SPENCER & VOGT GROUP
architecture preservation

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June 7, 2013

**Ms. Miriam Tuchman, RA**
**Project Manager, Public Buildings Department**
**City of Newton**

**Re:** ***Newton City Hall, 1000 Commonwealth Ave, Newton, MA***
***Window Conditions assessment and recommendations.***

Dear Miriam:

On May 17, 2013, Spencer & Vogt Group conducted field investigations with assistance of an aerial lift operated by Consigli Construction Company to assess the performance and condition of the windows. The investigation was limited to a respective sampling of windows per elevation in an effort to characterize conditions and provide reasonable recommendations for type of treatments.

It was observed that there are three main types of windows on the building: original wood windows, replacement vinyl windows, and original wood windows with retrofitted sash to hold double paned glazing. All of the windows are in either original or repaired wood window frames and casings.

**Original windows**

The only remaining original, unaltered wood windows on the building are located at the ground/basement floor level below the War Memorial Wing. The wood on these windows remain in mostly good condition but the glazing putty and paint is failing. There are miscellaneous wood repair needs such as a broken parting bead, damaged muntins, and

damage to the frames. Though the wood is salvageable, it was in this area of the building that the building occupants voiced the strongest opinion regarding the windows. Though content with operability, air infiltration at these windows was a huge complaint, with users pointing to mulch and dust particles that had entered the building through the windows.

**Vinyl windows**

Vinyl replacement windows were observed on the south elevation of the south east wing of the building, facing the parking lot. The windows appear to have been installed recently and exhibit no signs of failure. However, they were installed into the existing wood frames which suffer from failing paint and decay. Inside the service alley where these windows were installed, the wood frames are in the worst shape of any observed on the building. Most of the wood of these frames are deteriorated to an extent that full replacement is needed; indeed, it is a wonder that the sash were installed in frames in such poor condition. At some of the worst frames we observed an omission of flashing over the wood window head which lead to their increased rate of deterioration and to the corrosion of the steel lintel over

**Vinyl windows installed in original wood frames**

**Missing head of frame and deteriorated steel lintel. Note missing flashing at lintel.**

these windows.

**Original windows with retrofit sash**

The vast majority of the windows on the building were retrofitted within the last 10 years. It appears that the sash were all removed, stripped of paint, the glazing replaced with new double paned glass held in place with wood stops, and the wood frames prepared and painted. All of the paint is now wearing off of the windows and the wood stops are deteriorating, with failing wood and rusting/loose brads to hold them in place.

**Typical retrofitted window with failed paint and failing wood stops.**

The wood stops appear to have been constructed using pine, likely in an effort to match the original heart pine used for the windows.

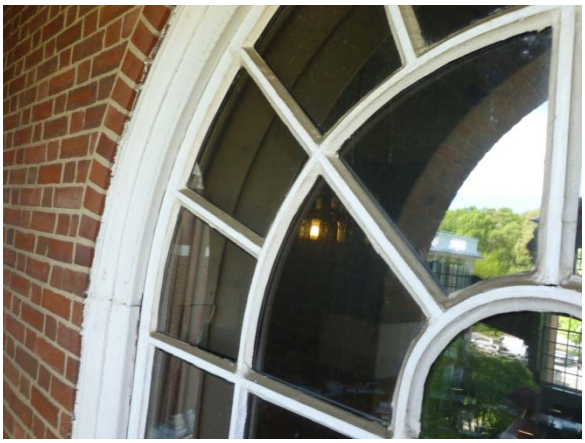
The problem with new growth pine is that it is not nearly as durable as old growth wood and it also expands and contracts at a different rate than the old wood. This consistent, varied movement has caused many of the brads holding the stops in place to wriggle free. The other issue with using wood stops as a glazing seal is that the wood does not adhere to the glass in the way glazing putty does. On the contrary, a joint is created between the glass and stop which allows water to run in behind the wood. This water then sits on the muntin, prevented from getting into the window by the sealant used to hold the glass in place. It then

**Failed paint at muntins and wood stops. Rusted brads sticking up out of wood.**

**Missing wood stop.**

slowly rots the wood surrounding it as there is no place for the water to escape.

Other windows were retrofitted using sealant as glazing putty instead of the wood stops. The sealant has weathered much better than the wood stops, however it is not paintable and very dirty.



**Window with sealant used as glazing putty.**

The building occupants give high marks for operability of the windows which is not an easy task with windows of this size. They presently operate using their original weight and pulley system. However, the greatest complaint by building occupants was with regard to how drafty the windows are. Drafty windows are the number one cause of comfort complaints in buildings with historic windows. A cool breeze is more disruptive to the body than a cool thermal mass, so the double pane glass compared with single pane glass does little to address this issue. The drafts in windows generally come from two places: where the sash meets the wood frame and where the wood frame meets the masonry opening. The way to remedy the draftiness is through installing weather stripping at the jambs and sills of the window, as well as at the meeting rail. The goal is to make a tight fit for the window against the frame to seal everything tight. At the masonry opening, ensuring a sound sealant joint between the masonry and wood is imperative as well as on the inside where the frame meets the plaster. This detail can be challenging as there is usually a void for the window weight pockets behind this wood to masonry joint. Having tight joints between each piece of wood is also important. So although the wood of the windows and frames are still in good condition, the thermal qualities of the windows are lacking which leads to consistent user complaints.

**Jamb of typical window. No weather stripping installed at jamb or sill.**

**Regulatory Review**

The Newton City Hall and War Memorial is individually listed on the National Register of Historic Places, which puts it under the purview of the Newton Historical Commission who will have to review and approve any work to the windows, which are character defining features, based on the Secretary of Interior's Standards for the Treatment of Historic Properties.

The Massachusetts Architectural Access Board requires that any building which expends more than 30% of the assessed building value on building upgrades must come into full compliance with the Access Boards regulations, 521 CMR. The City Hall is assessed at $14,700,000, which means a project costing $4,851,000 would trigger full compliance.

The Stretch Energy Code does not apply to Newton City Hall as it is an existing commercial structure. The building falls under Chapter 34 of the IBC and therefore alterations to the windows are not subject to follow any energy code requirements.

**Conclusion & Recommendations**

In the last two decades it has been recognized that properly restored wood windows can be as energy efficient as new windows and restoration is considered a more sustainable solution as most retrofit windows cannot be restored once installed, whereas historic windows can be restored again and again as long as the wood is maintained. In the case of Newton City Hall, it is discouraging that a large-scale window restoration project was completed only years ago and is exhibiting the amount of failure seen today. In general, our firm expects a window restoration project to last as long as installation of replacement windows. Unfortunately some of the retrofits made to the windows at Newton City Hall have been unsuccessful. The double paned glass has not helped user comfort and the wood stops used to hold the double paned glass are failing. Paint failure to the extent seen on these windows is anticipated. A quality paint job utilizing today's latex paints is only expected to last between 5 and 7 years.

There are essentially three options for addressing these windows: replacement, major restoration, minor restoration. If the city opts to use replacement windows there are multiple options on the market, including wood, aluminum, fiberglass, and vinyl. Given the size of many of the windows vinyl may not be an option everywhere. Replacing the windows would not address issues with the wood frames unless the frames were replaced as well. Any of these window systems would be the most expensive option, as custom windows would need to be made for the curved top windows. Further, after the life cycle of the replacement window is reached they will need to be replaced again, likely in 25 to 30 years. It is also likely the most challenging option to pass by the Newton Historic Commission, given that the existing windows can still be restored.

A minor restoration of the windows would involve the following work: re-nailing and replacing selective wood stops; painting of all the windows and frames, installing weather stripping, sealing at the frame to masonry opening and plaster wall. The problem with this approach is that the wood stops are likely to fail again the way that they have over the last 10 years. This means that in 10 years another "minor" restoration will be required. Also at this time it is likely that the seals in some of the double glazed windows will begin to fail. Once the seals fail moisture accumulates and fogs up the windows. This can only be fixed by replacing the pane.

A major restoration would do all of the items in the minor restoration, as well as replacing all of the double paned glazing with single paned glass. A thicker, 1/4" glass would need to be used as opposed to the original 1/8" to adjust for the changes made to the sash to install the double paned glazing. The glass would be installed with glazing putty in the traditional manner. To increase thermal qualities, we recommend installing aluminum storm windows on either the interior or exterior of the building. Allied Window constructs low profile storm windows that are appropriate for use in historic building restorations.

Thank you for this opportunity to speak to our observations and recommendations for future window work at the Newton City Hall. We look forward for an opportunity to share these ideas with personnel from facilities. We advocate strongly for attention to these concerns at this handsome, durable and significant building in the City of Newton.

Best Regards,

Thomas Burgess
Project Manager