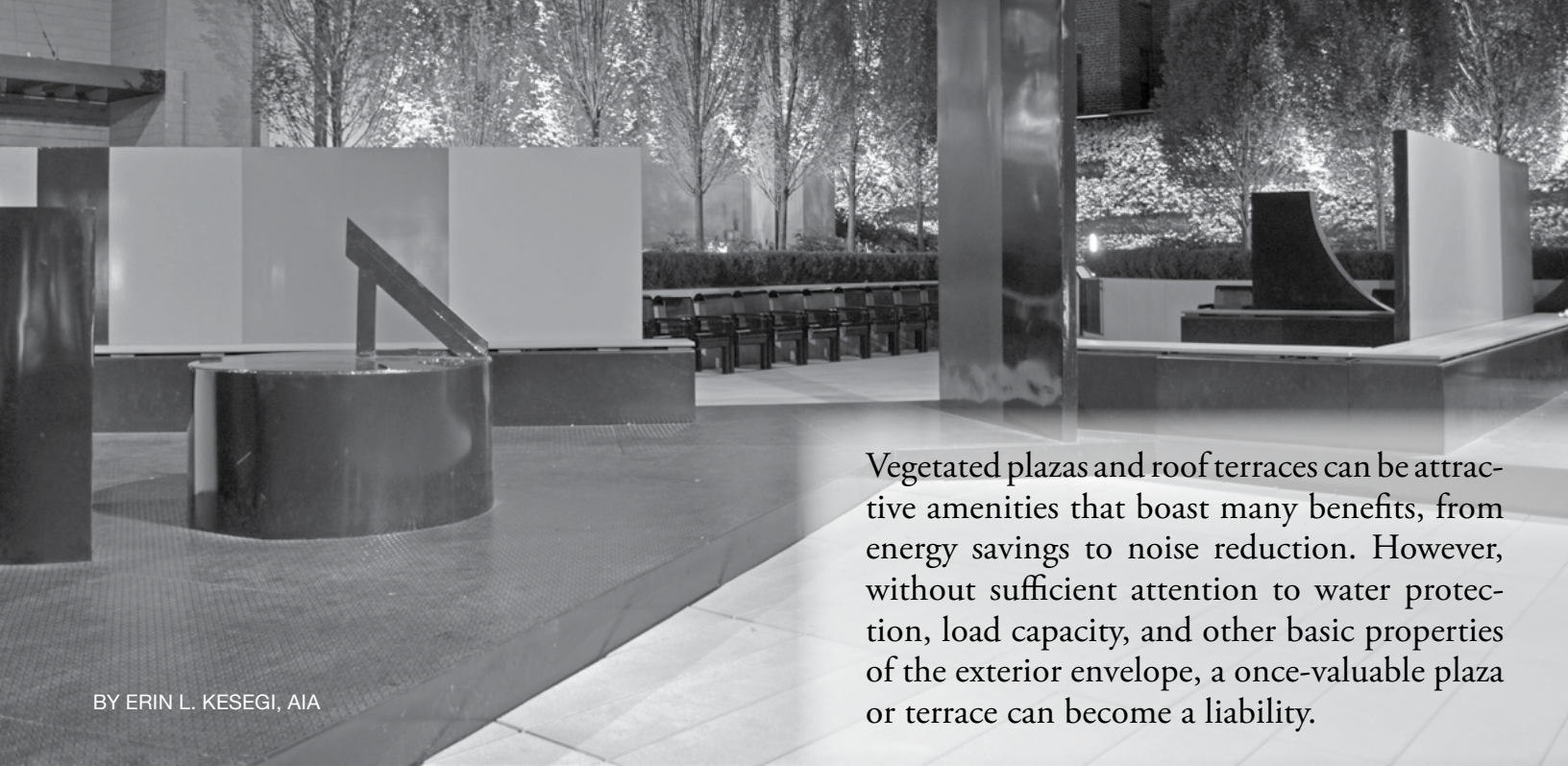


Waterproofing, Drainage, and Structural Systems: The Hidden Assemblies That Can Make or Break a Green Roof or Plaza



BY ERIN L. KESEGI, AIA

Vegetated plazas and roof terraces can be attractive amenities that boast many benefits, from energy savings to noise reduction. However, without sufficient attention to water protection, load capacity, and other basic properties of the exterior envelope, a once-valuable plaza or terrace can become a liability.

Under roof or plaza vegetation, systems hidden from view work tirelessly to channel water to thirsty plants while keeping it out of moisture-averse building elements. Ideally, water management assemblies on a vegetated roof or plaza should be even more resilient than those on a traditional roof, as they will be buried beneath plantings, growing media, root barriers, drainage mats, irrigation systems, and other components, making it difficult and expensive to repair a leak.

When working with the design team (the client, landscape architect, structural engineer, waterproofing consultant) it is important to establish the overall goals and parameters of the plaza or roof terrace project. Items to consider include the historic significance of the property, the functional requirements of the plaza or terrace,

the anticipated costs and maintenance demands, and the longevity of selected materials and assemblies.

A major portion of a plaza or roof terrace is the paving, fixtures, and site furnishings. In the selection of the materials and assemblies that comprise these hardscaping elements of the plaza or roof terrace one must consider the aesthetics, cost, ease of installation, durability, and ease of maintenance of the materials, assemblies, and fixtures. Safety is another important consideration when selecting such items as paving materials and handrails. The surface conditions and layout of paved areas must not create slip, trip, or fall hazards. When sloping paved areas for drainage it is vital to ensure that a comfortable and safe walking surface is maintained. Changes in elevation, such as stairs and ramps, must be designed to meet all accessibility codes. The

selection of paving assemblies must include the anticipated traffic volume and type, the load capacity of the existing structure, and overall aesthetics.

For landscaped elements such as planters and water features, the drainage, potential irrigation needs, and anticipated maintenance requirements must be part of any design decisions made by the landscape architect and the rest of the project team. A structural engineer will also have to determine whether the load capacity of the existing structure can support the weight of the proposed features. In determining the load capacity of the structure, the engineer will look at the potential dead loads created by the soils, planter walls, plantings, paving assemblies, water features, and site furnishings. The engineer will also look at the live loads created by pedestrians, vehicles, and such

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environmental elements as snow and ice.

When designing the drainage system for a plaza or roof terrace, the landscape architect and waterproofing consultant should ask the following questions:

- **Is there adequate positive drainage?** Look for opportunities to increase the slope of paved areas to facilitate drainage.
- **Are there enough drains?** Understand code requirements regarding the appropriate number of drains per square foot of roof or plaza area.
- **What are the appropriate type and locations for drains?** Incorporate b-level drains to facilitate surface and subsurface drainage. Specify surface drains to have ADA-compliant

and heel-proof grates. Include drains in both planted areas and paved areas.

For elevated plazas and roof decks, some form of waterproofing is a necessity especially if the plaza or terrace is located over occupied space. During the design phase, the waterproofing consultant can assist with the selection and detailing of the waterproofing system. Among the items to consider when selecting the appropriate system are the durability and longevity of the system components, the ease of installation, cost, and maintenance requirements. The proper detailing at terminations and penetrations are of utmost importance to prevent future leaks. A waterproofing system should be robust and durable so that it can provide a watertight assembly (and peace of mind) for several years. For elevated

plazas and roof decks, the thermal performance of the assembly must be taken into consideration. If the plaza or terrace is over conditioned space, insulation must be incorporated into the assembly. The design team will need to look at options for adding the required insulation values while maintaining the drainage ability and desired thickness of the assembly.

With any design project it is important for the design team to anticipate future maintenance needs when selecting the appropriate materials and assemblies. The design team can assist the client in developing a maintenance plan that includes items to be done weekly, monthly, seasonally, and annually. A client's maintenance staff should perform periodic cleanup and repairs to the plaza features. Such cleanup and

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repairs include the removal of litter and debris from planted areas and clearing drains. When selecting fixtures and equipment, the team must consider the future servicing of fixtures and accessibility of these elements for regular maintenance.

An attractive, well-designed, functional, and well-maintained green roof/plaza is a valuable amenity, one which acts as a showpiece for the building or property. Plazas and roof terraces must respond not only to the demands of occupants, but also to the larger interests of the community. With the right design approach and attention to detail, a well-planned plaza project can create a functional and appealing space that provides dependable performance well into the future.

— *Erin L. Kesegi, AIA, is a Senior Architect with Hoffmann Architects, Inc. in Hamden, CT.*

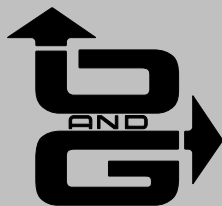


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