



4132 – EASY HOTEL, READING
4132/JK02

GREEN ROOF MANAGEMENT PLAN
Rev - / 16.01.18

1.0 WHAT TO EXPECT

Extensive green roofs such as on this project are not always green and colours tend to change throughout the year. They consist mainly of low growing drought tolerant Sedum plants, but may also include other species such as Saxifrage, wild grasses, moss and even herbs.

The appearance of planting will change along with the seasonal weather cycles and this is perfectly natural. It is also expected that more grass or moss may be present during the wetter months, simply because the conditions exist for these species of plant to exist. However, they will tend to die off during the dry summer months, because the shallow free-draining substrate in the blanket does not hold sufficient moisture for these plants to survive.

Generally there are approximately eight to ten different plant species in a sedum blanket, some being very similar in appearance to others, but perhaps being more 'drought tolerant' under certain conditions. Not every type of species will survive and the more dominant will be expected to prevail with time, simply because they adapt better to any given location. However, we would expect at least 50% of species to flourish regardless.

Extensive roofs are 'low maintenance', but not 'no maintenance'. The Sedum blankets contain little in the way of natural nutrient and so fertiliser must be applied at the required time to help the plants become resistant to weather and temperature extremes.

Extensive roofs that have a deeper substrate growing medium, with the vegetation provided from specifically chosen Plug plants or hydro-planting, will generally exhibit a greater variety of plant species that may also include grasses and herbs. Here it is expected that an increased amount of dead vegetation following flowering will occur and therefore the need for more maintenance to remove the dead seed heads.

Sedum plants absorb and store water in their leaves. They use this water to survive during times of drought. A moisture retention fleece is incorporated into the system beneath the blanket, but the function of this is to hold water after rainfall for sufficient time for the plants to take on the water via the roots. It is not a long-term water storage medium; so don't be too concerned if it is dry. Just check the leaves to see if they are fleshy and don't appear dried out. In winter, the plant appears to shrink back and the leaves become small and tight. This is because the plant has sufficient water present in the substrate, but will hold little so it is able to withstand frost.



2.0 GENERAL MAINTENANCE

General maintenance is normally carried out annually during springtime. However, certain tasks e.g. the removal of weeds or accumulated leaf litter, may need to be done during the Autumn, depending to some extent upon the surrounding environment i.e. trees, dependent upon the location of the roof.

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

3.0 BASIC ROOF RELATED MAINTENANCE PROCEDURES:

1. Ensure safe access can be gained to the roof and that relevant Health and Safety procedures are followed when working at roof level. Safety harness attachment points or man safe systems should always be used where provided.
2. Remove all debris and leaves from the roof surface, rainwater outlets, chutes, gutters, etc. All debris must be removed from the roof and not simply flushed down rainwater pipes. 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 fallen leaves do not cover and suffocate the sedum plants.
3. Open the lid of the Inspection chambers and ensure that all rainwater outlets (including down pipes) are free from blockages and that water can flow freely.
4. Ensure that any protective metal flashings or termination bars remain securely fixed and in place.
5. Examine all mastic sealant and mortar pointing for signs of degradation, and repair or renew as necessary.
6. Where promenade tiles or paving slabs exist, ensure that they remain secure in position and in good condition.
7. Ensure that any items of plant/equipment that may have been introduced to the roof, are sited on a suitable isolated slab and that any fixings that may have been used to secure them do not penetrate the waterproofing.
8. Report any signs of damage or degradation to the installer immediately, so that arrangements can be made for remedial work to be carried out if necessary. It is recommended that a roof plan marked with co-ordinates be used to record the findings of the inspection. This will avoid confusion and provide an on-going record of roof performance, which can be compared year on year.
9. Works to adjoining areas - When carrying out maintenance to adjoining areas, care must be taken not to damage the system. For example, any solvent-based product allowed to wash down into the system will seriously de-stabilise the molecular structure of the bitumen causing it to fail. If this thought to be likely, then the supplier should be contacted so that they may advise. Chemical damage will invalidate the guarantee.
10. Alterations - Any alterations to the system that may affect its integrity will invalidate the guarantee. If such a situation should arise, then the supplier should be contacted so that they may advise on the alteration and how it should be incorporated without affecting the guarantee.



4.0 PLANT RELATED MAINTENANCE TASKS REQUIRED:

1. **Plant encroachment.** Any planting, which has encroached into drainage outlets, walkways and the vegetation barriers (pebbles), should be removed. This removed vegetation can be used to repair any bare patches if required (see below). If movement/settlement of the pebble vegetation barrier has occurred, then additional washed stone pebbles (similar to the existing) should be added.
2. **Monitor the colour and rate of growth.** The colour and rate of growth should be examined, to establish the health of the plants. It must be stressed that many things can affect the growth and colour of the sedum plants. Generally, plants tend to be greener in wetter mild conditions (springtime) and where the roof pitch is shallow. During May, June and July the plants flower and you will see a mixture of colours - whites, pinks, yellows and even some purple. Some species of sedum blush red naturally during the summer and autumn, (e.g. Sedum album 'coral carpet') and so the roof takes on a more 'red/brown appearance. This is particularly the case once plants have flowered, leaving remnants of dry brown seed heads. The best visible indication of health 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. Please note that that this is a natural phenomenon and that this behaviour is important to the plant to acclimatise for surviving through a cold winter or hot summer. This usually occurs during climate extremes e.g. extreme hot or cold weather, prolonged drought or in very exposed conditions or when the plants are in distress, for example through lack of nutrient (fertiliser). Plants affected by a severe lack of water shrink back and the leaves will tend to be small and very tight. In distress the plants change gradually to a deep crimson red. If an irrigation system is fitted, it is best to run it only during prolonged dry weather for limited periods – see 'Irrigation' information below, If the plants are in this condition, but have received regular rainfall, then the likely problem is lack of nutrient and fertiliser should be applied. In shade, Sedums tend to grow greener and leggier. In general, sedums do not like permanent shade, so either avoid areas under larger trees or surrounded by buildings, or make it possible for more natural light to reach the roof. There may be noticeable differences in the growth of similar sedums in a different area of the same roof. This emphasises the living nature of each individual roof. If problems are suspected, the supplier should be contacted for advice and if necessary, a suitable course of action.
3. **Weeding.** Sedum blankets will at times include moss and grass. If considered excessive, provision should be made to remove any unwanted vegetation, e.g. weeds/ grasses/ saplings. These can be removed manually by hand, or by using a 'spot weed wipe', although care should be taken to follow specific instructions regarding the use of any proprietary products. Weeds are a problem of aesthetics rather than damaging the roof, but large areas of weed or grass should be removed, as should saplings. After removal of weeds treat area as if it were a bare patch (see below).
4. **Repairing Bare Patches.** Bare patches can be repaired easily, but only during the growing season (ideally during March/April or late August until the end of September). Take clumps of Sedum from areas of abundant growth and place on bare patches pressing gently into the soil. They can then have a light sprinkling of sand mixed with compost or substrate to improve uptake of cuttings. The Sedum cuttings will grow best if this is carried out during spring maintenance and kept moist and free of temperature extremes (frost and intense sun). Compost or topsoil can be used for smaller bare patches, but contact the supplier for advice or to buy specialised substrate.
5. **Fertiliser for sedum blankets.** Sedum Blankets are grown in a very shallow growing medium that contains very little nutrient, so the annual application of fertiliser is crucial to ensure that the plants remain healthy. Fertiliser should be applied during March/April. It is important to carry out this task during this time, because it helps to prepare the plants for extreme weather conditions and flowering and also because it allows the different species to gain all their nutrients without competing against each other. A good organic fertiliser can be obtained direct from the supplier in 25kg bags (each bag sufficient for covering 312.5m). This should be applied at the



rate of 80gm/m². Small areas (up to 30m²) can be applied using a hand held spreader or strewn by hand from a bucket. Fertilising larger roofs should be done using a trolley applicator. Apply fertiliser at the given rate written on bag. Fertiliser pellets settling on damp leaves may have a detrimental effect i.e. burning the leaves. It is therefore recommended that the fertiliser is lightly 'watered in' immediately after application. Dung based organic fertilisers should be avoided.

6. **Fertiliser for either plug planted or hydro-planted extensive green roofs** Use a 6-month slow release chemical fertiliser with an NPK ratio of 15, 9, 14 respectively, such as Plantacote Plus 6M, applied at a coverage rate of 50gm/m². Application: Small areas (up to 30m²) can be applied using a hand held spreader or strewn by hand from a bucket. Fertilising larger roofs should be done using a trolley applicator. Apply fertiliser at the given rate written on bag. This product can also be used on sedum blankets.
7. **Irrigation – for Sedum blanket systems on slopes exceeding 9 degrees** Sedum plants absorb and store water in their leaves. They use this water to survive during times of drought. A moisture retention fleece is incorporated into the system beneath the blanket, but the function of this is to hold water after rainfall for sufficient time for the plants to take on the water. It is not a water storage medium; so don't be concerned if it is dry. Check the leaves to see if they are fleshy and not dried out. Generally speaking, sedum roofs require no artificial watering following establishment. However, for sedum blanket systems only, we recommend the installation of a 'leaky pipe' or drip line irrigation system where the roof pitch exceeds 9 degrees. Irrigation will ensure that water is readily available on steeper roofs during warm, dry weather where the thinner blanket systems are more prone to drying out due to wind and natural evaporation, particularly roofs with a south facing aspect.

Leaky pipe or drip line irrigation systems are relatively inexpensive and considering the unpredictable weather patterns over the past 15 years, we feel that this small additional cost is a really worthwhile investment to maintain your sedum roof finish in top condition.

Irrigation should only be activated during prolonged periods of hot, 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 achieved using an inexpensive battery powered programmable timer

Please note - continuous daily watering is neither recommended or necessary, as this will only promote weeds and other unwanted plant species.



5.0 TASK SCHEDULE:

Task	Year 1				Year 2				Year 3				Year 4				Year 5				Years 6-10
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Watering: (to vegetation supplier's recommendations as necessary to maintain healthy growth)	•	•	•	•		•	•			•	•			•	•			•	•		As Years 2-5
Weeding: Removal of weeds/grasses/saplings to be removed by hand. Treat bare patches following removal of weeds (if required).		•	•			•	•			•	•			•	•			•	•		As Years 1-5
Monitoring plant growth – particularly during extreme of hot or cold weather, particularly during prolonged drought	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	As Years 1-5
Plant encroachment into drainage outlets to be removed (removed vegetation can be used to repair any bare patches if required)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	As Years 1-5
Repairing bare patches (during growing season ideally March/April or late August to end of September) to supplier's specification		•	•			•	•			•	•			•	•			•	•		As Years 1-5
Fertiliser: Organic fertiliser should be applied and lightly watered in during March/April at the vegetation supplier's recommended rate. Dung based organic fertilisers should be avoided.		•				•				•				•				•			As Years 1-5
Removal of fallen leaves/debris from roof surface, rainwater outlets etc.		•		•		•		•		•		•		•		•		•		•	As Years 1-5
Key : Q1 = January – March Q2 = April – June Q3 = July – September Q4 = October - December																					

Safe access in accordance with Health & Safety procedures should be followed ensuring safety harness/man safe systems are used where provided.