

## **Greening in Buildings**

### **Introduction**

Greening has become more common in urban landscape design and it plays an important role in improving the living environment in densely populated cities like Hong Kong. This practice note sets out the areas of considerations for Authorized Person (AP)/Registered Structural Engineer (RSE) in planning, designing and installing greening in buildings.

### **Submission for Approval**

2. Greening may exist in various forms, extent and locations in a building. Its effects on aspects such as the structural, drainage, usage, fire safety and maintenance of a building may vary significantly. Whether installation of greening constitutes building works under the Buildings Ordinance (BO) depends on the relevant facts and circumstances of each case. The relevant factors include degree of fixation, degree of permanence, nature and intended use, size, associated building works and provision of facilities, ease of assembling and ease of removal. All relevant factors have to be analysed and then considered in totality. For example, the construction of fixed planter boxes is regarded as building works but the laying of soil and planting of vegetation therein do not constitute building works under the BO.

3. Where no new building works are involved in the greening, plan submission to the Buildings Department (BD) for approval is not necessary. However, the AP/RSE should carefully consider the load bearing capacity of the existing building structure, effects of the greening on the drainage system and fire safety, and associated change in use.

4. Where new building or building works including strengthening of the existing structures are involved in the greening works, proposal for alteration and addition works should be submitted to the BD for approval.

### **Structural Consideration**

5. In assessing the effects of greening on structural elements in both new developments and existing buildings, all loading combinations associated with the proposed greening, such as drainage layer, substrate layer, growing medium layer, plant variety and weight etc. should be considered. The fully saturated weight of the layers should be taken into account. Consideration should also be given to the loading of the proposed irrigation system and construction load. Special attention should be given for the provision of greening that may pose higher risks, such as on inaccessible roofs, long-span roof/podium structures, roofs/podiums with water ponds or cantilever slab structures.

6. As stipulated in the Code of Practice for Dead and Imposed Loads 2011, the weight of soil, waterproofing and drainage system and plants for greening shall be taken as dead loads. Imposed loads should be allowed for in addition to the loading of the greening. For greening area where people may congregate, minimum imposed loads for the corresponding usage should be adopted.

7. In carrying out structural assessment to ascertain whether the proposed greening is suitable in an existing building, the AP/RSE should check the approved records of the relevant parts of the existing building and their existing site conditions against the loading induced by the greening which may vary significantly from green carpets to deep water ponds. Reference should be made to PNAP APP-117 on the Structural Requirements for Alteration and Addition Works in Existing Buildings.

### **Drainage System and Waterproofing**

8. Effective discharge of rain water during heavy rainfalls should be allowed for in the drainage design of all greenings. In general, surface fall not shallower than 1:80 should be provided to the associated structure and the greenery. In particular, the drainage system should be adapted to the specification of the chosen greenery system.

9. For new greening on existing building, the existing drainage system of the building may be neither adequate nor suitable for the greening. Therefore, additional or specific drainage provision may be required to avoid water ponding and overloading of the building structure.

10. Sound waterproofing of the roof/podium should be ensured before the provision of greening in order to avoid water seepage causing structural damage. All drainage provisions shall be inspected and maintained regularly. Where leakage, blockage or defects are detected, they should be rectified immediately.

### **Means of Escape**

11. The provision of greening in buildings should not affect the safety of occupants in case of fire. The extent of the refuge should not be diminished and/or obstructed by greenery or any other use.

### **Protective Barrier & Access for Maintenance**

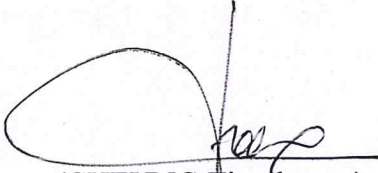
12. Protective barriers, such as balustrades and railing, should be provided for the safe access to the greening area and to prevent the danger of falling in accordance with regulation 8 of the Building (Construction) Regulations. Moreover, access and safety provisions for maintenance of the greening area should also be provided.

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### **Maintenance of Greening**

13. The building owners should be advised of the guidelines for the safe use of the greening, including regular inspection and maintenance of the affected structures and drainage system.



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