



Addendum No. 3

**Donald S. Russell U.S. Courthouse (SC0041ZZ)
Exterior Façade Repair**

**McMillan Pazdan Smith Project No. 022689
August 21, 2023**

The following clarifications, amendments, additions, deletions, revisions, and/or modifications are hereby made a part of the Contract Documents, and change the original documents only in the manner and to the extent stated below:

- Item No. 1: **General: Pre- Bid Meeting Minutes**
Minutes from the Pre-Bid meeting are attached.

- Item No. 2: **Project Manual – Bid From:**
Delete the previously issued Bid Form in its entirety and insert the attached Bid Form into the contract documents.

- Item No. 3: **Project Manual – 04 01 40 Repair and Conservation of Limestone Masonry:**
Delete the previously issued Section 04 01 40 in its entirety and insert the attached Section 04 01 40 into the contract documents.

This addendum contains	<u> 1 </u>	Summary Page
	<u> 3 </u>	Meeting Minutes Pages
	<u> 1 </u>	Bid Form
	<u> 1 </u>	Specification Section

End of Addendum No. 3



mcmillan | pazdan | smith
ARCHITECTURE

**Donald S. Russell U.S. Courthouse (SC0041ZZ)
Exterior Façade Repair**

**McMillan Pazdan Smith Project No. 022689
August 15, 2023**

PRE-BID MEETING MINUTES ADDENDUM 3

- Meeting Sign-in
 - Sign In sheet was provided in Addendum 2.

- *Date, time, and place of Bid Opening*
 - *Tuesday, August 29, 2023, 3:00 PM, City Call, 145 W. Broad Street (per Addendum 2)*
 - Bids shall be submitted in a sealed envelope with the name of Contractor, Contractor License Number, Project name, and the date/time of bid opening on the outside of the sealed envelope.

 - No bids will be accepted after bid time is called.

- Review of Contract Documents
 - Email Donnie Love with questions at dlove@mcmillanpazdansmith.com

- 5% *bid* bond or cashier's check must accompany the bid.

- Bid bond or cashier's check must be made payable to the Owner.

- Discuss any conflict between the plans and specifications and/or the project requirements/ site conditions with the Design Professional prior to the bid but no later than five (5) days prior to the bid date.

- Contractor's responsibility to visit project site and review contract documents before bidding the project.
 - Per Addendum 2, Contractors will be allowed access to the site for additional evaluation of the building on August 22, 2023 between the hours of 9 AM and 12 PM. Contractors may bring a lift to view the building if they choose to. Contractors will be able to view the interior courtyard during this time.

- Contract documents date: August 1, 2023

Pre-Bid Meeting Minutes
Donald Russell U.S. Courthouse
MPS Project No. 022689.00
August 15, 2023

- List of contacts, Owner and Architect
 - Owner: Jan de Voest, jdevoest@cityofspartanburg.org
 - Architect: Donnie Love, dlove@mcmillanpazdansmith.com

- Addenda issued to date:
 - Addendum 1 – August 8, 2023
 - Addendum 2 – August 16, 2023

- Scope of work
 - Base bid: limestone repair, repointing and cleaning per the drawings
 - Alternate 1: Brick repointing per the drawings
 - Alternate 2: Miscellaneous repointing per the drawings

- Site conditions
 - Parking (restrictions or unrestricted) – To be determined after award
 - Material storage requirements – To be determined after award
 - Access to building/site – Must be coordinated with the onsite Marshals.
 - Protection of facilities and Equipment – Facilities and equipment may be left inside the fence over night but must be coordinated with the onsite Marshals.

- Schedule of completion
 - Per Addendum 3
 - Base bid complete 45 days
 - Alternate 1 complete 45 days
 - If Alternate 2 is awarded, it must be completed within the 90 day total window.

- Allowances
 - Contingency Allowance - \$50,000.00

- Work Restrictions
 - Work hours shall be determined per City Ordinance; no work shall take place on the weekend.

- Third Party inspections
 - No permits or inspections are required.

- Questions during bidding
 - Email Donnie Love, dlove@mcmillanpazdansmith.com

Pre-Bid Meeting Minutes
Donald Russell U.S. Courthouse
MPS Project No. 022689.00
August 15, 2023

- Alternates
 - Alternate No. 1 – Repair and Conservation of Brick Masonry
Provide a price to repair brick masonry per Section 04 10 21 and as shown on the drawings.
 - Alternate No. 2 – Miscellaneous Brick and Limestone Repair
Provide a price for repair and cleaning of perimeter site wall, cheek walls and site signage per Sections 04 10 21 and 04 01 40 as shown on the drawings.
- To obtain Drawings:
 - Contract documents may be obtained by contacting Jan de Voest, City of Spartanburg at jdevoest@cityofspartanburg.org or 864-978-3303
- General Comments:
 - Contractors will be required to wear badges while on site per Section 01 14 00 Work Restrictions.
 - Adherence to Davis Bacon requirements is not required.
 - No mechanical grinders, cutters, or discs shall be allowed in the work per Sections 04 01 40 Repair and Conservation of Limestone Masonry and 04 10 21 Repair and Conservation of Brick Masonry.
 - The last day to ask questions will be August 24, 2023.



Request for Proposal
Exterior Façade Renovations for
Donald S. Russell U.S. Courthouse
Job No. GP-1306 BID

Proposal No: 2323-08-22-01
(Show this number on envelope and all correspondence)

FROM:

BIDDER _____

Date _____

Address _____

Telephone _____

Bidder's License No. _____

Contractor's License No. _____

TO: CITY OF SPARTANBURG (OWNER)
145 West Broad Street Post
Office Drawer 5107
Spartanburg, S. C. 29304

_____ submits herewith our proposal in response to the bid request
(Company Name)

number shown above in compliance with the description(s) and specifications (s) for the following:

Bidders will propose per the Scope of Work, Drawings and Specifications for the project.

BASE BID \$ _____ **Dollars**

ALLOWANCES: (FOR A COMPLETE DESCRIPTION OF ALLOWANCES, SEE SPEC SECTION 01 21 00).

General Contingency Allowance: \$ 50,000.00 _____ Dollars

**TOTAL BASE BID \$ _____ Dollars
(Includes Base Bid and All Allowances)**

ALTERNATES: (FOR A COMPLETE DESCRIPTION OF ALTERNATES, SEE SPEC SECTION 01 23 00).

Alternate # 1 Repair and Conservation of Brick Masonry	\$ _____	Add/Deduct
Alternate # 2 Miscellaneous Brick and Limestone Repair	\$ _____	Add/Deduct

UNIT PRICES

Bidder offers for the Owner’s consideration and use, the following UNIT PRICES. The UNIT PRICES offered by BIDDER indicate the amount to be added to or deducted from the CONTRACT SUM for each item-unit combination. UNIT PRICES include all costs to the Owner, including those for materials, labor, equipment, tools of the trades and labor, fees, taxes. Insurance, bonding, overhead, profit, etc. The Owner reserves the right to include or not to include any of the following UNIT PRICES in the Contract and to negotiate the UNIT PRICES with the BIDDER prior to including in the contract.

<u>Description</u>	<u>Unit</u>	<u>Pricing</u>
1. Repointing Brick Joints	SF	\$ _____
2. Repointing Limestone Joints	LF	\$ _____

Bidder acknowledges receipt of the following Addenda:

Addenda Received: No. _____ Date _____
 No. _____ Date _____
 No. _____ Date _____
 No. _____ Date _____

The undersigned further agrees that in case of failure on his part to execute the said contract and bonds within 10 consecutive calendar days after written notice has been given of the award of the contract, the check and/or bid bond accompanying this bid and the monies payable thereon will be paid into the funds of the Owner as liquidated damages for such failure; otherwise, said check or bid bond will be returned to the undersigned.

The bidder further purposes and agrees hereby to commence the work with adequate forces and equipment within 10 days after being notified by the Owner or Engineer to proceed, and to complete the work within the specified time.

The bidder further agrees to commence work on the date stipulated in the notice to proceed and to fully complete the project within the number of consecutive calendar days thereafter as listed below. The bidder also agrees to pay as liquidated damages, the sum as listed below for each consecutive calendar day thereafter the project remains incomplete.

Completion Time: 45 days for base bid, 45 days for Alternate 1
If Alternate 2 is awarded, it must be completed within the 90 day window.

ATTACHED HERETO is a certified check on the _____
_____ Bank of _____ and/or bid bond
with the _____ Company for the sum of _____
Dollars (_____), made payable to the Owner as a bid guarantee.

The attached completed and executed Debarred Firms certification is hereby made a part of this bid.

In compliance with the proposal invitation and subject to all conditions thereof, the undersigned agrees:

- A. This proposal as stated, is open for acceptance for a period of 90 calendar days from day of pending.
- B. To furnish any and all items at the prices set forth the items unless otherwise specified, within 60 Calendar days after receipt of purchase order; Contract and/or Notice to Proceed.
- C. Signing of this Proposal form, Proposer agrees all Addenda have been read and understood.
- D. Liquidated Damages in the amount of **\$300.00 per calendar day** will be assessed for each day beyond the scheduled completion date for the work that remains incomplete.

SIGNATURE OF BIDDER'S REPRESENTATIVE

Name & Title: _____

Date: _____

SECTION 04 01 40 – REPAIR AND CONSERVATION OF LIMESTONE MASONRY

PART 1 – GENERAL – PATCHING SPALLED LIMESTONE

1.1.0 SUMMARY

- A. This procedure includes guidance on repairing spalls in limestone using a cementitious patching material.
- B. These guidelines cover the following sections:
 - 1. Safety Precautions
 - 2. Historic Structures Precautions
 - 3. Submittals
 - 4. Quality Assurance
 - 5. Delivery, Storage and Handling
 - 6. Project/Site Conditions
 - 7. Sequencing and Scheduling
 - 8. General Protection (Surface and Surrounding)

These guidelines should be reviewed prior to performing this procedure and should be followed, when applicable, along with recommendations from the Regional Historic Preservation Officer (RHPO)

1.1.1 SUBMITTALS

- A. Sample Stone Repair: Reattach stone fragments and patch stone at locations selected by the Contracting Officer's Representative using methods specified. Provide one sample each for granite, limestone and marble.

1.2.0 PRODUCTS

1.2.1 MANUFACTURERS

- A. Jahn Restoration Techniques and Research www.jahnmortars.com

1.2.2 MATERIALS

- A. Cementitious patching material such as "M70 Stone Restoration Mortar" (Jahn Restoration), or approved equal; mixed and applied following manufacturer's guidance.
- B. Clean, soft cloths
- C. Clean, potable water

1.2.3 EQUIPMENT

- A. Stiff natural bristle brush
- B. Trowel
- C. Chisel
- D. Hammer
- E. Putty knife

1.3.0 EXECUTION

1.3.1 ERECTION, INSTALLATION, APPLICATION

- A. Cut back to sound stone with chisel and hammer. Mechanical grinders, cutters or discs are not allowed. Score surface to receive patch with chisel to provide a mechanical key with patching material. Undercutting if possible is recommended to hold patch more securely.
- B. Thoroughly clean all stone dust and debris from areas that are to be repaired by air and then with a soft brush and water.
- C. Pre-moisten stone with clean water and a stiff natural bristle brush to prevent patching mortar from drying out prematurely. Avoid over wetting stone, which inhibits adhesion. Prepare test patches as required for approval by the Contracting Officer's Representative to determine the correct degree of moistening.
- D. First mix the cementitious patching material well in a dry state, then add water as per manufacturer's instructions, depending on the porosity of the limestone; between 150-200 cc of water to one kg of dry material. Patching mortar should be shapable without using molds and as it is being applied should hold its shape right away. Do not mix more material than can be used within 30 minutes.
- E. Apply with trowel so that patch is slightly higher than adjacent surfaces. Jahn Patching mortar can be put on from 3 mm to any required thickness at once. Allow to harden for 7 days, then carefully cut back and tool to match adjacent surfaces.

PART 2 – REATTACHING LOOSE OR SPALLED LIMESTONE

2.1.0 SUMMARY

- A. This procedure includes guidance on reattaching loose or spalled limestone that is reusable and has not been extensively damaged.
- B. These guidelines cover the following sections:
 - 1. Safety Precautions
 - 2. Historic Structures Precautions
 - 3. Submittals
 - 4. Quality Assurance
 - 5. Delivery, Storage and Handling
 - 6. Project/Site Conditions
 - 7. Sequencing and Scheduling
 - 8. General Protection (Surface and Surrounding)

These guidelines should be reviewed prior to performing this procedure and should be followed, when applicable, along with recommendations from the Regional Historic Preservation Officer (RHPO).

2.1.1 REFERENCES

- A. American Society for Testing and Materials (ASTM), www.astm.org

2.2.0 PRODUCTS

2.2.1 MANUFACTURERS

- A. Axson Technologies (formerly Akemi Plastics, Inc.) www.axsontech.us

- B. Sika Corporation <http://usn.sika.com>

2.2.2 MATERIALS

- A. Replacement limestone - reuse any loose or fallen stone fragments that are still sound; re-use such stone in its original position and location; replacement stone should match existing limestone in color, texture and type.
- B. Epoxy Adhesive such as "Sikadur 32 Hi Mod" epoxy adhesive, or approved equal (Sika Corporation).
 - 1. High modulus, high strength, moisture insensitive epoxy adhesive with a pot life of 30 minutes at 70 degrees F.
 - 2. Can be applied at temperatures as low as 40 degrees F.
 - 3. Colored to match existing limestone.
- C. A color-matched polyester-based adhesive such as "Limestone Super", (Wood & Stone Company, a Axson Technologies US, Inc. company), or approved equal.
 - 1. 10-12 minute cure depending on ambient temperature; temperatures below 32 degrees F (0 degrees C) require heated mixture.
 - 2. Can be applied at temperatures as low as 20 degrees F
 - 3. Colored to match existing limestone.
- D. Permanent coloring agent as required, compatible with adhesive, and as recommended by adhesive manufacturer.
- E. Stainless steel rods for reinforcement: 1/4 inch diameter threaded rods, length as required.

2.2.3 EQUIPMENT

- A. Stiff bristle brushes (natural fiber or nylon)
- B. Polyethylene plastic mixing vessel for mixing adhesives and patching mortar.

2.3.0 EXECUTION

2.3.1 ERECTION, INSTALLATION, APPLICATION

- A. Carefully remove all loose fragments of stone. Set aside all pieces in good condition for reuse.
- B. Clean exposed metal anchors. Remove corrosion by scraping with a stiff wire bristle brush.
- C. Remove unsound metal anchors and replace with new stainless steel anchors of similar size and shape. Bed anchors in epoxy grout.
- D. Remove dust and debris from building stone and fragments using a stiff bristle brush.
- E. For small fragments (.5 cubic feet or less):
 - 1. Coat building stone surface with adhesive such as noted above, or approved equal. Be sure to cover the entire surface, filling all voids.
 - 2. While adhesive is still tacky, set stone fragment in place. Prevent fragment from

- moving until adhesive is fully cured.
3. Clean any residual adhesive from the stone surface using water and stiff bristle brush. Wet stone and fill any chips with lime-based patching mortar of appropriate color, texture and composition. Tool surface level with surrounding stone.
- F. For large fragments (more than 4 inches by 4 inches by 4 inches):
1. Follow procedures in E.1. above.
 2. After adhesive has cured, anchor fragments with 1/4 inch smooth stainless steel rods.
 - a. Drill 1/4 inch holes at a 45 degree downward angle through the face of the newly set stone fragment. Drill holes should extend at least 2 inches into the backing stone, 2 inches into the fragment and should allow for the rod to be countersunk at least 3/4 inches from the face of the stone.
 - b. Space the anchor rods between 3 and 5 inches apart and no less than 2 inches from any edge.
 3. Clean any residual adhesive from the stone surface using water and a stiff bristle brush. Wet stone and fill holes from countersunk rods with patching mortar. Tool surface level with surrounding stone.

PART 3 – RESETTING LIMESTONE

3.1.1 SUMMARY

- A. This procedure includes guidance on removing displaced limestone panels, repairing the substrate and re- installing the panels.
- B. These guidelines cover the following sections:
 1. Safety Precautions
 2. Historic Structures Precautions
 3. Submittals
 4. Quality Assurance
 5. Delivery, Storage and Handling
 6. Project/Site Conditions
 7. Sequencing and Scheduling
 8. General Protection (Surface and Surrounding)

These guidelines should be reviewed prior to performing this procedure and should be followed, when applicable, along with recommendations from the Regional Historic Preservation Officer (RHPO).

3.1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM) www.astm.org

3.1.3 QUALITY ASSURANCE

- A. Certifications: Prior to delivery, submit certificates attesting compliance with applicable specifications for grades, types and classes.
- B. Joint Raking: Prior to raking out all areas, cut back joints at location selected by the Contracting Officer using the methods specified. Raking will continue at no additional cost to the owner, until an acceptable sample is achieved. This area will serve as standard for joint raking for the entire job. It will be marked and left unpointed until all other pointing is

completed. Point when directed by the Contracting Officer.

- C. Sample Stone Pointing and Repair: Repoint joints, re- attach stone fragments and patch stone using materials and methods specified at a location selected by the Contracting Officer. The samples accepted by the Contracting Officer will serve as standard for the entire job. They will be marked and left undisturbed.
- D. Test panels shall be installed at each façade of the original building and each façade of all additions in order to match the mortar at each location.

3.1.4 PROJECT/SITE CONDITIONS

- A. Environmental Requirements: No stonework will be performed when the air temperature is 40F or below during and for 48 hours subsequent to the work.

3.2.0 PRODUCTS

3.2.1 MATERIALS

- A. Stone: To match existing in grade, color and finish.
- B. Lime: Should conform to ASTM C207, Type S, high plasticity, Hydrated Lime for Masonry Purposes.
 - 1. Lime which meets this standard will "work" well, resists drying during curing, and is sufficiently strong for the purpose of repointing.
 - 2. Lime expands as it hydrates, making high lime mortars more resistant to crack formation.
- C. Cement: Should conform to ASTM C150, Type I, White. It should not have more than 0.60% alkali nor more than 0.15% water soluble alkali. Use gray portland cement ONLY if a dark mortar is to be matched.
 - 1. Cement meeting this standard should increase the workability of the mortar, accelerate the setting time and slightly increase the strength of the mortar.
 - 2. The low alkali content will prevent efflorescence.
- D. Sand: Free of impurities and conforming to ASTM C144.
 - 1. Sand color, size, and texture should match the original as closely as possible. Provide a sample of the sand for comparison to the original, and have it approved by the RHPO before beginning repointing work.
 - 2. When possible, use bar sand or beach sand rather than crushed sand for the repointing mortar.

NOTE: Bar sand or beach sand should be washed to remove the salts before using.

- a. Crushed sand has sharp edges, which makes it more "sticky" and difficult to work into the joints.
- b. Bar sand, on the other hand, has rounded edges and flows easily during the mortar application.
- c. The working characteristics of mortar made with crushed sand may be improved by adding a slight amount of portland cement. The amount of cement should be determined by experimentation, but should not exceed 20%

of the total lime/cement binder. 20% or less of cement has minimal effect on the hardness of the mortar. Cement content above 20% will make the mortar too hard.

- E. Clean, potable water: If the water must be transported or stored in a container, the container must not impart any chemicals to the water.
- F. Stone dust finely ground from the same stone as that to be repointed.
- G. Additives: No antifreeze compounds or other admixture shall be used.

Note: Do not use anti-freeze compounds. These compounds are designed for use with cement mortars, and their effectiveness with high lime mortars is questionable. Furthermore, the compounds contain salts which can lead to serious problems in the masonry at a later time.

Note: Air entraining agents are not recommended. These agents are designed for use with cement rather than lime, and they result in decreased bonding of the mortar and the masonry. Air entraining is not necessary with high lime mortars because of the natural ability of these mortars to flex with temperature changes.

- H. Epoxy grout
- I. Reinforcement/Anchors: Stainless steel type 302/304 3/8" in diameter threaded rods, length as required.

3.2.2 EQUIPMENT

- A. Natural fiber or nylon bristle brushes
- B. Wire bristle brush for cleaning anchors
- C. Mixing Vessels
- D. Joint tools
- E. Chisel
- F. Hammer
- G. Hawk (plywood or steel mortar board)
- H. Trowel
- 1. Hoe
- J. Mesh screen
- K. Putty knife
- L. Wooden mortar boxes

3.2.3 MIXES

- A. Some factors to consider when mixing lime mortar include durability, color and texture, and workability.
 - 1. Durability: Repointing and resetting mortar should be softer than the masonry units and the original mortar to reduce stresses at the edge of the masonry and, in the case of lime mortar, to reduce shrinkage which can cause cracks in the mortar.
 - a. If the new mortar is harder than the masonry or the original mortar, it can cause serious stresses within the wall during thermal expansion and contraction,

- which can lead to deterioration of the masonry units rather than the mortar.
- b. If the mortar is softer, any deterioration which occurs will take place in the mortar, which is easier to replace than the units themselves.
2. The repointing and resetting mortar should allow the passage of water, both liquid and vapor. If the mortar does not allow water to pass freely through it, the water can become trapped inside the wall, freeze and cause serious deterioration to the masonry.
 3. Color and texture: The repointing mortar should match the original mortar in color, texture and physical characteristics.
 - a. Obtaining an accurate color match is best achieved by selecting appropriate sand.
 1. Use sand which is similar to the original in color and gradation. Sand from more than one source may be required.
 2. For repointing of natural stones, use finely ground stone "dust" in the mortar to match the joints as closely as possible to the stone.
 - b. If the original mortar was tinted, or if it is impossible to obtain a color match through the use of sand, it may be necessary to use a special mortar pigment. CAUTION: PIGMENTS MAY REACT WITH OTHER INGREDIENTS IN THE MORTAR TO FORM EFFLORESCENCE. THEY MAY ALSO WEATHER AT A DIFFERENT RATE THAN NATURAL COLORING AND CAUSE A COLOR VARIATION IN THE MORTAR. NOTE: IF PIGMENTS MUST BE USED, PURE MINERAL OXIDES SHOULD BE USED BECAUSE THEY DO NOT FADE OR LEACH OUT OF THE MORTAR. AMOUNT OF PIGMENT SHOULD NOT EXCEED 2% OF THE MORTAR MIX BY WEIGHT.
 - c. Many mortars used before the twentieth century have small lumps of incompletely burned or ground lime, or other impurities. To match the original appearance of the masonry, these impurities must be included in the new repointing mortar. Use identical materials such as ground oyster shells (obtained at feed stores) or lumps of lime, to duplicate original lumps.
 4. Workability: The workability or plasticity of the mortar is a direct result of the selection of materials.
 5. Test panels shall be installed at each façade of the original building and each façade of all additions in order to match the mortar at each location.
- B. Mortar Mix:
1. Have the existing mortar completely analyzed to insure that the repointing mortar will not be less permeable/harder than the masonry units or the original mortar. Note: It is better to have mortar that is more permeable than less.
 2. Measure all ingredients by cubic volume using a pre-established uniform measure, such as a small bucket, rather than a less uniform measure such as a shovel.
 3. For historic masonry set in lime mortar, use the following mortar mix:

1 part portland cement
3 parts lime
8-12 parts sand (To match existing mortar as closely as possible.) NOTE: The exact mix required will relate to the grain size and sharpness of the sand and will vary depending on the supply.

-OR-

For historic masonry set in standard mortar, use the following mortar mix (ASTM C270 Type "0") as a starting point:

1 part portland cement

2 parts lime or lime putty

6 to 9 parts sand and stone dust (To match existing mortar as closely as possible.)

-OR-

For Limestone (ASTM C270 Type "N"): 1 part
portland cement

1 parts lime

4-6 parts aggregate

Enough water to form a workable consistency

4. Mix a final "job-size" batch once the correct sand color, cement content, etc. have been determined through small tests to ensure the on-site mixing conditions will result in the same final product.

3.3.0 EXECUTION

3.3.1 ERECTION, INSTALLATION, APPLICATION

- A. Carefully remove shifted and loose stone panels. Clean of dirt, mortar, and loose debris. Retain for re-use. Re-build support masonry and lay new bedding material.
- B. Clean any exposed metal anchors of all corrosion by scraping and brushing with stiff wire brushes. Replace any unsound anchors as necessary with new stainless steel anchors of same approximate size and shape. Bed new anchors in epoxy grout.
- C. Re-set limestone, maximum tolerances from plumb and level of new work not to exceed variation from plumb and level of adjacent existing work.
- D. Wet masonry and lay in full bed of mortar. See 04100-03- S for mortar mixing procedures. Construct uniform joints. Shove vertical joints tight. Adjust stone units to final position while mortar is soft and plastic. Set stone with joints tooled back one inch. Point remaining depth as the rest of the stone is pointed. For pointing procedures, see 04520- 02-R.
- E. Keep mortar and stone damp (80-90% RH) for 72 hours or until mortar is cured.

3.3.2 ADJUSTING/CLEANING

- A. Immediately after repairing, patching, pointing and re- setting the stone, remove mortar, grout and adhesives from the face of the masonry.
- B. Use only tools and equipment which are clean and free of hardened or partially hardened material.
- C. After all work is complete, clean stone only with fiber bristle brushes and water. Use no acids, detergents, or other cleaning agents.

PART 4 – EPOXY PATCHING CRACKS IN LIMESTONE

4.1.0 SUMMARY

- A. This procedure includes guidance on patching cracks in limestone using an epoxy resin. This type of repair is suited for dormant (inactive) cracks no larger than 3/8" wide.
- B. These guidelines cover the following sections:
 - 1. Safety Precautions
 - 2. Historic Structures Precautions
 - 3. Submittals
 - 4. Quality Assurance
 - 5. Delivery, Storage and Handling
 - 6. Project/Site Conditions
 - 7. Sequencing and Scheduling
 - 8. General Production (Surfacing and Surrounding)These guidelines should be reviewed prior to performing this procedure and should be followed, when applicable, along with recommendations from the Regional Historic Preservation Officer (RHPO).

4.1.1 QUALITY ASSURANCE

- A. Contractor: A skilled firm with not less than five (5) years experience in masonry repointing and restoration. The Contractor shall be required to submit references for five (5) successfully completed projects of similar nature.
- B. Source of Material: Obtain materials for stone restoration from a single source for each type of material required, to ensure match of quality, color, pattern, and texture.

4.1.2 PROJECT/SITE CONDITIONS

- A. Environmental Requirements: Perform work only in dry and otherwise favorable weather conditions. Protect repaired masonry against freezing or excessively rapid drying for at least 48 hours after being laid. Do not repoint mortar joints or repair masonry unless air temperatures are between 40 F (4 C) and 80 F (27 C) and will remain so for at least 48 hours after completion of work.

4.2.0 PRODUCTS

4.2.1 MANUFACTURERS

- A. Akemina www.akemina.com
- B. Euclid Chemical Company www.euclidchemical.com

4.2.2 MATERIALS

- A. Epoxy-Based Stone Repair Adhesive: A commercially available, two component, moisture insensitive, high modulus, low viscosity, epoxy resin-formulated for penetrating deep into thin masonry cracks, such as "Akepox 1005 or 1006" (Akemina), "Eucopoxy Injection Resin" (Euclid Chemical Company), or approved equal.
- B. Single Source Responsibility: Provide epoxy resin, hardener and solvent produced by the same manufacturer.
- C. Acetone (C₃H₆O):
 - 1. A volatile fragrant flammable liquid ketone used chiefly as a solvent and in organic

- synthesis.
 - 2. Other chemical or common names include Dimethyl ketone; Propanone
 - 3. Potential Hazards: Volatile and flammable solvent
 - 4. Available from chemical supply house or hardware store.
- D. Limestone Dust
- E. Clean, potable water
- 4.2.3 EQUIPMENT
- A. Syringe
 - B. Stiff bristle brushes (non-metallic)
- 4.3.0 EXECUTION
- 4.3.1 PREPARATION
- A. Protection:
 - 1. Take whatever precautions are necessary to protect the existing building from damage resulting from work under this section.
 - 2. Prevent mortar and patching compounds used in repointing and repair work from staining face of surrounding masonry and other surfaces. Remove immediately mortar and patching compounds in contact with exposed masonry and other surfaces.
 - 3. Improper use of chemicals may constitute a health hazard. Refer to manufacturer's Material Safety Data Sheets for hazard data, special protection for use and precautions to be taken in handling and storage. Comply with manufacturer's recommendations for proper use of chemicals.
- 4.3.2 ERECTION, INSTALLATION, APPLICATION
- A. Thoroughly clean dust, dirt and debris from crack.
 - B. Wipe surfaces to be bonded with acetone and allow to dry thoroughly.
 - C. Thoroughly and completely mix resin and hardener (2 minutes). Mix at low speeds to minimize entrapped air. Blend the epoxy adhesive to match color matrix of adjacent limestone by adding color limestone dust or pigment.
 - D. Mask stone surfaces adjacent to crack to prevent staining of the limestone during repair operation.
 - E. After mixing, inject epoxy into cracks with a syringe and allow to seep in. Continue to apply material until crack is full. Sprinkle limestone dust on epoxy adhesive to mask crack.
 - F. Clean tools and any tape residue with acetone or solvent specifically formulated for the particular product used.

PART 5 - REPOINTING LIMESTONE

5.1.0 GENERAL

5.1.1 Description of Work

- A. The masonry repairs involve repointing of mortar joints in limestone.
- B. New pointing mortars shall match original in porosity and hardness.
- C. All work must be done in accordance with Preservation Brief 2 – Repointing Mortar Joints in Historic Masonry Buildings from the National Park Service.

5.1.2 Related Work

- A. All associated work shall be coordinated with the masonry repairs.
- B. All corrective work of leaking water carry-off systems, flashing, and associated ironwork shall be performed, as is practical, before, or in association with, the masonry repairs if required.

5.1.3 Qualifications

- A. All masonry repairs shall be performed by masons or conservators skilled, experienced, and specializing in the type of work specified. Contractor shall demonstrate that he has completed at least 5 similar projects within the last 5 years.
- B. All work shall be supervised and directed by a skilled mason.

5.1.4 Testing

- A. During the course of the work the mason shall allow the sampling and testing of all masonry materials and mortars to ensure the compliance of the work with the specifications.
- B. Work not conforming to the specifications shall be removed and replaced with no additional cost to the owner.

5.1.5 Test Panel

- A. Prior to performing repairs and restoration, perform examples of each type of work to be performed under this section of the specifications. Prepare test panels to verify selections of materials and use of proper methods and to demonstrate aesthetic effects as well as qualities of materials and execution. Build test panels to comply with the following requirements, using materials indicated for final unit of Work, including same base construction, special features for expansion joints, and contiguous work as indicated.
 - 1. Locate test panels on portions of the structure as directed by the Architect.
 - 2. Notify Architect one week in advance of the dates and times when test panels will be prepared.
 - 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 4. Obtain GSA acceptance of test panels before start of final unit of Work.
 - 5. Retain and maintain test panels during construction in an undisturbed condition as a standard for judging the completed Work.
 - 6. Accepted test panels in an undisturbed condition at the time of Substantial Completion may become part of the completed Work.

- B. Test panels shall be used to demonstrate all removal techniques, tooling and mortar finishing. Test panels on the historic building shall not be used to demonstrate the abilities of the workmen. This must be demonstrated by prior projects.
- C. For critical or exceptionally fine work it may not be practical to locate panels on the building. Separately constructed test panels may be required.
- D. Test panels on the building shall be located in inconspicuous areas and located by the Architect.
- E. Test panels shall be installed at each façade of the original building and each façade of all additions in order to match the mortar at each location.

5.1.6 Product Samples

- A. Make available to the Architect all package labels and descriptions for each product or ingredient listed in the work.
- B. Submit samples of all special ware prior to their installation in the work.

5.1.7 Material Storage

- A. All materials are to be kept dry and protected from weather and contamination.
- B. All labels and seals must remain intact until use.
- C. Any material that has deteriorated or been contaminated shall be discarded.

5.1.8 Local Conditions

- A. All stored materials must be maintained above 40 degrees F.
- B. No mortar shall be placed when the air temperature is 40 degrees F or lower. No antifreeze additives shall be allowed.
- C. Placed work which reaches 32 degrees F during the four days (96 hours) after placement shall be replaced.
- D. No mortar shall be placed when the wall temperature is above 80 degrees
- E. All new work shall be protected from drying out for four days after placement. Refer to moisture curing instructions described in these specifications.

5.2.0 PRODUCTS

5.2.1 MATERIALS

- A. Stone: To match existing in grade, color and finish.
- B. Lime: Should conform to ASTM C207, Type S, high plasticity, Hydrated Lime for Masonry Purposes.
 - 1. Lime which meets this standard will "work" well, resists drying during curing, and is sufficiently strong for the purpose of repointing.

2. Lime expands as it hydrates, making high lime mortars more resistant to crack formation.
- C. Cement: Should conform to ASTM C150, Type I, White. It should not have more than 0.60% alkali nor more than 0.15% water soluble alkali. Use gray portland cement ONLY if a dark mortar is to be matched.
 1. Cement meeting this standard should increase the workability of the mortar, accelerate the setting time and slightly increase the strength of the mortar.
 2. The low alkali content will prevent efflorescence.
- D. Sand: Free of impurities and conforming to ASTM C144.
 1. Sand color, size, and texture should match the original as closely as possible. Provide a sample of the sand for comparison to the original, and have it approved by the RHPO before beginning repointing work.
 2. When possible, use bar sand or beach sand rather than crushed sand for the repointing mortar.

NOTE: Bar sand or beach sand should be washed to remove the salts before using.

- a. Crushed sand has sharp edges, which makes it more "sticky" and difficult to work into the joints.
 - b. Bar sand, on the other hand, has rounded edges and flows easily during the mortar application.
 - c. The working characteristics of mortar made with crushed sand may be improved by adding a slight amount of portland cement. The amount of cement should be determined by experimentation, but should not exceed 20% of the total lime/cement binder. 20% or less of cement has minimal effect on the hardness of the mortar. Cement content above 20% will make the mortar too hard.
- E. Clean, potable water: If the water must be transported or stored in a container, the container must not impart any chemicals to the water.
 - F. Stone dust finely ground from the same stone as that to be repointed.
 - G. Additives: No antifreeze compounds or other admixture shall be used.

Note: Do not use anti-freeze compounds. These compounds are designed for use with cement mortars, and their effectiveness with high lime mortars is questionable. Furthermore, the compounds contain salts which can lead to serious problems in the masonry at a later time.

Note: Air entraining agents are not recommended. These agents are designed for use with cement rather than lime, and they result in decreased bonding of the mortar and the masonry. Air entraining is not necessary with high lime mortars because of the natural ability of these mortars to flex with temperature changes.

- H. Epoxy grout
- I. Reinforcement/Anchors: Stainless steel type 302/304 3/8" in diameter threaded rods, length as required.

5.2.2 MIXES

1. Refer to Part 3.2.3

5.3.0 EXECUTION

5.3.1 REPOINTING LIMESTONE MASONRY

- A. Only masonry joints that are open, loose, crumbled, or cracked shall be prepared for repointing.
- B. All joints to be repointed shall be raked out to a depth equal to 2 1/2 times the width of the joint. Any loose or disintegrated mortar beyond this depth should also be removed.
- C. All raking and cutting out shall be performed with masonry hand chisels and hammers. Chisels shall not be wedge type, but shall easily fit between the bricks to the required depth without touching the brick edges or faces.
- D. No chipping or cutting of the existing stone units shall be allowed or accepted.
- E. No mechanical grinders, cutters or discs shall be allowed in the work.
- F. All loose material shall be removed from the joints. Excessive water shall not be used, nor high pressure washing.
- G. Prepare and repoint joints with a historically appropriate (color, texture, hardness) mortar mix.
- H. The interiors and all surrounding areas shall not be wetted during the preparation of the joints. Temporary coverings, guttering and all necessary protection shall be installed prior to the preparation of the joints. Special attention shall be given to the protection of any electrical service, and fire and smoke detection systems.
- I. All joints to be repointed shall be thoroughly wetted to prevent the extraction of the water in the mortar mix by the stone units.
- J. Pointing shall not begin until all standing water in the joints is absorbed into the masonry.
- K. Pointing tools shall be square faced, and shall be intended for masonry repointing. No pointing trowels shall be used.
- L. All pointing tools shall fit easily into the full depth of the joint without wedging between the stone. Straight edged hawks shall be used to hold the mortar.
- M. Bring all backup bedding mortars up to a uniform depth equal to 2 1/2 times the width of the joint.
- N. Install pointing mortars in layers not to exceed 3/8" in depth, fully compacting each layer of mortar.
- O. Each successive layer of mortar shall not be installed until the previous mortar is thumbnail hard.
- P. Rewet joints, as described above, between installation of layers.
- Q. Leave each layer of mortar square and smooth.
- R. Remove any loose excess mortar in joint before installing next mortar layer.

- S. Final tooling of the exterior stonework shall leave the joint matching the surrounding existing joints.
- T. Great care shall be taken to ensure that the mortar does not extend onto the face of the stone.
- U. Clean masonry surfaces upon completion of the work.

5.3.2 CURING

- A.. Provide sufficient moisture in the lime mortar mix to permit continuous hydration of the cementitious materials. The most effective procedure for curing shall be based on climatic and job conditions. The lime mortar must remain moist for 96 hours following installation into the work.
- B. The timing between mortar layers will vary with climatic conditions. Temperature and relative humidity extend or reduce the time between consecutive operations. Cold or wet weather lengthens and hot or dry weather shortens the time period. Moderate changes in temperature and relative humidity can be overcome by providing additional heating materials during cold weather and by reducing the absorption of the base by pre-wetting during hot weather.
 - 1. Some moisture must be retained in or added back to freshly applied mortar. If the relative humidity is relatively high (above 75%) the frequency for re-wetting may be reduced. If it is hot, dry and windy, the frequency of re-wetting must be increased.
 - 2. The method of curing selected should consider the physical characteristics of the structure as well as the previously mentioned conditions. The methods can be one or a combination of the following.
 - a. Moisture curing is accomplished by applying a fine fog spray of water as frequently as required, generally twice daily in the morning and evening. Care must be taken to avoid erosion damage to mortar surfaces.
 - b. Plastic film, when taped or weighted down around the perimeter of the repointed area, can provide a vapor barrier to retain the moisture between the membrane and mortar. Care must be exercised when placing the film; if too soon, the film may damage the surface texture; if too late, the moisture may have already escaped.
 - c. Canvas, cloth, or sheet material barriers can be erected to deflect sunlight and wind, both of which will reduce the rate of evaporation. If the humidity is very low, this option may not provide adequate protection.

PART 6 - GENERAL CLEANING OF EXTERIOR LIMESTONE

The cleaning or removal of stains from stone may involve the use of liquids, detergents or solvents which may run off on adjacent material, discolor the stone or drive the stains deeper into porous stones. Use the products and techniques described here only for the combinations of dirt/stain and stone specified.

6.1.0 SUMMARY

- A. This procedure includes guidance on the removal of surface dirt and environmental pollution on exterior limestone. NOTE: GENERALLY, THIS WORK SHOULD BE ACCOMPLISHED BY AN EXPERIENCED CONTRACTOR.
- B. Read "General Project Guidelines" along with this specification. These guidelines should be reviewed prior to performing this procedure and should be followed, when applicable, along with recommendations from the Regional Historic Preservation Officer (RHPO). The guidelines cover the following sections:
 - 1. Safety Precautions
 - 2. Historic Structures Precautions
 - 3. Submittals
 - 4. Quality Assurance
 - 5. Delivery, Storage and Handling
 - 6. Project/Site Conditions
 - 7. Sequencing and Scheduling
 - 8. General Protection (Surface and Surrounding)
- C. See also: "Guidelines For Using High Pressure Cleaning Equipment On Masonry", Appendix B.

6.2.0 PRODUCTS

6.2.1 MANUFACTURERS

ProSoCo, Inc.
Lawrence, KS 66117
1-800-255-4255

6.2.2 MATERIALS

- A. Limestone (unpolished): Sodium hydroxide, (pH 14), undiluted.
 - 1. For heavy high pollution stains, an alkaline-based prewash such as "Sure Klean 766 Limestone & Masonry Prewash" or equal, follow manufacturer's instructions including rinse cycle.
 - 2. Followed up with "Sure Klean Limestone & Masonry Afterwash" or equal, as per manufacturer's instructions.
- B. Clean, potable water (heated to a temperature effective and tested for cleaning procedure and approved by RHPO).

6.2.3 EQUIPMENT

- A. Pressure water rinsing equipment (measuring between 100 and 400 psi for low-pressure; between 400 and 1000 psi for medium pressure).
- B. Fan-type spray tips (15 -45 degree fan spray).
- C. Stiff fiber-bristle brushes.
- D. Plastic spatula.

6.3.0 EXECUTION

6.3.1 EXAMINATION

- A. Examine site conditions to determine that current drainage is sufficient for adequately and safely removing cleaning waste and run-off from the site.
- B. Test-clean a small, inconspicuous area to check for adverse effects and damage to the material.

6.3.2 PREPARATION

- A. Protection:
 - 1. Protect surrounding materials on the site and adjacent building surfaces from coming in contact with the cleaning materials and run-off.
 - 2. Provide workers with necessary protection against cleaning chemicals, overspray and run-off.
 - 3. Prevent cleaning chemicals from coming in contact with any painted, polished or metallic surfaces.
 - 4. Divert flow of run-off to drains in compliance with municipal codes. Comply with municipal codes regarding containment and disposal of cleaning materials.
- B. Surface Preparation:
 - 1. Before proceeding with cleaning operations, remove all miscellaneous hardware, anchors and bird excrement from the surface to prevent any discoloration.
 - 2. Check for open holes and joints in surface and repoint mortar joints and caulk gaps around window and door openings, as required to prevent water and cleaning solutions from penetrating deeply into the wall.
 - 3. Clean the limestone working from bottom to top.

Note: Bird excrement that comes in contact with cleaning solution will leave a permanent dark-colored stain on the surface.

6.3.3 ERECTION, INSTALLATION, APPLICATION

- A. Pre-wet limestone surface using a low pressure wash (between 100 and 400 psi).
- B. Apply a heavy coating of limestone pre-wash using a soft, nylon bristle brush. Follow manufacturer's applications instructions.
- C. Allow to stand for one hour or as long as determined by testing.
- D. Thoroughly rinse the surface using high pressure water (between 800 and 1000 psi) until all suds have disappeared.
 - 1. Rinse all corners, moldings, and interstices to remove all traces of chemical without damaging surrounding materials.
 - 2. Rinse water should be heated to 150-180 degrees Fahrenheit or as determined most effective during testing.
- E. While surface is still wet from rinsing off pre-wash, apply limestone afterwash with a soft, fiber bristled brush.
 - 1. Dilute limestone afterwash with as much water as determined effective during testing.
 - 2. If surface has begun to dry, re-wet before applying afterwash.
 - 3. Cover all corners, moldings, and interstices of the limestone.
- F. Allow to stand for 3-5 minutes or as long as determined by testing.

- G. Thoroughly rinse the surface using high pressure water (between 400 and 1000 psi), with a water flow of 6-8 gallons per minute.
1. Rinse all corners, moldings, and interstices to remove all traces of chemical without damaging surrounding materials.
 2. Heat rinse water to a temperature determined most effective during testing.

Notes:

When cleaning, avoid overcleaning. Aim for achieving 85% clean. Most damage occurs when attempting to clean the last 15%.

Test-clean a small area to determine effectiveness of cleaning methods, materials, equipment, pressures, etc., as necessary. Do not proceed until an acceptable cleaning operation has been approved and fully documented

Do not treat the surface with acid cleaner more than once.