KAVANAGH BURKE
CONSULTING ENGINEERS

SUDS Management Plan

for

Warehouse Development

at

Magna Drive,

Citywest,

Dublin 24

Job No:	**D1720**
Date:	**May 2024**
Client:	**Rockface Development Limited**
Local Authority:	**South Dublin County Council**




INTRODUCTION

The subject site is located in Citywest at Magna Drive. The site will be serviced primarily through connections with the existing services in Magna Drive.

SURFACE WATER RUNOFF MANAGEMENT

The surface water runoff generated from the proposed development will be routed through Sustainable Urban Drainage System (SuDS) elements. These elements will promote runoff interception, detention and infiltration at source before runoff reaches the attenuation system. The flow control device will be installed on the outfall of the proposed site drainage system designed to attenuate 1 in 100 years storm event of any duration (+20% climate change factor). Therefore, no flooding on or off the site will be caused by the runoff originating from the development in the event of storm up to 1 in 100 years return. Since the temporary flood storage forms a part of the overall attenuation volume, the maximum allowable discharge was limited to the green filed runoff rate below QBAR as per criterion 4.3 "River Flood Protection" chapter 6.3.4 of GDSDS. All flows and volumes for the storm water network design and the attenuation sizing were calculated with a 20% climate change factor applied to all rainfall intensities. We have treated all permeable paving as impervious areas to account for permeable paving loss of performance over time. For the calculations purpose a conservative approach was taken and all permeable paving areas were deemed impervious.

A proprietary Petrol Interceptors and Silt Traps will be provided on the inlets to the proposed attenuation system to improve the runoff quality and prevent contaminations from the yard percolating into subsoil.

In majority of rainfall events the maximum calculated discharge rate will not be achieved. Only the excess SW runoff from the site (that was not disposed in the provided SUDS devices) will be discharging to the receiving SW network. The proposed flow control device will only achieve maximum flow in the rainfall event utilising full calculated attenuation volume. The attenuation capacity of the permeable paving and other SUDS features wasn't included in the calculations and 20% climate change factor was included (exceeding the 10%CCF stipulated in GDSDS) adding to the factor of safety for the proposed attenuation and drainage network.

Nature based runoff disposal solution was incorporated to comply with requirements of the South Dublin County Council SuDS Explanatory, Design and Evaluation Guide and to promote interception losses. Low intensity rainfall events will be intercepted in the provided permeable paving and unlined detention basin. Majority of storm water runoff is generated by low intensity rainfall events therefore we should only observe storm water being discharged to the receiving storm water network if the rainfall will exceed the capacity for storage and infiltration of the SuDS devices and interception storage built into attenuation system. This exceedance flow will be discharged to an existing storm water network in absence of the nearby watercourses that could potentially receive the SW runoff.

Storm water runoff losses through infiltration will occur in SUDS features.However, the proposed detention basin design is conservative and did not take any infiltration losses into account for attenuation volume calculations.

For detailed storm water network, SUDS and attenuation layout refer to drawing Ref. D1720-C0003-CL1.

RUNOFF TREATMENT MANAGEMENT TRAIN

The treatment train approach was applied to the storm water network and attenuation design to ascertain that both the runoff quality and quantity are appropriately addressed. An array of techniques has been used to fulfil the requirements of each element of the treatment train:

Pollution prevention – To prevent chemicals and other pollutants from contaminating the rainfall runoff, a maintenance regime for the proposed development will be established and it will include regular sweeping of the site and collection of rubbish. Waste bins provided will be watertight and will incorporate lids or will be located in designated bin storage to prevent the rainfall flushing the contaminants out of them. Proprietary silt trap and petrol interceptor will be provided on the surface water drainage network to intercept debris, silts and hydrocarbons and prevent them from entering the attenuation tank and from being discharged to the soil or receiving watercourse.

Source control – To detain and infiltrate the runoff as close as possible to the point of origin, we have included the following infiltration SUDS devices:

- Permeable surfacing
- Landscaping
- Detention Basin

The above mentioned devices are explained in greater detail in the next chapter.

Site control – To deal with as much of the runoff as possible within the site, all storm water runoff will be intercepted in the Suds devices (permeable surfacing and detention basin). Storm water runoff from all impervious surfacing will be routed through various SuDS devices allowing for runoff interception and disposal through infiltration. The excess of runoff will be channelled to attenuation system where it will be allowed to infiltrate through permeable base into subsoil.

Regional control – to mimic the behaviour of the green field site and protect the receiving watercourse, the attenuation is designed to cater for all durations of rainfall

up to 100-year return period for the purpose of minimising on-site and offsite flooding.

SUDS DEVICES

During the surface water drainage design process, a matrix of possible SUDS devices and their environmental benefits were analysed to decide on which of these elements were suitable for inclusion in the proposed development. The following is our review of these devices;

0 - unlikely benefit
1 – maximum benefit could be achieved in some cases with good design
2 – likely benefit

	Green and Blue Roofs	Rain harvesting	Rain gardens	Bioretention rain gardens	SuDS tree pits	Permeable surfaces	Swale	Filter drains	Channels and rills	Filter strips	Basins	Wetlands and ponds	Storage structures
Quantity	1	1	1	1	1	2	2	2	1	0	2	2	2
Quality	2	0	1	2	2	2	2	2	1	1	2	2	0
Amenity	1	2	2	2	2	2	1	0	1	1	2	2	0
Biodiversity	2	0	2	2	2	0	2	0	1	1	1	2	0

Figure 1 Sustainable Drainage Explanatory Design & Evaluation Guide 2022 – Table of Biodiversity and Amenity Value of different SUDS components.

SUDS devices incorporated in the storm water network and attenuation design:

Pervious paving is proposed to all carparking spaces and pedestrian circulation areas throughout the development allowing storm water infiltration into underlying stone and soil. This device not only reduces the quantity of runoff but it also has a positive impact on runoff quality. Due to the shallow nature of the underlying build-up, permeable paving can be utilised even on sites with high ground water levels where other deeper infiltration devices would not work. According to CIRIA 697 SUDS Manual: “Pervious surfaces, together with their associated substructures, intercept surface water runoff and provide a pollutant treatment medium prior to discharge to receiving waters. Treatment processes that occur within the

surface structure, the subsurface matrix (including soil layers where infiltration is allowed) and the geotextile layers include:

- filtration
- adsorption
- biodegradation
- sedimentation."

High amenity value and unlikely biodiversity benefits

Detention Basin are surface storage basins or facilities that provide flow control through attenuation of stormwater runoff. They can also facilitate some settling of particulate pollutants. Detention basins are normally dry and in certain situations the land may also function as a recreational facility.

High amenity value and moderate biodiversity benefits

In addition to the above SuDS devices, pre-treatment components such as "Surf-Sep" or equivalent vortex debris and silt particle separator and "Klargester" or equivalent oil separator are proposed to collect sediments and pollutants and treat the surface water runoff from areas of possible hydrocarbons spills that are exposed to rainfall. All runoff from carriageways, roofs and any hardstanding areas will pass through the Surf-sep vortex debris and silt particle separator which according to manufacturer's specification has potential for capturing more than 95% of solid pollutants (see brochure attached).

Downstream of the detention basin, a flow control device will be provided which is designed to restrict the discharge from the site to ensure the green field runoff rate is not exceeded. The proprietary pre-treatment devices, petrol interceptor and silt trap, will ensure that good quality discharge will be provided with ease of inspection and maintenance ensuring a long efficient service life.