

Capitol Square

Water Infiltration Investigation

RECOMMENDATIONS

The following recommendations for repair are preliminary and general in nature based on the limited scope of investigation and the corresponding evaluation described above. Detailed repairs can only be developed during the design development phase of construction document preparation. The initial scope of the leak investigation was quickly found to be underestimated. Additional leak locations and test areas were included, but further testing will be required to fully understand the performance of some of the building components.

Curtainwall Glazing System

Results of the low pressure water tests conducted on the curtainwall in two areas of the building and a cursory review of the design drawings were the basis of a general evaluation for the curtainwall. The exact condition in all areas has not been determined, and may only be determined with further testing or during remedial construction. It cannot yet be determined if the defects in the curtainwall system are isolated or typical throughout the building.

In general leak areas, excessive amounts of water are entering the curtainwall through failed splice joint sealant and gaskets. Other sources such as the extra holes drilled for the bullnose fasteners and panel sealant failures at the tops of the vertical mullions are minor contributors to the extra water in the system. The water cannot then weep out fast enough due to insufficient weep spacing or blocked ends in the beauty caps. This water is backing up over the interior side of the horizontal rails or infiltrating the internal end dam and splice joint seals of the aluminum frame. This is causing numerous leaks at the perimeter of the building on the majority of the floors.

The points of water infiltration should be repaired throughout the curtainwall system. Bridge joint sealant should be installed on the mullion cover splices. The bondline of this joint should be installed on the face of the metal mullion instead of the edge. The gaskets that have dislodged or deteriorated should be removed and replaced. This may require full deglazing to access the exterior back pressure gaskets.

Further watertesting is required to determine the overall condition and performance of the internal seals and weep capabilities of the curtainwall system. We recommend a series of watertests (AMA 501.2) in known leak conditions. If no leak is produced, we propose a differential pressure test (ASTM E1105) be conducted at typical locations. Further recommendations to repair the internal seal and weep system if required can be made with the information gathered from these tests.

Storefront

The leaks from the decorative band of the storefront can be repaired in one of two ways. Either the original weep system can be modified and installed or the storefront wall system can be made into a full barrier system.

The gold panel section was originally designed to weep out the horizontal metal pieces but is blocked by the horizontal panel joint between the gold panel and the aluminum trim pieces. The system should be deglazed to inspect the internal seal at the aluminum frame. All defects should then be repaired. Weep holes should be added to the metal trim pieces and new sealant installed

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at the panel and trim joints.

Alternately, the storefront can be made into a barrier system by replacing the exterior gaskets with a full silicone wet seal. All splice and butt joints should receive silicone bridge joints.

Each method would alter the appearance of the curtainwall and require varying installation and long-term maintenance costs.

If the storefront is made into a barrier wall system the kickplate section at the wall base does not need to be removed. Careful detailing would be required at the kickplate to edge flashing intersection to ensure that all butt joints are tied-in to the glazing and sill joints.

If the gasket system is retained, internal seals and weeps should be added to the kickplate section. A pan should be installed under the wall base to direct water out to the slab edge.

Pre-cast Concrete Panels

No work is required to address the hairline cracks found on the surface of the precast panels. All larger structural and cold joint cracks in the panels should be repaired to prevent further water infiltration and degradation of the structural and attachment steel components. A low-modulus epoxy injection would be the least visible repair method.

Precast Concrete Column Covers & Louvers

Cold joint cracks and structural cracks should be injected with a low-modulus epoxy as described for the concrete panels above.

All failed sealant joints should be removed and replaced with the proper joint profile.

The end dam sealant should also be checked and repaired as necessary at the lower interior louver frame corners. The end dam should connect to the external sealant joint, not the backing rod. Weep holes should be installed through the internal panel attachment plates to allow water blocked by the end dam in the jamb space to weep out at the sill to the interior wet room.

Building Expansion Joint

A general inspection and tune-up repair should be conducted for the full length of the expansion joint cover.

The end terminations of the cover require re-design to ensure a proper seal as they change plane.

The existing construction and condition of the elevator threshold should be reviewed and repaired as required. The new deck coating should be properly tied-in to the expansion joint at the elevator threshold to provide a continuous seal.

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Garage Elevator Penthouse

The roof edge flashing should be redesigned and re-installed to properly lap under the roofing membrane.

The metal trim and gold panel section design drawings should be reviewed to re-design the weep system or a complete barrier system should be installed. This would require repair of failed joints and bridge sealant installation at the butt joints of the metal sections.

Parking Garage Floor Slab

The new deck coating should address the majority of leaks through the fourth level garage slab cracks. Special attention should be made to the detailing at the perimeter curb cold joint and concrete walls.

Garage Stairwell Penthouse

The stairwell penthouse should be re-roofed after altering the roof slope to drain to the scupper. Alternately, the water as it drains from the existing roof could be collected in a gutter or deflected with an awning over the doorway. If a gutter is installed the downspout should be located to drain to the deck drain on the east side of the penthouse.

The new rectangular section of the exterior wall on the fourth level of the parking garage should be re-built to allow the cement plaster to weep at the wall base over flashing and deck coating turned up the interior face of the wall. Alternately, the wall should be waterproofed by removing the existing failed sealant joint and installing the new wall coating tied-in to the deck coating.

The seal at the threshold should be modified and tied-in to the new deck coating. The existing threshold is mounted flush with the structural slab allowing ponded and wind blown water from the slab to run into the interior from under and over the threshold. A pan with end dams can be installed under the threshold as long as it meets the ADA requirements, to reduce the amount of water entering the penthouse from the entry door threshold.

Mechanical Floor Corner Planters

The three original planter membranes should be replaced.

Third Floor Roof Decks

The deck coating termination as it is on the face of the panel is a poor detail unless the entire panel is made water tight. Water in the panel from the curtainwall is trapped at the wall base. It is eventually infiltrating the interior through the topping and structural slab penetrations. A better termination would have been to turn the deck coating up edge flashing installed behind the precast panel base and then seal the cavity between the edge flashing and the precast panel. To do this as a remedial measure would require extensive demolition and resloping of the roof deck.

All deteriorated deck coating should be repaired.

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It is recommended that an elastomeric coating to match the color of the precast panels is applied to the full height and exposed top edge of the precast panels then lapped over the existing deck coating.

The metal deck edge flashing should be removed and re-installed to create an inner seal at the panel intersection. A closure piece may have to be fabricated depending on the panel intersection.

Twenty Third Floor Terraces

The interior slab level is 1" below the exterior mortar bed and tile finish level and the deck membrane does not provide a water tight termination at the building wall. The tile courses and mortar bed adjacent to the building wall should be removed in order to install a raised curb on the structural slab in the wall cavity below the precast panel. New metal edge flashing formed with a three inch vertical back leg should then be installed over the curb and new deck membrane. The tile and mortar bed should then be replaced with a slightly lower slope to drain than the existing. The new flashing should run continuously under the sidelight and door threshold. Silicone sealant joints should then be installed between the precast panel and the metal flashing and the tile and the metal flashing.

All doors should be removed and re-built with integral weatherstripping at the door sill, jambs and head.

As stated in the evaluation above, the membrane termination was not verified at the parapet edge or at individual deck penetrations. These areas should be the subject of further testing and investigation if leaks not associated with the curtainwall persist at the deck perimeters.

Roof Penthouse

The economizer fan equipment duct penetration should be completely re-detailed. New flashing should be fabricated to fit over the duct and down the sides. The new flashing should be set in sealant on the duct and behind the standing seam metal roof. All penetrations should be properly sealed. The batten ends should be left open to drain.

The gap in the concrete curb noted on the south side of the penthouse wall base should be filled and the exterior deck coating repaired in this location.

The gaps in the sealant and deck coating termination on the north facing curb termination should also be sealed.

The cracks and open penetrations in the modified EIFS wall are likely allowing small amounts of water to infiltrate the framed divider wall. All penetrations should be resealed. The panel edges should be taped and wall re-coated.

Additional watertests should be conducted on the deck coating and drain penetration on the north deck drain above leak 24H & J. The deck coating should be repaired if required.

The plumbing lines from the locker room should be inspected and repaired as required.

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A floor coating or metal pan should be installed under the waterheater, drainlines and floor drain penetration.

Helipad

The original drawings for the skirt around the helipad landing area should be further reviewed. It is likely that re-building the skirt will be required.