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Consultant Advice Notice

Project:	Waterloo Metro Quarter Development – Building 1	**Project No.**	1024873
Subject:	Response to Submission CoS 41	**Doc No.**	RPT-005
Author:	David Collins	**Date:**	27/01/2021
Attention:	Mirvac Development	**Revision:**	A

This Consultants Advice Notice has been prepared to provide a response to the City of Sydney's Response to Submission item 41 (as follows).

The roof terrace to level 13 of Building 1 includes an accessible area that has been indicatively designed (subject to tenant fit-out), and an expanse of gravel roof with photovoltaics. Studies show that co-locating photovoltaics and green roofs can greatly improve the performance of the PVs, whilst supporting habitat and biodiversity. This should be considered for this roof.

The indicative design of the PV systems to the roof terrace to level 13 of Building 1 has considered a 10° panel pitch to enable sufficient rainfall run-off while maintaining a low profile to sit within the approved building envelope. This 10° pitch on a 1,000mm panel width limits the height above the roof at the raised edge of the panel to be less than 200mm.

Research on integrated PV and green roof systems "Photovoltaic-green roofs: A review of benefits, limitations and trends" by Shafique, Luo and Zuo published in Solar Energy, Vol 202, May 2020 notes the high initial costs and limited experimental data. A study in Germany in 2007 suggests a 6% increase in PV output for a PV-green roof planted with sedum. Other studies suggest around 1%.

It is acknowledged that integrated photovoltaics with landscaping can have some marginal efficiency gains. However, the spacing of the panels and the raising of the panels above the roof to allow plants to grow beneath is likely to have the following impacts:

- Reduce the total area of PV panel able to be installed thereby reducing the total electricity generated per annum by the building.
- Raise the effective height of the building envelope which could increase overshadowing impacts on surrounding buildings and public spaces.
- Increase the cost of the framing required to support the panels above the green roof – and increase the potential risk of water penetration at each roof fixing point.
- Planting may impact the wiring and junction boxes to the rear of the panels, creating increased maintenance requirements.
- Planting along the front edge of the panel could create partial shading of the panel – this can significantly reduce the electrical output of a panel.
- Increase the maintenance requirements for both the landscape and PV

The current design, to have separate green roofs and PV areas on the roof, is the preferred approach and maximises the benefits of both. The green roof can be enjoyed and maintained without the clutter of PV panels, and the PV system is installed, operates, and is maintained efficiently.