Habitat Management Plan for 4 Oak Hill Park

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Appendix A: Bauder Biodiverse Green Roof Specification

1. Landscape Management Objectives

The landscape and habitat management plan for 4 Oak Hill Park is based on the initial biodiversity specification for the roof areas. The key components of which are:

- An increasing number of flora and fora species present on the site.
- A mixtures of habitats created by different depths of substrate and surface finishes

To be read in conjunction with the roof plan of the green roof areas.

2. Back ground Information

Extract from the Camden Biodiversity Action Plan 2013-2018

Green Roof Design Basics
There are many things to consider when designing and implementing a green roof: Whether site is overlooked and any potential privacy infringements; Root barriers and waterproofing and drainage capacity (see below for design specifications); Amount of external heat generated by the building and surface flooding risk; Weight and structural considerations; Ease of installation and maintenance; Aesthetics, access and amenity provision; Habitats and biodiversity.

Biodiversity design and considerations
The following outline some key principles for maximising the biodiversity benefit of
living roofs. These can be most extensively be applied on green or brown roofs designed for biodiversity; however they can also be incorporated to varying degrees
into intensive and semi-intensive green roofs.
Surroundings
☐ In built-up areas, living roofs and walls can make a significant contribution to
an area's greenspace.
☐ Habitats in the surrounding areas should be considered e.g. if there are important brownfield sites nearby, the strategic provision of brownfield habitat on roofs could increase connectivity between sites.
Substrate
☐ Substrate depth should be between 80 and 150mm and vary across the roof.
☐ For brown biodiverse roofs, reclaimed building material can be used but should be screened to ensure that it is not contaminated.
☐ Areas of bare ground can provide habitat for warmth-loving invertebrates and
recreate an open mosaic habitat structure.

Mounds and ridges can provide varying microclimates suitable for different species and create structurally diverse vegetation.

Planting
Planting should consider the climate, microclimate, plant attributes and objectives. Vegetation can establish either through natural colonisation or planting. Colonisation can produce habitat of high value but can also create problems with undesirable species. The sowing of annuals or plug planting combined with seeding can be beneficial as it provides a resource for species for the first few years during establishment.
Sedum has less biodiversity value but can still deliver drainage benefits etc. and can be combined with other plantings and substrates (on biodiverse roofs should be less than 30%).

Wildflowers provide a habitat for beetles, bees, butterflies and moths. Planting density should be 15-20 species/m2. In addition to constituting the main planting for biodiverse green roofs, they can be incorporated into extensive brown roofs and sedum roofs. Mosses, succulents and grasses can provide additional variation.
Shrubs and cover can be provided depending on structural considerations and substrate depth and can provide cover for wildlife, perches and winter food for birds, and windbreaks.
Other Biodiversity Features
Over-wintering vegetation allows many invertebrates to complete their lifecycle;
Log piles and deadwood can provide habitat and perches for invertebrates and birds;Bee banks are mounds of sand and provide valuable nesting sites;
Stones and mounds of cleaned bricks can provide insect and spider habitat;
Ponds and wet areas can provide a valuable resource for many species;
Bug hotels and habitat walls for nesting and overwintering invertebrates.
Maintenance
Maintenance will vary between roofs and it is important to understand the maintenance requirements before the roof is installed; Most extensive green roofs do not require extensive irrigation and fertiliser; Initial watering will usually be required during establishment (for around 6 weeks); Monitoring and removal of undesirable species may be required; Habitat management e.g. re-creating bare-ground areas may be required.

3. Review of the Management Plan

The flora and fauna on the roofs is likely to evolve over time. It is therefore highly likely that the plan be required to change and along with it the maintenance requirements. To facilitate this the plan calls for monitoring in the second summer with a review of the plan and maintenance for years three to five. This process to be repeated after five years.

4. Maintenance Programme

These are in line with the Camden BAP detail within this document.
2 visits per year in Spring/summer and autumn for five years.
Additional monitoring visit in summer of second and fifth year.

Work to be carried out by approved Green Roof Maintenance provider.

Note: None of the green roof are designed to be trafficked in any way, the roofs should not be accessed by anyone except for repair or essential maintenance works, any damage to the surface finishes of the roofs should be reported to Bauder immediately.

Initial 10 weeks (directly after installation)

The green roofs,
Seeded biodiverse roofs are designed to need a minimum of maintenance. However, some intimal watering will be required during the first 10 weeks after installation if there is insufficient rain fall.

- Watering of seeded areas (after the seed has germinated) should be regular (every day) when there are periods without rainfall, this can be reduced as the planting become more established.
- Watering should be carried out with a fine mist sprinkler or rose. Care should be taken not to wash out the seed with excessive water or pressure.
- Efforts should be made to not to traffic the roof during watering.

Establishment Period (Yrs 1-2)

Maintenance. During the first 2 years maintenance visits should be twice yearly (spring/summer and autumn)
Maintenance Works
All Areas, every visit work required:

- Pebble Border: remove all vegetation from Pebble borders
- Outlets: check outlets are clear and free from slit and detritus
- Remove unwanted and invasive grass and weeds.
- Fertilise if required spring/summer visit as per Bauder Specification

Monitoring
Summer of year 2

- Assess the % failure of seeding. If failed area larger than 5m2 should be reseeded in the following spring or autumn.

From these assessments the management plan for the following 3 yrs can be adjusted.

Maintenance Period (Yrs 3-5)

Maintenance. During the years three to five maintenance visits should be twice yearly (spring/summer and autumn)

Maintenance works all areas every visit:

- Pebble Border: remove all vegetation from Pebble borders
- Outlets: check outlets are clear and free from slit and detritus
- Remove unwanted and invasive grass and weeds.
- Fertilise in spring/summer visit if required as per Bauder Specification

Monitoring
Summer of year 5

- Assessment of the number of original plant species still present on site, plus additional species which may have colonised the roofs.
- Assessment of the success of the wet area, log piles. Stone and sand areas with details of what species are flourishing in these areas.

From these assessments and reference to the Camden BAP (2013-2018) the management plan for the following 5 yrs can be adjusted.

Suggested wildflowers from the Camden BAP

Achillea millefolium / Yarrow (BL) Origanum vulgare / Wild marjoram

Agrimonia eupatoria / Agrimony Plantago media / Hoary plantain

Anthyllis vulneraria / Kidney vetch Primula veris / Cowslip

Centaurea nigra / Common knapweed Prunella vulgaris / Selfheal

Echium vulgare / Viper's-bugloss Ranunculus acris / Meadow buttercup

Galium verum / Lady's bedstraw

Hypericum perforatum / Perforate St.

Johnswort

Ranunculus bulbosus / Bulbous

buttercup

Reseda lutea / Wild mignonette

Knautia arvensis / Field scabious Sanguisorba minor / Salad burnet

Lamium album / White dead nettle (BL) Silene latifolia / White Campion

Leontodon autumnalis / Autumn hawkbit

Leontodon hispidus / Rough hawkbit

Silene noctiflora / Night flowering catchfly

Leucanthemum vulgare / Oxeye daisy Silene uniflora / Sea campion (GRG)

Linaria vulgaris / Common toadflax Silene vulgaris / Bladder campion

Lotus corniculatus / Bird's-foot trefoil Thymus ducci / Wild Thyme (GRG)

Malva moschata / Musk mallow Trifolium Pratense / Red clover (BL)

Suggested grasses

Briza media / Quaking-grass Other festuca spp.

Festuca ovina / Sheeps fescue Koeleria macrantha / Crested hair-grass

Many of these species are incorporated within the Bauder Flora 3 seed mix. Some have been omitted as they grow too tall and would shade the PV arrays.