Comhairle Contae
Fhine Gall
Fingal County
Council

Fingal County Council

Green & Blue Roof Guide

Contents

Retrofit green roof, Fortnam and Mason, credit Biophilic Design

Preface

Why this guide is needed?

Fingal County Council (FCC) has introduced a Green Roof Policy as part of the Fingal Development Plan 2023 – 2029 (Development Plan). The potential of green and blue roofs has been recognised by FCC as a means of delivering against multiple policy objectives relating to flood risk, climate change, amenity and biodiversity, particularly where availability of space is limited.

FCC promotes the incorporation of Sustainable Drainage into developments, and the use of green blue roofs plays a key role in supporting delivery of a range of objectives including Objectives IUO12 & DMSO206.

The development of this guidance discharges commitment F14 of the Fingal Climate Action Plan (2024-2029).

Who this guide is intended for?

This Guide is primarily intended for those designing green blue roofs for new developments. The Guide will also support the planning review process, where green blue roof proposals are assessed by FCC against the objectives set out in the Development Plan.

What the guide provides

This Guide confirms the requirements which FCC will apply when reviewing green and blue roof designs which form part of planning applications.

This Guide provides high level guidance along with signposting other useful documents. This Guide should not be viewed as a substitute for more extensive and detailed guidance.

Meakstown Community Centre at Lanesborough Park

Cover: Bord Gais green roof

1.0 Introduction

1.1 Why Green and Blue Roofs are essential for Fingal

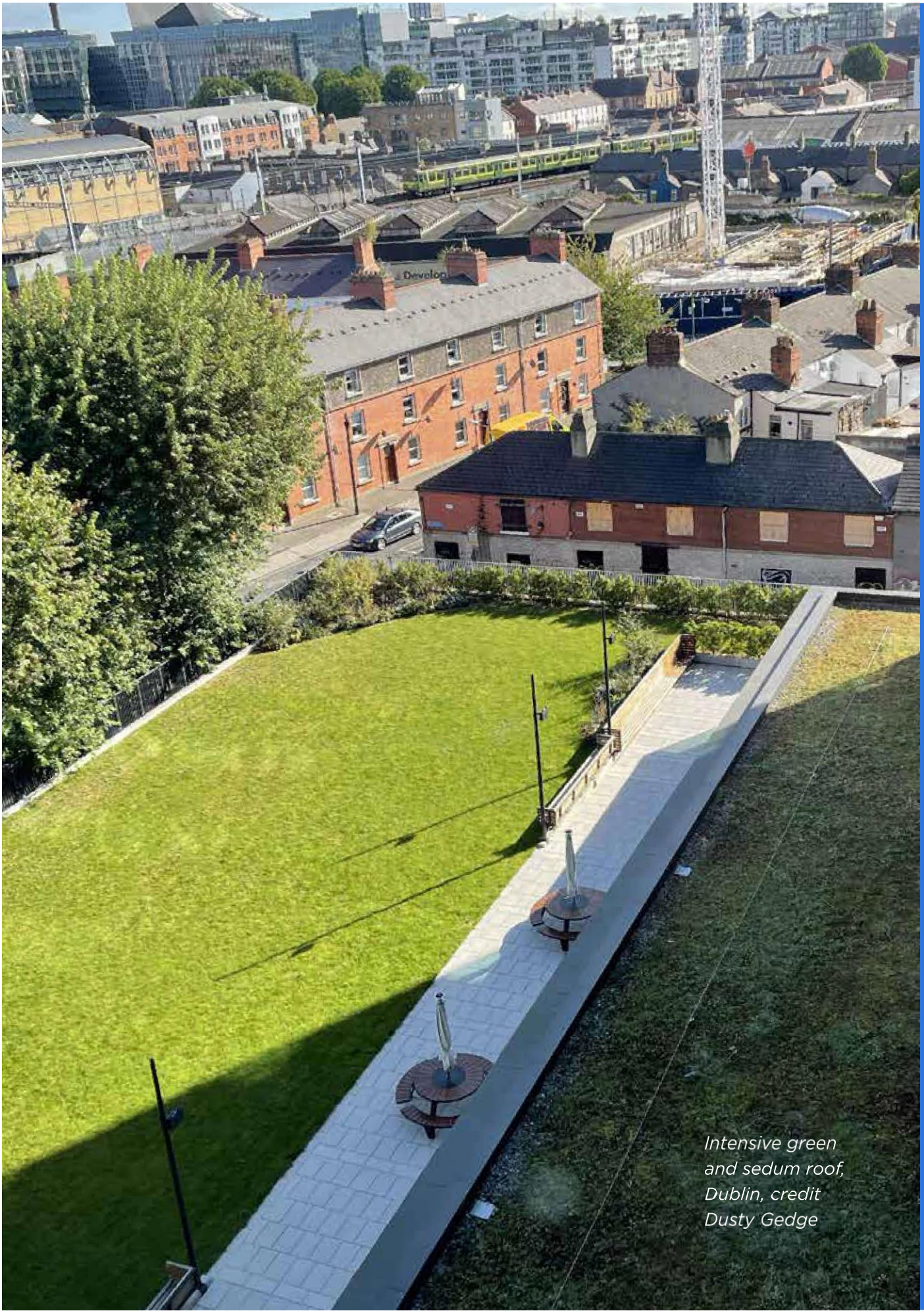
Fingal County Council (FCC) has introduced a Green Roof Policy as part of the Fingal Development Plan 2023–2029.

The potential of green and blue roofs has been recognised by FCC as a means of delivering against multiple policy objectives relating to flood risk, climate change, amenity and biodiversity, particularly where availability of space is limited.

FCC promotes the incorporation of Sustainable Drainage into developments and the use of green blue roofs plays a key role in supporting delivery of a range of objectives including Objectives IUO12 & DMSO206.

The development of this guidance discharges commitment F14 of the Fingal Climate Action Plan (2024-2029).


Credit LDA



Intensive green and sedum roof, Dublin, credit Dusty Gedge

1.2 What are Green and Blue Roofs?

Green roofs are roofs or podium decks onto which vegetation is grown, or habitats for wildlife are established.

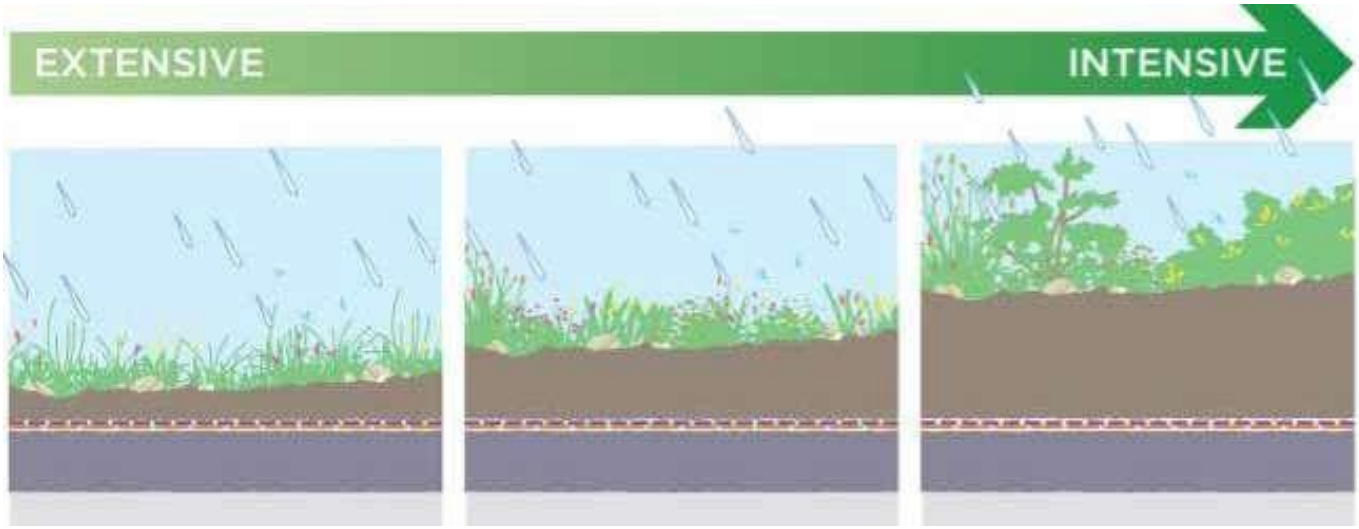
There are various types of green roof including: extensive and intensive roofs; semi-intensive; roof gardens; biodiverse roofs; and brown roofs. Green roofs can also be designed to serve an amenity function.

Extensive green roofs are defined by the Green Roof Organisation (GRO), as having a minimum substrate depth of 80mm though deeper is preferable for drought resilience (eg. 150mm). They are typically planted with sedums, grasses and other meadow species. Sedum mats don't provide habitat complexity, whereas meadow and grass species are preferred for biodiversity benefits.

Intensive green roofs are defined as having a minimum substrate depth of 200mm and a broader range of plant species can be used due to the deeper soil. Soil depths of 300mm or over can support the broadest range of plants.

Biosolar green roofs have solar power installations integrated as part of the green roof structure and are designed to maximise biodiversity.

Blue roofs hold rainwater runoff on roofs and podium decks and release rainfall slowly through a 'flow control'. Green blue roofs are simply green roofs with this addition. Blue roofs do not have to be vegetated and rainfall runoff can be stored within open or closed structures on roofs and podium decks. Storing rainwater which falls on the roof provides the potential to reduce or remove the requirement for attenuation storage elsewhere on a proposed development site.



1.3 Green roofs supporting delivery of Fingal Climate action plan and Strategies

The requirement for green roofs as part of new development in Fingal is underpinned by the objectives set out in the Development Plan.

Furthermore, the development of this Guide was one of the commitments made by Fingal County Council as part of the Fingal Climate Action Plan.

Fingal Development Plan 2023 – 2029

Fingal Climate Action Plan

Green Roofs (Objective DMSO207)

> *Require the use of Green Roofs particularly on apartment, commercial, leisure and educational buildings as part of the overall surface water management strategy for each development, where appropriate.*

Green Walls and Roofs for New Developments (Objective DMSO208)

> *Promote and encourage the use of green walls and roofs for new developments that demonstrate benefits in terms of SuDS as part of an integrated approach to green infrastructure provision.*

Green and blue roofs can provide an array of beneficial impacts. Green and Blue Roofs protect the receiving surface water system by reducing the rate and volume of runoff when compared with runoff from a conventional flat roof.

Green blue roofs have a pronounced effect in dealing with day-to-day rainfall in reducing runoff and improving water quality.

Green Roofs as Amenity Space (Objective DMSO208)

> *FCC Development plan encourage the use of green roofs as amenity space.*

In general, extensive green roofs are not perceived as suitable for amenity. Access to extensive roofs for amenity use can be designed in with careful consideration and this application is common in Germany, especially Berlin.

Functional Surface Area and Urban Green Infrastructure (Objective DMSO210)

> *To be in line with the European city average of 15-22 m^2 per person, Fingal will maximise, in so far is feasible, the amount of functional surface area that can be made up of urban green infrastructure by the lifetime of this plan through the use of, but not limited to, roof gardens, green roofs, vertical gardens, courtyards, community gardens, school allotments, parks or forests.*

Biosolar roof, credit Dusty Gedge

Air quality (Policy IUP38 – EPA and Air Quality)

> *FCC will continue to work proactively with the EPA to monitor and improve air quality in Fingal.*

Plants in green roofs have the ability to absorb pollutants like carbon dioxide, volatile organic compounds, heavy metals, and airborne particles.

Air Quality Plan for NO_2 in Dublin

Biodiversity. Green roofs can provide unique opportunities for wildlife in Fingal, through re-introduction of habitats that have been lost over decades of development. Simple adaptations to standard green roof design can maximise the provision for biodiversity.

Urban Cooling. Green roofs have been demonstrated to provide heat management effects; both internally within the building (reducing the need for heating and cooling within buildings, therefore reducing carbon emissions) and external ambient air temperatures (reduction in urban heat island effect).

Fingal CC will endeavour to apply Green roofs on new buildings as part of their own development.

The following clause is from the Fingal Climate Action plan:

F21	Assess the feasibility of green roofs on all new Fingal public, operational and social buildings and provide where viable and appropriate. Evaluate date from CARO/UCD project on Green Roof substrates

Retrofit green roof, Fortnam and Mason, credit Biophilic Design

1.4 Misunderstandings associated with green and blue roofs

Numerous misunderstandings have evolved over the years in relation to green and blue roofs that have resulted in designers and developers being wary of using them as a way of managing rainfall runoff.

Some of the perceived barriers include damage to water proofing, significant additional cost, significant structural loading, unmanageable maintenance, fire risk and potential incompatibility with PV panels. Section 3 of this Guide further considers these perceived barriers.

There are an extensive number of case studies across the world and an increasing number of case studies in Ireland that robustly challenge these preconceptions, through application and use of green blue roofs.

Here are some useful resources:

- London Living Roofs & Walls Report - 2019
- Climate ADAPT case study: Basel, Switzerland
- SmartCitiesWorld article: Amsterdam installs blue-green roofs
- Hamburg City Council: Green Roofs & Green Walls
- Minnesota Stormwater Manual: Green roof case studies

Credit Dusty Gedge

2.0 Green roofs as part of planning process

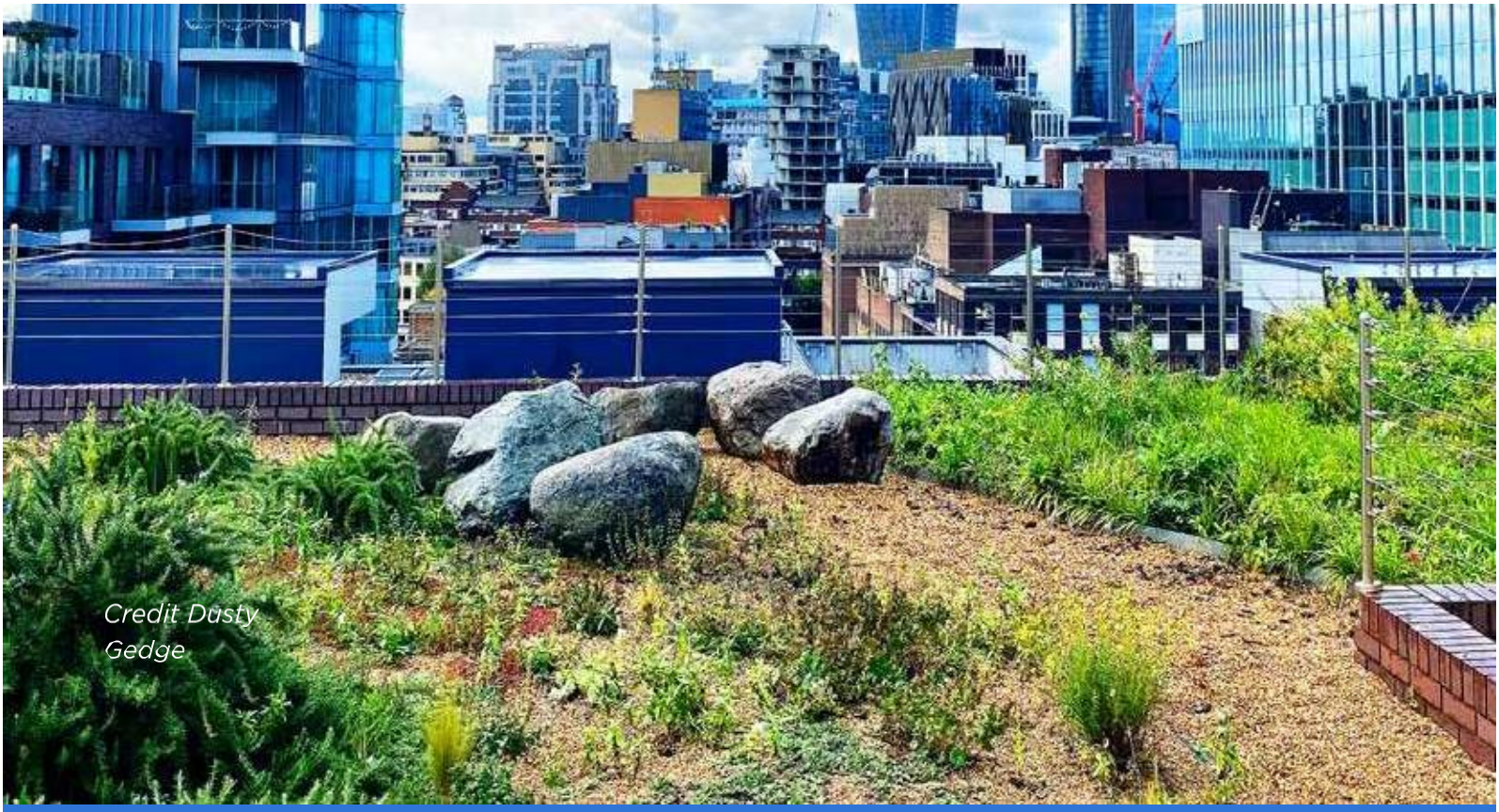
2.1 Introduction

FCC will require the use of Green Roofs on new developments, particularly on apartment, commercial, leisure and educational buildings as part of the overall surface water management strategy for each development, where appropriate.

Residential development will be considered for exemption where there isn't a continuous roof that is centrally managed i.e., the owner of each dwelling is responsible for their own roof.

Exemption may also be applicable where the green roof is considered to be incompatible with conservation (built heritage) requirements.

Exemptions will only be granted by FCC where it is demonstrated that suitable provision is made for SuDS measures (in accordance with FCC Council **Green/ Blue Infrastructure for Development - Guidance Note**) and all other planning requirements) and that appropriate sustainable drainage measures can be delivered on the site without the use of a green blue roof.



Credit Dusty Gedge

2.2 Standard green roof planning conditions

The following conditions shall be applied through the planning process on a case by case basis.

Condition 1 – area coverage

> *FCC will request a green roof to be included with planning applications that incorporate roofed areas. Roofs that are flat or gently sloped roofs are considered appropriate for green and blue roof application. Green roofs (including the shingle perimeter) are expected to extend to 60% coverage of the building area.*

Rationale; To support the delivery of a range of Fingal Development Plan objectives including Objectives IUO12 & DMSO207.

Condition 2 – hydraulic operation

> *The design of green roofs will make provision for suitably sized exceedance overflow(s).*

Rationale; To ensure adequate hydraulic operation of green roofs in the event of blockage or design exceedance.

Condition 3 – multi-functionality

> *The design of the green blue roof should maximise biodiversity and / or amenity benefits. Any amenity use shall be facilitated without effecting storage capacity or drainage function of the green roof.*

Rationale; To support the delivery of a range of Fingal Development Plan objectives including Objective DMSO208.

Condition 4 - access, operation and maintenance

> *Green roofs shall be designed with consideration of their future maintenance requirements.*

Rationale; To ensure the long term operation of the green roof and protection of the building.

Fingal County Council offices outbuilding

3.0 Design considerations

3.1 Approaching design

It is fundamental that the green and blue roofs provide the drainage function of removing rainfall from the roof.

The key difference when compared with a conventional flat or sloping roof is that they do not drain water off the roof as rapidly as they would have in the past.

Green roof design should always be considered from scheme concept design stage. Whilst being best suited to flat roofs, they can be successfully used on sloping roofs. Designers should consider how green and blue roofs integrate into the wider drainage strategy.

Key design items to consider at an early stage are:

- Type of green blue roof, with early consideration of maximising opportunities for biodiversity.
- Determining any requirements for amenity – in high density developments in town centres, rooftop has become a method for delivering public open space.
- Structural requirements and how this might affect building design.
- Likely storage requirements and maximising storage potential on the roof and therefore minimising requirements elsewhere.
- Methods for dealing with exceedance and overflow in managing extreme rainfall.
- Early consideration of maintenance and access requirements and design relative to other roof-level equipment such as mechanical and electrical plant.

3.2 Structural considerations

The additional structural loading of a green blue roof is a key consideration, as there may be an additional cost for strengthening to cope with the extra load.

Early discussions with the project structural engineer are recommended to ensure that the loads can be factored into the overall building design. The structural requirements of the building design are required to accommodate wind and snow load. In milder climates such as Fingal, the likelihood of water and snow load is low so it may be appropriate to not apply these loads together in design calculations . Engineering judgement is required to establish suitable loading combinations.

The weight of the green blue roof will depend on several factors:

- The maximum depth and volume of water being stored.
- Depth and density of growing medium.
- Weight of the green blue roof assembly (in saturated state).
- The planting used.
- Whether it is being used for amenity purposes, the maximum number of people being facilitated and any amenity features used (paving, seating etc.).
- Specific consideration should be given to differential loading of sloping roofs, particularly where water is being stored on the slope.

The structural capacity of the green and blue roof component should be considered for ongoing maintenance and any other activities that may take place on the roof.

The risk of flotation of the insulation layer should be considered and surcharge weight may be required to be incorporated into the blue rood design. C817 Blue Roofs: a Guide to implementation provides guidance on required surcharge weight.

Regardless of whether the roof is a green or blue construction, the structural design should consider the risk of blockage at the outlet allow for the maximum depth of water possible above the overflow. This should include consider the maximum hydrostatic pressure on the parapet.

3.3 Hydraulic design

There are several aspects that need to be considered as part of the hydraulic design:

- Rainfall return period being catered for.
- Area being allocated to green and blue roof as a percentage of the total roof area being drained.
- Number of outlets and where they will be positioned.
- Whether outlets are being designed to control outflow (slow release of rainfall runoff from the roof) or provide unrestricted discharge from the roof.
- The design of overflows should conservatively consider 100% runoff from all areas being drained by the green roof.
- Allowance should also be made for runoff from vertical surfaces draining onto the roof when sizing overflows. 50% of the wall area draining onto the flat roof should be factored into the area calculation for sizing overflows. (No allowance for vertical surfaces is required for attenuation storage calculations)

It is not always necessary to store the maximum rainfall (1 in 100 year rainfall) on the roof and smaller return periods such as the 1 in 10 year rainfall return period can usually be catered for with excess rainfall overflowing to the next part of the drainage system at ground level.

Utilising the storage that is in inherent in the green roof structure will minimise the storage required elsewhere on site.

Note: Areas of ponding, i.e. backfalls and depressions on the roof structure, where water would pond for long periods is not considered acceptable by FCC. Ponds will be considered acceptable on biodiverse roofs where ponding areas are designed and integrated within the green roof vegetated structure with the use of additional liners. (see Section 3.12)

3.4 Calculation of green and blue roof area

Calculation of green roof percentage coverage should make allowance for the provision of overruns, parapets, hatches and roof lights, fire breaks, service penetrations and hard landscape.

Where green roofs includes PV panels, consideration of the requirements of Technical Guidance Doc Part B (Fire Safety) is required.

Roof areas that are not considered for green roof should still be considered for blue roof.

3.5 Calculating storage

All types of green roofs will reduce the amount of surface water running off a roof.

Green roofs hold on to rainwater in the short term and when the water begins to be slowly released, a proportion will be retained within the plants and soil layer and some rainwater will be released back into the atmosphere via evapotranspiration.

How much water the green roofs will hold will depend on the size and depth of the green roof, the type of plants, and the time of year (plants and the soil layer will experience greater evapotranspiration during the summer months).

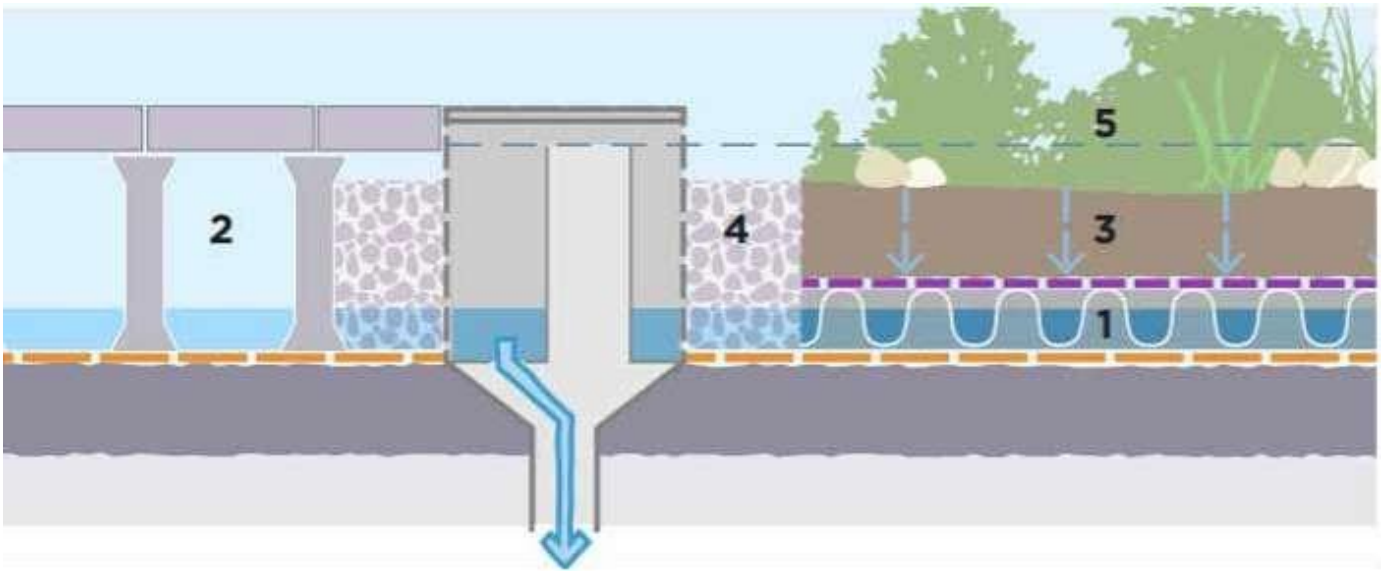
Credit Biophilic Design

3.6 Estimating available storage volume

In determining available storage volume, consideration must be made of:

- The materials being used to construct the green blue roof and what percentage of these materials are considered 'void' available for storage.
- The slope of the roof – whilst often referred to as a 'flat roof', a fall across the roof would be expected. Any level variations must be considered in the calculation of available storage volumes.
- When designing for the 1-in-100 year (with 20% climate change allowance) rainfall event, materials can be assumed to be dry with void space available for storage with the exception of drainage board pockets which can be assumed 50% full.

Note: Designers should not assume 0% fall because a flat roof is specified. It is likely that a fall of between 1-in-40 to 1-in-80 will be used in detailed design and construction to minimise the risk of backfalls and ponding.



Key for diagram:

1. Drainage board / Reservoirs – assume reservoirs are full for purposes of attenuation storage calculation (50% voids)

2. Storage layer provided by geocellular structures or pedestals – as per manufacturers specification (90-95% voids)

3. Growing medium layer (15-25% voids)

4. Stone (30% voids)

5. Where flows are stored above the vegetation layer (100% voids), the designer should confirm that:

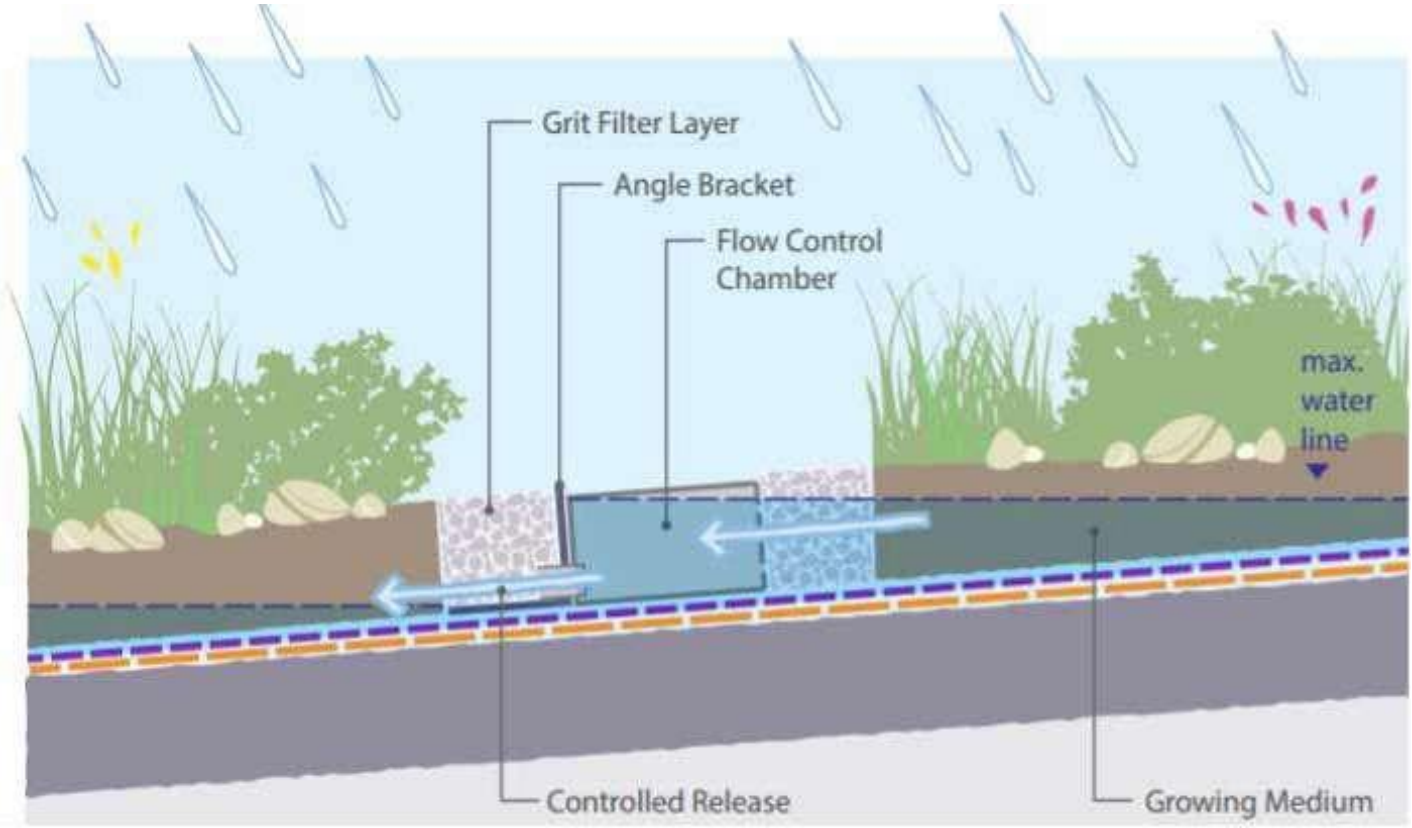
- the growing medium will not be subject to flotation
- surface ponding on the roof will only come into effect during extreme rainfall and any ponding will dissipate after a short time period

Note: Void porosity figures presented above are provided as initial guidance and detailed figures should be informed by manufacturers specification.

3.7 Sloping roofs

Where there is a slope on the roof, storage calculations should consider how much storage volume is available within the roof structure.

The roof can be compartmentalised to maximise the storage potential of the roof.



Case study: Sloping green blue roof

The roof layout was compartmentalised to maximise the available storage.

This roof has a 3° pitch that required baffles to attenuate up to the 1-in-30 rainfall event with more extreme event volumes being passed onto and managed in raingardens at ground level. The baffles hold rainfall runoff in each compartment with slow release to the next compartment maximising the storage available across the roof.

3.8 Allowances for interception losses

CIRIA publications 'C644 Building Greener' and 'C753 The SuDS Manual Table 24.6' detail that 5mm interception losses are expected from green roof constructions.

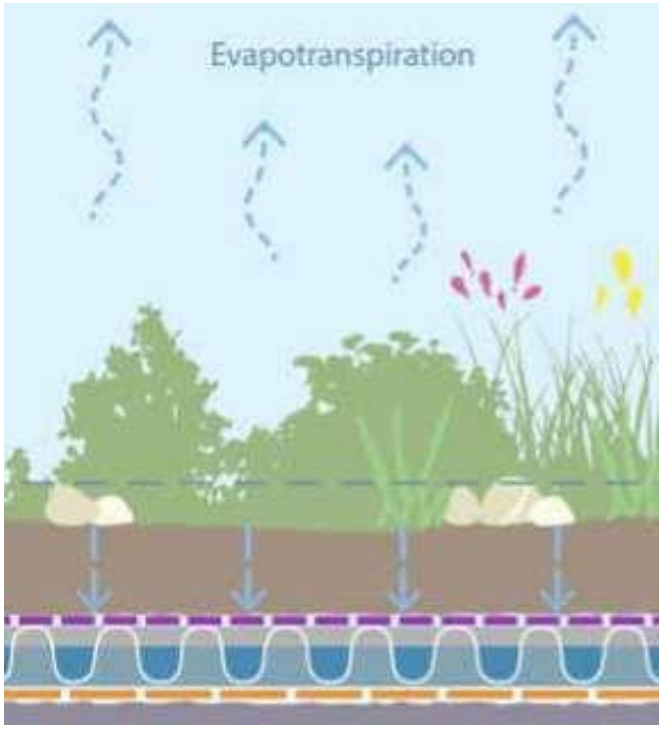
Interception losses will not occur every time it rains. Research indicates that interception of the first 5mm of rainfall would be anticipated for 80% of summer and 50% of winter rainfall events. The extent of rainfall intercepted will be influenced by various factors including:

- Type of vegetation used - Succulent plant types will retain water and therefore generally will have less capacity to take up water whenever rainfall occurs.
- Antecedent dry period – longer dry periods before rainfall will mean that vegetation, growing medium and drainage reservoirs will have dried out and will have more capacity to take up rainfall.
- Planned regular irrigation of the roof (more likely to happen with intensive or semi-intensive roofs) will mean that the roof will have less capacity to provide significant interception losses.
- Field capacity – deeper growing medium profiles will have greater capacity to intercept runoff.

Over recent years surface water and sewer flood events have frequently coincided with warmer summer months; a season that green infrastructure such as green blue roofs are more likely to have capacity to generate losses from evapotranspiration.

FCC will accept the following reductions in runoff coefficient to allow for the interception losses expected whenever green roofs are incorporated (thus resulting in reduction in storage requirements demonstrated as part of stormwater attenuation calculations).

- Extensive Green Roof – first 5mm of rainfall lost per square meter of Green Roof provided. (Suggested Cv of 0.9).
- Intensive Green Roof – first 10mm of rainfall lost per square meter of Green Roof provided. (Suggested Cv of 0.8).
- Reduction in Cv does not apply to green blue roofs where the growing medium is being used to store runoff.



3.9 Outlets & Flow controls

When sizing outlets from the roof there are two design scenarios to be considered:

- Flow control or free release of flow within normal design parameters.
- Design exceedance or blockage of outlets that will bring overflows into operation.

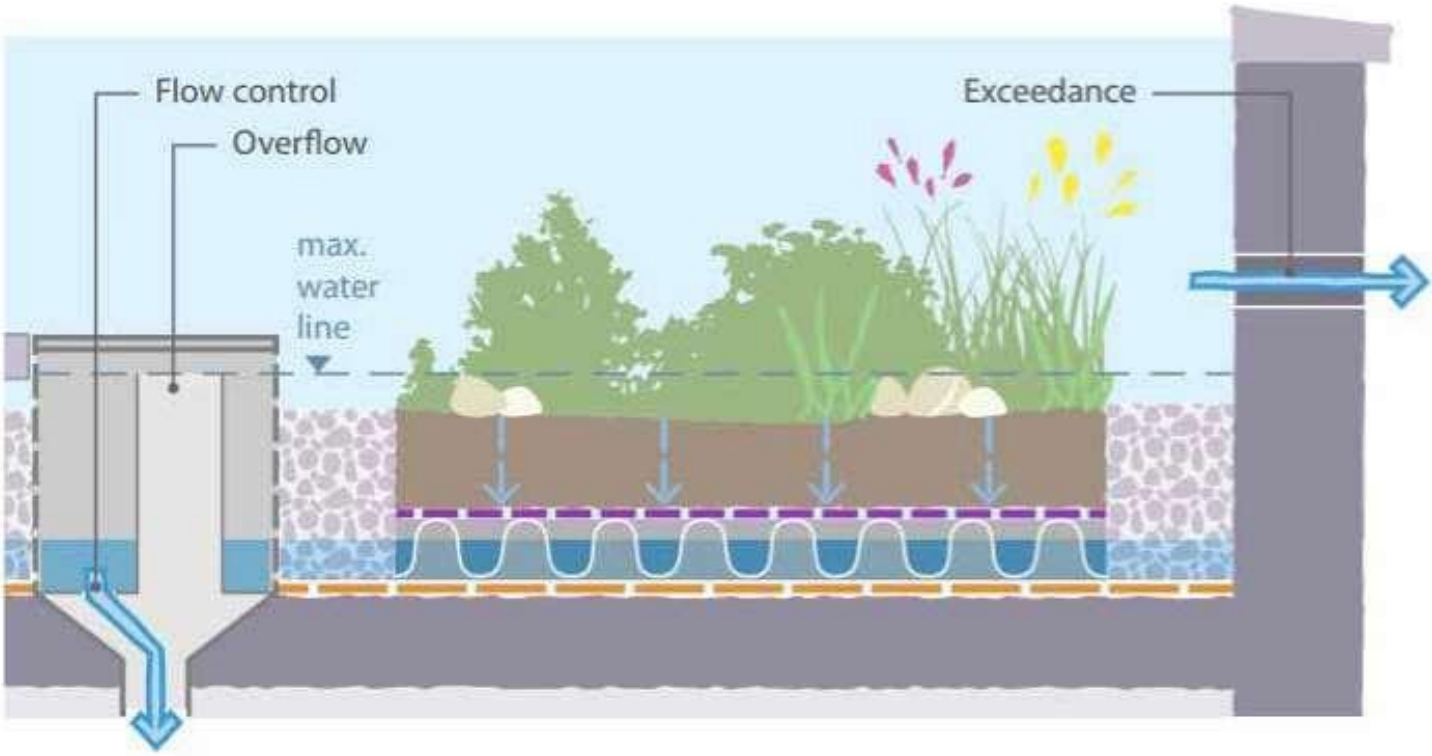
The number and positioning of roof drainage outlets are likely to be determined by location of low points on the roof or places where outlets can be conveniently connected to lower (ground) levels. The sizing of flow controls will be informed by the number of openings proposed.

A recommended minimum orifice opening size of 10mm is suggested for flow controls. The coefficient of discharge for the orifice opening (or suitable alternative flow restriction mechanism) should be confirmed with the manufacturer.

Note: The designer must demonstrate how the flow control opening is protected from blockage for both green blue roofs and blue roofs, irrespective of flow control opening size.

3.10 Overflows

When designing overflows (location(s) and quantity), calculations should assume 100% runoff from all areas being drained by the roof including 50% of the area of any adjacent walls that drain onto the green blue roof.



3.11 Using green and blue roofs as communal amenity areas

Where the roof area is proposed for amenity use, the balance between the provision of communal open space and compliance with SuDS and Green Blue Roof policies will be assessed on a case-by-case basis by FCC.

Applicants are encouraged to consult with FCC prior to submitting their planning application.

When designing blue roofs as a hard landscape amenity space, the use of slabs which can be supported by pedestals, providing storage in the underlying void, should be considered.

When considering blue and green roofs for amenity purposes, there are a few initial considerations to be made in a design context:

- How will people get onto and off the roof?
- Consider choice of plant species for visual aesthetics (in addition to biodiversity contributions).
- Is the vegetation suitable for walking on and if not can the users of the roof be restricted from walking on the vegetation? Areas which cannot take pedestrian activity need to be clearly delineated.
- Are there any other health and safety measures that need to be considered?

3.12 Maximising habitat potential

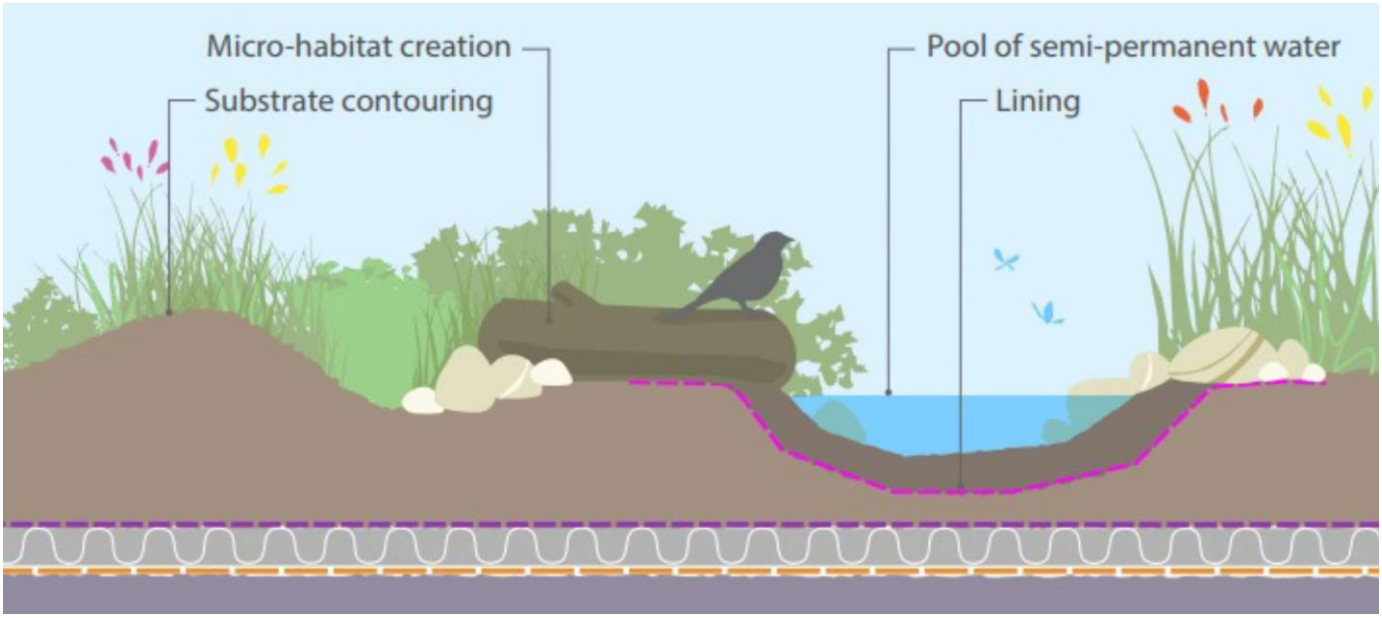
Biodiverse green blue roofs have significant potential in a FCC setting to offer alternative sites for certain mobile species of fauna which would otherwise be lost through high-density development.

Biodiverse green blue roofs provide opportunities for urban dwellers who don't have access to gardens or green space to have some interactions with nature. This is a benefit to human health and well-being.

A biodiverse green roof uses a blended substrate with a mix of clay sand and stone mounds placed on it to create a undulating and diverse topography. Planting should be considered for attraction of aphids and invertebrates, which will provide food sources for an urban bird and bat populations.

Green roofs designed for biodiversity should consider:

- A varied substrate depth with mounds.
- Use of logs and rubble to create micro habitats. Log piles can provide areas for shelter and nesting sites for invertebrates such as bees and wasps.
- Roofs can be planted or seeded with a range of native species to attract pollinators such as bees.
- Consideration can be given to creation of small water features through use of liners and contouring of growing medium.



3.13 Plant selection

Where a biodiverse green blue roof is proposed, then a seed mix that replicates Irish dry grassland habitats, of Irish origin as far as possible, should be specified by a suitably qualified landscape architect or ecologist.

Native Irish seed mixes may be difficult to obtain, and it may be prudent to collect suitable seed on site pre-construction for use. It may be useful to check what is growing on site and in the locality through FCC and National Biodiversity Data Centre records. Grasses should be excluded in extensive systems due to the water demand.

Consultation may also be required with the National Parks and Wildlife Service on a case-by-case basis regarding the provenance of seed mixtures, where there is a concern that seeds may disperse from the development site into protected areas.

3.14 Fire safety considerations

Sedums and succulents, and soils with low organic content (less than 20% organic material) are considered to be naturally fire-retardant and do not present a unique risk to propagating flame spread relative to a conventional flat or gently sloped roof.

In Germany, where there are millions of square meters of green roof installed, the use of a green roof is considered to provide a protective barrier preventing waterproofing elements from catching fire.

The proposed Green Roof shall be designed and installed to current best practice and include measures to prevent the spread of fire. The Green Roof Code provides useful guidance to minimise risk from fire, as follows:

Substrates should have:

- A depth in excess of 80 mm.
- A maximum of 20% organic matter.

Plant selection and management should:

- Include plants such as succulents which retain water within their structure, reducing the risk of drying out.
- Ensure no significant volume of dry material is left on the roof (such as die back from tall grasses at the end of growing season)

Fire breaks should comprise:

- Gravel/shingle strips provided around all structures penetrating the roof covering at least 500mm in width, or 1m in width where they are to act as fire-breaks on large roof areas.
- There should be a 1m wide gravel or slab 'fire break' every 40m

Intensive green roof which are irrigated, regularly maintained and have a thick substrate are considered by the Green Roof Code to have no greater fire risk than a conventional roof finish.

Dublin Fire Brigade (DFB) have a preference for no vegetation below PV panels. Where vegetation is proposed below PV panels, DFB should be consulted for their consideration.

All green roofs shall be designed in adherence of current fire safety requirements. The above advice is intended as initial guidance. Designers should refer to the following documents:

- Technical Guidance Document B 2017 - Fire Safety - assets
- BS 8616:2019 Specification for performance parameters and test methods for green roof substrates
- Fire Performance of Green Roofs and Walls - DCLG UK:2013
- Fire Safety Certificates

3.15 Maintenance considerations

It is important to consider, as part of the design process, how people, equipment and material will get on and off the roof.

Safe working platforms and protection against falls should be provided for green and blue roof installation works and systems for safe work should also be available for safe maintenance and operation.

The fall restraint and fall arrest systems should be designed specifically for the maintenance requirements of the green roof system used, with maintenance requirements varying between intensive and extensive roofs.

A maintenance plan should be developed for the green blue roof identifying anticipated tasks and the frequency at which they should be undertaken under the following categories; regular tasks, occasional tasks and remedial tasks.

Safety, Health and Welfare at Work (Construction) Regulations 2013

BS 7887: 2005 - Code of practice for the design, selection, installation, use and maintenance of anchor devices conforming to BS EN 795

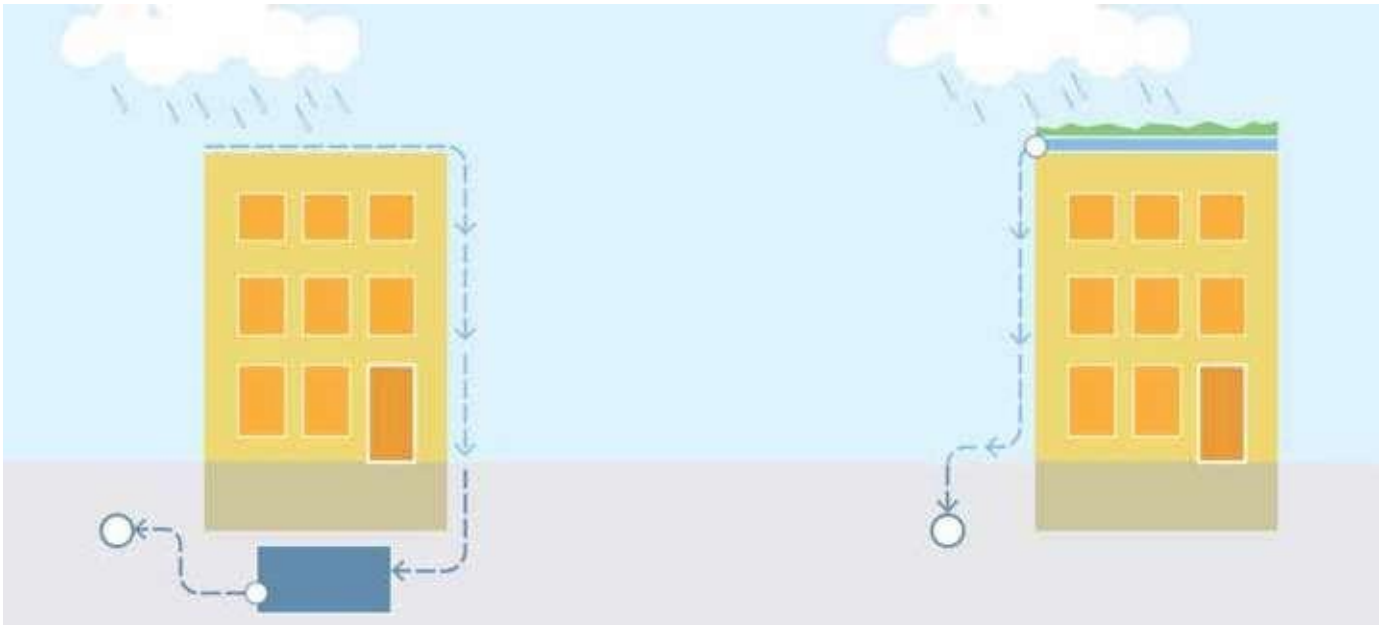
3.16 Cost considerations

Common elements which should come into consideration when considering cost include:

- Additional loading requirements. Where water is stored on the roof this will have a loading requirement. Other loading factors such as wind and snow loading also need to be considered for the structural design of the building. The structural designer will have to consider whether snow loading and storage of rainfall can be considered separately (it does not commonly snow heavily and rain at the same time) or whether these factors have to be considered in combination.
- Potential to offset attenuation storage requirements elsewhere on the site where rainfall runoff is stored directly on the roof.

The diagram below shows how integrating a blue roof can replace the requirement of an attenuation tank under the building with pumped discharge. Utilisation of the roof for attenuation of runoff can result in significant cost savings:

- Potential reduction in energy costs. The insulation properties of green roofs will keep the property warmer in the winter and cooler in the summer. Green roofs can reduce building energy use by 0.7% compared to conventional roofs.
- Reduction in design life costs. By protecting the roof liner using the green blue roof, the life expectancy of the liner can double.
- Potential maintenance costs. These costs will vary depending upon the type of green blue roof and the types of plants selected.



4.0 Further reading

4.1 Futher reading

Fingal County Council - Policies/ Strategies/Masterplans

Fingal Development Plan
Fingal Climate Action Plan

Legislation

Water Framework Directive (2000/60/EC)
Planning and Development Act 2000
Section 7, 12 of the Water Services (No. 2) Act 2013
European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 S.I. 296 of 2018
Wildlife (and Amendment) Acts 1976-2012
Climate Action and Low Carbon Development (Amendment) Act 2021

National/Regional - Policies/Strategies

National Development Plan 2021-2030
OPW Flood Guidelines Planning System and Flood Risk Management Guidelines 2009
Greater Dublin Strategic Drainage Study 2005 (Regional drainage policies Vol.3)
The National Climate Change Adaptation Framework, Building Resilience to Climate Change 2012
The National Climate Change Strategy 2007 – 2012
National Landscape Strategy for Ireland 2015
National Climate Action Plan 2019
National Biodiversity Action Plan 2017– 2021
'All Ireland Pollinator Plan' 2015-2020
National Planning Framework 2018
Regional Spatial and Economic Strategy for Eastern and Midlands Region 2019
Water Quality and Water Services Infrastructure
Climate Change Sectoral Adaptation Plan 2019
Flood Risk Management Climate Change Sectoral Adaptation Plan 2019

Applicable Standards/regulations

Greater Dublin Regional Code of Practice for Drainage Works
Technical Guidance Document B - Fire Safety - assets
Building standards - Technical guidance document

Suggested further guidance

Green Roof Code of Best Practice UK: 2014.
The GRO Green Roof Code 2021
C644 Building Greener (CIRIA 2007)
C753 The SuDS Manual (CIRIA 2015)
C817D Blue roofs. A guide to implementation (CIRIA 2024)
Fire Performance of Green Roofs and Walls

Note: Wherever applicable, please refer to the most recent version of each referenced document, standard, or publication to ensure accuracy and compliance with current guidelines.

Authors

This guide draws upon the author's 25 years of practical experience in the application of SuDS.

Anthony McCloy

Director McCloy Consulting

Anthony McCloy is a Chartered Engineer working exclusively in the water sector since 1998. Since 2003 he has focused on SuDS design, hydraulic modelling for SuDS and flood risk. He has co-authored SuDS Guidance documents for Planning Authorities and is a key tutor for the (CIRIA) National SuDS training workshops since 2006.

Kevin Barton

Director Robert Bray Associates

Kevin Barton has been working as a Landscape Architect for over 25 years and designing SuDS landscapes exclusively since 2011. In addition to project work, Kevin has also contributed to SuDS Guidance documents for Planning Authorities and water companies; presented on SuDS topics at domestic and international conferences; provided expert SuDS training through CIRIA and directly to local authorities.

Acknowledgements

We would like to thank FCC who provided their valuable time and input in the development of this Guide:

Comhairle Contae Fhine Gall
Fingal County Council