

## Design Review Solves Problems in Advance.



Design intent of world-renowned architects implemented without sacrificing durability

Over a period of many years Leavitt Associates has worked with Brown University to help set a uniformly high standard in construction quality for new buildings on campus. In one recent example, a world-renowned architect was commissioned to design a new academic building at Brown University.

Although the design presented an outstanding architectural concept, Brown's experience with similar projects in the past had taught them to be cautious. They (rightly) insist on "redundant" waterproofing systems, incorporating concealed through-wall flashings and cavity wall construction.

The concept design included many precise corners and thin edges that did not appear to leave room for effective flashings. Also, the design had outdoor terraces with recessed planters on the upper floors, over habitable space. Curtainwall terminating on the surface of these plazas meant that zero depth was available for base flashings. And the plaza on the exterior was flush with the plaza on the interior, a situation in which water could be expected to flood into the building.

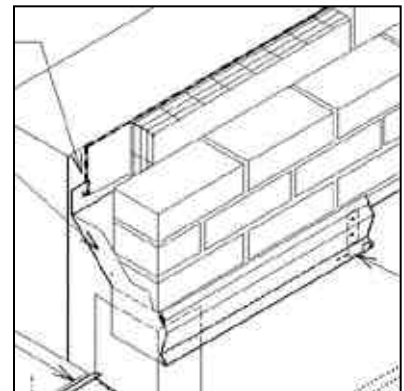
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“...design was addressed without compromising the design intent.”

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At Brown's request, Jonathan Leavitt spent many hours with the design team, and made visits to the Architect's office, to work through the details. In the end, every one of Brown's concerns about the exterior envelope design was addressed without compromising the design intent. For example, the design team developed concealed recessed flashing terminations that achieve proper base flashing height at the plazas, while preserving the appearance of a flush plaza. The building opened on schedule and has had no leakage or other problems.

Campus Design Standards for the Exterior Masonry, Windows, Roofing, and Below-grade Waterproofing.



After serving as Brown's consultant for several large new campus buildings, Brown retained Leavitt Associates to prepare a set of model design standards for future buildings.

## Historic church sanctuary restored better than new.



The First Presbyterian Church in Norfolk, Virginia contacted us because of a problem with their new organ. Water leaking from the roof had damaged part of a new mechanism while the craftsmen were installing it; and the installers stopped work until the leakage could be fixed. This problem created some urgency, because the organ builders had a limited window of availability in their schedule.



Leavitt Associates responded immediately. We inspected and water tested the building thoroughly and found that a series of problems had developed over the years. Masonry parapets had deteriorated and were allowing water to flow behind the interior plaster finishes.

Masonry piers at the roof line had deteriorated to the point where bricks could be removed by hand. The stone tracery surrounding the stained glass windows had lost nearly all of its mortar;

When we first arrived, we saw the organ pipes covered with plastic to prevent water damage.

and the joints had been filled with sealant. In the low roofs surrounding the Sanctuary, wood joists extending into the exterior masonry walls had rotted, allowing the roof to "collapse" by several inches. Many of these problems originated with the fact that the original roof perimeter flashings had not extended through the masonry, but stopped at the face of the mortar joints, allowing slow leakage over the years.

Slow leakage through parapets had permitted termites to eat the wood lath behind the plaster



Before the installation of new roof flashings, water was flooding through the stained glass windows and tracery.

Leavitt Associates developed a restoration program that the Church put into effect promptly, with Hoy Construction as the General Contractor. The organ installation was completed, and a new Carillon installed in the Bell Tower.

Leavitt Associates designed structural reinforcement and supports for the new Carillon in the church tower



All the copings were re-built with copper flashings to prevent continued leakage and deterioration of the masonry



The piers had deteriorated to a powder where they penetrated the roof. We re-supported the piers in place with specially designed low-stress grouted anchors.



The church building is now in a position to remain durably protected against the elements, for many decades to come.

## Don't Spend All Your Money at Once



The residents of the Brentford Condominium in Harvard Square, Cambridge knew that their building, a historic structure dating from 1900, could absorb a large amount of maintenance money. One of the most worrisome problems was that floors were sagging for some unknown reason, sometimes by as much as four or five inches. Also, a piece of copper cornice had come loose, raising the question of whether the 100-year old structure posed a hazard to the public.

We helped them develop priorities, conducted a thorough field investigation to determine the causes of the problems. Fortunately, we found that the sagging floors were not caused by deteriorating wood framing, but by consolidation of the internal wood structure relative to the exterior masonry shell. No remedial work at all was required, other than leveling the floors with new wood flooring.



Exterior masonry on the Brentford Condominium was restored over a period of several years, with the most critical areas addressed first. Areas that were re-pointed blend visually with the areas that were not re-pointed, avoiding the need for a total repointing.



We examined the copper cornices and were able to reattach pieces that had come loose, avoiding an expensive replacement program. Chimneys were completely rebuilt.

The limestone balconies were partially reconstructed, including replacement of missing balusters.





## When is the cheapest solution also the best?



A motel investment property built on leased land has 18 years left on its ground lease, after which it is going to be torn down. But in the meantime, it needs to maintain an appearance consistent with the nationwide motel chain it represents. We recommended an EIFS (Exterior Insulation and Finish System) overcladding for this purpose. Normally we do not recommend EIFS. But in this case, the building had only vertical strip windows, and the substrate material is solid masonry. We worked with the contractor to develop a pre-fabricated application method. All the EIFS panels were manufactured off site in a shop, so the construction process went quickly and created minimal disturbance for the motel.

In another similar case illustrated below, we worked with a 127,000 sf apartment rental property in Virginia Beach that had a history of leakage.

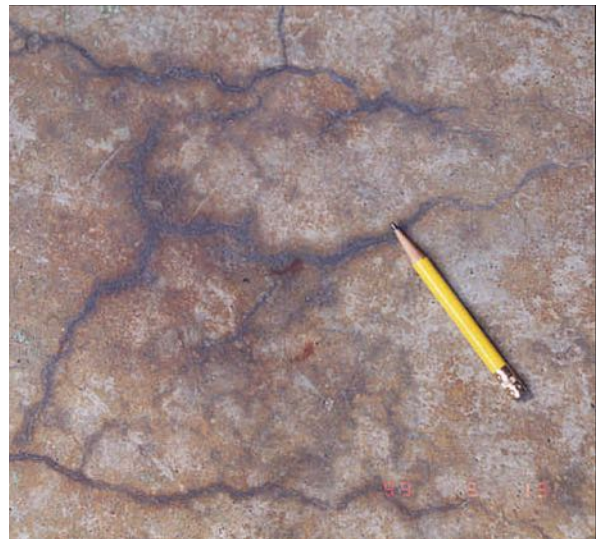


The original construction had concrete floor slabs exposed at the edges, a source of chronic leakage



Management had been "child-proofing" individual balcony guardrails as best it could. These rusted guardrails were replaced with new galvanized steel as part of the re-cladding.

Our water testing and exploratory openings showed that no effective flashings had been used in the original design, and that water was entering at the exposed edges of concrete floor slabs. In this case we recommended EIFS, because the exterior walls consisted of vertical panels of masonry.



Steel reinforcement in the balconies was starting to rust, causing cracks in the concrete. We used protective chemical inhibitors and coatings to slow the deterioration

The building had none of the conditions that are problematic for EIFS, such as window sills and horizontal ledges. Total project cost for the concrete restoration, re-cladding, replacing balcony handrails, and re-sealing the windows was less than \$7.60 per square foot of building.

New EIFS cladding has stopped all leakage and makes the building much more attractive to tenants in this community near the beach front.



## Do new condominium projects have leakage problems? Not this one.



The developers of this luxury building on a historic site in the Boston's South End are experienced owners and operators of residential properties. They were aware that new residential buildings with balconies, terraces, and complex shapes need attention to detail. They also knew that condominium associations look to the developer to fix whatever details do not receive adequate attention. And they were committed to spending a little extra effort on the exterior envelope details to avoid problems in the future.

Savoy Associates LLC retained Leavitt Associates as the Architect of Record, in addition to David Hacin Associates, an established designer of residential buildings in the South End. The exterior envelope detailing – walls, windows, roofing, terraces, and penthouses – was done by Leavitt Associates; and the interior design and materials were selected by Hacin Associates.

The site for the Savoy included a derelict masonry building that had to be preserved. We incorporated the existing walls into the new structure, cleaned and restored the masonry, and added new through-walls flashings to prevent new leakage problems from developing.

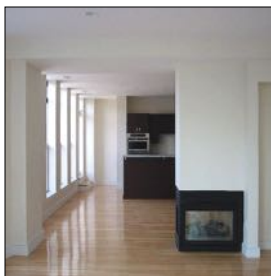


14 feet floor-to-floor made it possible to install parking lifts to increase the number of spaces available to the owners without losing a floor of occupied space.

The end result is a high-quality project free from nagging, unresolved complaints related to the exterior walls.



The completed building is an outstanding addition to the neighborhood and one of the best new addresses in the South End.



The interiors, shown here shortly after completion, have ceiling heights ranging from 9'-1" to 10'-4". We were able to do this without exceeding the height limitations because we carefully coordinated the beam locations with the

HVAC distribution. The W10 floor beams run parallel to the HVAC, and the deeper floor beams are concealed in walls. The ground floor height of

### Project Facts

Owner	Savoy Associates LLC
Contractor	Sea-Dar Construction Inc.
Address	1280 Washington Street, Corner of Savoy and Washington
Date Completed	September 2002
Square Footage	Approx. 32,000 sf
Number of Units	13, including three penthouses; one retail space at grade
Parking	9 spaces in protected garage, with buyers' option to install parking lifts
Construction Cost	Approx. \$200 per sf