

- It is recommended that seasonal variability is considered (winter vs summer rainfall patterns) stipulating the systems dynamic behaviour. Running the model for multiple storm durations will identify which storm duration is critical for attenuation and pipe design, rather than relying solely on Met Eireann data and uniform runoff,
- It is recommended that a detailed hydraulic model is used to simulate a range of storm events to verify pipe velocities, surcharging risks and overall system resilience,
- The positively drained area used for attenuation tank sizing and sum of areas contributing to storm network sizing should be consistent,
- Attenuation storage volumes and flow control device specifications should be cross validated against detailed hydraulic modelling outputs such as those generated by MicroDrainage or similar software, to verify design robustness and compliance with discharge limits.
- As referenced in **Section 2.4.3** above, 20% allowance for climate change should not be directly applied to estimated volume needing attenuation. Instead, the climate allowance should be applied to meteorological inputs of the model,
- As referenced in **Section 2.4.3** above, an additional allowance of 10% for urban creep should be allowed for within the drainage design,
- Full details of proposed HydroBrake are required, including orifice diameters, design head, material and maintenance access. Hydro Brake performance must be validated considering blockage scenarios,
- It is recommended that the hydraulic model is re-run with revisited Cv values to align precisely with requirements of the CDP and CIRIA C753.
- Have surcharging effects been evaluated in hydraulic modelling process? Does the design model demonstrate no flooding for 30-year storm return periods and no property flooding for 100-year event?
- It is generally good practice to include silt trap manholes on site prior to by-pass separators for areas prone to sediment-laden runoff.

2.5.6 Interception/Treatment

Interception of runoff is intended to prevent small rainfall events which are less than 5mm (and up to 10mm if possible), with treatment volumes for 15mm required if interception is not provided. Interception mechanisms rely on runoff retention through storage, infiltration, or evapotranspiration to enable event capture.

Section 3.3.1 of the Molony Millar report considers the requirements for *Interception Storage*. This section notes that treatment storage is not required, if interception storage is required. While Section 3.3.1 advises that interception storage is provided via the green/blue roofs, permeable paving and the grassed unlined detention basin, no supporting calculations are provided to indicate that sufficient interception storage is provide within the design.

Various assumed compliance scenarios are set out in *Table 24.6 Interception Mechanisms* (CIRIA C753) which can be used for assessing interception compliance for numerous differing drainage systems.

Comment: *Molony Millar to confirm volume of interception storage as provided within the various measures proposed is sufficient to meet the requirements of interception storage, while taking account of Table 24.6 Interception Mechanisms of CIRIA C753.*

2.5.7 Exceedance Flows

The natural watershed of the finished surfaces within the proposed development has been shown on drawing 1285-8-C02. However, no specific drawing has been provided detailing overland flow routes in case of blockages, etc. While the lands to the north-east of the pond are shown to drain away from the pond and adjacent buildings towards the receiving waterbody, the flow path to the south-east, towards the adjacent private property is unclear. There, it is not clear that any blockage in the outlet pipework, or indeed any exceedances in the capacity of the pond will not result in overland flow towards this adjacent, private property.

Comment: *Molony Millar to clarify the level of protection as provided to the adjacent private residence, should there be an incidence of overland flow from the detention pond.*

2.6 Health and Safety and Maintenance Issues

The proposed drainage system comprises SuDS devices, traditional road gullies, manholes, attenuation systems, a petrol interceptor and underground pipes. These elements are considered acceptable from a Health and Safety perspective once supplier/manufacturers guides are followed and complied with during the detailed design, construction and operation.

Optimum performance of the SuDs treatment train is subject to the frequency of maintenance provided. At detailed design stage, it is recommended that a suitably assessed maintenance regime be adopted.

Particular consideration is required at detailed design stage to the design, maintenance requirements and whole life plan (and replacement) of the SuDS system as a whole.

Regular maintenance of the Hydro Brake will be required to remove any blockages, particularly after any heavy rainfall events or local floods.

It is recommended that the petrol interceptors be fitted with an audible high-level silt and oil alarm for maintenance and safety purposes. Regular inspection and maintenance are recommended for the petrol interceptor.

Please note that silt and debris removed from the petrol interceptor during maintenance will be classified as contaminated material and should only be handled and transported by a suitably licensed contractor and haulier and disposed of at a suitably licensed landfill only.

2.7 Items to be Considered at Detailed Design Stage

There are several items that require attention at detailed design stage. A summary of same are as follows:

- Hydro Brake flow control device selection to be given due consideration to hydraulic performance, actual head behind the unit, maximum potential clear passage size and maintenance requirements.,
- Medium and long-term Operation and Maintenance requirements for all drainage components on site, and ensure access for cleaning HydroBrake, petrol interceptors, gullies and SuDS features,
- Proper detail design and construction of SuDS features is an essential requirement to ensure long term optimum hydraulic performance, in addition to the maximizing of the biodiversity opportunities provided by the use of SuDS measures. It is recommended that a collaborative approach is utilized, between engineers, architects, ecologists and landscape architects.
- Assess and address any potential pollutant hazards.

APPENDIX A

Stormwater Audit – Stage 1 Feedback Form

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RPS Consulting Engineers - Stormwater Audit - Stage 1 Feedback Form	
Project :	Development at Riverside, Kilgobbin Road, Stepaside, Co. Dublin
Date :	04/09/2025
RPS Reviewers :	TK , GMcC
Status :	S3 P02
Project Reference :	IE002435

Item No.	RPS Review Comment	Comment / Clarification Request / Suggested Mitigation	Response from Clients Representative	Acceptable / Not Acceptable
1	**Evaluation of Qbar for the Development** 1) The Molony Millar Engineering Report uses a 1.22ha site area to calculate the sites equivalent greenfield runoff rate. 2) The Molony Millar engineering report sites a SAAR value of 1001mm. This value appears high, when compared to data from the latest flood estimate package released by the Office of Public Works (OPW). Under the latest revision of the Flood Study Update programme (FSU). 3) The Qbar calculated within the UK SuDS assessment utilizes a WRAP Soil Type 2. Soil type 2 is the default soil type allowed to the site area, when using the UK SuDS greenfield calculator. 4) The engineering report applies reasonable but simplified runoff coefficients compared to CIRIA C753 guidance to which the GDSDS refers to	1) Molony Millar to clarify if the entire site area of 1.22ha is positively drained, or if a lesser area of the proposed site positively drained. It is also recommended that a catchment area drawing should be provided to clearly indicate the contributing area, for ease of visualization. 2) Molony Millar is to justify the use of a SAAR value of 1001mm. It is recommended that this value is revised as per the latest SAAR figures in close proximity of the proposed development. 3) Molony Millar to review the Soil WRAP type selected for the design, to ensure that it is consistent with the findings from the site-specific site investigation. 4) Molony Millar to review the runoff coefficients employed within the design to ensure they are consistent with the requirements of the CDP and CIRIA guidance documents. Molony Millar should confirm if a Cv value of 0.3 for grassed areas is adequate for this site with SPR of 0.47.	1). Updated to 1.08ha on the revised set of drawings/reports. 2) The SAAR Value of 876mm was taken from data provided by the OPW Flood Studies Update (FSU) at the ungauged node location 10_1211_1 (close to the subject site). 3) Soil type 4 considered on the updated set of drawings/calculation. 4) The runoff coefficient of 0.4 has been considered in the latest report.	Acceptable
2	**Surface Water Drainage Strategy** 1) The CDP requires all developments to apply a factor of 1.1 to their drainage design and attenuation volumes to account for urban creep. The application of an urban creep allowance is to accommodate potential future increases in impervious surfaces. The application of a 10% allowance for urban creep is set out in Section 7.1.1 of Appendix 7.1 Stormwater Management Policy - Including Stormwater Audit Procedure of the CDP. 2) Permeable paving is proposed for the car parking areas. No subsurface drainage arrangement or overflow connections to the proposed surface water network are shown. 3) The natural direction of watershed of the finished surface is indicated on the drainage drawing. While the lands to the north-east of the pond are shown to drain away from the pond and adjacent buildings towards the receiving Ballyogan Stream, the flow path to the south-east, towards the adjacent private property is unclear. There, it is not clear that any blockage in the outlet pipework, or indeed any exceedances in the capacity of the pond will not result in overland flow towards this adjacent, private property. 4) The drawing 1285-8-C05 Surface Water SuDS & Attenuation Related Details includes a detail of a filter drain. However, no filter drain is shown on the corresponding plan drawing. 5) It is generally good practice to include silt trap manholes on site prior to by-pass separators for areas prone to sediment-laden runoff.	1) Molony Millar to review the requirements to allow for urban creep within the design, to ensure that it is consistent with the requirements of the County Development Plan. 2)Molony Millar to consider the practicalities of draining the subbase of the impermeable hardstanding, given the impermeable nature of the subsoil under and the lack of a positive drainage system. 3) Molony Millar to clarify the level of protection as provided to the adjacent private residence, should there be an incidence of overland flow from the detention pond. 4) Molony Millar to clarify the provision, if any, of filter drains within the scheme. 5) Molony Millar to consider incorporation of silt trap manholes.	1) We have revised our drainage calculation to include the 10% urban creep. 2) We have adressed this item and it is now incluueded in our latest set of drawings. Collection drains beneath the permeable paving and filter drains have been provided. 3) An overflow pipe has been added to the detantion basin. An overflow pipe discharges via a weir in Manhole S5, set at level +102.25m. Refer to drawing C02. 4) Filter drains are shown on the drainage drawing (south of block B). Refer to drawing C02. 5) Manhole S2 is now a silt trap manhole. Refer to drawing C20.	Acceptable
3	**SuDS Management Train** 1) In the engineering report, a SuDS Management Train approach has been generally incorporated, with multiple SuDS components addressing the majority of runoff, including green/blue roofs, permeable paving and retention pond. However, the report does not explicitly demonstrate the full management train coverage for all runoff areas. Additionally, a formal pollutant hazard analysis, such as a 'Simple Index Approach' has not been clearly presented. 2) The current proposal lacks in sufficient soft SuDS measures, particularly along road sections.	1) Further clarification is recommended to confirm comprehensive application of the SuDS management train and appropriate pollutant hazard assessment consistent with best practice. 2) Molony Millar to consider the provision of additional SuDS measures within the scheme, such as swales, tree pits, bioretention areas and rain gardens where feasible.	1) The updated engineering report will have a narritive describing all the Suds Measures 2) Additional Suds measures as tree pits/ filter drains and rain gardens have been included on the latest set of drawings/reports. Swale wasn't possible due to the existing of mature trees on the south boundary. A swale has been included instead along the northern boundary.	Acceptable
4	**Engineering Report** 1) Section 3.3 of the report notes that treatment storage is not required, if interception storage is required. While Section 3.3.1 advises that interception storage is provided via the green/blue roofs, permeable paving and the grassed unlined detention basin, no supporting calculations are provided to indicate that sufficient interception storage is provide within the design. 2) No site-specific HydroBrake details or flow/depth curve has been included within the engineering report. The orifice sizing must balance between sufficiently restricting flows to prevent downstream flooding while avoiding upstream surcharge or basin overtopping, while also ensuring it is suitably sized to limit the potential, for blockages occurring.	1) Molony Millar to confirm volume of interception storage as provided within the various measures proposed to ensure they meet the requirements for interception storage. 2) Molony Millar to consider including site specific HydroBrake performance characteristics within the hydraulic model. Full details of proposed HydroBrake are required, including orifice diameters, design head, material and maintenance access.	1) Tree pits and permeable paving are collecting the road/impermeable surface, and it provides enough storage for the first 5mm of rainfall. 2) These details will be included on the final engineering report (Site 3D model in Appendix 5).	Acceptable

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RPS Consulting Engineers - Stormwater Audit - Stage 1 Feedback Form	
Project :	Development at Riverside, Kilgobbin Road, Stepaside, Co. Dublin
Date :	12/08/2025
RPS Reviewers :	TK , GMcC
Status :	S3 P01
Project Reference :	IE002435

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5	**Hydraulic Model Review** Hydraulic design results are provided in the Appendix III and IV of the Engineering Report. Queries for Molony Millar to address on the hydraulic model are listed adjacent.	•It is recommended that a detailed hydraulic model is used to simulate a range of storm events to verify pipe flow versus capacity, velocities, surcharging risks and overall system resilience, •It is recommended that seasonal variability is considered (winter vs summer rainfall patterns) stipulating the systems dynamic behaviour. Running the model for multiple storm durations will identify which storm duration is critical for attenuation and pipe design, rather than relying solely on Met Eireann data and uniform runoff, •The positively drained area used for attenuation tank sizing and sum of areas contributing to storm network sizing should be consistent, •Attenuation storage volumes and flow control device specifications should be validated against detailed hydraulic modelling outputs such as those generated by MicroDrainage or similar software, to verify design robustness and compliance with discharge limits. •It is recommended that the hydraulic model is re-run with revisited Cv values to align precisely with requirements of the CDP and CIRIA C753. •Have surcharging effects been evaluated in hydraulic modelling process? Does the design model demonstrate no flooding for 30-year storm return periods and no property flooding for 100-year event? • It is recommended that the climate change allowance is factored into meteorological rainfall inputs rather than calculated storage volumes as the engineering report would suggest.	1) The results of the hydraulic model will be included on the final report (Site 3D model in Appendix 5).	Acceptable
6	**Interception and Treatment** 1) Section 3.3.1 of the Engineering Report considers the requirements for Interception Storage. This section notes that treatment storage is not required, if interception storage is required. While Section 3.3.1 advises that interception storage is provided via the green/blue roofs, permeable paving and the grassed unlined detention basin, no supporting calculations are provided to indicate that sufficient interception storage is provide within the design.	1) Molony Millar to confirm volume of interception storage as provided within the various measures proposed is sufficient to meet the requirements of interception storage, while taking account of Table 24.6 Interception Mechanisms of CIRIA C753.	1) The impermeable area that requires interception storage (paved road) is being provided by the tree pits and permeable paving.	Acceptable
7	**Exceedance Flows** 1) The natural watershed of the finished surfaces within the proposed development has been shown on drawing 1285-8-C02. However, no specific drawing has been provided detailing overland flow routes in case of blockages, etc. While the lands to the north-east of the pond are shown to drain away from the pond and adjacent buildings towards the receiving waterbody, the flow path to the south-east, towards the adjacent private property is unclear. There, it is not clear that any blockage in the outlet pipework, or indeed any exceedances in the capacity of the pond will not result in overland flow towards this adjacent, private property. 2) While the location and size of the detention pond is shown on the drainage drawing, no information in relation to the top water level (TWL) anticipated in a 100 Year storm event is proposed. 3) While the detention pond has been designed for the 100 Year storm event, there are no details shown as to an overflow structure to be utilised in the event of an exceedance of the provided tank storage volume.	1) Molony Millar to clarify the level of protection as provided to the adjacent private residence, should there be an incidence of overland flow from the detention pond. 2) Molony Millar is to provide a specific drawing outlining the proposed details of the detention pond, which should include all structural levels, along with details of the estimated TWL during a 100 Year storm event. 3) Molony Millar is to clarify the proposal for any potential overflow event that may occur, should the 100 Year pond capacity be exceeded during extreme events.	1) the detention basin has an overflow pipe to the stream. Which will reduce/mitigate the risk of overflow of the adjoining sites. 2) Maximum water level of the detention basin (+102.25m [650mm deep]) is shown on drawing C21. 3) As per item above, overflow pipe is provided. Level and detail ise shown on drawing C21.	Acceptable