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Mr. Robin Zentner, Project Manager
Division of State Facilities
P. O. Box 7866
Madison, WI 53707-7866

Re: Wisconsin State Capitol
Capitol Stone Cleaning & Repair
DSF Project No. IICIK

Dear Mr. Zentner,

I have completed my survey and research related to the Kasota Stone walls and granite and marble walls, floors and balustrades of the Central Portion of the Capitol. I offer this summary final report on findings.

Introduction

I have conducted a cursory survey of the stone surfaces in the Capitol. This includes the Kasota Stone walls and Granite, Syenite and Marble walls, floors and balustrades of the Central Portion of the Capitol as well as Kasota Stone walls in the primary public corridors of each wing.

The condition survey consisted of examining the surfaces for tape, tape residue, other sticky substances, magic marker and other foreign marks. I also observed areas of nicks and chips at the corners of stone columns and piers and on some floor surfaces. Notations were made on floor plans and photos of typical conditions were taken. These observations were made during on-site work on March 23, 25 and April 5, 19. During after hour's periods I was assisted in part of this survey by Mr. Ron Blair of the Bureau of Facilities Management. As part of the survey work I interviewed several Capitol staff and State Police officers who were present during the public protest activities of February and March 2011.

In concert with the condition survey activities, I conducted research into potential repair methods, treatments for removal of tape residue and other foreign matter on the Kasota Stone. This included discussions with several very knowledgeable stone suppliers, chemical companies, masonry experts and conservators.

Those contacts include:

- Mr. James Durham, President, Quarra Stone Company, LLC, Madison, WI.
- Mr. Mike Scheffler, PE, Associate Director, Wiss Janney Elstner, Northbrook, IL.
- Mr. Ron Vetter and Ms. Cindy Krenik, Vetter Stone, Mankato, Minnesota
- PROSOCO, Inc., Technical Support, Lawrence, Kansas
- Diedrich Technologies, Inc., Technical Support, Oak Creek, Wisconsin
- Ms. Donna Haberman, Conservator, Midwest Center for Art Conservation, Minneapolis, Minnesota. Ms. Haberman made an on site visit.

Through the efforts of Mr. Mike Bath, we were also able to locate and review documents from the South and East Wing Rehabilitation and Restoration projects related to the stone cleaning and repairs. Kasota Stone technical cleaning procedures developed by the U. S. General Services Administration were reviewed.

Capitol staff also conducted a series of tests of various cleaning solutions and chemicals that will effectively remove the foreign matter and residue without damaging the stone. This testing is still in process at the time of the preparation of this report.

Summary Report

For the purposes of this report damage is defined as harm to property resulting in a change in wholeness or disfigurement. In this case the object being the stone surfaces of the Capitol. I also noted some defacement of the appearance of the stone.

The primary damage (change in wholeness) to the Kasota and Mankato Stone appears to be limited to nicks and chips at the corners of Kasota Stone piers on the ground and first floors. Very minimal amounts also exist on the second and third floors. These sharp corners of soft stone are vulnerable to damage from impacts of items, such as handbags, briefcases, backpacks, packages and similar items people carry. Carts and wheel chairs also contribute to these chips. This type of damage has been occurring since the building was completed as evidenced by the many older chips and evidence of previous repairs.

These recent nicks and chips are identified by their "fresh" light color. I can not with absolute certainty attribute these nicks and chips to any particular event or exact time frame, but I can say they are recent, within the last few months, as they have not become dirty.

Essentially the building experienced 3-5 years of wear within a two week period of late February and early March, 2011. The nicks and chips are typically small (1/4" or less) but a few are 3/4" in size. They are found in some first and ground floor locations along primary circulation routes. They are found between 6 inches and 42 inches above the finished floor in areas that are brushed by people and carts.

The repair of these chips is a very difficult and time consuming effort. Repairs at corners of the stone are difficult due to adhesion of the patching material to a small area. It may be necessary to drill into the stone to set a small pin or other mechanical attachment device to provide a physical as well as adhesive bond. This has been done on previous similar stone repairs in the Capitol.

Also difficult is the matching and blending of the epoxy patch material. It will take a highly skilled and artistic mason to accomplish a proper match to the stone due to the wide variation in surface color and variegation in any one area. A custom mix is required for each area of repair or patch.

One basic principle of stone repair that cannot be overlooked is the necessity to match the "new" patch to "clean" adjacent surfaces. In order to successfully make the quality level of repairs appropriate to this National Historic Landmark building, the stone surfaces will first need to be cleaned of grime and dirt. The noted corners of the Kasota Stone are very dirty and many are very dark with grime and dirt. Repairs must be matched to clean adjacent surfaces.

The Granite, Syenite and Marble surfaces within the Central Portion of the Capitol (walls, piers, balustrades and floor) appear to show very few areas of recent nicks or chips. No new chips were observed on the marble balustrades of the first floor or on the galleries of the second floor.

It was also noted during the survey that there are several floor stones on the ground and first floors that require attention. In isolated areas, previous repairs to large chips, cracks and spalls have failed and these repairs are in need of replacement. The foot traffic from large crowds of people present over several weeks may have contributed to the failure of these previous repairs in the marble floors.

The degree of difficulty associated with these repairs is above that required for the Kasota Stone walls. This is primarily due to the variation and veining in the marble itself and the multiple colors present within an individual stone. Significant custom mixing, blending and matching is required for a high quality repair. Two loose floor stones were also noted on third floor east and brought to the attention of the Capitol mason.

The Kasota and Mankato Stones are the softest stones in the Capitol and are the most susceptible to absorption of adhesives, chemicals and oils. There are isolated areas of recent permanent marker application on the stone walls. These are classified as defacement. These are likely over-run from someone writing on a poster board. These number just a very few and are quite isolated. The permanent marker should be removable with two to three applications of a poultice. The types of poultice that will be effective are currently being used by the Capitol mason.

The residue of masking tape, duct tape and other sticky adhesives on the Kasota and Mankato Stone, Syenite and Granite appears to be in very isolated areas on the walls within the Central Portion of the Capitol as well as the public corridors. This is also associated with defacement. The most concentrated areas of tape residue are on the ground and first floors of the North Wing. It should be noted here that the tape residue on the stone is extremely hard to observe under normal lighting conditions or without an intensive survey effort. Transparent tape is almost invisible on the stone walls so there is likely more than that noted during the survey.

Anecdotal evidence from Capitol staff and police officers indicates that protestors used mostly blue painters tape to apply signage to the stone surfaces. Evidently some of this was distributed by Capitol staff. The blue tape leaves little residue behind when removed after a short time. The dark colored Syenite piers of the ground floor were evidently covered with hand made signage during the protests. These areas do have numerous areas of tape residue and other residue on the full height of the stone surfaces.

Some areas of the Kasota and Mankato Stone walls appear to have become darker, possibly from excessive human contact (skin oils) and/or residue from pizza box top signage taped to the walls. This is most evident in the grand stairs from ground to first floor and to a lesser extent on the grand stairs from first to second floor. These areas significantly detract from the visual appearance of the stone surfaces.

Some of this darkening was noted during the comprehensive restoration and rehabilitation project and relatively unsuccessful attempts at cleaning with a mild solution of Spic-N-Span were undertaken. In my opinion the darkening is now slightly more significant than when the restoration and rehabilitation was complete in the late 1990's. These oils have likely penetrated into the surface of the stone and may not be easily or safely removable. Any cleaning attempts must be carefully studied and tested prior to actual cleaning treatment.

At the ground and first floor side corridors, multiple areas of horizontal dark marks or streaks are found on the Kasota Stone walls, especially at the arched portals connecting the side corridors to the circular corridor around the rotunda. These marks are most likely from carts and other wheeled vehicles and are found above 6" and below 24" on the walls.

Many areas of the Kasota Stone have likely been cleaned with some acidic cleaner, probably during a regrouting effort in the 1960's or 1970's. Evidence of this is in the form of vertical streaks and stains on the stone surface. This is evident on most of the Kasota Stone walls but most prevalent in the ground floor corridor of the East Wing. These streaks and stains are a visual detractor to the beauty of the stone. These streaks and stains are now under years of grim and dirt accumulation and it is not known if they can be safely removed.

All areas of tape residue or other residue or defacement on the stone surfaces should be carefully cleaned. This cleaning can not effectively be done with simple warm water washing. Tape residue and adhesive will be removed with the use of a surfactant or dissolving chemical such as acetone to soften, loosen and then remove the residue without simply smearing it into the stone. These surfactants or chemicals will also remove the accumulated dirt and grime likely leaving a clearly evident "clean spot" on the stone surface.

For this reason a full cleaning of the stone surfaces is highly recommended. Another advantage of the full cleaning is this will facilitate identification of all areas of damage and defacement. This cleaning needs to be comprehensive, from corner to corner and top to bottom of every Kasota Stone wall surface, with the exception of the barrel vaults of the grand stairs.

Full cleaning of the stone surfaces within the public spaces has apparently not taken place since the completion of the comprehensive interior restoration and rehabilitation project in the late 1990's. The Kasota Stone walls and granite piers and wall surfaces all have a layer of dust over a layer of grime on them. Surface dust is especially evident above eight feet while grime is especially evident below four feet.

The recommended stone surface cleaning therefore can be associated with both cyclical maintenance needs and the need to carefully, appropriately and effectively remove marker, tape, other residues and defacement on the stone walls and to provide for proper color match related to stone repairs.

All public space floor surfaces in the Capitol are cleaned on a regular basis. Generally this is every evening. Due to this regular cleaning, the floors viewed during the condition survey were all in generally good condition. Food and beverage stains were observed on third and fourth floors and one area of significant graffiti was observed on first floor in the North Wing. These issues were noted and brought to the attention of the cleaning crew.

Recommendations

In my opinion a total cleaning of the Kasota and Mankato Stone is warranted. A partial cleaning of the Syenite and Granite piers is also necessary. The cleaning is partially necessary as part of cyclical maintenance and partially to identify and then remove defacement of the adhesives or residues.

A series of testing efforts is underway by Capitol staff to determine the best manner in which to clean the stone. This involves first testing chemicals and surfactant solutions on small new stones samples to observe the cleaning ability, ability of the chemical to actually remove the adhesive and not simply smear it over the surface and to be sure the chemical does not stain or otherwise damage the stone surface.

A second set of tests is being conducted on used Kasota Stone. Several pieces of ground floor West Wing Kasota Stone were saved following the restoration and rehabilitation project completed in the 1990's and were retrieved from Central Service storage. These tests should confirm the ability of the chemicals to remove the grime and hand oils from the stone. Tests of the effectiveness of chemicals on removing the stains and streaks associated with the 1960's work may also be conducted.

Once chemicals, process and techniques that are safe and effective have been confirmed, a mock-up test should be done on an actual section of Kasota Stone wall. A location in the basement of the South Wing is suggested. I would be available to review and approve these tests. With a successful mock-up approval, cleaning of the stone surfaces and then repairs may proceed.

A peer review by a professional with expertise in the field of stone conservation is strongly recommended. This type of evaluation is common in the field of historic preservation, especially with significant properties like the State Capitol. This professional would evaluate the conditions, the protocol developed and the test mock-ups and offer a critique. This feedback should insure that the processes and materials are appropriate and that no key issues were overlooked. A peer review should be accomplished before the final mock-up is undertaken.

Poultice

A poultice will be necessary to remove some of the permanent marker on the Kasota Stone surfaces. The Capitol mason has been using an off the shelf poultice with fairly successful results. Several people I talked to noted that the poultice should be about a PH of 8. It has also been suggested that a custom poultice may be more effective. An effort in the range of 80-100 person hours is expected as multiple applications of the poultice are required at most locations.

Repair

Repair of recently damaged stone corners or floor surfaces should be accomplished only after the stone surfaces have been cleaned. These repairs should be undertaken by highly skilled masons with experience and expertise with similar stone materials in similar conditions. Upon completion of the cleaning, the stone repair of recent damage to the walls and floors may proceed. This is anticipated to require about 200-250 person hours including appropriate testing, preparation, patching and monitoring of curing. For the stone repairs, materials supplied by Bonstone, Cathedral Stone and Stone Boss are potential products to consider. It is assumed that the very small chips at the corners of the Kasota Stone can not be successfully repaired due to their size.

Cleaning Protocol

Based upon the information developed to date, a preliminary cleaning protocol may include:

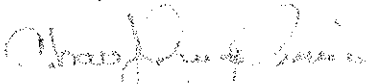
1. Vacuum and use a damp cloth to wipe down the stone surfaces and remove surface dust.
2. Use a weak mixture of water and a liquid surfactant (nontoxic, nonionic detergent) and thoroughly clean the stone surface to remove surface grime, dirt and hand oils. The surfactants have cleaning properties in dilute solutions that help loosen and remove grime and oils. The use of natural sponges is suggested. Brushes may be necessary. Rinse stone after surface cleaning to remove all residues and let dry for several days.
3. Spot clean the stone to remove remaining tape adhesive and other residues. The type of solution for effective and safe removal of the residue has not yet been fully tested, but acetone or an acetone gel, are likely to be workable. Rinse the spot clean area. Repeat as necessary.
4. Do a thorough clean rinse of all stone surfaces.

A team of semi-skilled people will be required to accomplish the cleaning. They should be trained and supervised in this work. It is estimated that this effort may take between 3,500 and 4,000 person hours, including time to set up, take down and move scaffold and ladders. This estimate does not include supervision person hours. It is assumed that this cleaning would take place during hours the Capitol is closed to the public.

Artwork

Per our discussion, if there is suspected damage to painted artwork I would suggest the services of the Midwest Art Conservation Center of Minneapolis. Contact Senior Conservators Mr. David Marquis or Ms. Joan Gorman.

Sincerely,



Charles J. Quaglin, AIA, NCARB
Preservation Architect

An appendix containing annotated floor plans, with observed locations of damage and defacement and related images, is provided in a separate binder.