CONDITION 3 – LANDSCAPING DETAILS
Planning Reference: PL/25/1721
Site: 362 Oxford Road, Reading RG30 1AQ
Condition: 3 – Landscaping (Parts a–f)

1. INTRODUCTION

This submission is made to discharge Condition 3 (Parts a–f) relating to landscaping, boundary treatment, hard surfacing, lighting, planting, green roof provision, living wall specification, services coordination and long-term landscape management.

The ecological bird and bat enhancement measures have been submitted separately under Condition 4.

This document should be read in conjunction with:

- Updated Landscaping General Arrangement Drawing
- Boundary Detail Drawings
- Lighting Layout
- Services & Drainage Coordination Plan
- Hard Landscape Schedule (Ref: LLD2498-LAN-SCH-001)

PART (a) – BOUNDARY TREATMENT

Boundary treatments are detailed within the Hard Landscape Schedule and accompanying drawings.

F1 – Site Boundary Fence

- Traditional featherboard fence
- Panel height: 1830mm
- Softwood finish
- Supplier: Lawson Timber

G1 – Vehicular Gate

- Automated steel driveway gates
- Finish: Black RAL 9005
- Hot dip galvanised and powder coated to BS EN 13438
- Supplier: Aspen Straight Top Driveway Gate

All boundary heights, finishes and materials are clearly identified in the schedule and drawings.

Mammal Gaps

Where fencing is installed, 130mm x 130mm hedgehog access gaps are incorporated at ground level to maintain ecological connectivity.

A 1:20 typical boundary detail drawing is submitted.

PART (b) – HARD SURFACING & MATERIAL SPECIFICATION

The Hard Landscape Schedule provides full specification of kerbs, edgings, surfacing and paving.

Kerbs & Edgings

K1 – Marshalls Kerb Half Batt Straight (125 x 255 x 914mm, Grey)
Used for vehicle access, circulation and parking areas.

K2 – Marshalls Kerb Half Batt Straight (125 x 150 x 914mm, Grey)
Used for vehicle access, circulation and parking areas.

K3 – Roof Edge Aluminium Edging (150mm depth)
Wallbarn 2.4m edging bar with integrated corner and connector for green roof applications.
Used to retain green roof substrate.

Surfacing

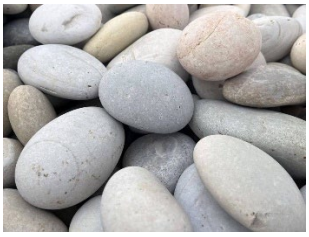
PV1 – Bituminous Surface Ultiporous permeable tarmac
Vehicular access areas in accordance with Engineer's specification.

PV2 – Marshalls Priora Permeable Block Paving (Brindle, 200 x 100 x 60mm)
Circulation and parking areas.

PV3 – Marshalls Priora Permeable Block Paving (Charcoal, 200 x 100 x 60mm)
Vehicular areas.

PV4 – Marshalls Fairstone Granite Eclipse (Graphite, 1206 x 600 x 30mm)
Pedestrian areas.

PB – Duck Egg Cobbles (60–120mm)
Mixed natural tones within planting areas.



Permeable paving supports surface water management and SuDS compliance.

PART (c) – PLANTING SCHEDULE

The following planting schedule is submitted in accordance with Condition 3(c). All stock shall be container grown (CG) unless otherwise stated and installed in accordance with BS 8545:2014 and BS 4428:1989.

1. Feature Tree

Carpinus betulus (Hornbeam)

- • Size: 14–16 cm girth (standard)
- • Root: Container grown
- • Form: Clear stem
- • Height: Approx. 4–5m at planting

Tree planting to include underground guying, irrigation pipe and 75mm mulch layer.

2. Hedge Planting

Berberis thunbergii f. atropurpurea 'Admiration' (PBR)

- 30–40cm height, branched
- 3L CG
- Planted at 400mm centres
- Total length: 21.37m
- Quantity: 51 No.

3. Shrub Planting

Prunus spinosa – 10L CG – 3 No.
Pyracantha 'Golden Charmer' – 2L CG – 4/m² – 3 No.
Rosa canina – 2L CG – 4/m² – 3 No.
Carex elata 'Aurea' – 2L CG – 5/m² – 5 No.
Berberis darwinii – 2L CG – 5/m² – 8 No.
Shrub beds to be cultivated to 450mm depth with soil improvement and 75mm mulch layer.

4. Perennial Planting
Crocosmia 'Emily McKenzie' – 2L CG – 7/m² – 14 No.
Escallonia rubra – 3L CG – 4/m² – 3 No.
Fuchsia magellanica – 3L CG – 5/m² – 13 No.
Hypericum androsaemum – 3L CG – 5/m² – 14 No.
Pulmonaria 'Blue Ensign' – 1L CG – 7/m² – 48 No.

5. Bulb Planting
Fritillaria meleagris – 103 No. @ 30/m²
Iris foetidissima – 18 No. @ 10/m²
Scilla siberica – 143 No. @ 30/m²
Galanthus nivalis – 351 No. @ 40/m²
Eranthis hyemalis – 109 No. @ 20/m²

6. Green Wall Planting
Green wall planting to be installed at a density of 96 plants per m² (2L CG stock).

Indicative species mix includes:

- Bergenia 'Eroica'
- Euonymus fortunei 'Emerald Gaiety'
- Heuchera 'Lime Rickey'
- Pachysandra terminalis 'Variegata'
- Polypodium vulgare
- Hyacinthoides non-scripta
- Ulex europaeus
- Galanthus

Final mix to be confirmed prior to installation.

7. General Specification

- Topsoil to comply with BS 3882.
- All planting to be watered in at installation.
- 75mm mulch to all beds.
- Replacement of any failed plants within the next planting season.
- Maintenance in accordance with the submitted 5-year Landscape & Ecological Management Plan.

PART (d) – GREEN ROOF & LIVING WALL

1. Green Roof Specification
The approved roof plan incorporates an extensive green roof system comprising:

- Bauder XF301 Sedum Blanket System
- Bauder Flora 3 Native Wildflower Seed Mix
- Aluminium roof edging (150mm depth)
- Root-resistant waterproofing membrane
- Drainage layer
- Filter fleece
- Extensive substrate
- Pre-grown sedum blanket and wildflower mix

The Bauder Flora 3 mix comprises 49 British native species, providing:

- Extended flowering period (April–October)

- Pollinator support
- Bird seed resource
- Biodiversity enhancement

Roof edging is aluminium mill-finish and installed flush to retain substrate.

2. Green Roof Establishment & Maintenance

Establishment Phase

- Sedum establishment: 4–6 weeks
- Seeded areas monitored for 10–12 weeks
- Watering during dry periods
- Early morning or evening watering
- No trafficking during establishment

Long-Term Maintenance

- Biannual inspection (minimum twice yearly)
- Spring fertiliser application
- Removal of invasive weeds
- Drainage outlet clearance
- Waterproofing inspection
- Replacement of failed vegetation
- Irrigation review where applicable

During prolonged dry weather:

- Sedum areas soaked weekly
- Wildflower areas watered as required

3. Living Wall System

The development incorporates the ANS Living Wall System™ installed to elevations as shown on the approved drawings.
Planting:

- 2L container grown stock
- Density: 96 plants per m²

Maintenance to include:

- Monthly inspections
- Biannual horticultural husbandry visits
- Irrigation calibration and servicing
- Pest and disease monitoring
- Pruning and shaping
- Replacement of failed plants

Maintenance responsibility shall rest with the Building Owner or appointed Management Company, with records retained for inspection if required.

PART (e) – LANDSCAPE & ECOLOGICAL MANAGEMENT PLAN

A minimum 5-year management strategy will be implemented including:

- Establishment watering
- Biannual roof inspections
- Monthly living wall maintenance
- Weed control
- Fertilisation
- Drainage inspection
- Replacement of failed plants

Responsibility: Building Owner / Appointed Management Company.

PART (f) – SERVICES & DRAINAGE COORDINATION

Submitted drawings confirm:

- Below-ground services layout
- Drainage routes
- Soakaway positions
- Service corridors identified

Planting areas have been coordinated to avoid service conflicts.
Permeable paving and green roof systems contribute to sustainable drainage and surface water attenuation.

— 2022

ANS Living Wall System

Maintenance Guide

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Maintenance

Having successfully designed, grown and installed the ANS Living Wall System™, maintenance is essential to guarantee the wall has a fresh and vibrant appearance and is growing healthily on an ongoing basis.

ANS offer a professional maintenance contract to maintain the living wall on site, for both interior and exterior applications. This ensures that your living wall grows suitably, is pruned accurately and is fed as appropriate. Once plants have finished flowering, the dead flowers are removed and the apical dominance of the plants is kept in check. This ensures a healthy wall, aesthetically and scientifically.

The maintenance schedule for a living wall is dependant on the planting design, location of the wall and the client's requirements.

On the following pages we've listed typical maintenance work for exterior, high-level exterior, and interior living walls.

Maintenance

Exterior Living Walls

Maintenance visits are typically monthly. Horticultural husbandry visits are carried out twice a year.

This would involve:

- Checking for any pest and disease
- Checking for airborne weeds
- Cleaning below the living wall
- Trimming and pruning where necessary
- Shaping plants
- Plant replacements if necessary
- Applying biological control through irrigation system
- Checking moisture levels
- Irrigation system service (ensuring even distribution, re-calibration through the seasons, and checking for any frost damage through the winter)

Maintenance

Exterior Living Walls (over 6m)

Maintenance visits are typically monthly. Horticultural husbandry visits are carried out twice a year. These visits require extra equipment, for example, a cherry picker, scissor lift, scaffold tower, spider lift, or by abseil.

This would involve:

- Checking for any pest and disease
- Checking for airborne weeds
- Cleaning below the living wall
- Trimming and pruning where necessary
- Shaping plants
- Plant replacements if necessary
- Applying biological control through irrigation system
- Checking moisture levels
- Irrigation system service (ensuring even distribution, re-calibration through the seasons, and checking for any frost damage through the winter)

Maintenance

The ANS promise is that with our maintenance programme in place the living wall will be kept in its original pristine condition.

The NEC, installed in 2012

David Attenborough Building, installed in 2016

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Maintenance Schedule

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ANS Living Wall System

Typical yearly maintenance schedule for an external ANS Living Wall

January
- Inspect irrigation – check for frost / ice damage
- Check no failing plants
- Dead leaf removal

February
- Winter inspection
- Remove and replace failing plants
- Ensure even distribution of irrigation
- Pest control
- Check for air borne weeds
- Sweep hard standing

March
- Check irrigation
- Check for any pests and diseases
- Visual inspection of wall
- Check for air borne weeds
- Sweep up any debris
- Feed

April
- Re-calibrate irrigation for Summer months
- Check weeds
- Check for plant failure from Winter months
- Sweep up hard standing
- Feed
- Check for pests and diseases

May
- Spring clean up
- Spring feed to wall
- Check for pests and diseases
- Check for airborne weeds
- Sweep up all local areas
- Remove and replace failing plants
- Check for any leak repairs if necessary

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June

- Check on all irrigation
- No air borne weeds
- Prune as necessary
- Ensure even plant coverage
- Sweep up as necessary

July

- Check irrigation
- Visual inspection to wall
- Prune as necessary
- Pest / disease control

August

- Summer – close visual inspection
- Remove Spring foliage, dead leaves and flowers etc
- Summer feed
- Remove any airborne weeds
- Prune as necessary
- Apply insecticide as necessary
- Sweep up all hard standing

September

- Check even distribution of irrigation
- Airborne weeds
- Prune as necessary
- Sweep up hard standing

October

- Autumn clean up
- Remove dead flower heads
- Autumn feed
- Replace any failing plants
- Sweep up

November

- Visual inspection of wall
- Ensure even distribution of irrigation
- Dead head / leaf as necessary
- Clean / sweep up

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December

- Decommission irrigation for Winter months
- Clean out solenoid valves and filters
- Check pump for correct working
- Consistency of presentation – groom as necessary
- Pull out any weed seedling

Horticultural husbandry visits are carried out twice a year, and depending on the living wall, can require extra equipment such as a cherry picker, scissor lift, scaffold tower, spider lift or by abseil. These visits involve a full trim, pruning, dead-heading, plant replacements if necessary and calibration of the irrigation system.

Shown below is a sample of a maintenance schedule for an external living wall. Some degree of flexibility must be allowed for as some seasons require more labour than others.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Visually inspect the living wall	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Check the moisture levels			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Recalibrate irrigation zones		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Check the health of plants		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Carry out remedial work if necessary		✓		✓		✓		✓		✓		✓
Remove weeds		✓		✓		✓		✓		✓		
Prune in accordance with season			✓							✓		
Dead head seasonal plants			✓	✓	✓							
Treat for pest and disease						✓	✓		✓			
Apply feed and nutrient as necessary			✓				✓					
Service irrigation system	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Check run off outlets for blockage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Replace any plants that have failed		✓	✓							✓		
Sweep and tidy below wall	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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Typical yearly maintenance schedule for an internal ANS Living Wall

As interior living walls are not so affected by the elements and changing seasons, the work carried out on each maintenance visit remains fairly consistent. Visits are usually once every fortnight or monthly, however our maintenance programme for interior living walls is dependant upon the client's requirements, for example, a very specific aesthetic may need to be maintained which would require more frequent visits.

Horticultural husbandry visits are carried out twice a year.

A typical maintenance visit would involve:

- Checking for any pest and disease
- Checking moisture levels
- Sweeping below the living wall
- Applying fertiliser if necessary
- Checking and adjusting irrigation
- Cleaning gutter and remove fallen or dead leaves
- Making sure the area is clean and tidy
- Shaping and pruning the plants
- Plant replacement if necessary

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BAUDER FLORA 3 SEED MIX

General Use/ BioSOLAR Installations

The Bauder Flora 3 Seed Mix is a blend of seed, tackifier and additives developed to maximise diversity of vegetation on green roofs. Bauder Flora 3 has all the components required to improve the germination and the successful establishment of vegetation for a variety of rooftop conditions: light and shade; exposed and sheltered. The varied mix of species is designed to deliver the British native, biodiverse species required for BREEAM compliance.

Bauder Flora 3 contains a broad range of wildflowers chosen to give an extended flowering season providing nectar and pollen rich habitat for priority pollinators, larval food plants for butterflies and seed sources for birds.

Mix Details:

- **UK Native British Provenance Seed Mix** (certification on request)
- **49 Species**
  - 31 species of which eight are annuals
  - 8 Grasses/Sedge
  - 2 Sedum species
- **35 of the wildflowers are classed as RHS Perfect for Pollinators**
- 12 Butterfly and moth larval food plants.
- Shade tolerant species.
- Low growing to medium height.
- **Mix percentages; 65% perennial wildflowers, 20% annuals & 15% grasses.**

Key Specification Features

- Very broad spectrum of species ensuring a broad diversity of created habitats.
- Lengthy flowering season – April to October.
- High number of annuals to give excellent colour in first year.
- Shade tolerant species to give coverage in less sunny locations.
- Low growing plants with good wind tolerance suited to exposed locations.
- Ideal mix for BioSOLAR installations establishing quickly to provide substrate stabilisation.
- Designed to deliver British native, biodiverse species required for BREEAM compliance.

Ecological Value

This Flora 3 plant mix has a high ecological value providing a long flowering period and nectar sources for a wide variety of pollinators. Plants with long flower tubes such as Wild Red Clover and Vetch species will provide valuable nectar sources for Long-tongued Bumblebee species including the priority species Brown-banded Carder Bee.

Bird's-foot Trefoil and Kidney Vetch make up 20% of the mix, which are important larval food plants for ten butterfly and moth species, including common and small blue priority species. Plant seed heads provide refuge and overwintering sites for invertebrates and our mix includes Black Knapweed and Common Toadflax, which provide valuable seed sources for birds.

The yellow composite flowers such as Rough Hawkbit and Mousear Hawkweed in this mix provide good nectar sources for generalist pollinators including hoverflies and beetles. The mix also contains native and or naturalised sedums that will provide evergreen ground cover in sunny areas and can support specialist invertebrates such as the notable bug species *Chlamydatus evanescens.*

BAUDER FLORA 3 SEED MIX

Establishment and Growth

Typically the mix will produce flowers from April to October starting with species Wild Strawberry and Cowslip, through the summer with Yarrow and Black Knapweed with Lady's Bedstraw flowering later into the autumn. The annuals, biennials and grasses will provide cover and colour in the first season allowing time for the slower growing perennials to establish in later years. The mix has been specified to be drought tolerant with sedum species and low growing perennials.

BioSOLAR

Plants are chosen that do not exceed 40 cm in height to avoid problems with shading of solar panels when the vegetation is used in conjunction with Bauder BioSOLAR. Shade tolerant ground cover plants were specified that will occupy semi-shade microclimates under the panels.

Green roofs are exposed environments subject to wind erosion therefore the mix contains pioneer and ephemeral species such as annuals, biennials and short perennials, which establish quickly from seed and help to stabilise the substrate and prevent wind erosion prior to perennial root systems getting established. A small percentage (typically <15%) of the mix contains non-aggressive grass and sedge species, which will also help to establish and stabilise the substrate.

The seed source is British Provenance (with the exception of sedum species) and suppliers of the mix adopt the Flora Locale Code of Practice for collectors, growers and suppliers of native flora.

flora LOCALE

(Flora locale is an independent charity. Promoting and advancing the conservation and enhancement of native wild plant populations)

Bauder's Unique Additive Mix

Establishing seed at roof level is difficult, to maximise the germination and establishment of the diverse range of seed used, Bauder has developed a unique blend of seed adhesive, organic nutrients and mycorrhizal fungi to encourage water and nutrient uptake by the developing seedlings.

- The seed mix and additives are combined with a bulking agent which enable the correct sowing rate to be achieved, the adhesive binds the seed to the substrate preventing it from being blown away in windy conditions or washed deep into the substrate and failing to germinate.
- A small quantity of organic slow release fertiliser gives the seed a gentle boost as it establishes. Mycorrhizal fungi increases the root surface area helping the transfer of water and nutrients from the substrate to the developing root system of the plant, enabling the plants to establish quickly.

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Specification downloads:
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BAUDER

GENERAL MAINTENANCE

Green Roof Extensive System

Lightweight sedum system XF301.

BAUDER EXTENSIVE GREEN ROOF SYSTEMS

XF301 and SB & WB vegetation blankets and other substrate based planting schemes.

What to Expect From a Bauder Extensive Green Roof System

There is a common misconception that extensive green roofs, and sedum plants in particular, are always green and that from ground level they resemble grass. This is misleading, as they consist mainly of low growing, drought tolerant plants including sedums, saxifrage, wild flowers, grasses, moss and herbs.

The appearance of the vegetation within an extensive green roof will change year on year, dependent upon fluctuations in the seasonal weather throughout the period. It should also be expected that more grass and moss will be present during the wetter months, because the conditions will be ideal for these species to exist, they will tend to die off during the dry summer months, as free-draining extensive substrates will not hold sufficient moisture for them to survive.
The growth and flowering of the individual species within the vegetation mix through the late spring and summer will be dependent upon the weather prevailing at the time, which will also determine which species will be most prominent in any given year.
In the winter, sedum will become smaller and turn red/brown in colour as they prepare themselves to withstand the coming winter frosts. This gives the vegetation a red/brown hue in the late autumn and winter months, which is sometimes mistaken for the plants being distressed, when in fact they are in optimum condition for the time of year.

It is another misconception that extensive green roofs are maintenance free> Green roofs are 'low maintenance' rather than 'no maintenance'. Bauder recommend that all green roofs have a way of watering during prolonged periods without rain. All green roofs will benefit from water during droughts (See Bauder's Watering Guide).
All green roofs will require feeding from time to time e.g. Bauder's lightweight Xero Flor Sedum Blanket contains little in the way of natural nutrient, so fertiliser must be applied annually to ensure that the plants become resistant to extremes of weather and temperature.

The Bauder XF301 Sedum Blanket contains approximately 14-17 different plant species, some very similar in appearance to others but being more drought tolerant. Not every species incorporated will survive and the more dominant will be expected to prevail over time because they will adapt better to a particular location. Regardless of this, we would anticipate that at least 50% of the species will flourish.

Extensive green roofs that have a deeper substrate growing medium, where the vegetation is provided either by selected plug plant species or seeds, will generally support a broader species mix, which can include wild flowers, grasses and herbs. An increased amount of dead vegetation will arise from this type of species mix following flowering, which will need to be cut back and removed, both to reduce the bio-mass on the roof and to encourage seed drop from the dead flower heads.

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Watering and Irrigation: all green roofs will require water during prolonged periods of dry weather, generally sedums are much more drought tolerant than native wildflowers but both will benefit from a prolonged soaking (not little and often) to prevent them from fully drying out (Details are in the Bauder Watering Guide).

General Maintenance

General maintenance is normally carried out annually during springtime. However, certain tasks which will be dependent upon the location of the roof, such as the removal of weeds, seedlings and accumulated leaf litter from overhanging trees may also need to be done during the autumn.

The following procedures should be carried out as indicated below, in order to ensure that the roof is maintained in good condition and to protect the validity of the guarantee.

Preliminary Maintenance Procedures

- Ensure safe access can be gained to the roof and that relevant Health and Safety procedures are followed when working at roof level. It is advised that the contractor should always seek proof of current maintenance for any man-safe roof access systems prior to proceeding with the work on site.
- Remove all dead vegetation and debris from the roof surface, taking particular care to ensure that all chute outlets, gutters and downpipes are clear. Where the species mix incorporates wild flowers and grasses it is recommended that all dead vegetation is strimmed off and the waste lowered to the ground and carted away.
  Please note: Roofs in the vicinity of taller trees will need more frequent maintenance. We recommend removing dead leaves during the spring and again in the autumn, to ensure that they do not damage the roof vegetation.
- Remove the lids of all Inspection chambers, ensure that all rainwater outlets and downpipes are free from blockages and that water can flow freely away.
- Ensure that any protective metal flashings and termination bars remain securely fixed in place. Advice the client of the need to repair or renew as necessary.
- Examine all mastic sealant and mortar pointing for signs of degradation. Advice the client of the need to repair or renew as necessary.
- Check that all promenade tiles and paving slabs remain in position, secure and in good condition.
- Ensure that any new items of plant/equipment that may have been introduced to the roof are mounted on suitable isolated slabs and that any fixings used to secure the plant/equipment in place do not penetrate the waterproofing. If in doubt, please contact Bauder for further advice.
- The Building owner should keep a record of all inspections and maintenance carried out on the roof. Any signs of damage, contamination or degradation to the waterproofing should be reported to Bauder immediately, in order that arrangements can be made for remedial work to be carried out if necessary. Damage to the landscaping should be reported to the building owner. If this damage includes Bauder components, then Bauder may be contacted for remedial advice.

- When carrying out maintenance to adjoining areas, care must be taken not to damage either the landscaping or the waterproofing system. If it is considered that either has been affected, the Bauder should be contacted for advice. Any waterproofing damage caused after completion of the original installation may invalidate the guarantee.
- Any unauthorised alterations to the waterproofing system will invalidate the guarantee. If such a situation should arise, then Bauder should be contacted so that we may advise on the alteration and how it should be incorporated without affecting the guarantee.

Vegetation Maintenance Tasks

The following tasks should be carried out annually: -

Application of Fertiliser to the vegetation: As a general rule all sedum based green roofs require feeding annually to promote strong growth in the sedum and make them more drought tolerant. Biodiverse and Wildflowers system often do not need annual fertiliser as this may allow weed species to out compete them.

1. Plant encroachment

Any vegetation which has encroached into drainage outlets, walkways and the vegetation barriers (pebbles) should be removed. The vegetation removed may be set aside and used to repair any bare patches if required (see below). If movement/settlement of the pebble vegetation barrier has occurred, additional washed stone pebbles similar to the existing are to be added.

2. Monitor the colour and rate of growth

The colour and rate of growth of the vegetation should be reviewed to establish the health of the plants. It should be noted that many factors can affect the growth and colour of the vegetation and that plants tend to be greener in wetter, mild conditions (springtime) and where the roof pitch is shallow.

Notes

- During May, June and July, sedum plants flower and you will see a mixture of colours – predominantly whites, pinks and yellows with some purple. The foliage of some species of sedum, such as Sedum Album "Coral Carpet", is blush red naturally during the summer and autumn, and so the vegetation can take on a more 'red/brown appearance. This becomes more noticeable once plants have flowered, leaving remnants of dry brown seed heads. The best visible indication of the health of a plant is if the leaves are fleshy and contain plenty of water.
- When exposed to extreme conditions, sedum plants have a tendency to turn a deep red colour. This is a natural phenomenon and is important to help the plant to acclimatize, ready to survive a cold winter or hot summer. This will usually occur during extreme cold weather as well as periods of prolonged drought, in very exposed locations or when the plants are in distress through lack of nutrient (fertiliser).
- If an irrigation system is fitted, it is best to run it only during prolonged dry weather and for limited periods – see 'Irrigation' information below.

- If sedums are showing signs of distress, but have received regular rainfall, then the most likely problem is a lack of nutrient and a fertiliser should be applied.
- Only a relatively few species of sedum and other plants suitable for an extensive green roof installation will persist in partial and full shade, and they will generally be greener in colour and grow "leggier" in these locations. There will be a significant variance in the growth and colour between the plants growing in full or partial shade and those in full sun and this should be recognised as a feature of the living nature of each individual roof.
- If problems with the vegetation are suspected, Bauder may be contacted for advice and, if necessary, a suggested course of action.

3. Weeding

With the exception of saplings, which should always be removed, weeds in an extensive green roof should be considered as a problem only of aesthetics. If considered excessive, they can be removed either manually or by using a 'spot weed wipe', ensuring that care is taken to follow specific instructions regarding the use of any proprietary products. After the removal of weeds and saplings, treat the affected area as if it were a bare patch (see below). All extensive green roof installations will at times include some moss and grass.

4 Repairing Bare Patches.

Bare patches can be easily repaired and this is best done during the main growing seasons of March/April or from late August until the end of September. Take vegetation cuttings from surrounding areas of abundant growth and place on bare patches, pressing gently into the soil. A light sprinkling of sand mixed with compost should then be dressed over the affected area to improve the uptake of the cuttings. The best results will be achieved if this work is carried out during spring maintenance and the affected area is kept moist for a short period afterwards. Please contact Bauder for further project-specific advice.

Please note: In areas of extreme exposure or where localised wind-swirl is caused by adjacent structures, it is possible that both the vegetation and substrate will be disturbed by periods of high wind. Should this occur, consideration should be given to how best to secure the installation against similar conditions in the future prior to re-instatement. If a problem of this type is suspected, Bauder may be contacted for advice and, if necessary, a suggested course of action.

5 Fertiliser for Bauder XF301 sedum blankets

Bauder Sedum Blankets are grown in a shallow growing medium which contains very little nutrient, so the annual application of fertiliser is crucial to ensure that the plants remain healthy. Fertiliser should ideally be applied during March/April, as it helps the plants to prepare for extreme weather conditions and flowering whilst also allowing the different species to gain sufficient nutrients without competing against each other.

Organic fertiliser can be obtained direct from Bauder in 25kg bags, which is sufficient for an area of 312.5m2 when applied at the recommended rate of 80gm/m². Areas of up to 30m² may be applied using either a hand held spreader or strewn by hand from a bucket. Larger roofs should always be done using a trolley applicator, which can be purchased direct from Bauder. Always apply the fertiliser at the given rate written on bag.

It is recommended that the fertiliser is lightly 'watered in' immediately after application, to avoid "burning" of the foliage, which may occur if fertiliser pellets settle on the leaves. Dung-based organic fertilisers should be avoided.

6 Irrigation

Bauder SB sedum blanket and XF301 systems

When Bauder sedum systems are installed we recommend installed we recommend the provision of either a sprinkler or drip line irrigation system where the following conditions apply: -

- All south-facing roof without shade.
- All roof slopes exceeding a 2° pitch.
- Windy or exposed site locations, where the wind can dry out the blanket.
- Sites up to 50 miles inland of the east coast of the UK mainland.

Irrigation should only be activated during periods of dry weather, or if the sedum plants are showing signs of distress. The irrigation system is best activated for 2-3 hours, preferably at dawn or dusk to minimize unnecessary evaporation. Then once every 4-6 days for the duration of the hot weather conditions. This can be easily managed by using an inexpensive battery-powered, programmable timer.

Native Wildflower/Biodiverse Roofs

Extensive substrate green roof systems vary greatly in the amount of water they require. Sedum is very drought tolerant, wildflowers much less so. The watering requirements will depend on the following factors:

- The Pitch of the roof
- The amount of rainfall it receives.
- The exposure of the roof.
- The vegetation growing on the roof.
- The depth of the substrate and drainage board.

Bauder always advise that there should be a way to water the roof during times of dry weather. This might be a water supply point adjacent to the green roof, or a fully automatic irrigation system.

Some Biodiverse roofs are designed not to be watered. Whilst this will remove the water demands from the roof, it will reduce the flowering period of the plants and over time reduce the number of species as plants struggle with the harsh environment.

In these cases Bauder would strongly recommend that increasing the depth of substrate in some areas (15-2000mm+) to help prevent the substrate drying out completely (See Bauder Water Guidelines).

Please note - continuous daily watering is neither recommended nor necessary and will only promote weeds and other unwanted plant species.

Advice and Supply of Irrigation Equipment

Access Irrigation Ltd is one of the country's longest established irrigation specialists and has considerable experience in green roofs. They are happy to provide irrigation advice on any Bauder project and can supply a wide range of irrigation products.

Please contact:-
Access Irrigation Ltd
Crick Northampton NN6 7XS
T: 01788 823811 F: 01788 824256
E: sales@access-irrigation.co.uk
www.access-irrigation.co.uk

Support

Extensive roofs should require only minimal maintenance. Bauder is happy to offer advice on any issues concerning your green roof and any such query should be forwarded to the Bauder Green Roof Technical Department at the address below in the first instance. We believe our products and systems are of the highest standard and we are always prepared to discuss any queries or concerns that may arise. It is always of great help if you can provide photographs of the affected area(s) to accompany any such queries.

Please note: In the event of any query arising which it is thought may affect the condition of the system, then Bauder should be contacted at the address below. We cannot accept responsibility for any problem or failure due to use outside those parameters for which the system was designed or 'acts of god' beyond our control e.g. extreme weather conditions or damage through pests.

BAUDER GREEN ROOF MAINTENANCE SERVICE

With over 30 years' experience in the design and supply of green roofs throughout the UK and Ireland Bauder can offer unparalleled experience and expertise in green roof maintenance including sedum, plug planted and wildflower.

Having established the largest UK facility cultivating green roof vegetation blanket we have unique knowledge and horticultural expertise for roofscape vegetation. With national coverage by over 50 field personnel, you can be assured of a prompt reliable service to fully meet your requirements.

Our Service

Bauder's experienced team will provide you with a tailor-made maintenance programme for your green roof. A typical Bauder maintenance programme Includes:

- Full inspection and evaluation of your green roof
- Application of organic slow release granular fertiliser
- Removal of leaves and debris
- Removal of unwanted vegetation
- Inspection and clearance of outlets
- Examination and testing of irrigation

This work is undertaken by Bauder's experienced maintenance technicians who will carry out the necessary risk assessments and comply with all current health and safety legislation throughout the duration of the work. Finally, you will be provided with a bespoke report with photographic verification outlining the condition of the planting and any areas requiring on going treatment.

To discuss your specific requirements, please call our Green Roof Maintenance Team for a no obligation quote.

T: 0845 271 8801 **E:** greenmaintenance@bauder.co.uk

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BAUDER

GENERAL MAINTENANCE

Watering Guide

Extensive green roof systems.

Watering Guide

The following is a simple guide for the requirements of the initial establishment watering (directly after installation) and long-term watering or irrigation for a Bauder extensive green roof system.

All green roofs require water at installation and in hot, dry weather.

Establishment watering

All green roofs require some form of establishment watering which should continue until the plants have developed a sound root system. Establishment watering critically needs a fully operational rooftop water supply with adequate pressure and flow rate at the point where watering is delivered. This watering should be via surface sprinklers or on small roofs a hose with a fine rose. This must be carried out even when an irrigation system has been fitted that will come into operation at a later stage. In warm weather, watering should take place in the early morning or evening to reduce evaporation.

Bauder Flora Mixes/Wildflower Plugs/WB Native Wildflower Blanket

Bauder recommend that seeded and plug planted areas are installed in the spring and autumn months when there is usually milder weather, moderate temperatures, and likelihood of regular rainfall. Seed and plugs are very difficult to establish in mid-summer and do not grow in mid-winter.

Seed & Plugs: 10-12 weeks after installation

WB Native Wildflower Blanket: 4-6 weeks after installation

Ensure the substrate remains damp to the touch by watering regularly. In mid-summer, the roof may need daily, watering and will have to be constantly monitored.

Bauder Wildflower Plugs should be saturated completely prior to planting. Seeded roofs should not be watered until seed has germinated - for more information see Bauder Green Roof Installation Guide.

Bauder XF301/Bauder SB Substrate Sedum Blanket/Sedum Plugs

Sedum is drought resistant but only once it has fully established.

XF301/Bauder SB Substrate Sedum Blanket: 4-6 weeks after installation

Sedum Plugs: 10-12 weeks after installation

Ensure the substrate remains damp to the touch by watering regularly. In mid-summer, the roof may need daily, watering and will have to be constantly monitored.

Note: Sedum turns red when stressed through lack of water.

Bauder recommend that sedum plug planted areas are installed only in the spring and autumn months when there is usually milder weather, moderate temperatures, and likelihood of regular rainfall.

Key points for installation:

1. Ensure all other roof works are completed before the green roof is installed.
2. Test the watering system, ensure there is a working water source at roof level with sufficient pressure at the point of watering.
3. Do not try to install living vegetation on extremely hot, sunny days.
4. Install any vegetation on the day it is delivered (See Bauder's Green Roof Installation Guide).
5. Ensure the vegetation blankets are laid carefully and additional substrate is used to patch any open joints.
6. Water in the vegetation (even in winter) and fertilise if required (with Bauder Organic Fertiliser).
7. Watering should take place in the early morning or evening to reduce evaporation.
8. Avoid any trafficking of the roof.
9. Avoid any storage of materials on the roof.
10. Continue to water the roof as required for the whole establishment period.

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Long Term Watering/Irrigation

This advice is for green roofs after their initial establishment is complete. Roofs are hostile environments for all plants. There is an increase in wind at higher levels and the reduced depth of substrate can dry out quickly when surrounded by a warm building. The perimeter of a planting area is more prone to drying than the centre.

ALL green roofs will require watering in times of drought.

Generally watering is best carried out in the early morning or later evening (irrigation should be set to come on at night)

Bauder WB Native Wildflower Blanket/Flora Seed Mixes & Native Plugged Roofs
The British Native species are not as drought tolerant as sedum. The depth of growing medium (substrate) means the plants struggle to retain enough water in very dry weather. Watering should be carried out regularly as the weather dictates, typically this would involve watering after one or two weeks without rainfall.
Watering is likely to prolong the flowering season for many species.
Ideally monitor the appearance of the roof along with the local weather forecast.
Advise: **Water every 4-5 days. Water until the substrate is soaked, and the drainage board is full of water.**
Note: Overwatering will produce a lush, thick green roof covering which can choke other species, underwatering will increase the speed in which plants flower and go to seed or brown off.

Bauder XF301/Bauder SB Substrate Sedum Blanket/Sedum Plugs
Sedum is a very drought resistant plant and will survive even quite long periods of drought, however it will benefit from the occasional soaking i.e. in prolonged hot, dry weather (2-3 weeks without rain in the summer months).
Note: Sedum turns red when stressed through lack of water.
Advise: Water heavily once every week, water the sedum until the vegetation and substrate are total soaked.
Note: Overwatering will encourage grass and weed species to establish, underwatering will shrink the sedum plants enabling erosion of the exposed substrate.

This guide assumes: Summer months are April to October. Winter Months: November to March. Whilst generally summer months are hotter and drier, common sense should dictate when the weather is particularly severe for the time of year.

More comprehensive details are contained in the Watering Requirement Guidelines, which include details of irrigation.

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BAUDER

GENERAL MAINTENANCE

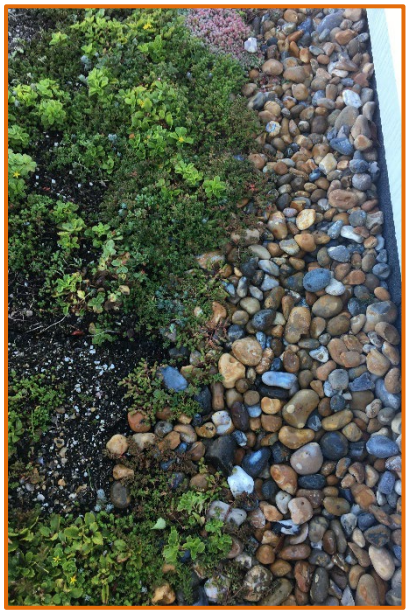
Sedum Patching

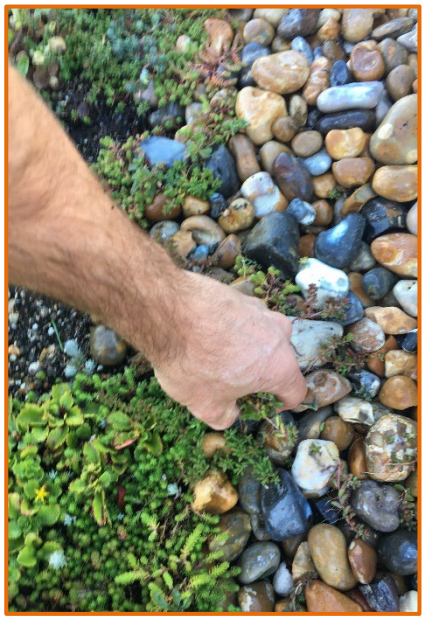
Extensive green roof systems.

Repairing Patches in Your Sedum Blanket

Assess the areas that require repairs.
You will need approx. one 20kg bag of substrate per m^2 of bare roof

Make sure blankets are butted up tight and joints are as neat as possible. Fill all gaps with substrate.





Harvest sedum cuttings from around the pebble margin of the roof that can be pulled out completely. In areas of very lush growth, gently tear off the top growth of the sedum plants (do not try and pull out the roots).

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Either spread these directly on to the area or add to a bucket of substrate and mix in the cuttings.

Spread the cuttings/substrate mix as a thin layer over the bare areas.

Fertilise the whole roof using Bauder Slow Release Organic Fertiliser.

Water regularly with a gentle spray for 6-8 weeks to keep the blanket moist. Refer to “Bauder One Page watering guide”.

When complete, avoid walking on the green roof.

Please note: Patching should not take place between November and February or in very hot dry conditions in mid-summer.

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