MILWAUKEE PUBLIC SCHOOLS

Historic Washington High School
Window Replacement

PHOTOS BY RESTORATION WORKS, INC.

RESTORATION

VS.

PHOTOS BY KOLBE & KOLBE MILLWORK CO., INC.

NEW

MILWAUKEE PUBLIC SCHOOLS

Detailed Removal Process

A comprehensive window restoration involves many steps: The process includes stripping to bare wood, epoxy restoration, dutchmans and/or custom milling, tool sanding or sanding by hand, routing for conversion to insulating glass (if possible), custom milled window glazing stops or putty, new glass, IG (Insulating Glass) conversions, paint or stain finishes, weight and chain balance systems, high-tech weatherstripping, hardware restoration, and custom milled replacement windows with or without weight pockets.

- Restoration Works Inc.

1. **Assessment:** Openings are properly labeled and numbered. Each window is then assessed to determine restoration needs & environmental concerns.
2. **Environmental Concerns:** Individual containment enclosures, per room, for lead and ACM abatement, as required; window paint is assumed lead based, glazing is asbestos containing. Students & faculty shall not be present during any removal and field restoration work. Air testing will be required to pass occupancy clearances per room.
3. **Restoration:** Sashes must be pulled to the interior, not to damage integral jamb.
4. **Restoration & Removal By General Contractor:** Each sash loaded on truck and taken to restoration shop. Sash restoration estimated to take 5-6 weeks per group.

MILWAUKEE PUBLIC SCHOOLS

…continued

Restoration Team:

- Typically includes: General Contractor & Restoration Specialist

MPS Requirements:

- Teams much have proven experience with restoration process and positive referrals.
- Prevailing Wage requirements met.
- Fully insured w/5 million umbrella requirement for prime contractor.
- Must meet MPS CCS (Contract Compliant Services) requirements for HUB, COIN, Student Employment & Education

6. **Openings Secured:** Openings will be boarded up with a coroplast, corrugated translucent board, until sashes are ready for reinstallation.
7. **Other G.C. Responsibilities:** To provide access, scaffolding, meet safety regulations & perform abatement. G.C. will also handle all stripping or replacement of items left intact including jambs, exterior sills, stools, trim, etc. for each opening as well as reworking counter balances. The estimated time to complete work will be 5-6 days per opening, depending on staffing availability to remove, stripe, epoxy repairs and paint w/ a total of 10-12 man days for a completed window.

MILWAUKEE PUBLIC SCHOOLS

Shop Restoration Process

RESTORATION WORKS, INC.

1. **Capacity:** Restoration Specialist's capacity and turnaround will determine schedule and milestones.
2. **Assessment:** Glass & glazing removed, sashes disassembled, reviewed for damage then completely stripped of all existing paint/stain.
3. **Epoxy Restoration:** Per Restoration Works Inc. they have a 3 Part restoration process addressing structural repairs, appearance coat, final presentation coat.
4. **Parts Re-Assembled and Pinned.** Route out glazing channels to provide 2,244 Low-E, 1/4" single pane individual lites.
5. **Add on:** 1/2" Routing for overall Low-E, insulated Glass
6. **Environmental Process:** Infrared, low to no chemical stripping process.

MILWAUKEE PUBLIC SCHOOLS

Re-Installation

RESTORATION WORKS, INC.

1. **Freight:** General Contractor to provide freight from restoration shop to job site.
2. **Upper Sashes Fixed in place**
3. **New Weather Stripping Installed:** Recommended V-Bronze spring w/Q Lon 320 kerf cut-in & parting bead
4. **Hardware Installed**
5. **Quality Control:** Field air infiltration and water penetration testing will be conducted in accordance with AAMA 502-90, Method B, utilizing exterior applied chambers.

MILWAUKEE PUBLIC SCHOOLS

MPS Restoration Approach Benefits

1. **Original Construction and Detailing.** The exact original architectural detailing will be maintained.
2. **Old Growth Wood Material Quality.** The original windows were constructed using quality old growth lumber.
3. **Mahogany Wood Replacement Components.** Wood component replacement parts will be plantation growth mahogany.
4. **Replacement Part Milling.** Replacement parts will be milled to match existing.

MILWAUKEE PUBLIC SCHOOLS

MPS Restoration Approach Concerns

1. **Security.** During rehabilitation, the temporary infill panels may make the facility vulnerable to vandalism.
2. **Occupant Comfort.** The temporary infill panels may impact the interior conditioned space and cause discomfort for the building occupants.
3. **Extended Rehabilitation Schedule.** The window restoration option will increase the rehabilitation schedule. This will have a negative impact on the building occupants and the operation of the educational institution.
4. **Weak Local Contractor Base.** There is an inadequate local contractor base to meet the capacity requirements of this project and the insurance requirements of MPS.
5. **Lower Overall Unit Energy Efficiency.** A Restored existing window assembly would be less energy efficient and would not meet current air or water infiltration testing standards.
6. **Hazardous Material Exposure Risk.** The abatement of asbestos and lead containing materials will increase the risk of interior exposure for approximately forty-nine classrooms.
7. **Unknown Additional Costs for Restoration Approach.** There may be additional costs related to the restoration approach because of the unknown condition of the existing windows and unit disassembly breakage.

MILWAUKEE PUBLIC SCHOOLS

PROJECT ESTIMATION FOR: **April 14, 2015**

WINDOW RESTORATION

WASHINGTON HIGH SCHOOL

Restoration Works, Inc. Offsite Restoration Estimation			475,000
Alternate Add 1 - 1/2" Overall Insulated Glass & Additional Routing			62,000
Alternate Add 2 - Restore Brick Molding			52,000
General Construction Costs			614,000
GC Containment Allowance			60,000
Scaffolding/Lift Allowance			25,000
Sub Total		**$**	**1,288,000**
Additional Consultant Fees (Restoration CO including new specification sections)			
Addition MPS Administration Costs			
Contingency	10.0%		129,000
Contingency, Additional Design, Specification & Administration Costs		**$**	**154,000**
PROJECT TOTAL		**$**	**1,442,000**

MILWAUKEE PUBLIC SCHOOLS

New Wood Window Process

1. **Removal Process & Abatement:** Remove the existing window sash, frame, and counterweight pockets.
2. **Prepare Openings:** Install new wood blocking and apply weather resistive barrier treatment.
3. **Installation:** Install new wood window unit, elastomeric sealant, and spray polyurethane foam sealer. Apply polyurethane sealant with backer rod to the exterior interface. Provide weeps at the sill condition.

Improved energy efficiency associated with the window replacement:

- **Integrated Window Unit Weather stripping.** Improved resistance to air leakage as a result of integrated weather stripping between the sash and the surrounding frame.
- **Improved Rough Opening Energy Efficiency**. Improved overall window assembly energy efficiency by removing the existing counterweight pockets, installing ancillary wood blocking, and installing a spray foam insulation sealer into the window rough opening.
- **Liquid-Applied Sill Pan Flashing**. Improved unit moisture management by using a liquid-applied pan flashing with weeps that will be applied to the substrate of the existing sill condition prior to new window installation.

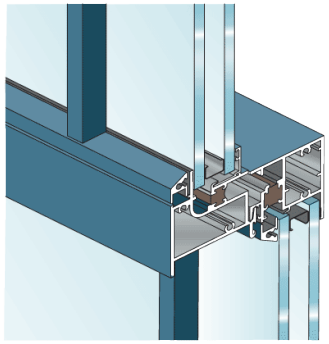
MILWAUKEE PUBLIC SCHOOLS

New Wood Window Estimated Costs

Approved New Wood Windows Kolbe & Kolbe Majesta Single Hung Wood Windows	**$ 1,490,000**
Estimated General Construction Costs Scaffolding and Staging	**$ 162,500**
Total	**$ 1,652,500**

MILWAUKEE PUBLIC SCHOOLS

New Aluminum Window Process



1. **Removal Process & Abatement:** Remove the existing window sashes and counterweights.
2. **Prepare Openings:** Fill counterweight cavity with spray foam insulation. Apply weather resistive barrier treatment.
3. **Installation:** Install new aluminum window unit. Install spray polyurethane foam sealer in rough opening. Apply polyurethane sealant with backer rod to the exterior interface. Provide weeps at the sill condition.

Improved energy efficiency associated with the window replacement:

- **Integrated Window Unit Weather stripping.** Improved resistance to air leakage as a result of integrated weather stripping between the sash and the surrounding frame.
- **Improved Rough Opening Energy Efficiency**. Improved overall window assembly energy efficiency by installing a spray foam insulation sealer into the counterweight pockets and window rough opening.
- **Liquid-Applied Sill Pan Flashing**. Improved unit moisture management by using a liquid-applied pan flashing with weeps that will be applied to the substrate of the existing sill condition prior to new window installation.

NEW ALUMINUM WINDOWS

MILWAUKEE PUBLIC SCHOOLS

New Aluminum Window Estimated Costs

New Aluminum Windows Aluminum Single Hung Windows	**$ 790,000**
Estimated General Construction Costs Scaffolding and Staging	**$ 162,500**
Total	**$ 952,500**