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URBAN GREENING FACTOR AND NET BIODIVERSITY

9.379 – 330 GRAY'S INN ROAD

17/03/2021 *by Mark Whittingham, reviewed by Ben Holmes*

This design note summarises the applicant's formal response to London Borough of Camden Nature and Conservation Officer and GLA Stage 1 comments on urban greening and biodiversity.

SUMMARY OF CONSULTATION RESPONSES

LONDON BOROUGH OF CAMDEN NATURE AND CONSERVATION OFFICER (23/12/2020)

In terms of our expectations for biodiverse and biosolar roofs, your documents state 'extensive', which can just cover sedum mats, they also state 'intensive', which is more about the depth of substrate (though the higher UGF score suggests biodiverse). Biodiverse roofs can be extensive or intensive, but extensive or intensive roofs are not necessarily biodiverse (it depends on design and species). The devil is in the detail so we'll want this up front. On the wider biodiversity question, your selection of species in the public and resident's garden areas is quite good, but we want further details on whether there is net increase in biodiversity.

I'll need to look at it further with my Trees and Landscaping colleagues about the loss of the large TPO tree. Certain Cllrs at Committee will challenge its loss so there will need to be sufficient justification and replacement planting (i.e. including trees of a large ultimate size that are visually prominent so contribution highly to amenity).

GLA STAGE 1

The applicant should therefore review the urban greening proposed, seeking to improve the quality or quantity, to increase the proposed UGF.

It is requested that further information is provided when the UGF is reviewed and confirmed. The extent of green roofs across the site should also be reviewed, ensuring that opportunities for intensive green roofs have been maximised.

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The applicant should provide evidence how the proposed development secures a net biodiversity gain. If biodiversity net gain is not achievable on the site the applicant should review opportunities for biodiversity offsetting in consultation with the borough.

LOSS OF TPO TREE

The development requires the removal of one walnut tree *Juglans regia*. This 11m mature tree is a non-native tree species that potentially supports only a very small number of insects (four according to http://www.countrysideinfo.co.uk/woodland_manage/tree_value.htm) and is thus of very limited value in terms of its ecological function. The development cannot go ahead without removing the tree but we have planned the development to enhance net biodiversity (see below) and replace this tree with another native tree species which is of considerably more value to biodiversity (see below).

This tree will be replaced by a more biodiverse species – silver birch *Betula pendula*. We will use a well developed tree (e.g. 4m+ in height) as a replacement. This species can support up to 229 insect species, 126 lichen species and naturally occurs throughout England (see http://www.countrysideinfo.co.uk/woodland_manage/tree_value.htm); thus resulting in a gain in biodiversity.

URBAN GREENING

The Urban Greening Factor (UGF) has been calculated for the residential and commercial portions of the scheme; a site-wide calculation has also been carried out. As shown in the table below the residential portion of the scheme achieves a UGF in excess of 0.4 and is therefore compliant with London Plan Policy G5.

The commercial element of the scheme has maximised greening as far as possible; the remaining sealed surfaces predominantly consist of essential amenity and servicing areas and rooftop plant.

The scheme as a whole includes significant areas of semi-natural vegetation, consisting of native trees under planted with species-rich grassland. The scheme also includes significant areas of extensive green roof (details in the following section) which have been designed to provide pollination services for pollinating insects found close to the site. As noted below a net gain in biodiversity will be achieved; as part of the BREEAM assessment the scheme will also incorporate various suitable ecological enhancements, these will be developed further at the next design stage.

Surface Cover Type	Factor	Wicklow Yard		Railway Garden		Site-wide	
		Area	Score	Area	Score	Area	Score
Semi-natural vegetation (e.g. trees woodland, species flower-rich grassland) maintained or established created on site.	1.00	15.65	15.65	144.65	144.65	160.30	160.30
Wetland or open water (semi-natural; not chlorinated) maintained or established created on site.	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Intensive green roof or vegetation over structure. Vegetated sections only. Substrate minimum settled depth of 150mm.	0.80	342.00	273.60	495.80	396.64	837.80	670.24
Standard trees planted in natural soils or in connected tree pits with a minimum soil volume equivalent to at least two thirds of the projected canopy area of the mature tree	0.80	15.65	12.52	59.65	47.72	75.30	60.24
Extensive green roof with substrate of minimum settled depth of 80mm (or 60mm beneath vegetation blanket) – meets the requirements of GRO Code 2014.	0.70	105.10	73.57	0.00	0.00	105.10	73.57
Flower-rich perennial planting – see Centre for Designed Ecology for case-studies.	0.70	12.00	8.40	44.55	31.19	56.55	39.59
Rain gardens and other vegetated sustainable drainage elements	0.70	4.30	3.01	36.15	25.31	40.45	28.32
Hedges (line of mature shrubs one or two shrubs wide) – see RHS for guidance.	0.60	0.00	0.00	0.00	0.00	0.00	0.00
Standard trees planted in pits with soil volumes less than two thirds of the projected canopy area of the mature tree.	0.60	0.00	0.00	8.90	5.34	8.90	5.34
Green wall –modular system or climbers rooted in soil	0.60	95.00	57.00	100.00	60.00	195.00	117.00
Groundcover planting	0.50	0.00	0.00	44.11	22.06	44.11	22.06
Amenity grassland (species-poor, regularly mown lawn).	0.40	0.00	0.00	135.25	54.10	135.25	54.10
Extensive green roof of sedum mat or other lightweight systems that do not meet GRO Code 2014.	0.30	0.00	0.00	0.00	0.00	0.00	0.00
Water features (chlorinated) or unplanted detention basins.	0.20	6.66	1.33	0.00	0.00	6.66	1.33
Permeable paving	0.10	60.45	6.05	286.90	28.69	347.35	34.74
Sealed surfaces (e.g. roofs, external concrete, asphalt, stone)	0.00	3026.39	0.00	729.94	0.00	3756.43	0.00
Total Score		**451.13**		**815.69**		**1266.81**	
Total Area (sqm)		**3588.20**		**1985.90**		**5574.20**	
Urban Greening Factor		**0.13**		**0.41**		**0.23**	

SPECIFICATION OF BIODIVERSE GREEN ROOFS

The applicant is committed to installing biodiverse green roofs wherever technically feasible. The location of green roofs has been indicated by the architect on drawing number P150 (revision P01).

Green roofs will be biodiverse and include the following species of ecological value to the local area:

1. Mixture of plant species included in sward that occur naturally in the area and are used by pollinators recorded in the immediate radius of the site (e.g. 2km)[1].
2. Mixture of plant species that flower at different times thus providing support to pollinating insects and increasing visual attractiveness for people living on site (see Table 1)
3. On intensive roofs ensure the presence of legumes in the sward which have been shown to increase carbon capture in soil (e.g. recent paper in Nature Communications 2019).

Table 1: Examples of species to include in the biodiverse seed mix for use on in the green roofs for this development (we will work with seed suppliers to derive a suitable mixture of species and pass this to LBC for comment before finalising)

Plant species (common name/species)	**Pollinator species (known to occur within 2km of site and other species/groups which may be of interest to include as target species)**
White Clover Trifolium repens	Honeybee Bumblebee
Red Clover Trifolium pratense	Honeybee Bumblebee Bombus hortorum
Lucerne Medicago sativa	Honeybee Bumblebee butterflies
Chicory cichorium intybus	Adia cinerella Apis mellifera Azelia zetterstedti Bellardia vulgaris Bombus lapidarius Bombus pascuorum Bombus pratorum Botanophila striolata Coenosia tigrina Dilophus febrilis Dolichopus plumipes Empis bicuspidata Episyrphus balteatus Eristalis arbustorum Eristalis tenax Eupeodes corollae

[1] Preliminary list of pollinating insects within a 2km radius if the site: Tree Bumblebee Bombus hypnorum, Large Red-tailed Bumblebee Bombus lapidarius, Honey Bee Apis mellifera, Gooden's Nomad Bee Nomada goodeniana, Hairy Footed Flower Bee Anthophora plumipes, Chocolate Mining Bee Andrena scotica, Common Carder Bee Bombus pascuorum, Flavous Nomad Bee Nomada flava, Grey Mining Bee Andrena cineraria, Grey-patched Mining Bee Andrena nitida, Buff-tailed Bumblebee Bombus terrestris.

	Haematopota pluvialis Helophilus pendulus Lonchoptera furcata Maniola jurtina Melanostoma mellinum Melanostoma scalare Meligethes sp. Muscina assimilis
Caraway Carum carvi	Syrphids Wasps Solitary bees beetles
Bird's-foot trefoil Lotus corniculatus	Honeybee bumblebee
Yarrow Achillea millefolium	Eristalis interrupt Eristalis arbustorumj
Field scabious Knautia arvensis	Syrphid fly: Melanostoma mellinum Solitary be: Andrena hattorfiana Bombus lapidarius Lepidopterans Beetles
Self Heal Prunella vulgaris	hoverflies Bombus pascuorum, Bombus hortorum Apis mellifera
Wild Cervil (Cow Parsley) Anthriscus sylvestris	Mining bees: Andrena sp Syrphidae: Eristalis, Syrphus, and Sphaerophoria lacewings, beetles and hoverflies
Buckwheat Fagopyrum esculentum	Apis Melifera Wild bees (Lasioglossum, Andrena, Hylaeus) Syrphinae
Common knapweed Centaurea nigra	social bee species: long and short-tongued species

NET BIODIVERSITY

Net biodiversity change will be addressed using the Natural England tool (see http://publications.naturalengland.org.uk/publication/5850908674228224). We have populated the tool with the data we have for the site so far (prior to precise measurements of green space – currently estimated from satellite data). The tool predicts a substantial increase in net biodiversity gain (+245%). This is achieved through a combination of the landscaping design and installation of green roofs (as outlined above). Following a detailed review of the landscaping proposals and collaboration with the architect (AHMM) and landscape architect (East) we expect this will be achieved.

The exact figure for change in biodiversity will be calculated post-planning as part of the BREEAM assessment, following completion of the Preliminary Ecological Assessment. The majority of the gains will come from the green roofs (see above), green walls, trees and semi-natural vegetation. In addition the use of artificial boxes (for birds, bats and bees) will further enhance the biodiversity gains. The specific species known to occur in the area will be matched to the provision of these habitats.

STATEMENT OF AUTHOR'S QUALIFICATIONS

Professor Mark Whittingham has been a Professor of Applied Ecology at Newcastle University since 2013. He has lead and participated in a large number of research projects (46 funded research projects to date) and his recent focus is on multi-functional land use and ecosystem services. He has published over 160 papers in the peer-reviewed literature (see https://scholar.google.co.uk/citations?user=FrfyNjUAAAAJ&hl=en). He is a Fellow of the Royal Society of Biology (elected in 2016) and a Member of the Chartered Institute of Ecology and Environmental Management since 2010. He has run an ecological consultancy (Whittingham Ecology) with his wife since 2008. He has a PhD and a first degree in Ecology.

Specifically relevant to the task at hand here he is leading the biodiversity element of a current EU H2020 10 Million Euro project (SUPERG) which is trialling mixtures of seeds to provide benefits for different ecosystem services (of particular note in this context are the ones focussed on providing benefits for pollinating insects and another focussed on carbon capture).