



450 N STREET EXTERIOR ENVELOPE REMEDIATION

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Sacramento, CA 94279

Date: January 24, 2005

ABMS NO. 118059

Project Scope:

Summary:

This project will remediate the water intrusion through the glazing system, precast concrete panels, and the 23rd Floor balcony decks at 450 N Street in Sacramento, CA. The State of California Department of General Services Real Estate Services Division (DGS) contracted with McGinnis Chen Associates, Inc. (McGinnis Chen) to prepare this budget package. This package contains schematic design drawings, outline specifications, photographs, phasing requirements, and an estimate of probable construction cost.

Introduction:

450 N Street is a twenty-five-story office building and four-level parking structure occupied by the State of California Board of Equalization (BOE). The Construction was completed in January of 1993.

The building is a steel-framed structure with lightweight concrete floors over steel decking. The exterior building envelope is a combination of extruded aluminum glazing assembly and pre-cast concrete panels with punched window openings that highlight the building corners, the twelfth floor mechanical floor, and the twenty-third and twenty-fourth floor parapets.

In 1998, McGinnis Chen (as Rosenberg McGinnis, AIA Inc.) investigated the curtainwall system as part of an overall building leak investigation and report for McDonough, Holland & Allen, representing CalPERS, the building owner. The following is an excerpt from the June 1, 1998 report:

"Curtainwall Glazing System: Based on a limited visual survey and testing, an excessive amount of water is infiltrating the curtainwall system through failed glazing gaskets and splice joint sealant failures. The water does not weep out sufficiently and is suspected of causing the majority of the leaks observed at the building perimeters. Further testing is required to determine the actual path of infiltration through the aluminum frame curtainwall system and to provide a repair.

Pre-cast Concrete 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..."



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In 2003, McGinnis Chen conducted an investigation to confirm water source path, infiltration, and other system deficiencies to propose a repair recommendation for the DGS. The following is an excerpt from the December, 2003 report:

"The curtainwall glazing system utilizes an exterior neoprene fixed gasket to seal and secure the dual pane vision and single pane spandrel glass into the extruded aluminum framing. The neoprene gasket is prematurely deteriorating. Each glass unit has the surrounding aluminum framing corner joint sealed. At the spandrel sill to vision head assembly the horizontal spandrel rail incorporates an interior track with weep holes (3 per rail). The weep holes have reticulated foam baffles in the track. Water is designed to empty into the beauty cap and drain out the ends. During wind driven rainstorms, the track at the horizontal rail fills and over flows onto the suspended ceiling and also wicks up into the batt insulation. Differential pressure water testing and simple spray testing confirmed that the weep design is overwhelmed during wind driven rainstorms. A continuous deep vertical mullion cover separates the horizontal beauty caps. The deep vertical mullion cover is spliced every 27 ft. (nominal) and a gunnable silicone sealant is used to seal the butt joint of the vertical mullion covers. The sealant is deteriorated and failed at all of the butt joints observed. Water directed at the splice joint resulted in water entering the interior side of the curtainwall and filling the track at the horizontal rail. Additionally, gaps in the sealant are reported by the building engineering staff at the vertical mullion to pre-cast panel joint..."

... McGinnis Chen recommends the same repair to the pre-cast concrete panels as was described in the June 1998 Rosenberg McGinnis report. In addition, a proper sealant joint over the punched window frame joints is to be installed."

McGinnis Chen initiated this budget package effort in November 2004 to recommend design and planning methods to remediate this water intrusion. A scope of work was developed in conjunction with glazing system contractors, a glazing system manufacturer, a restoration contractor, a construction manager experienced in high-rises, and a structural engineer experienced in wind analysis. The DGS and the BOE were consulted during the accumulation of this information. The resultant scope of work and phasing strategies reflect this input. In addition, one area has been assigned on the south elevation for a proposed mock-up. This area includes most of the components listed in the Description of Proposed Remedial Work. The 23rd Floor balcony decks will also require replacement due to on-going leaks. As a result, this budget package effort has projected a total cost to perform this remediation.

Description of Proposed Remedial Work:

This project shall remediate the water intrusion through the glazing system and precast concrete panels. Further remedial work will take place at the 23rd Floor patios, which will require replacement due to on-going leaks. A separate line item for deck replacement is added to this budget package.

A. General Project Conditions

1. Pre-Construction

- a. Site survey for verification of existing conditions by Architect.



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- b. Determination of project provisions for construction staging, hours of operation, noise, and other general operation parameters.

2. General Mobilization

- a. Establishment of on-site office and temporary facilities.
- b. Procurement and storage of materials.
- c. Protection of unaffected work areas and adjacent property.
- d. Coordination of swing-stage usage with Owner.
- e. Security of site.

B. Exterior Envelope

1. Curtainwall Work

- a. General: Coordination of work between the interior and exterior.
 - i. Vision Glass (To be coordinated with the spandrel glass scope of work)

Exterior

- Removal of the existing closed cell neoprene sponge gaskets in sections starting at the head.
- Proper cleaning of the glass and metal surfaces.
- Installation of a new headless gasket properly engaged at the metal race.
- Application of a cap bead of silicone sealant at the new headless gaskets.
- Removal of the sealant at the horizontal beauty cap (HBC). (x LF or x Locations)
- Removal of the HBC.
- Reconfiguration of the weep holes at the HBC.
- Insertion of baffles at the modified weep holes.

Interior

- Removal of the existing wedge EPDM gaskets at the interior.
- Field measurement of openings at all four sides of the glass to determine gap widths.
- Installation of new silicone gaskets properly engaged at the metal nub.

- ii. Spandrel Glass (To be coordinated with the vision glass scope of work)

Exterior

- Removal of the existing sponge from the head condition.
- Cut away sealant to free the exterior glazing bead from the head.
- Removal of the exterior glazing bead at the head.
- Removal of the sponge gasket from the jambs.
- Removal of the remaining sponge gasket from the sill.
- Removal of the glass.
- Removal of the interior wedge at the head.
- Removal of the interior wedges at the jambs.



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- Temporary removal of the interior-glazing bead.
 - Removal of the remaining wedge at the sill.
 - Proper cleaning of the metal surfaces of all sealant.
 - Cleanout of the horizontal drainage channels.
 - Inspection of the metal-to-metal seals and end dams. Repair if necessary.
 - Installation of a new dense silicone hook trim lip gasket at the head of the unit.
 - Reinstallation of the interior vertical glazing bead. Mechanically fasten to prevent disengagement.
 - Installation of the new gaskets.
 - Application of a silicone sealant at gasket corners and metal-to-metal intersections.
 - Reinstallation of the glass using the existing setting blocks. The existing edge blocks may also be used.
 - Installation of new headless gaskets properly engaged at the sill and jambs.
 - Repositioning of the exterior glazing bead at the head.
 - Installation of a new headless gasket properly engaged at the head.
 - Application of a cap bead of silicone sealant at the new headless gaskets.
 - Re-sealing of metal-to-metal joints.
 - Reinstallation of the HBC.
 - Re-sealing of HBC to the adjacent metal.
- b. General: Removal of spandrel glass to coordinate with fire sprinklers at the 3rd Floor.
- i. Sealant (To be coordinated with the vision and spandrel glass scope)
- Removal of existing sealant at intersection of curtainwall and precast concrete panels. (x LF or x Locations)
 - Application of new silicone sealant at intersection of curtainwall and precast concrete panels.
 - Installation of proper sealant "bridge" joints over the punched window frame joints.
 - Reinstallation of sealant at the louvers.
 - Resealing of the screw fasteners and existing field-drilled holes along the bull nose trim.
 - Replacement of bull nose trim sealant at the intersection with the vertical mullions.
 - Attachment of custom-molded silicone boots at the vertical mullion splice joints.

The work described above applies to the entire curtainwall system.

2. Precast Concrete Panels

- a. Low modulus epoxy injection at the larger structural and cold joint cracks. (Allowance Quantity of 75 LF for each of the eight precast building faces)

3. Miscellaneous Exterior Items

- a. Replacement of 23rd Floor balcony roof decks and associated penetration flashing and base flashing. Floor drains to be repaired. (All balcony decks: x SF)
- b. Remediation of ground floor storefront consistent with curtainwall methodology.
- c. Resealing of the 3rd Floor fire sprinkler heads where occur through the spandrel glass at the roof of the parking structure.



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4. Mock-up

- a. Location of one area on the building for a repair mock-up. The area shall represent typical conditions on the building.

5. Performance Testing

- a. Differential Pressure Testing at each area of glazing repair using ASTM methods and industry standards to demonstrate the adequacy of the proposed repairs.
- b. In the case of excessive infiltration, coordination of additional repairs and retesting shall occur until the level of water infiltration is acceptable.

C. Interior Remediation Work

1. Ceiling

- a. Removal of existing 6' or 8' width of perimeter ceiling tiles: Width to be determined 6' or 8'.
- b. Installation of new acoustical ceiling tiles at these locations.

2. Spandrel Insulation

- a. Removal of unsalvageable insulation. (x SF Allowance Quantity)
- b. Reattachment of salvageable insulation in conflict with horizontal track. (x SF)
- c. Replacement of unsalvageable insulation with rigid insulation. (x SF)
- d. Cleanout of the horizontal drainage channels.

3. Gypsum Walls

- a. Mold remediation if required at wall cavity behind spandrel glass. (Allowance Quantity of 12 occurrences at the walls at each floor including containment)
- b. Installation of new gypsum board walls at these locations. (Allowance Quantity)
- c. Replacement of finishes (paint & carpet) at these locations. (Allowance Quantity)

D. Closeout

1. General

- a. Project Clean-up.
- b. Survey of project to verify completion.
- c. Coordination with Project Architect for final walk-through.
- d. Completion of Punch List items.

Phasing:

A. Exterior Work

1. Coordination with the DGS and BOE on phasing the rigs, protection of property, and general project timing. The exterior work will take place before the interior work. The proposed project



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duration is based on the usage of three rigs at a time. The usage of five rigs has been provided as a reference. (See attached Exhibit A)

B. Interior Work

1. Coordination with the DGS and BOE on phasing the tenant relocation and staging at the interior space. The interior work may commence at any time following a two-week minimum sealant curing time. Work will take place at one-half of one floor (two building faces) over the course of four working days. A fifth working day has been allotted as a transition day for work to end on one floor and commence on another. (See attached Exhibit A)
2. Modular workstations exist along the perimeter at most of the floors. It has been assumed that 20% of these workstations will need to be dismantled to allow access to the work areas. Such workstations will be reassembled following completion of the work at that area.
3. Protection of interior spaces during remediation.

Interior Sequence at a Typical Floor

Days 1 & 2

- Relocation of tenants at one-half of one floor to "swing space" established by the DGS.
- Dismantle conflicting workstations as appropriate.
- Clean work surfaces.
- Provide supports as required to support desktops to perform work.
- Perform remedial work outlined in "Description of Proposed Remedial Work".
- Erect interior rolling scaffolding at the same perimeter locations.
- Perform ceiling and spandrel insulation work outlined in "Description of Proposed Remedial Work" utilizing the interior rolling scaffolding.

Days 3 & 4

- Affected tenants from "Days 1 & 2" return to space.
- Relocation of tenants at the other half of one floor to "swing space".
- Repeat "Days 1 & 2" procedure for the remaining half of the same floor.

Day 5

- Transition day for work to be completed on one floor and commence on another.

It has been assumed that mold remediation, if required, will add ten working days per floor (five days per half of each floor) to complete such work.

Code Analysis:

Performance of work to reflect wind pressure analysis by structural engineer. (See attached Exhibit B)