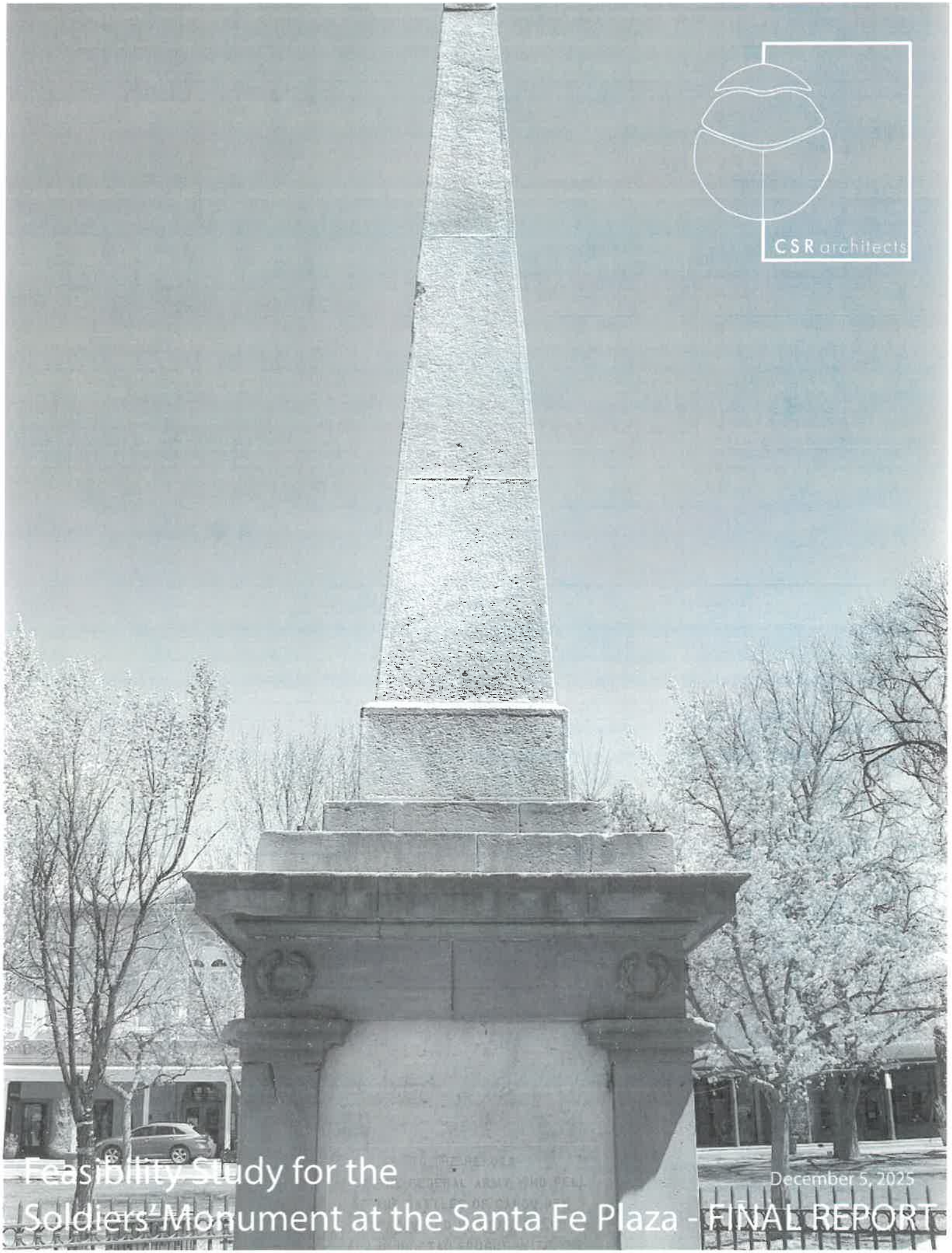

CSR architects

Feasibility Study for the Soldiers' Monument at the Santa Fe Plaza - FINAL REPORT

December 5, 2025

Acknowledgements

City of Santa Fe

Mark Scott, City Manager

Facilities Division, Public Works Department
Sam Burnett, Director
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Paul A. Duran, Senior Planner, Historic Preservation Division, Planning & Land Use Department

Cherry/See/Reames Architects, PC (CSR Architects)

Tina M. Reames, FAIA, PLA, CDT, President - Principal-in-Charge, Historic Architect, Field Evaluator

Nikki Brown - Design Professional

Consultants

Eric Trujillo, P.E. – Structural Engineer

Loren Worthen - Worthen Memorials, Inc., Materials & Construction Consultant

Jim Lardner - New Mexico Travertine,Inc., Stone Specialist

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01 Executive Summary

Executive Summary

01

BACKGROUND, SUMMARY OF SCOPE, LIMITATIONS, DELIVERABLES, AND ADDRESS OF FACILITY

After having been selected by the City of Santa Fe, CSR Architects was asked to provide architectural services for the feasibility study of the historic Soldiers' Monument at the Plaza in Santa Fe, New Mexico. The feasibility study would look at three things:

1. The restoration of the original monument as it was prior to 2020;
2. The restoration of the monument without the "offending" plaque;
3. The relocation of the monument to a location to be determined at a later date.

The Plaza was designated a National Historic Landmark (NHL) on December 19, 1960 by the Secretary of Interior Department and listed in the National Register of Historic Places (NR #66000491) in 1966.

To our knowledge, the Plaza was last assessed in 2005 by Morrow Reardon Wildinson Miller, Ltd. Landscape Architects when conducting a Cultural Landscape Report.

The CSR Architects Team held their first site visit on May 7, 2025, where they spent the morning taking photographs and assessing the condition of both the base and broken elements of the obelisk with the structural engineer, Eric Trujillo, P.E. of Luchini / Trujillo Engineers. Photographs and measurement were taken to establish a diagram of the fully erected monument. An additional site visit was held on May 20, 2025 with CSR and Loren Worthen, of Worthen Memorials, to assess the reconstructability of the monument and its elements. One final site visit was made on Thursday, August 7, 2025 when Heather Lamboy, AICP and Paul Duran, Santa Fe Historic Resources Expert met with the structural engineer and CSR representative to examine the monument's foundation. A 12" x 24" hole was dug on the northeast side of the monument to a depth of 32". Digging was performed by Paul Duran. The ultimate goal will be to rebuild the existing obelisk, either in place or at another location, provide structure as needed so that the monument will be stable and not need any bracing. Questions regarding the repair and/or replacement of the obelisk as well as the possibility of moving the monument will be further assessed and documented within this report.

01.a BACKGROUND

The Soldiers' Monument was erected in 1869 to commemorate those who gave their lives during the Civil War and Indian skirmishes of the period. The installation of the monument on the Plaza added an important central spatial element to the Plaza's center. It is the oldest historic constructed element still present in the Plaza today.

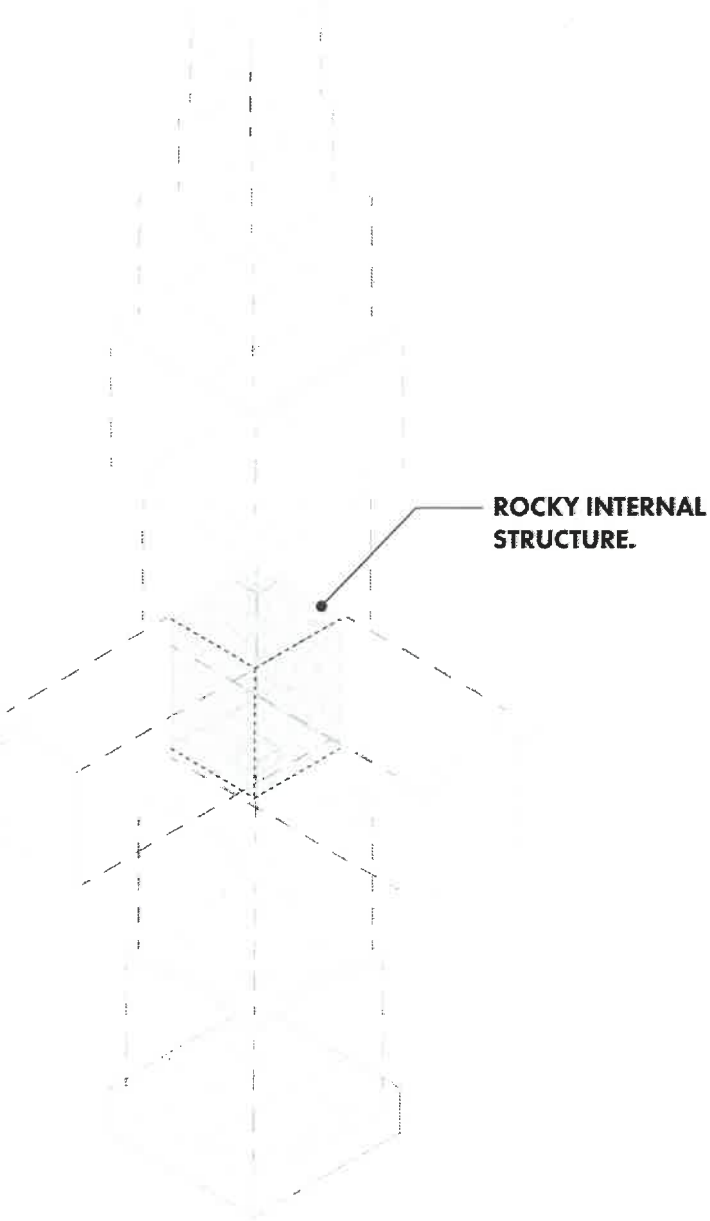
The designer and builders are unknown, but is it likely that the Monument was built by local craftsmen using mostly locally available materials such as cast stone, sandstone, rubble, and marble. The Monument occupies approximately sixty-four (64) square feet at its base, measuring approximately 8' x 8' and measuring approximately thirty (30) feet from historic grade to top of obelisk. It has roughly, nine (9) pieces of sandstone at the base completing the lowest level which is now partially buried; with four (4) sandstone columns at each corner framing four (4) marble plaques The marble stones were hand etched to include inscriptions on all four sides. (See diagram on page 9 with monument components labeled.)

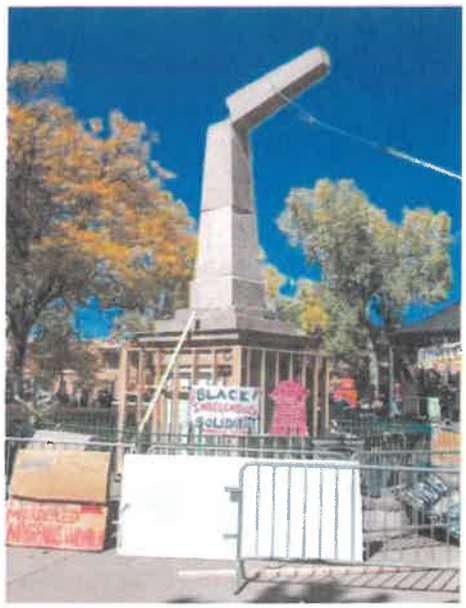
Late 19th century Santa Fe Plaza with radial pathways and the Soldiers' Monument at the center.

During the 2020 protest, the Monument was damaged when people pulled down the obelisk and damaged the marble plaque with the inscription depicting native Americans as "savages".

With the removal of this portion of marble slab it is apparent that the inside of the monument is filled with rubble, stone, bits of concrete, and dirt. There is nothing in the 2006 Santa Fe Plaza Cultural Landscape Report by Morrow Reardon Wilkinson Miller, LTD, Landscape Architects indicating that there are any sacred relics or burial items inside the monument. The base rests on the Plaza grade which is lower than the present day grade with sidewalks and grass.

The following diagram shows an exploded isometric view of the existing monument as it still stands on the plaza.





Option#1 - Rebuild Existing Obelisk Portion of Monument Using Historic Material Only

1. Carefully transport obelisk pieces to Plaza site.
2. Rebuild obelisk using new keyed joints.
3. Where obelisk pieces are missing, determine if it will be structurally sound.
4. Seal all gaps between stone with new mortar, consistent with historic mortar used (further testing will be required to determine the proper quantities of limestone, sand, and water.
5. Remove portions of flaking sandstone so no further water may penetrate the layer and flake off.
6. Clean existing plinth base, marble and obelisk using the mildest means as to not damage the stone further.
7. What to do about missing marble piece? Remove existing marble and cut into thinner piece and reinstall missing damaged piece. Engrave the missing text.

Option #2A - Rebuild Existing Obelisk Portion of Monument Using Historic and New Material

1. Carefully transport obelisk pieces to Plaza site.
2. Rebuild obelisk using new keyed joints.
3. Cut existing obelisk stone to reshape the obelisk using thinner face pieces and fill inside with concrete??
4. Seal all gaps between stone with new mortar, consistent with historic mortar used (further testing will be required to determine the proper quantities of limestone, sand, and water.
5. Remove portions of flaking sandstone so no further water may penetrate the layer and flake off.
6. Clean existing plinth base, marble and obelisk using the mildest means as to not damage the stone further.
7. What to do about missing marble piece? Remove existing marble and cut into thinner piece and reinstall missing damaged piece. Engrave with text omitting the word "savages".

Option #2B - Rebuild Existing Obelisk Portion of Monument Using New Material

1. Carefully transport obelisk pieces to Plaza site.
2. Use existing obelisk pieces as interpretive exhibit.
3. Rebuild obelisk using new material.
4. Reinforce existing plinth to provide a stable base for the new obelisk. Repair, replace plinth components as needed.
5. Seal all gaps between stone with new mortar, consistent with historic mortar used (further testing will be required to determine the proper quantities of limestone, sand, and water.
6. Remove portions of flaking sandstone so no further water may penetrate the layer and flake off.
7. Clean existing plinth base, marble and obelisk using the mildest means as to not damage the stone further.
8. What to do about missing marble piece? Install new marble piece to complete the damaged side. New text omitting the word "savages".

Note: This option will require additional design including, but not limited to Structural Engineering.

Option #3 - Relocate Entire Existing Monument to Another Site Chosen by the City of Santa Fe

1. Dig and construct new footing for existing monument relocation.
2. Carefully deconstruct existing monument, label each piece, transport to new site - distance unknown.
3. Carefully reconstruct monument base at new site, include new reinforcement to stabilize obelisk placement.
2. Carefully transport obelisk pieces to new site - distance unknown.
2. Carefully reconstruct obelisk using new keyed joints.
3. Where obelisk pieces are missing, use new or historic material depending on the choice made for rebuilding.
4. Seal all gaps between stone with new mortar, consistent with historic mortar used (further testing will be required to determine the proper quantities of limestone, sand, and water.
5. Remove portions of flaking sandstone so no further water may penetrate the layer and flake off.
6. Clean existing plinth base, marble and obelisk using the mildest means as to not damage the stone further.
7. What to do about missing marble piece? Decide to use new or historic marble and revise text.

Note: This option will require additional design including, but not limited to Civil Engineering, Structural Engineering, and Landscape Architectural. Site unknown at this time.

01.c LIMITATIONS or EXCLUSIONS

1. No Materials Testing was conducted, only visual inspection
2. No Design and Construction Phase Services are provided, however we measured and provided diagrammatic drawings to fully understand the monument components.
3. ALL Options are ultimately inconclusive based on Structural Findings and further Structural Observation and Design needed for the rebuilding of the monument.

01.d DELIVERABLES

1. Final Assessment Report with opinion of construction costs. One reproducible hard copy, bound, with a digital copy on a flash drive. Site evaluation photos, monument plans, elevations, or other miscellaneous information collected will be provided.

01.e ADDRESS OF FACILITY

Street & number:	63 Lincoln Ave
City or town:	Santa Fe
State:	New Mexico
County:	Santa Fe
Zip Code:	87501

01.f OPINION OF CONSTRUCTION COST

The Opinion of Construction Cost totals*

Option #1- Rebuild Existing Obelisk Portion of Monument Using Historic Material Only $420,112.98
Option #2A - Rebuild Existing Obelisk Portion of Monument Using Historic and New Material $554,273.15
**Option #2B - Rebuild Existing Obelisk Portion of the Monument Using New Material $880,090.70
Option #3* - Relocate Entire Existing Monument to Another Site Chosen by the City of Santa Fe $1,139,211.48

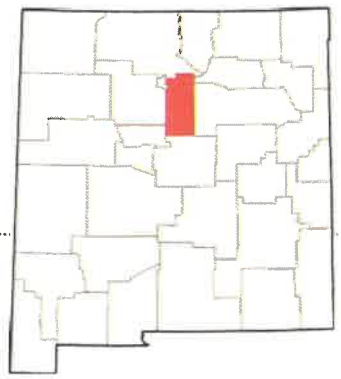
*ALL Options are ultimately inconclusive based on Structural Findings and further Structural Observation and Design needed for the rebuilding of the monument.

**Option #2B and Option #3 are most viable and preferred for long-term stability and code compliance. (See Structural Report)

***Option #3 assumes the new site location within 20 miles of the Plaza. These are estimated costs that do not include any additional design or engineering costs.

PLEASE NOTE: these amounts are based on consultation with both Worthen Memorials, Inc. for constructability, and New Mexico Travertine, Inc. (NMT) for replacement of sandstone pieces. They include a 15% Contingency, Overhead and Profit, Bond, and New Mexico Gross Receipts Tax.

Site and Monument Assessment



02

SANTA FE PLAZA, SOLDIER'S MONUMENT
Santa Fe, New Mexico

02.a Site Condition

The Soldier's Monument is located within the Santa Fe Plaza in a fenced area consisting only of the historic cast stone and sandstone base with inscribed marble plaques on all four sides. A single stone remains on top where the obelisk used to rise. The remaining pieces of the obelisk are being stored at an undisclosed, secure site within Santa Fe.

It appears that the damage done during the 2020 protest included paint and other materials that were attempted to be removed/cleaned from the monument. Areas are scratched, gouged, and scarred.

Historic mortar joints have disintegrated or have been opened up as a result of the cleaning. New darker color mortar has been installed in some areas and is still intact.

The sandstone components show signs of freeze-thaw damage where water has penetrated cracks on the surface. Some spalling has occurred and several areas are fragile to the touch.

The upper right portion of marble on the north face has been removed. This marble held the harmful language. This marble piece was 1-3/4" thick.

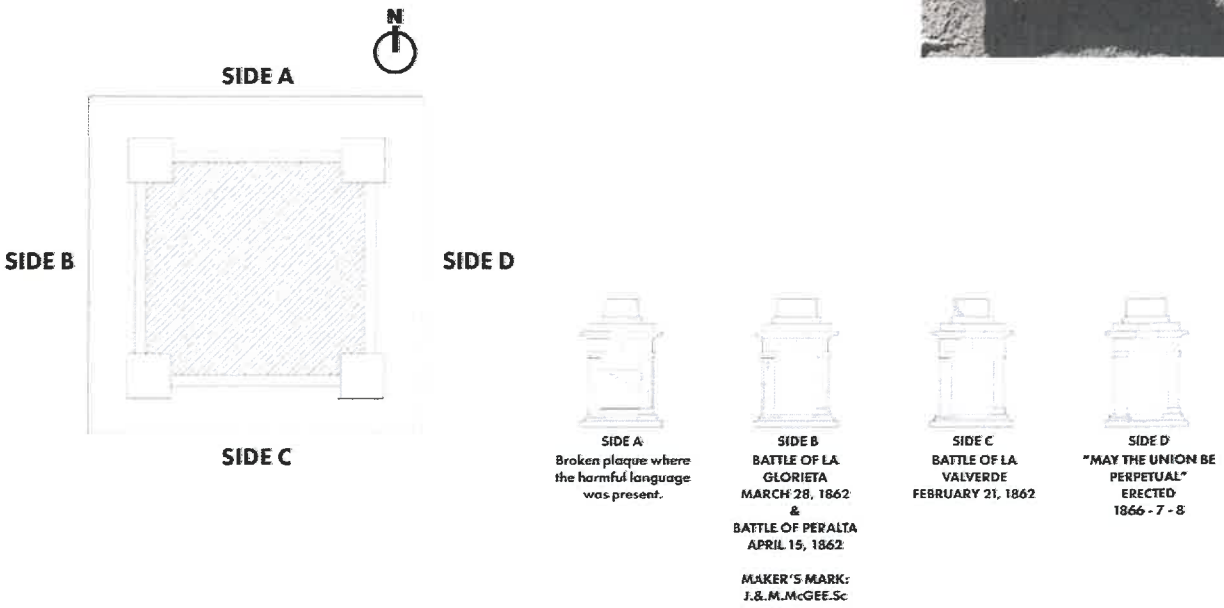
02.b.1.0 PLINTH

The monument's plinth is in fair to poor condition. The plinth appears to have a slight tilt to the southwest, but appears to be stable and unmoving. The bottom stones are slightly buried and continue below the grade at least 32". No visible sign of a footing was found when a small hole was dug to investigate it further. See structural report for more information.

COMPONENTS OF PLINTH:

The base is four-sided, approximately 8''0" x 8'-0" with stepped sandstone blocks, some bevelled and others straight cut, with four columns at the corners.

SOLDIER'S MONUMENT ELEVATIONS AS IT STAND TODAY



02.b.1.1 CAST STONE / SANDSTONE: It is presumed that there is a combination of historic cast stone and solid sandstone used for the monument. As each side of the monument exhibits duplicate intricate wreath designs, carving solid stone in such precise duplicity seems uncommon, but not unheard of among stone masons. The stone has weathered in time and is showing signs of moisture damage with mildew and lichen growth. This is typical of historic stone weathering.

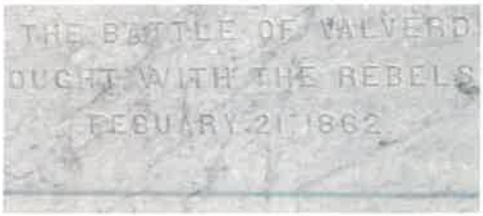
02.b.1.2 MARBLE: The marble is white, 1-3/4" or 2" thick panels installed vertically on all four sides. Inscriptions are complete with some typos or words removed, evident by the 1/4" indented inscription, highlighted in grey and others left unchecked, highlighted in yellow. They read as follows:

Side A: TO THE HEROES WHO HAVE FALLEN IN THE VARIOUS BATTLES WITH _____ INDIANS IN THE TERRITORY OF NEW MEXICO.

Side B: TO THE HEROES OF THE FEDERAL ARMY WHO FELL AT THE BATTLES OF CANON DEL APACHE AND PIGEON'S RANCHO (LA GLORIETA) FOUGHT WITH THE REBELS MARCH 28, 1862 AND TO THOSE WHO FELL AT THE BATTLE FOUGHT WITH THE REBELS AT PERALTA APRIL 15, 1862. J.&M.McGEE.Sc

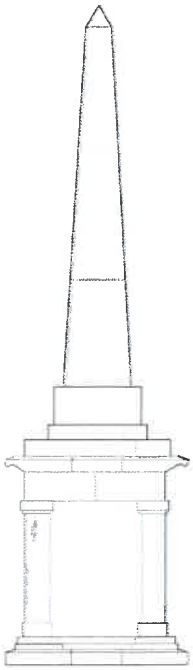
Side C: TO THE HEROES OF THE FEDERAL ARMY, WHO FELL AT THE BATTLE OF VALVERDE FOUGHT WITH THE REBELS FEBUARY 21, 1862

Side D: ERECTED BY THE PEOPLE OF NEW MEXICO THROUGH THEIR LEGISLATURES OF 1866 - 7 - 8. ----- MAY THE UNION BE PERPETUAL.



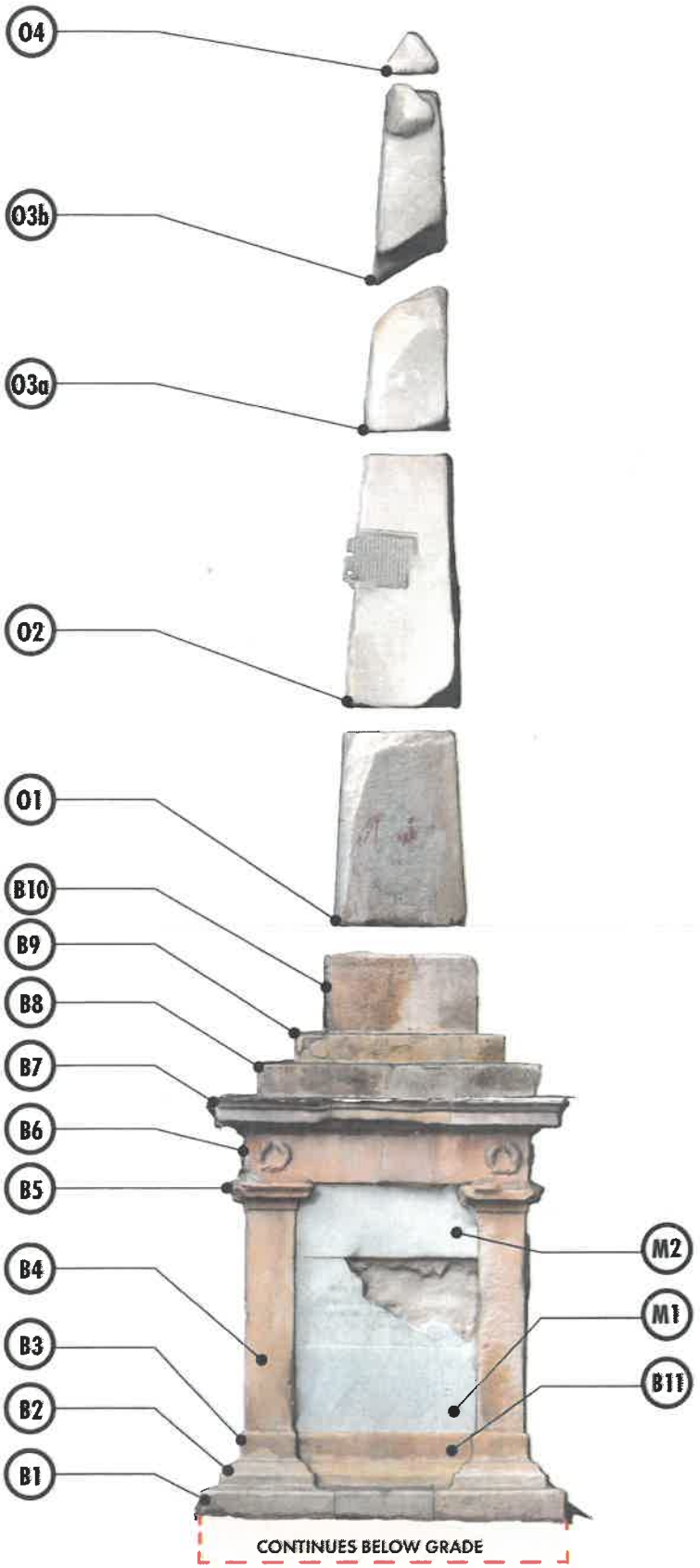
02.b.2.0 OBELISK: The obelisk was formed by stacking three four sided stone pieces atop the plinth with a capstone piece on top. The current remaining pieces of the obelisk are being stored in a secure location off-site on pallets. Most pieces appear to have included a slot for stacking and pinning pieces together. The recovered obelisk stone pieces have only slots. The original pins are missing. Not all of the broken obelisk pieces were recovered. Several large stones have been broken into smaller pieces. It is uncertain which pieces go together at this time. To fully assemble the obelisk will be similar to putting a three-dimensional puzzle together with missing pieces.

The largest base piece of the obelisk has the majority of graffiti and cleaning agent remaining on three of four faces. There are four holes at the base of this piece centered approximately 3" from the bottom. Some holes still contain a metal sleeve that was possibly used to lift the stone into place at installation. Now the hole is either empty or the metal sleeve has been crimped.



SIDE B

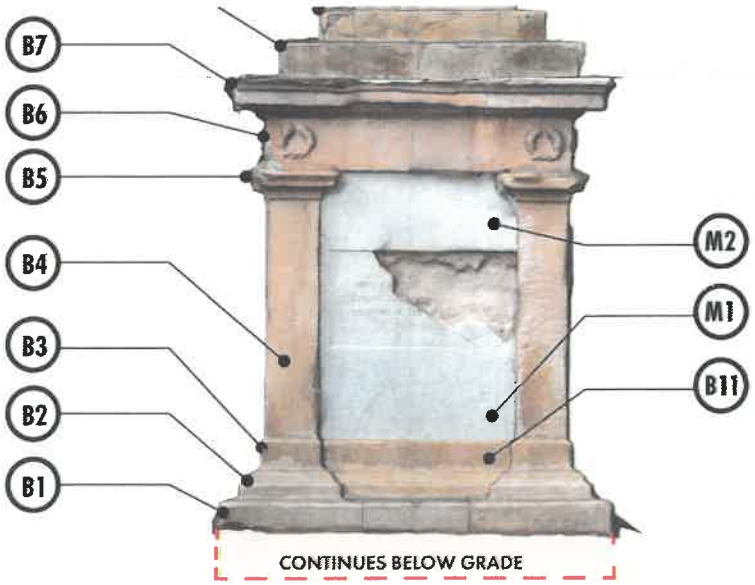
02.b.3.0 COMPONENTS: *The components of the complete monument are labeled and dimensioned below.*



***ALL OTHER CARVED MARBLE PLAQUES WILL BE NOTED AS: (M3)**

02.b.3.1.1 COMPONENT ASSESSMENT:

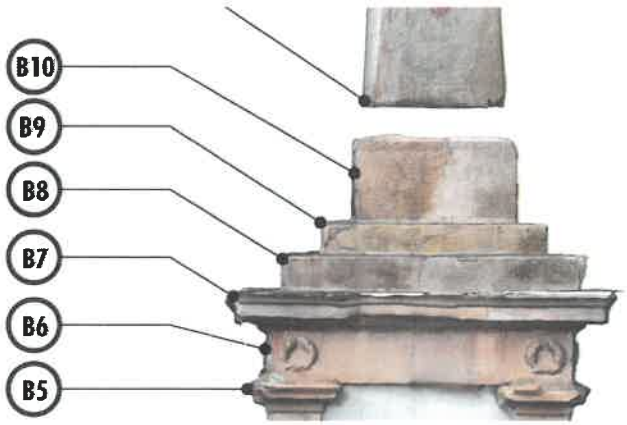
Resource Item #	Condition Indicator Assessed	Condition Status	Rationale & Key Points
B1	9 Base Stones - 7" above grade	Fair Condition	The base has 7" visible above grade, but 11" continue below grade. The top of the stone is delaminating in at the upper sloped surfaces on sides A, C, & D. Edges are chipped on all sides with a large chip on side D where the obelisk probably fell.
B2	4 Lower Column Bases	Fair to Poor Condition	The lower column base is beveled and stepped to meet the upper column base. The stone is delaminating and chipped on all sides. There is a large crack separating the base at side C and D. At side D this base has been shattered at the inner corner of the left column base. If this stone were to be moved, it would lose all integrity and would need to be replaced.
B3	4 Upper Column Bases	Fair to Poor Condition	The upper column base is a block slightly smaller than the lower base top step and larger than the column shaft above it. The stone is delaminating and chipped at the corners on all sides. At side D above the shattered base the lower inner corner of the left column base has been chipped away by some impact. It is not certain if this stone is cracked continuously through the block.
B4	4 Column Shafts	Fair to Poor Condition	The Column Shaft appears to be a solid block of stone, rectangular in shape and volume with a niche for the marble plaque to slide into place. Side A - Left Column has a vertical crack beginning at the top down two-thirds of the shaft. Right Column has been scraped heavily. Side B - Left Column has small residual scratches and pock marks. The top is cracked from possibly an impact point. Right Column has inner edges scraped. Side C - Left Column has a few chips and scrapes and a faded handprint from the painted graffiti. Right Column also has some chips and scrapes. Side D - Left and Right Columns have chips and scrapes.



***ALL OTHER CARVED MARBLE PLAQUES WILL BE NOTED AS: (M3)**

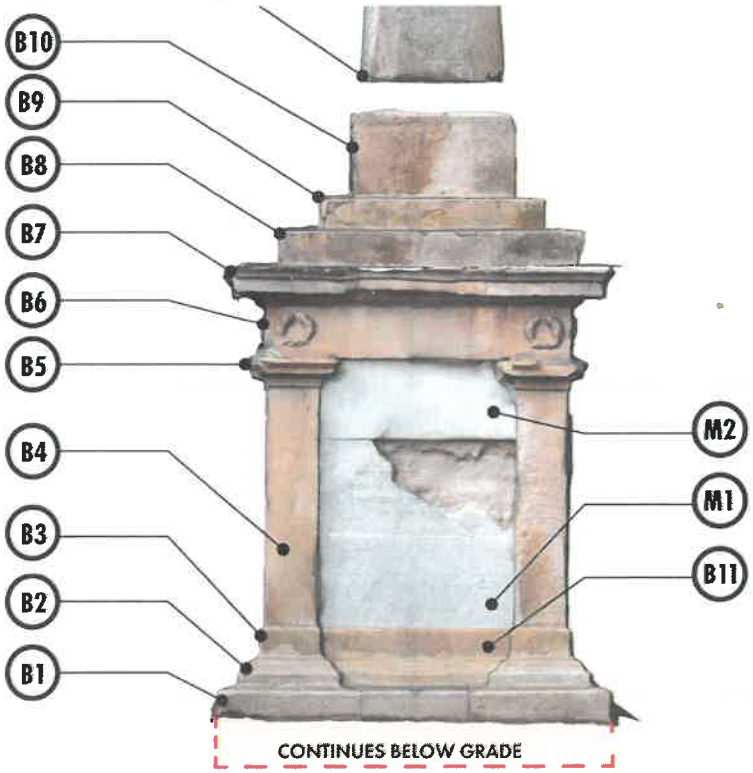
02.b.3.1.2 COMPONENT ASSESSMENT:

B5	4 Column Capitals	Fair to Poor Condition	The Capital appears to be a solid piece of stone with varying widths of square cap stones stacked from the column shaft, small to large with a slotted under side to allow for a drip edge. Side A - Left Capital is missing its left corner. Right Capital is missing the majority of its overhanging top layer, with considerable decay at the outer corners of the next lower overhang. Side B - Left Capital is missing the majority of its overhanging top layer, with the outer corner of the next layer chipped away. Right Capital is missing the outer corners of the top layer of the overhanging stone. Side C - Left Capital is missing the majority of its overhanging top layer, with considerable decay at the outer corners of the next lower overhang. Right Capital is missing the outer corners of the top layer of the overhanging stone and the outer corner of the next layer of stone. Side D - Left Capital is missing the inner corners of the top and second layers of stone. Right Capital is missing the inner corner of teh top layer and the center of top layer is chipped. The next layer under is missing the outer corner.
B6	4 Capstones with "Open Wreaths"	Fair Condition	The Capstones include two "open wreaths" per side centered above the columns. All appear to be intact. The stones on Side A appear to have some water damage, but no delamination. On sides C & D show faded graffiti marks and slight water damage.
B7	9 Upper Cap Stones	Fair to Poor Condition	The upper cap consists of 9 stones that are almost a mirror image to the base stones but not as deep. The upper outer edge of the top is chipped on all sides. Side D has a large chip in the center where the obelisk coming down may have damaged it.
B8	Obelisk Wide Base	Fair Condition	The Obelisk Wide Base consists of 4 solid blocks of sandstone with a hole and metal sleeve at each corner when looking from the top. The top of stone shows sign of weathering with black lichen growing.
B9	Obelisk Middle Base	Fair Condition	The Obelisk Middle Base consists of 4 visible stones. At all sides, there are two holes on the vertical face at the corners with a metal sleeve inserted. Because of their regular placement it is thought that these were used to help lift the pieces in place during initial installation. Each of these stones has significant weathering and hairline cracks, some delamination, and lichen growth. Mortar between stones is missing in most areas.



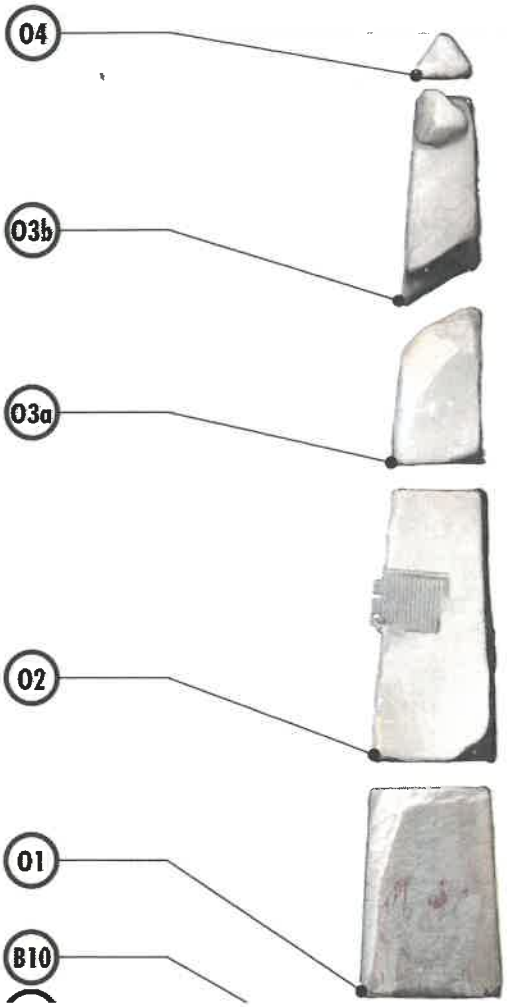
02.b.3.1.3 COMPONENT ASSESSMENT:

B10	Obelisk Upper Base	Fair Condition	The Obelisk Upper Base is one solid block of sandstone with a beveled top edge and a central slot on top. Side A ha a chipped upper right corner with some residual paint that has left a white residue. Side B has a chipped upper left corner and chipped vertical right side; residual paint appears to have been washed off. Side C top edge is uneven and chipped left vertical side. Side D has residual red paint from graffiti. Mortar between this stone and the Obelisk Middle Base is present in two shades of gray possibly from original installation and a later repointing.
B11	Middle Plaque Base	Fair to Poor Condition	The Middle Plaque Base on Side A consists of 2 stones shaped to match the lower and upper column bases. The face and edges have some areas of delamination and small chips at the bottom edge. Side B is missing the upper plaque base and has similar delamination and small chips. Side C is missing the upper plaque base and has much more delamination and wear. Side D is missing the upper plaque base and has similar delamination as A & B with edges chipped and worn away.
M1	Bottom Marble Plaque	Poor Condition	This piece of marble has been damaged and a large triangular portion of the marble was removed. The piece missing is 1-3/4" thick.
M2	Top Marble Plaque	Good Condition	This 2" thick piece is still intact and undamaged.
M3	Marble Plaque, full height	Fair to Good Condition	Side B - appears to be intact with a brownish blotchy stain at the top. Uncertain if this can be cleaned. Side C - appears to be intact with a brownish blotchy stain at the top. Uncertain if this can be cleaned. Side D - appears to be intact with small chips around the "1866" date and near the bottom.



***ALL OTHER CARVED MARBLE PLAQUES WILL BE NOTED AS: M3**

02.b.3.1.4 COMPONENT ASSESSMENT:



04	Capstone	Fair to Poor Condition	This four sided pyramidal shape is missing its point and has sides showing weathering with lichen growth and deterioration of the crisp edges. One bottom corner is missing. There is slot in the bottom of the Capstone approximately 1" x 3" which appears to be either a mortise for a tenon or an opening to receive a pin of some sort. The adjoining segment 03b also has a slot.
03b	Obelisk Upper Shaft part 2	Poor Condition	This four sided slanted shaft of the obelisk has a broken bottom end from the tearing down of the monument in 2020. The top has a slot approximately 1" x 3" to receive a pin for stacking the capstone to this piece. The pin is missing and it is unknown what material it was. This part of the shaft is sitting on its side in storage, so only 3 sides were visible. They all show signs of weathering with large chips at the edges where it fell on hard surfaces.
03a	Obelisk Upper Shaft part 1	Poor Condition	This four sided slanted shaft of the obelisk has a broken top end from the tearing down of the monument in 2020. This part is severely misshapen from large missing pieces sheared off when it fell. All three visible sides show signs of weathering with large chips at the edges and middle sides from impact. Flecks of green paint are visible from scraping the surrounding fence. There is no slot at the bottom end of this piece.
02	Obelisk Middle Shaft	Fair to Poor Condition	This four sided slanted shaft of the obelisk has a rough and sandy bottom and top end. All three visible sides show signs of weathering with large chips and a broken corner. The missing corner appears to be on site in storage and could be lifted to see that it fit. Flecks of green paint are visible from scraping the surrounding fence. Other scrape marks and chips are visible and residue from paint or a cleaning product are present.
01	Obelisk Bottom Shaft	Poor Condition	This four sided slanted Bottom Shaft of the obelisk has a rough and sandy top end with a visible slot. All four sides show signs of weathering with large stains from graffiti and the removal cleaning agent. Other scrape marks and chips are visible and several holes from either lifting mechanisms or maybe embedded bullets?

Luchini Trujillo Structural Engineers, Inc.

December 5, 2025

CSR Architects
c/o Tina M Reames
220 Gold Ave
Albuquerque, NM 87102

Re: Soldiers' Monument at Santa Fe Plaza
Feasibility Study

Dear Tina,

Our office conducted site visits on May 7 and August 7, 2025, to assess structural damage to the Soldiers' Monument resulting from the 2020 protests.

This report addresses the plinth base and stored obelisk pieces only; it does not include fencing or site walls.

Existing Conditions - Foundation

- Excavation Summary
  - Excavation adjacent to the monument revealed a 22-inch thick sandstone base, embedded 14-inches below grade (8-inches exposed).
  - Excavations continued 18-inches below the sandstone base until refusal.
- Foundation Composition
  - The sandstone blocks span between large boulders, with soil filling the voids.
  - The extent and treatment of the boulders remain unknown.
- Other Observations
  - Concrete fragments found were likely remnants from past stabilizations during adjacent water line work. Not necessarily structural support but replacing soils lost during excavation.
  - Clay piping fragments, like historical water supply systems were discovered in the excavation.
- Overall Assessment
  - Buried boulders, not concrete, likely support the monument.
  - It is unclear whether the boulders were placed intentionally or are natural.

Existing Conditions - Plinth

- Monument Base
  - Composed of several sandstone block pieces; connections are unknown (dowels or keyed joints were not observed).
  - Masonry joints are in poor condition; sandstone blocks show deterioration (cracks, spalls, impact chips).
  - Joint gaps vary in width, suggesting block movement over time – could be caused by differential movement.
- Site Grading and Drainage
  - Poor grading around the monument was observed; a concrete banco and fence trap runoff, allowing water to infiltrate soils below.
  - The banco was likely installed during plaza drainage renovations, leaving the monument at the lowest elevation.
  - No drainage system exists within the banco area; soils experience wetting and drying cycles.
  - If the soils are moisture-sensitive, shrink-swell behavior may continue to damage the monument over time.

Existing Conditions - Obelisk

- Construction & Assembly
  - The pieces were inspected within a storage facility.
  - The obelisk is comprised of four separate stacked pieces, jointed with masonry joints.
  - Some pieces have holes or spaces possibly for dowels, but it is unclear if dowelling was used or if these features are original.
- Condition & Damage
  - Ends, corners, and edges of all pieces were severely damaged.
  - Most remaining pieces do not show cracks or punctures, except for one.
  - All pieces are weathered, chipped and dimpled.
- Plinth Connection
  - The top piece of the plinth is clean and has a hole, likely for doweling, lifting or erection.

Repair Options for Consideration

Option 1 – Rebuild Obelisk with Historic Stones

Scope:
Reassemble the obelisk using existing stones and keeping the current plinth and foundation.

Considerations:
Pros:

- Preserves historical value.

Cons:

- The plinth base is in poor condition, and its deficiencies are left unaddressed.
- No mechanical connections so there is no ductility.
- Both the dry stacked obelisk and plinth base may not meet current International Existing Building Code (IEBC) requirements for structural integrity when performing a substantial repair.
- Moisture intrusion issues will persist.

Recommendation:
Least preferred option. Only consider if historical preservation is the top priority. If selected, the following plinth and foundation exceptions apply:

- Expect continued deterioration from moisture and freeze-thaw cycles.
- The City must acknowledge non-compliance with IEBC and a special exception may be necessary.

Option #2A – Rebuild Obelisk with Historic and New Material

Scope:
Mechanically connect original stones and replace damaged ones with new material (using damaged historical stones as thinner face materials). Keep the current plinth and foundation.

Considerations:
Pros:

- Preserves as much original material as possible.
- Improves obelisk stability with mechanical connections.

Cons:

- The plinth base is in poor condition, and its deficiencies are left unaddressed.
- Risk of damaging weathered stone during repairs (including the top stones of the plinth).

Recommendation:
Second least preferred option. Only consider if preservation is the top priority. Without rebuilding the plinth and foundation, the same limitations as Option 1 apply.

Option #2B – Rebuild Obelisk with All New Material

Scope:
Construct a new obelisk with entirely new stone pieces. Display the original pieces nearby.

Considerations:
Pros:

- Allows for modern construction of the obelisk for improved durability.
- If the original pieces are displayed within the banco and fence area, it creates an opportunity for grading improvement to minimize moisture content changes in the surrounding soils of the monument.

Cons:

- Loses historical value.

Recommendation:
Preferred option if the monument remains in its current location. This option requires building the plinth for long-term stability. With a new plinth, this becomes the best choice for preserving the original site.

Option #3 – Relocate Monument to New Site

Scope:
Move the monument to a new site and rebuild with improved connections and new foundations.

Considerations:
Pros:

- Fully resolves structural issues moisture issues.
- Improves obelisk stability with mechanical connections.
- Opportunity to raise the base above surrounding finish grade.
- Damaged stones can be replaced.

Cons:

- The monument will no longer be at its original site.

Recommendation:
Preferred option if the monument is moved. Relocation provides the greatest opportunity to strengthen and provide a new foundation support.

Closure

The conclusions and opinions rendered herein are based on the information and evidence currently available. No warranties, express or implied, are made regarding the accuracy or completeness of these conclusions. Should additional facts or evidence emerge, we reserve the right to review and update opinions accordingly.

The recommendations provided are intended as conceptual guidelines for planning and cost estimation purposes only. For precise engineering and design of structural requirements, the services of a licensed professional with expertise in the relevant field should be consulted.

Please feel free to contact either of the undersigned if you have any questions or need additional information.

Respectfully,

Eric D. Trujillo, P.E.

Soldiers Monument
ERIC D. TRUJILLO
NEW MEXICO
21656
12/5/25

Preliminary Archaeological Assessment at the Soldier's Monument for the Structural and Foundational Evaluation Future Rehabilitation

Paul A. Duran

City of Santa Fe, Planning and Land Use Department,
Historic Preservation Division

Permit No. NM-27-298-M/S

10/21/2025

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Introduction

On August 7, 2025, the City of Santa Fe Historic Preservation Division staffed archaeologist Mr. Paul A. Duran, conducted a preliminary field assessment at the Soldier's Monument "Obelisk" in support of the Luchini Trujillo Structural Engineers (LTSE) and CSR Architects (CSR) structural evaluation of the foundations of the Obelisk (structure). Mr. Duran's assessment was monitored by Dr. Alysia Abbott (archaeologist) and Planning and Land Use Director Heather Lamboy in support of the rehabilitation of the structure's current condition.

The assessment consisted of following the Soldier's Monument site and elevations plan (Figure 1) provided by CSR which identified the locations where two 12" wide by 12" long windows to the foundation on the northeast and southwest corners of the structure. Only the northeast window was considered as the engineer believed that there was enough information to give a proper evaluation of the structure's foundation. Given the limited visibility of the proposed northeast window the archaeologist and engineer exceeded the dimensions to 2' wide by 2' long and excavated down to 32" respectively (Figures 2-7).

The general assessment of the structures above ground integrity and history can be assessed further in Mr. Murphey's 2025 Historic Cultural Property Inventory (HCPI) survey report attached to this document in Appendix A. This document serves as a limited general assessment for considerations moving forward in regard to the rehabilitation of the structure and the general site and will discuss the subsurface soil description, artifact discussion, and the structure's foundation from the northeast corner of the site (Figures 1-8).

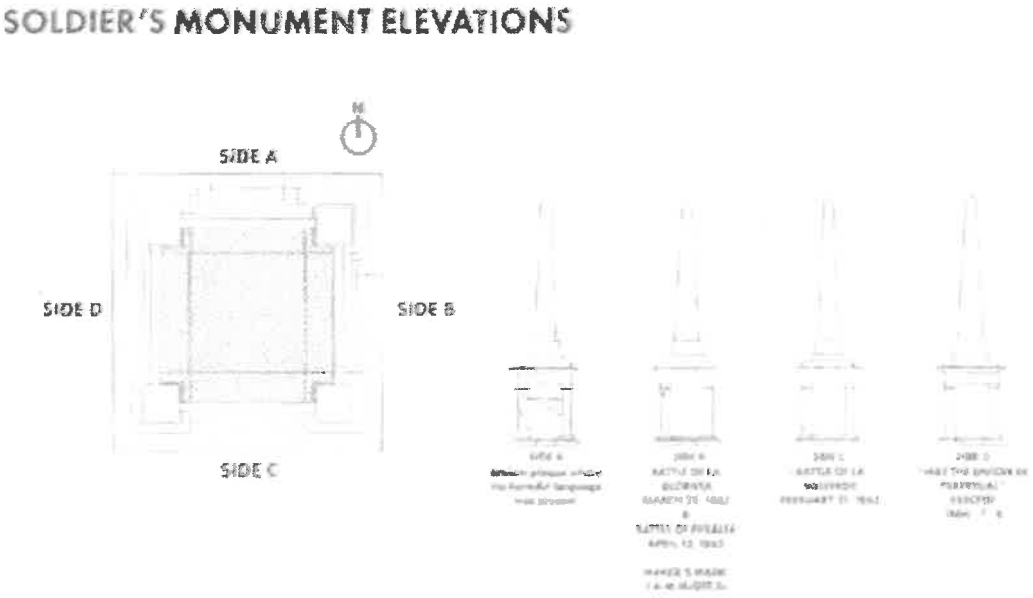


Figure 1. Soldier's Monument Site Plan and Elevations.

Soil Discussion

The soils observed during the assessment are described below in levels as the soil stratigraphy changes in material, color, and composition as identified in Table 1. Level 1 located at the northeast corner of the structure is identified as wooden mulch chips from 0-5 inches (in) (0-13 centimeters (cm)) below present ground surface (bpgs). As the assessment continued, the wood mulch chips changed to Level 2 to a dark brown O horizon with organic materials and matter including roots and leaves at 5-9 in bpgs (13-23 cm). The O horizon of organic material and matter changed in composition to Level 3 an A horizon silty clay mineral soil with no roots and the presence of historic fragmented cultural material. The A horizon was the most prominent soil observed from 9-20 in bpgs (23-50 cm). The A Horizon abruptly changed to Level 4 a R horizon identified by granitic cobbles and boulders and the presence of cement from 20-32 in (50-80 cm). The best estimation of the diameter of the granitic cobbles and boulders were noted to be from 8-40 cm respectively (Figures 2-6). Level 4 will need further assessment if and when the foundation will be repaired or replaced.

Table 1. Soil Table from the NE Corner of the site.

Levels	Horizon	Color	Structure	Depth
1	O	Light brown	Wood Chips	0-5 in/0-13 cm

2	O	Brown	Roots/Leaves	5-9 in/13-23 cm
3	A	Dark Brown	Moist/Compact	9-20 in/23-50 cm
4	R	Mixed Browns/Reds	Hard/Compact	20-32 in/50-80 cm

Artifact Discussion

The assessment of the structure's footings in the northeast corner was excavated using hand tools including a shovel, trowel, hand brushes and screened at 1/8" to minimize any ground disturbing impacts to the structure and site. The presence of modern trash debris was observed between Levels 1 and 2 starting at the ground surface to the top of the A horizon at 0-9 in (0-23 cm). Between Levels 3 and 4 historic artifacts were observed, recorded, and collected including an 1897 "Indian Head" penny and an early 1900s intact glass medicine bottle from 9-20 in (23-50 cm). Other artifacts noted in Levels 3 and 4 include Tewa polychrome, glass, and ceramic fragments (Figure 8). The presence of cultural material was no longer observed from the top of the granitic cobbles and boulders however it is unknown to what extent cultural materials are present and further investigations are warranted if the footings of the structure are repaired or in any way altered.

Table 2. Artifact Table by level of assessment.

Levels	Depth in/cm	Type	Color	Condition	Description	Qty.
1	0-5 in/0-13 cm	Modern	Clear, brown, and green	Glass and plastic fragments	Modern trash debris	12
2	5-9 in/13-23 cm	Modern	Clear and brown	Glass fragments	Modern trash debris	18
3	9-20 in/23-50 cm	Historic and Modern	Clear, brown, green, and copper, Tewa polychrome	Glass bottle and fragments, Tewa polychrome sherds, copper penny, and bone fragments	Historic and Modern trash midden	16

4	20-32 in/50-80 cm	Unknown	No artifacts observed	N/A	N/A	N/A

Foundation Assessment

The Obelisk's foundation comprises of granitic cobbles, boulders, and cement at a depth from 20-32 in (50-80 cm). The granitic rock does not appear to have been formed by hand tools of any kind and looks to be in its natural form. However, cement has been used to hold these materials together. No formed or manufactured rock was visible below ground surface. The depth of the foundation is unknown and may exceed the extent of what is currently known and most likely is greater than 32 in bpgs (80 cm). The overall appearance of the foundation is limited but generally appears to be intact and stable. Further investigations may be necessary to address the exact depth, integrity, and material composition (Figures 5-7).

Concluding Remarks

This initial assessment identified the presence of modern to historic trash debris consisting of fragmented glass, animal bone, plastic, copper pennies, Tewa Polychrome sherds, and metal artifacts. The soil generally comprises of an O, A, and R horizons but to what extent is unknown and further investigations is necessary to understand the depth of the granitic cobbles and boulders and what lies beneath the current foundation. It is recommended given the limited review and window in the northeast corner of the site that all further proposed ground disturbing work at a minimum be monitored by a qualified archaeologist listed on the City of Santa Fe's List of Approved Archaeologists and Historians for the Historic Downtown Archaeological Review District.

Figure 2. Soldier's Monument "Obelisk" site overview.

Figure 3. Begin assessment in the NE Corner.

Figure 4. Levels 3 and 4 where the historic cultural materials were observed .

Figure 5. Top of the granitic rock.

Figure 6. Bottom of excavation.

Figure 7. Plan view of the end of assessment.

Figure 8. Historic and modern trash midden from Levels 3 and 4.

Appendix A: Mr. John Murphey's 2025 Historic Cultural Property Inventory Form

SEE APPENDIX FOR HCPI FORM.


U.S. COAST & GEODETIC SURVEY
ELEV. 6839.6 FEET
$250 FINE OR IMPRISONMENT
FOR DISTURBING THIS MARK
ABOVE MEAN SEA LEVEL
BENCH MARK

Opinion of Construction Cost

04

Opinions of Construction Cost and Feasibility for Options
**ALL options are inconclusive based on Structural Findings and further Structural Observation and Design needed for the rebuilding of the monument. CSR consulted with a Stone Mason, Memorial Company, and Stone Quarry for estimated costs.

04.a Option #1 - Rebuild Existing Obelisk Portion of Monument Using Historic Material Only

Option #1 - Rebuild Existing Obelisk Portion of Monument Using Historic Material Only					
Santa Fe Soldier's Monument					
Item No.	description	unit	cost including	quantity	subtotal
1	**Carefully transport obelisk pieces to Plaza Site**				
	Crane - 1 day	Ea.	$30,000.00	1	$30,000.00
	Estimated (# of man hours)	Ea.	$125.00	24	$3,000.00
2	**Prepare new keyed joints**				
	Estimated (# of man hours)	Ea.	$125.00	24	$3,000.00
	Specialized Equipment	Ea.	$30,000.00	1	$30,000.00
3	**Rebuild obelisk (contingent on all existing pieces fitting together with no missing pieces)**				
	Crane - 5 days	Ea.	$30,000.00	5	$150,000.00
	Estimated (# of man hours)	Ea.	$125.00	48	$6,000.00
4	**Seal all gaps between stone with new mortar**				
	Stone Mason (# of man hours)	Ea.	$125.00	24	$3,000.00
5	**Remove portions of flaking sandstone at base**				
	Stone Mason (# of man hours)	Ea.	$125.00	24	$3,000.00
6	**Clean existing plinth base, marble, and obelisk using the mildest means**				
	Stone Mason (# of man hours)	Ea.	$125.00	80	$10,000.00
7	**Remove existing marble and cut into thinner piece to engrave**				
	Estimated (# of man hours)	Ea.	$125.00	48	$6,000.00
	Specialized Equipment	Ea.	$30,000.00	1	$30,000.00
	OPTION #1 REBUILD and REPAIR SUBTOTAL				**$274,000.00**
	CONTINGENCY @ 15%				$41,100.00
	Subtotal				**$315,100.00**
	Overhead @ 10%				$31,510.00
	Subtotal				**$346,610.00**
	Profit @ 10%				$34,661.00
	Subtotal				**$381,271.00**
	Bond @ 2%				$7,625.42
	Subtotal				**$388,896.42**
	NMGRT @ 8.1875%				$31,216.56
	OPTION #1 REBUILD and REPAIR GRAND TOTAL				**$420,112.98**

**NOTE: this option is inconclusive based on Structural Findings where further Structural Observation and Design is needed regarding the stabilization of the obelisk on the existing plinth.

04.b Option #2A - Rebuild Existing Obelisk Portion of Monument Using Historic and New Material

Option #2A - Rebuild Existing Obelisk Portion of Monument Using Historic & New Material					
Santa Fe Soldier's Monument					
Item No.	description	unit	cost including	quantity	subtotal
1	**Carefully transport obelisk pieces to Plaza Site**				
	Crane - 1 day	Ea.	$30,000.00	1	$30,000.00
	Estimated (# of man hours)	Ea.	$125.00	24	$3,000.00
2	**Prepare new keyed joints**				
	Estimated (# of man hours)	Ea.	$125.00	24	$3,000.00
	Specialized Equipment	Ea.	$30,000.00	1	$30,000.00
3	**Cut new obelisk pieces (contingent on field measuring and establishing pieces to replace)**				
	Crane - 2 days	Ea.	$30,000.00	2	$60,000.00
	Indian Buff or Silver Buff Limestone	Ea.	$25,000.00	1.1	$27,500.00
4	**Rebuild historic/new obelisk**				
	Crane - 5 days	Ea.	$30,000.00	5	$150,000.00
	Estimated (# of man hours)	Ea.	$125.00	48	$6,000.00
5	**Seal all gaps between stone with new mortar**				
	Stone Mason (# of man hours)	Ea.	$125.00	24	$3,000.00
6	**Remove portions of flaking sandstone**				
	Stone Mason (# of man hours)	Ea.	$125.00	24	$3,000.00
7	**Clean existing plinth base, marble, and obelisk using the mildest means**				
	Stone Mason (# of man hours)	Ea.	$125.00	80	$10,000.00
8	**Remove existing marble and cut into thinner piece to engrave**				
	Estimated (# of man hours)	Ea.	$125.00	48	$6,000.00
	Specialized Equipment	Ea.	$30,000.00	1	$30,000.00
	OPTION #2A REBUILD SUBTOTAL				**$361,500.00**
	CONTINGENCY @ 15%				$54,225.00
	Subtotal				**$415,725.00**
	Overhead @ 10%				$41,572.50
	Subtotal				**$457,297.50**
	Profit @ 10%				$45,729.75
	Subtotal				**$503,027.25**
	Bond @ 2%				$10,060.55
	Subtotal				**$513,087.80**
	NMGRT @ 8.1875%				$41,185.36
	OPTION #2A REBUILD GRAND TOTAL				**$554,273.15**

**NOTE: this option is inconclusive based on Structural Findings where further Structural Observation and Design is needed regarding the stabilization of the obelisk on the existing plinth.

Option #2B - Rebuild Existing Obelisk Portion of Monument Using New Material

Santa Fe Soldier's Monument

Item No.	description	unit	cost including	quantity	subtotal
1	**Carefully transport obelisk pieces to Plaza Site**				
	Crane - 1 day	Ea.	$30,000.00	1	$30,000.00
	Estimated (# of man hours)	Ea.	$125.00	24	$3,000.00
2	**Use existing obelisk pieces as interpretive exhibit**				
	Crane - 1 day	Ea.	$30,000.00	1	$30,000.00
	Estimated (# of man hours)	Ea.	$125.00	24	$3,000.00
	Specialized Equipment	Ea.	$30,000.00	1	$30,000.00
3	**Cut new obelisk pieces**				
	Crane - 2 days	Ea.	$30,000.00	2	$60,000.00
	Indiana Buff or Silver Buff Limestone	Ea.	$45,000.00	1.1	$49,500.00
4	**Carefully reconstruct existing monument base (replace any pieces that break)**	Ea.	$85,000.00	1.1	$93,500.00
	Add recommended structural footing	Ea.	$50,000.00	1	$50,000.00
	Estimated (# of man hours)	Ea.	$125.00	160	$20,000.00
5	**New obelisk install**				
	Crane - 5 days	Ea.	$30,000.00	5	$150,000.00
	Estimated (# of man hours)	Ea.	$125.00	24	$3,000.00
6	**Seal all gaps between stone with new mortar**				
	Stone Mason (# of man hours)	Ea.	$125.00	24	$3,000.00
7	**Remove portions of flaking sandstone**				
	Stone Mason (# of man hours)	Ea.	$125.00	24	$3,000.00
8	**Clean existing plinth base, marble, and obelisk using the mildest means**				
	Stone Mason (# of man hours)	Ea.	$125.00	80	$10,000.00
9	**Remove existing marble and cut into thinner piece to engrave**				
	Estimated (# of man hours)	Ea.	$125.00	48	$6,000.00
	Specialized Equipment	Ea.	$30,000.00	1	$30,000.00
	OPTION #2B REBUILD SUBTOTAL				**$574,000.00**
	CONTINGENCY @ 15%				$86,100.00
	Subtotal				**$660,100.00**
	Overhead @ 10%				$66,010.00
	Subtotal				**$726,110.00**
	Profit @ 10%				$72,611.00
	Subtotal				**$798,721.00**
	Bond @ 2%				$15,974.42
	Subtotal				**$814,695.42**
	NMGRT @ 8.1875%				$65,395.28
	OPTION #2B REBUILD GRAND TOTAL				**$880,090.70**

**NOTE: this option is inconclusive based on Structural Findings where further Structural Observation and Design is needed regarding the stabilization of the obelisk on the recommended newly reinforced plinth.

04.d Option #3 - Relocate Entire Existing Monument to Another Site Chosen by the City of Santa Fe

Option #3 - Relocate Entire Existing Monument to Another Site Chosen by the City of Santa Fe					
Santa Fe Soldier's Monument					
Item No.	description	unit	cost including O&P (2017)	quantity	subtotal
1	**Dig and construct new footing for monument relocation**				
	Equipment	Ea.	$30,000.00	1	$30,000.00
	Estimated (# of man hours)	Ea.	$125.00	40	$5,000.00
2	**Carefully deconstruct existing monument, label each piece**	Ea.			$0.00
	Truck/trailer	Ea.	$30,000.00	1	$30,000.00
	Crane - 1 day - transport to new site location (assumed within 20 miles)	Ea.	$30,000.00	1	$30,000.00
	Estimated (# of man hours)	Ea.	$125.00	160	$20,000.00
3	**Carefully reconstruct existing monument base (replace any pieces that break)**	Ea.	$85,000.00	1.1	$93,500.00
	Crane - 5 days - transport to new site location (assumed within 20 miles)	Ea.	$30,000.00	5	$150,000.00
	Add recommended structural footing	Ea.	$50,000.00	1	$50,000.00
	Estimated (# of man hours)	Ea.	$125.00	160	$20,000.00
4	**Carefully transport obelisk pieces to new site location**				
	Crane - 1 day	Ea.	$30,000.00	1	$30,000.00
	Estimated (# of man hours)	Ea.	$125.00	24	$3,000.00
5	**Prepare new keyed joints**				
	Estimated (# of man hours)	Ea.	$125.00	24	$3,000.00
	Specialized Equipment	Ea.	$30,000.00	1	$30,000.00
6	**Rebuild obelisk (contingent on all existing pieces fitting together with no missing pieces; replace missing pieces)**	Ea.	25,000.00	1.1	$27,500.00
	Crane - 5 days	Ea.	$30,000.00	5	$150,000.00
	Estimated (# of man hours)	Ea.	$125.00	48	$6,000.00
7	**Seal all gaps between stone with new mortar**		13,000.00	1	$13,000.00
	Stone Mason (# of man hours)	Ea.	$125.00	24	$3,000.00
8	**Remove portions of flaking sandstone**				
	Stone Mason (# of man hours)	Ea.	$125.00	24	$3,000.00
9	**Clean existing plinth base, marble, and obelisk using the mildest means**				
	Stone Mason (# of man hours)	Ea.	$125.00	80	$10,000.00
10	**Remove existing marble and cut into thinner piece to engrave**				
	Estimated (# of man hours)	Ea.	$125.00	48	$6,000.00
	Specialized Equipment	Ea.	$30,000.00	1	$30,000.00
	OPTION #3 RELOCATE SUBTOTAL				**$743,000.00**
	CONTINGENCY @ 15%				$111,450.00
	Subtotal				**$854,450.00**
	Overhead @ 10%				$85,445.00
	Subtotal				**$939,895.00**
	Profit @ 10%				$93,989.50
	Subtotal				**$1,033,884.50**
	Bond @ 2%				$20,677.69

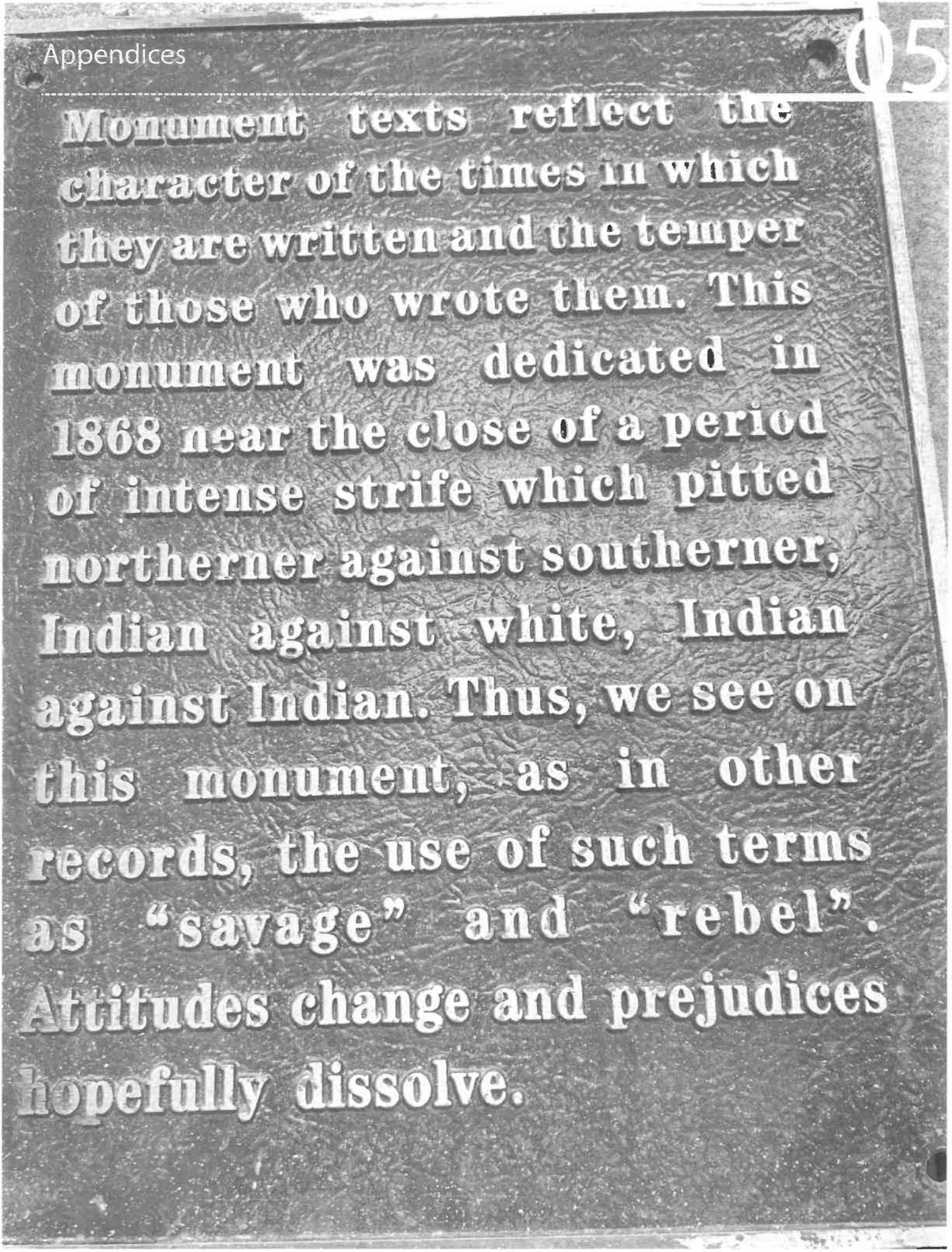
	Subtotal				$1,054,562.19
	NMGRT @ 8.1875%				$84,649.29
	OPTION #3 RELOCATE GRAND TOTAL				**$1,139,211.48**

**NOTE: this option is inconclusive because the site is not known, therefore, soils testing and other site upgrades are unknown. The new site will require a full landscape architectural design including civil and structural engineering design work.

In Addition: *According to NMT, the original quarry that the historic monument acquired its stone was most likely near Lamy, NM (the same quarry as the Cathedral Basilica of St. Francis of Assisi). The quarry is closed now, so NMT found another quarry with a similar stone.*

From Jim Lardner, President, NM Travertine, Inc.: for the entire monument, replacement from the bottom base (B1) to the top of the obelisk(O4) the price would be around $130,000 +/-10% with the following assumptions. The price for the top four pieces (O1-O4) would be around $45,000 +/-10% with the same assumptions:

1. The base up to the bottom of the stone with the relief carved on the corners would be solid concrete with the stone being a veneer.
2. The material would be Indiana Buff or Silver Buff limestone with a smooth finish.
3. Marble panels and inscriptions on marble panels are not included.
4. FOB Job Site.
5. No taxes or bonding is included.
6. Drawings with two sets of redline revisions are included.
7. Installation is by others.
8. Lead time is 4-6 months from approved drawings and 50% deposit.
9. New Mexico Travertine, Inc. standard terms and conditions apply.


Monument texts reflect the character of the times in which they are written and the temper of those who wrote them. This monument was dedicated in 1868 near the close of a period of intense strife which pitted northerner against southerner, Indian against white, Indian against Indian. Thus, we see on this monument, as in other records, the use of such terms as "savage" and "rebel". Attitudes change and prejudices hopefully dissolve.

Appendix A: Mr. John Murphey's 2025 Historic Cultural Property Inventory Form

Historic Cultural Properties Inventory (HCPI) Base Form (FORM 1)

Historic Preservation Division, New Mexico Department of Cultural Affairs

Date of Form: July 3, 2025

For HPD Office use only:
HCPI No._____ District No._____ __NRHP __SRCP Criteria __A __B __C __D

1. Name of property: Santa Fe Soldiers' Monument Soldiers' Monument The Obelisk	2. Location: Santa Fe Plaza Downtown and Eastside Historic District – Santa Fe	3. Local Reference Number: Santa Fe ID: N/A; has not been assigned 4. County: Santa Fe Parcel # 910017954

5. Property Type:
_ Buildings:
_x_ Structures: Monument structure and seating wall
_x_ Site _x_ Object

6. Date of Survey:
March 14, 2025

7. Previous Survey Date(s):
__ Yes:
_x_ No:

8. Name of Project:
HDRB Status Evaluation

9. Lat/Long:
35.6874318,-105.9391666,132

10. Photo Information: John W. Murphey, photographer. Photo 1: View of east elevation. Camera facing west. March 7, 2025.

11. Brief Description of the Property:

Completed in 1868, the Santa Fe Soldiers' Monument is a sandstone and marble memorial located at the center of Santa Fe's historic Plaza. It stands within a network of axial alignments established in the nineteenth century, which it enhances by serving as a visual anchor, further emphasized by its eight-sided seating bench (*banco*). The monument is a vernacular rendition of the Neoclassical style, favoring austerity over ornamentation. It was built by local craftsmen—many of whom were Hispanic—and features mostly locally quarried materials. Following vandalism on October 12, 2020, its damaged obelisk was removed and placed in secure storage where it remains today. While it contributes to both the State and National Register listings for the Santa Fe Historic District, the monument does not have local designation under the Downtown and Eastside Historic District.

Continued on Page 5.

12. Who uses the property? Public monument

13. Construction Date:
Date: 1867-68
_x_Known __ Estimated Source: newspaper accounts and archival documents

14. Setting:
__ Suburban __ Rural __ Village _x_ Urban If Urban: __ Commercial __ Industrial __ Residential _x_Public

15. Relationship to Surroundings: __ Similar _x_ Dissimilar
Comments: A historic structure that has not been updated with Territorial or Pueblo Revival ornamentation

HCPI Base Form (FORM 1) *(Continued from other side)*

16. Additional Perspective: (Photos, drawing, footprint, etc., indicate north arrow when possible)

Source: Office of the Santa Fe County Assessor
Blue parcel lines are not accurate

17. Surveyor:
(your name, address, telephone number, and any group affiliation)

John W. Murphey
Architectural Historian
Architectural History Services
505-577-7593/707-583-7819
John@archhistoryservices.com

For: Elizabeth West, Old Santa Fe Association board member

18. Owner (if known) and other knowledgeable people:

Current owner: State of New Mexico and administratively managed by the City of Santa Fe.

19. Is Property Endangered? __ Unknown __ No _x_ Yes How? Vandalized in 2020 and contemplated for removal by the City of Santa Fe

20. Significance to Current Community: __ Unknown __ None __ Low __ Moderate _x_ High
Describe: Considerably high, and the focus of passionate debate informed by diverse historical, cultural, and political perspectives

21. Other Significance or Information of Interest: (such as historical, legendary, structural, former ownership, etc.)
See Historical Overview.

22. National or State Register:

Is this property individually listed on a historic register? __ Unknown _x_ No __Yes
If yes: __ State __ National
If 'no' or unknown, do you think this property is eligible for listing? __ No _x_Yes
Why? See Evaluation of Historical Status

23. National or State Historic District: City of Santa Fe

Is this property in a historic district? __ Unknown __ No _x_ Yes
If yes: __ Significant _x_ Contributing __ Non-contributing __ No Status: Contributing to listed State and National Register Santa Fe Historic Districts, per New Mexico State Historic Preservation Office communications

If 'yes', what is the name of the district? _x_ State _x_ National __ City of Santa Fe: No Status : Downtown and Eastside Historic District

24. Supplemental Forms:

__ None _x_ HCPI Detail Form (FORM 2) __ Continuation Sheets, # pages: _____

Historic Cultural Properties Inventory (HCPI) Detail Form (FORM 2)

Historic Preservation Division, New Mexico Department of Cultural Affairs

For HPD Office use only. *Please complete HCPI FORM 1 before completing FORM 2*
HCPI No._____ District No._____ __NRHP __SRCP Criteria __A __B __C __D

1. Name of property:	2. Location:	3. Local Reference Number: Santa Fe ID: N/A
Santa Fe Soldiers' Monument Soldiers' Monument The Obelisk	Santa Fe Plaza Downtown and Eastside Historic District – Santa Fe	4. County: Santa Fe 5. Date of Survey: March 14, 2025

ARCHITECTURAL AND CONSTRUCTION DETAILS:

6. Visible Construction Material:

__Adobe
__ Brick __ Composition __ Concrete: Block
__ Concrete: __Concrete: __ Earth __ Masonry:
__ Cast Stone __ Poured __ Plaster __ Simulated
__ Metal: __ Metal: __ Metal: __ Stone:
Corrugated Structural Siding V-Crimp Random Ashlar
Stone:
__ Random Coursed __Stone: River Rock __Stone: Rusticated __ Stone: Tabular
_x_ Stucco: __ Tile: Clay __ Vinyl Siding __ Wood: Board and Batten
Wood:
__ Horizontal Siding __ Wood: Jacal __ Wood: Log __ Wood: Shingle
__ Wood: Tongue and Groove
_x_ Other: Stone, metamorphic stone, Marble; Sedimentary stone, Sandstone

7. Number of Stories _x_ N/A Does Not Apply
Number: _x_1 __11/2 __2
__21/2 Other:_____

8. Foundation: __ N/A
__ Not visible __ None
__ At Grade _x_Raised:
Materials: _x_ Concrete: _x_Stone
Other:
Notes

9. Roof: _x_ N/A Does Not Apply
Shape: __Flat __Gabled
__ Hipped __ Pyramidal
__ Shed __ Other:
Pitch: __ None __ Low
__ Medium __ Steep
Features__ Eave:
__ Parapets
Materials: __Asphalt
__ Earth
__ Composition shingle __ Metal: Pressed
__ Composition Roll __Metal: Corrugated
__ Metal: Standing Seam __Metal: Standing Seam
__ Tile: Terra Cotta __ Wood: Shingle
Other:

10. Window Types Does Not Apply

Operation	Material	Glazing	Number

11. Door Types Does Not Apply

Type	Style	Material	Number

12. Chimneys _x_ N/A Does Not Apply

13. Porches _x_ N/A Does Not Apply
Type: __ Entry __Partial-Width __ Full-Width __ Wrap

14. Other Significant Features N/A

15. Modifications: x __ No known modifications

#1 Date: 1935; circular seating wall constructed as part of New Deal Plaza improvement project; newspaper accounts and historic photographs and postcards
#2 Date: Unknown – by 1950s; decorative steel fencing; historic photographs
#3 Date: 1973-74; demolition of circular seating wall and installation of current eight-sided structure; newspaper accounts and historic photographs
#4 Date: October 2020; following the toppling of the obelisk, the damaged structure was moved to a hangar at the Santa Fe Regional Airport

16. Primary Architectural Style __ Not Applicable

__ Art Deco/Streamline Moderne	__ Gothic Revival	__ Mission Revival	__ Pueblo	__ Spanish-Pueblo Revival
__ Bungalow/Craftsman	__ International	_x Neo-Classical	__ Queen Anne	__ Territorial
__ Colonial Revival	__ Italianate	__ Northern NM	__ Ranch	__ Territorial Revival
__ Folk Victorian	__ Mediterranean	__ Prairie	__ Spanish-Colonial	__ Tudor Revival

Notes: __ Other: Vernacular

17. Documents Available and Their Locations

Historic Preservation Division
Land Use Department
City of Santa Fe
200 Lincoln Avenue
Santa Fe, NM 87504
(505) 955-6605
https://www.santafenm.gov/land-use/historic-preservation

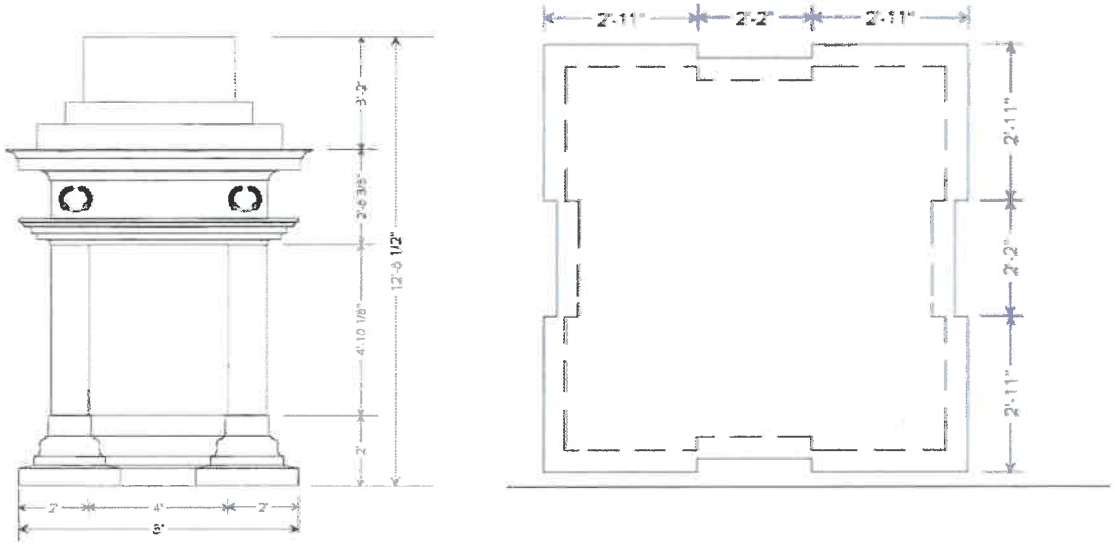
Archaeological Records Management Section
Laboratory of Anthropology
708 Camino Lejo
Santa Fe, NM 87501
(505) 476-1320
https://nmhistoricpreservation.org/arms.html

SITE:

18. Attached or Associated Properties Yes – Santa Fe Plaza National Historic Landmark

Are associated properties eligible for listing: **The Santa Fe Soldiers' Monument stands at the center of the historic Santa Fe Plaza and serves as its oldest and best-preserved feature**

19.Site Plan: Scaled drawing of Santa Fe Soldiers' Monument. Courtesy of City of Santa Fe Facilities Division.



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Architectural Description Continued

Location and Setting

The Santa Fe Soldiers' Monument stands at the center of the historic Plaza, a public space with a continuous history dating back over 400 years to the city's founding (Photo 2). For nearly 160 years, the monument has served not only as a memorial to Civil War soldiers but also as an integral element of the Plaza's design, providing a central focal point and reinforcing its axial symmetry. This arrangement reflects European and Spanish urban design precedents, particularly those established in colonial-era Mexico, where plazas were often organized around a central monument or fountain.

Originally conceived as a place of mourning, the monument was enhanced in the 1930s with a circular banco (or seating wall) and evolved into a gathering spot for residents and visitors alike as a place to sit and talk, rest, or simply watch the life of the Plaza unfold (Photo 3). This type of urban amenity is now rare in a city increasingly shaped by the automobile.

Beyond its design and commemorative role, the Soldiers' Monument is significant for its age and its remarkably original condition. It is the oldest unaltered feature of the Plaza, especially notable given that the Palace of the Governors has been remodeled twice since the monument's construction. In fact, the Santa Fe Soldiers' Monument is the oldest authentic structure in downtown Santa Fe, predating the Cathedral Basilica of St. Francis of Assisi.[1]

A Monument Defined

The Santa Fe Soldiers' Monument meets the traditional definitions of a monument, including "structures which are characteristic or remarkable on account of their being erected as memorials,"[2] and "anything by which the memory of a person or thing is preserved or perpetuated,"[3] or, as defined by architectural historian Cyril M. Harris, a

[1] An exception would be the three placita-style buildings on the 100 block of East Palace Avenue, which likely date to the colonial period but have been significantly altered.

[2] "Monument," *The Encyclopedia Americana, Vol. 19* (Chicago: American Corporation, 1929; 1954), 420.

[33] "Monument," *Webster's New Twentieth Century Dictionary of English Language* (New York: Publishers, 1943), 1091.

"stone, pillar, or building erected in memory of the dead, of an event, or an action such as a battle."[4]

It is fundamentally a historic commemorative structure rather than public art. Unlike public art, which is often designed as an expressive, interpretive, or purely aesthetic installation, the monument is a fixed architectural feature with a civic function—intended to mark public memory and organize urban space.

It was constructed as part of the Plaza's formal design using enduring materials and contributes to the historical and spatial integrity of both the Plaza and the Downtown and Eastside Historic District. As such, it is best understood as a structure within the historic built environment rather than as artistic work

Surrounding Features

Seating Wall

Surrounding the monument is an eight-sided seating wall, constructed as part of the 1974 federally funded Santa Fe Plaza Renovation Project (Photo 3). The wall is finished in painted stucco and rises between 16 and 17½ inches above the adjacent paving. It is capped with rectangular slabs of reddish-brown sandstone measuring 24 to 26 inches wide, providing a flat, usable surface for seating. The stucco finish exhibits moderate deterioration and cracking (Photo 4). At the four cardinal directions, trapezoidal ground-level light fixtures are integrated into the wall's base.

The wall was erected during the second phase of the renovation project and was designed by John Gaw Meem and drawn by his former associate Kenneth Clark, who oversaw the project. It replaced a larger circular seating wall constructed in the 1930s. The new octagonal design was intended to visually connect with the Plaza's eight axial pathways, thereby reinforcing the monument's spatial relationship with the larger site. Reducing the size of the enclosed area also addressed recurring complaints that the monument—and the Plaza overall—had become overgrown with vegetation.

[4] "Monument," Cyril M. Harris, *American Architecture: An Illustrated Encyclopedia* (N.Y.: W. W. Norton & Company, 1998), 220.

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Steel Picket Fence

A green-painted steel fence, Victorian in appearance, stands behind the seating wall (Photo 5). It consists of 104-inch-long panels composed of narrow vertical pickets. Decorative rings are set between the mid- and top rails, and each picket terminates in a pointed finial extending approximately 5½ inches above the top rail. The north panel is divided to form a gate, providing access to the monument.

The fence is not original to the monument and was not part of the 1930s Plaza renovation project. A similar steel fence first appears in photographs from the 1950s, suggesting it was likely installed around that time for security purposes (Fig. 8).

Soldiers' Monument Structure

Standing behind the fence is the Civil War memorial structure, completed in 1868. Erected by local craftsmen—many of whom were Hispanic—the structure remains largely as it appeared before its decorative obelisk was toppled on October 12, 2020. What endures is the essential core of the monument, still bearing the architectural weight and symbolic meaning of the original 157-year-old memorial.

The monument is a four-sided structure designed to hold four marble tablets, each positioned at a cardinal point (Photo 6). Most of its components are fashioned from locally quarried sandstone, giving it a sense of belonging to its environment—similar to the surrounding simulated adobe buildings, though in a more authentic way. While the monument expresses a classical form in its overall composition, it does not fully articulate any of the three classical orders. Instead, it embodies a local, vernacular interpretation of the Neoclassical mode.

Base

It begins at ground level with a broad stone base measuring 8 feet in length, designed to convey visual weight (Photo 7). The face of the base is tooled, and its top surface slopes gently upward to meet the feet of the pilasters. This level, along with its underlying anchoring, supports the entire structure and establishes a formal platform for the monument.

Main Shaft

The main shaft, or die, rises approximately 7 feet and is framed by sandstone pilasters topped with simplified Doric-style capitals (Photo 8). This restrained classical reference imparts a quiet dignity to the monument, directing attention to the inscribed tablets rather than to decorative elements, which are limited here to small wreaths.

Tablets

The pilasters divide the die into four faces, each holding a large (assumed to be 4'x 6') marble tablet inscribed with text. The tablets are made of white marble with dark gray veining (Photo 8). Their exact origin is unclear, though it is known that the original marble slabs—from which these may be repurposed—were supplied by a monument maker in St. Louis.

Each inscription is composed in all capital letters, incised into the marble using a chisel. This V-cut technique produced narrow grooves that catch light and shadow, enhancing legibility. The inscriptions are set within a recessed panel, further emphasizing the text and lending visual depth to the otherwise flat surface.

Architrave

Capping the shaft is a simple projecting architrave or cornice, fabricated from sandstone and measuring 2 feet 8 inches in height (Photo 9). A flat frieze runs along its face, punctuated at each corner by low-relief medallions (Photo 10). These carved laurel wreaths — the monument's only decorative elements —symbolize military honor and victory, introducing a classical mourning motif to an otherwise austere composition.

Obelisk Structure

Above the architrave sits a stepped stone platform that historically supported the obelisk. This upper base, measuring approximately 3 feet in height, is constructed of sandstone blocks.

Based on historical and pre-vandalism photographs, the obelisk stood approximately 15 to 17 feet tall and was constructed of four distinct parts: lower section, midsection, top section, and pyramidion capstone (Photo 11).

These pieces were likely shaped off-site and shipped to Santa Fe for assembly. Except for the capstone, they appear to have been simply stacked and held in place by gravity, a common method during the nineteenth century. Aside from a lightly tooled surface treatment, the obelisk itself was architecturally plain, serving primarily to elevate and complete the monument's vertical composition.

Following vandalism on October 12, 2020, the obelisk was removed and placed in secure storage in a hangar at Santa Fe Regional Airport. Photographs of it taken in 2024 show all components of the obelisk with one piece damaged, likely from its fall (Figs. 13 & 16).

Condition and Historic Integrity

The October 12, 2020 event caused specific damage to the monument, most notably to the north marble tablet, which was partially destroyed—its inscription chipped away and now illegible (Photo 12). As previously noted, the obelisk was removed and placed in storage. Markings from the 2020 event remain visible, including red painted handprints and a faded "Land Back" slogan across the north frieze. Small areas of abrasion also remain, reflecting the City's efforts in January 2025 to remove the painted handprints and other graffiti from the 2020 vandalism.

However, other forms of damage commonly attributed to that event appear, based on earlier photographs, to predate it. These include several areas of cracking, joint separation, and natural delamination of the sandstone—some of which are historic, as evidenced by a small Dutchman repair at the north cornice. Such deterioration is typical for soft sandstone exposed to the elements over time. Today, the monument, almost 160 years old, reflects the cumulative effects of weathering and material fatigue (Photo 13).

The Santa Fe Soldiers' Monument retains most of the National Register of Historic Places' seven aspects of integrity: location, design, setting, materials, workmanship, feeling, and association. Although its design has been compromised by the damage and removal of the obelisk, that feature remains in storage and could, with repair and in-

kind replacement, be reinstalled or reconstructed—a common preservation approach for funerary monuments with these types of features. The damage to the north tablet is significant, but it affects only one of the four inscriptions. In a sense the near-total loss of this single inscription returns the monument's focus to its primary commemorative intent: honoring fallen Union soldiers of the Civil War.

While the overall setting and design of the Plaza have evolved since 1868, the monument remains one of its few largely intact historic features, reinforcing the Plaza's spatial organization and historical associations.

Current Marble Tablet Inscriptions

North

WHO HAV* [partial letter]
VARIOUS BAT* [partial letter]
INDIANS IN THE * [partial letter]
OF NEW MEXIC * [partial letter]

Text before August 8, 1974
TO THE HEROES
WHO HAVE FALLEN IN THE VARIOUS BATTLES WITH SAVAGE
INDIANS IN THE TERRITORY
OF NEW MEXICO.

East

ERECTED
BY THE PEOPLE OF NEW MEXICO
THROUGH THEIR LEGISLATURES
OF 1866 – 7 – 8
MAY THE UNION BE PERPETUAL.

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South

TO THE HEROES
OF THE FEDERAL ARMY, WHO FELL
AT THE BATTLE OF VALVERDE
FOUGHT WITH THE REBELS
FEBUARY [sic.] 21, 1862.

West

TO THE HEROES
OF THE FEDERAL AMRY WHO FELL
AT THE BATTLES OF CANON DEL
APACHE AND PIGEON RANCHO
(LA GLORIETA) FOUGHT WITH THE
REBELS MARCH 28, 1862. AND TO
THOSE WHO FELL AT THE BATTLE
FOUGHT WITH THE REBELS AT
PERALTA APRIL 15, 1862.

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Historical Overview

Halting Confederate Ambitions in the Far West

Although located thousands of miles from the Eastern Theater, New Mexico—then a territory—played a pivotal role in halting Confederate expansion. The small battles and skirmishes at Valverde, Glorieta Pass, Peralta, and Albuquerque held outsized strategic and symbolic significance within the broader conflict. In particular, the Battle of Glorieta Pass (March 26–28, 1862) effectively ended Confederate ambitions in the region. It crushed their plan to extend westward into the Southwest and toward the Pacific, forcing a full retreat back to Texas.

Fear of Confederate invasion swept through Santa Fe in early 1862. Confederate troops, led by Brigadier General Henry H. Sibley, had crossed the Rio Grande north of El Paso in February. In Mesilla, they encountered a sympathetic population who felt abandoned by the territorial capital. A year earlier, Lieutenant Colonel John R. Baylor had captured Fort Fillmore and declared Mesilla the capital of a Confederate Arizona Territory, which encompassed the southern sections of present-day Arizona and New Mexico.

Advancing up the Rio Grande, Sibley met Federal forces under Colonel Edward Canby. The Battle of Valverde, fought February 20–21, ended in a Confederate victory. News of this defeat sent fear up the Rio Grande valley, as Santa Fe residents realized Sibley was marching north to capture their city.

On March 4, Sibley—accompanied by Texas Rangers and Confederate sympathizers from Mesilla—entered Santa Fe. They planted Confederate and Texas flags atop the Palace of the Governors, raided the territorial treasury, and regrouped in preparation for an attack on Fort Union.

Seeking a decisive blow, Sibley dispatched Major Charles L. Pyron and 300 soldiers east along the Santa Fe Trail to secure Glorieta Pass. Near Apache Canyon, Pyron encountered a reinforced Federal force, including the 1st Colorado Infantry. Although tactically inconclusive, the Battle of Glorieta Pass devastated the Confederate supply line, forcing their eventual retreat and collapse of the campaign.

One of the Union commanders involved in this defense would later petition for a monument to honor the Union soldiers who died in these actions—an effort that culminated in the creation of the Santa Fe Soldiers' Monument.

These Honored Dead

"It is for us the living to be dedicated here to the unfinished work which they who fought here have thus far so nobly advanced... that from these honored dead we take increased devotion to that cause for which they gave the last full measure of devotion."
Abraham Lincoln, November 19, 1863

Conceiving a Monument

On Monday, December 3, 1866, Samuel Ellison, the speaker New Mexico House of Representatives, presented a petition to the New Mexico House of Representatives seeking funds to mark the graves of Union soldiers killed in the Civil War's Battle of Glorieta Pass and its associated skirmish at Apache Canyon.[5] The petition originated with Chief Justice John Potts Slough, who had commanded Union forces during the engagement and successfully halted the Confederate troops' advance on Fort Union along with their broader ambitions toward the Southwest. A resident of Colorado, Slough was appointed Chief Justice of the New Mexico Territory in 1866 and had relocated to Santa Fe. In addition to his judicial duties—notably his efforts to dismantle New Mexico's entrenched peonage system—he became involved in local railroad and mining enterprises.

Ellison formally requested that the petition be reviewed, "asking that the cemeteries where the victims who lost their lives in the defense of their country in the battles of Apache Cañon and Glorieta are laid, be enclosed."[6] The verb *enclose* echoed earlier federal language promoting the proper containment, protection, and marking of Union burial sites. Beginning as early as 1861, the War Department had directed officers to keep accurate records of soldiers' burial locations and to mark these sites

[5] New Mexico House of Representatives, *Journal of the House of Representatives of the Territory of New Mexico: Session of 1866-67* (Santa Fe: Manderfield & Tucker, 1867), 25.
[6] Ibid.

appropriately.[7] An omnibus act passed the following year authorized the government to establish cemeteries at battlefields and other sites where soldiers had fallen. The initial intent was to bury them in situ and to protect their graves from disturbance.

Ten days later, the nature of the legislative request shifted: it now called for a "monument in the vicinity of Kosloskie's [sic] ranch," a reference to Kozlowski's Ranch near Pecos Pueblo, where Union forces had established a field hospital during the battle.[8] The House agreed to advance the petition, assigning a committee to the matter composed of Ellison and fellow Republican legislators Francisco Perea and Benigno Jaramillo.

The petition moved through several committees over the course of December, advancing toward approval. While the language remained largely consistent—emphasizing the need to protect the graves and authorizing the erection of headstones or monuments—its geographical scope began to expand. The reviewing committee was ultimately tasked with investigating the "other graves of soldiers who fell fighting in defense of the Territory against the rebel invaders," a reference to the Battle of Valverde in Socorro County, which involved far more deaths than Glorieta.[9]

After two weeks of deliberation, the House of Representatives voted on December 19 to approve the creation of an act authorizing the "erection of monuments over the graves of the federal soldiers who fell in the battles of Apache Cañon and La Glorieta," with the unstated intention that it would also include the victims of Valverde—97 of whom had been quickly buried at Fort Craig near Socorro.[10]

The act carried over into the new year's legislature and advanced to the Legislative Council, where it was rejected. Finally, at the end of January, it was reintroduced—this time as a resolution to the full Legislative Assembly—and was successfully passed on January 31.

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[7] Kurt G. Piehler, *Remembering War the American Way* (Washington, D.C., Smithsonian Institute Press, 1995), 49.

[8] New Mexico House of Representatives, *Journal of the House of Representatives of the Territory of New Mexico: Session of 1866-67*, 33.

[9] Ibid., 44.

[10] The War Department exhumed these remains in the 1880s, reinterring most at Santa Fe National Cemetery and some later at Fort Leavenworth, Kansas.

The wording of the petition remained essentially the same but now included a request for markers to be erected for Union soldiers killed at the Battle of Valverde:

> Whereas the Legislative Assembly of the Territory of New Mexico desires, in the name of the people it represents, to manifest their gratitude and honor the memory of those victims that fell in defence [sic] of the territory of New Mexico; therefore funds of the territorial treasury not otherwise appropriated, to enclose the graves, and erect monuments over the federal soldiers killed at the battle of Apache Cañon and Glorieta, that now lie near the house of Kuzlowski; and to enclose the graves and erect monuments over the federal soldiers killed at Valverde and now interred at Fort Craig.[11]

The act that was passed included a budget appropriation of $1,500 for the erection of "one or more" monuments.

The newly formed Monument Committee—now composed of Governor William Frederick Milton Arny and Simon Delgado—must have quickly realized that marking hundreds of individual graves was well beyond the limits of the act's modest funding. Additionally, coordinating the marking of grave sites across three separate battlefields, each under potentially different ownership, presented significant logistical challenges. Within a week, the original intent was set aside. Instead, Governor Arny approved a resolution authorizing the creation of a single "joint monument to be erected in the Public Plaza in the City of Santa Fé, in honor of the officers and soldiers who fell in battle during the late rebellion."[12]

The resolution is significant for several reasons. It established the territorial government's authority to erect a monument in the Santa Fe Plaza—the city's central civic space, and that it would serve as a memorial for all Union soldiers, including members of Colorado regiments killed in the New Mexico Territory. The monument was

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[11] New Mexico House of Representatives, *Journal of the House of Representatives of the Territory of New Mexico: Session of 1866-67*, 106-108

[12] Governor William Frederick Milton Arny, letter, February 11, 1867, in *Report of the Soldiers' Monument Commission, Reports of the Secretary of the Territory*. State Records Center and Archives, Santa Fe. This is a compilation of documents related to the financing and construction of the Santa Fe Soldiers' Monument. The State Archives provided to the author a PDF representing 75 pages of the report. Hereafter cited as RSMC.

first of its kind in the West and predated many Civil War soldier memorials elsewhere in the United States. In fact, the Santa Fe Soldiers' Monument was one of only a handful of soldier memorials erected in the 1860s.[13]

The resolution also marks the first mention of the four inscriptions that would adorn what soon came to be known as the Soldiers' Monument.

First Wording and Creating the Tablets

The first inscription included a lengthy dedication to the "Gallant Dead" who defended the territory "during [the] war of the Great Rebellion."[14] The phrase *Gallant Dead*—a widely used nineteenth -century expression—reflected the period's formal and often romanticized language of military sacrifice. This wording was ultimately omitted from the final monument.

The second inscription referred to the anticipated dedication date, a reference that survives in abbreviated form on the current east tablet.

The third inscription commemorated the Battle of Valverde and named both the Union and Confederate commanding generals. This wording, though substantially reduced in length, is preserved on the south tablet.

The fourth inscription honored those who fell at Glorieta Pass and Apache Canyon, originally referred to as "Pigeons Ranch (La Glorietta) and Apache Cañon." Its core meaning remains on the monument's west tablet.

Authorized by the legislature, Governor Arny contracted the E. W. Warne Marble Works of St. Louis, Missouri to fabricate and inscribe the marble slabs for the monument. In a letter dated March 18, 1867, company head Edgar Warne expressed mild surprise at the

[13] Erected in 1863, the Kensington Soldiers' Monument in Berlin, Connecticut, is considered the oldest American Civil War memorial in the United States. Only a handful of monuments were constructed during or immediately after the war. The earliest monument at Gettysburg National Military Park is the 1st Minnesota Infantry Monument—a granite base topped with an urn—erected in July 1867. The majority of the approximately 800 monuments dotting the Gettysburg battlefield were erected in the 1880s. See Tom Huntington, *Guide to Gettysburg Battlefield Monuments* (Lanham, MD: Stackpole Books, 2013), 43.
[14] Governor William Frederick Milton Arny, February 11, 1867.

brevity of the proposed inscriptions—only about 855 letters or characters—as submitted by the governor.[15] Due to the limited amount of text submitted, Warne proposed using large, capital letters to visually fill the surface of the four marble slabs. He also indicated that his workmen would carve a scotia—a molded trim—around the inscriptions "to make the lettering show better."[16]

This correspondence is notable in part because the final inscriptions appear to have been considerably shorter, totaling just 452 characters. Moreover, no visible scotia is present on the current monument, suggesting that the tablets may have been embedded in such a way that this detail was obscured. It is also possible that the original slabs were later removed or reversed when the revised 1868 inscriptions were introduced.

While the marble slabs were being inscribed in St. Louis, the Monument Committee contracted a local firm, John & M. McGee, to construct the base that would hold them. Operated by Irish immigrant brothers John and Michael McGee, the company presented itself as a full-service enterprise—architects and builders capable of producing everything from tombstones to smelters.[17] Assisted by a cadre of Hispanic craftsmen and laborers,[18] the McGee brothers worked on the monument through the summer months. By October, construction had advanced enough to warrant a cornerstone-laying ceremony.

Evolution of the Civil War Monument

A brief newspaper notice published in advance of the cornerstone ceremony described a 32-foot-high memorial, indicating that the structure had already assumed an obelisk form.[19] This shape had first been employed in the United States in 1799 with the Lexington Revolutionary War Monument, a stunted obelisk placed on the Lexington Green.[20] The form gained broader popularity with the construction of the Bunker Hill

[15] E. W. Warne, letter to Governor William Frederick Milton Arny, March 18, 1867, RSMC.
[16] Ibid.
[17] "John & M. McGee, Architects and Builders" [advertisement], *The New Mexican*, October 27, 1867, 2.
[18] This is based on an 1867 accounting sheet, presumably created by the Monuments Commission, RSMC.
[19] "Monument to the Heroes of the War," *The New Mexican*, October 5, 1867, 2.
[20] James Mayo, *War Memorials as Political Landscape: The American Experience and Beyond* (Westport, Conn.: Praeger Press, 1988), 65.

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Monument in Boston, begun in 1825 and completed in 1843. By then, the obelisk had become a favored architectural form for commemorating battles and honoring fallen soldiers, although wartime monuments remained uncommon in the United States before the Civil War.

Initially, the American commemorative obelisks were conceived as monolithic shafts, inspired by European reinterpretations of ancient Egyptian prototypes. These early examples were often uninscribed or only minimally marked, emphasizing the purity of form over narrative detail. Historian Thomas J. Brown has argued that the Bunker Hill Monument, rather than memorializing individual sacrifice, effectively distanced itself from the human cost of war.[21]

By the time of the American Civil War, however, the typology had evolved. Obelisks or shafts were now typically set atop a defined base and plinth, aligning more closely with funerary design of the period. This shift is exemplified by the Bull Run Monument (1865) at Manassas—one of the earliest Civil War memorials—where the shaft rises from a stepped base, balancing classical gravity with symbolic verticality[22] (Fig. 1). The change reflected not only evolving aesthetic preferences but also a growing desire to integrate commemorative function with architectural form (Fig. 2).

Post–Civil War iterations of the obelisk further advanced this evolution. Obelisks increasingly rose as discrete vertical elements from a four-sided die or pedestal, expressly designed to bear inscriptions. This transformation allowed monuments to serve both symbolic and documentary purposes, combining visual impact with commemorative specificity, often including the names of fallen soldiers.

Brown attributes this emerging neoclassical form and the proliferation of such monuments to a national mood that viewed the Civil War as an "epic as grand as the histories of ancient Greece and Rome or the upheaval of post-revolutionary Europe."[23]

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[21] Thomas J. Brown, *Civil War Monuments and the Militarization of America* (Chapel Hill, N.C.: The University of North Carolina Press, 2019), 15.
[22] Kurt G. Piehler, *Remembering War the American Way* (Washington, D.C., Smithsonian Institute Press, 1995), 58.
[23] Brown, *Civil War Monuments and the Militarization of America*, 13.

The Santa Fe Soldiers' Monument exemplifies this transitional phase. Its inscribed base anchors the decorative obelisk shaft, with the lower portion assuming a central role in both its design and its commemorative function.

By the late nineteenth century, representational sculpture—most often depicting a lone infantryman—had largely supplanted the obelisk as the preferred mode of Civil War memorialization[24] (Fig. 3). These so-called common soldiers' monuments proliferated across courthouse squares, public parks, and cemeteries throughout the eastern United States. Typically, Union soldiers were depicted facing south, while Confederate figures looked north, each silently asserting sectional memory within a shared national landscape.[25]

"One of the Most Important Events"

As reported in an October 24, 1867 newspaper article, the cornerstone-laying ceremony for the Santa Fe Soldiers' Monument was treated as a major public event. Governor Robert B. Mitchell, one of the participants, described it as "one of the most important events in the history of our Territory."[26]

The gathering drew dignitaries from both New Mexico and Colorado, featured musical performances, and included lengthy orations. A central part of the ceremony involved placing a box "containing memorials" behind the cornerstone. [27] Intended as a time capsule, the box held copies of newspapers from Santa Fe and Albuquerque, various coins and Masonic relics, and a list of Union soldiers who died at Glorieta Pass, Apache Canyon, and Valverde—a list that was originally slated to be engraved on the monument's marble tablets.

This list was based on a required War Department muster roll enumerating each soldier's name, rank, regiment, and place of death. This compilation, dated March 14,

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[24] Piehler, *Remembering War the American War*, 57.

[25] Richard V. Francaviglia, *Main Street Revisited: Time, Space, and Image Building in Small-Town America* (Iowa City, Ia.: University of Iowa Press, 1996), 98.

[26] "Laying the Corner Stone of the Monument," *The New Mexican*, November 5, 1867, 1.

[27] Ibid.

1867, documented nearly 200 deceased soldiers.[28] Among them was Captain Alexander McRae, a North Carolina native, who was killed by Confederate troops of the 5th Texas Mounted Rifles Regiment at the Battle of Valverde on February 21, 1862, as well as Private José Romero, a New Mexican who fell the same day in the same engagement.

A Panel as Frontier Manifesto

By the end of 1867, according to a letter from the quartermaster at Fort Union, the inscribed marble tablets produced by the St. Louis Monument Company had arrived in New Mexico by train.[29]

With the start of the new year, the wording intended for the monument began to shift. It is unclear who initiated these revisions, but they occurred shortly after the monument's most prominent advocate, Chief Justice John P. Slough, was killed on December 15, 1867. He was shot by fellow legislator William Logan Rynerson, who had recently introduced a resolution to remove Slough on grounds of unprofessional conduct.[30] This change also coincided with a renewed request from the legislative assembly for additional funds to complete the monument.

In a January 3, 1868 letter to the assembly, the newly appointed territorial secretary, Henry H. Heath, justified the request by noting that the contractor, John & M. McGee, had already expended the original $1,500 appropriation—along with a small sum donated by local citizens—yet the monument remained unfinished.[31] Heath explained that "plans and dimensions [for the monument] were enlarged" after the contract was issued. He estimated that an additional $1,800 would be required to complete the work. The finished monument, he predicted, would "in future ages, be an object of pride to our people, which, as time passes onward, will become more and more sacred in posterity."[32]

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[28] War Department, Adjutant General's Office, ledger entries of deceased Union soldiers from New Mexico and Colorado regiments, top ledger dated March 14, 1867, RSMC.
[29] M. M. McGraw, letter to John P. Slough, December 6, 1867, RSMC.
[30] Darlis A. Miller, "William Logan Rynerson in New Mexico, 1862–1893," *New Mexico Historical Review* Vol. 48, No. 2 (April 1973): 103–4.
[31] Henry H. Heath, letter to the Legislative Assembly, January 3, 1868, RSMC.
[32] Ibid.

Nowhere in Heath's letter is there mention of revised inscription language. Yet by January 21, 1868, the Journal of the House of Representatives recorded that at least two inscriptions had been altered.

The new texts were significantly shorter and more closely resemble those found on the monument today. Further edits consolidated the content of two panels into one, making room for a newly conceived inscription. This final tablet introduced explicit references to frontier violence, presenting Native resistance as an obstacle to territorial settlement—a perspective that reflected the dominant attitudes of territorial officials.

The change in text was made explicit in a legislative act dated January 29, 1868, which also authorized the increased funding. The act criticized the original inscriptions for making "no provision . . . for honoring the brave victims who have perished in the various wars with the savage Indians surrounding us."[33] This marked a decisive shift: what had begun as a Union war memorial was now expanded to include a panel adopting racialized language and valorizing loosely defined "battles" against Native peoples.

During the Civil War period, Union soldiers in the Southwest were simultaneously engaged in military campaigns against Indigenous nations—a multi-faceted conflict later described as the "Three-Cornered War."[34] Losses suffered in these campaigns likely motivated the addition of this new text, broadening the memorial's commemorative scope beyond the Civil War alone.

The "Savage" Panel: Confronting a Dehumanizing Term in Its Historical Context

The term *savage*—reprehensible both then and now—was widely used by the U.S. government and many Euro-Americans to characterize Native peoples. Alongside words like *hostile*, it functioned rhetorically to justify the seizure of tribal lands and to rationalize the military suppression of Indigenous resistance.

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[33] New Mexico House of Representatives, *Journal of the House of Representatives of the Territory of New Mexico: Session of 1868-69*, 72.

[34] See Megan Kate Nelson. *The Three-Cornered War: The Union, the Confederacy, and Native Peoples in the Fight for the West* (New York: Scribner, 2020).

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Governor Robert B. Mitchell, in his 1868 annual report on the New Mexico Territory (the same report that documented the change of text), devoted several pages to what he described as the ongoing threat of "hostile" Indians.[35] He drew a sharp contrast between the Pueblo communities—settled agriculturalists who had long adapted to Spanish and later Mexican rule—and the semi-nomadic tribes who resisted American encroachment.

Of the Pueblo communities, Mitchell wrote: "the model tribe of America; they have no animosity towards any living being, peaceful, industrious, honest and among the most prosperous people in the western country, they deserve every attention, and kindness from all classes of people, official or otherwise."[36] In contrast, he expressed "disappointment and regret" over the condition of the frontier, describing it as plagued by "bands of Indians" committing "depredations" on white settlers.

This framework of dividing Native groups into the assimilable and the irredeemable was not unique to the U.S. territorial government. Spanish colonial authorities had long employed a similar classification: *Indios amigos*—the friendly Indians who could be baptized and settled—versus *Indios bárbaros*, or barbarous Indians whose resistance to control marked them as threats requiring military suppression.[37]

Indigenous hostilities most often arose in areas where white settlement encroached on tribal lands. These acts of resistance included livestock raids, the burning of homes, and, at times, the killing of settlers. Some conflicts were more prolonged and deadly — especially for Indian combatants — such as the Apache wars, which began and ended outside the scope of the Civil War. While these actions had a profound impact on frontier life, they were often defensive responses rather than acts of unprovoked aggression

[35] New Mexico House of Representatives, *Journal of the House of Representatives of the Territory of New Mexico: Session of 1868-69*, 26-28.
[36] Ibid.
[37] See David J. Weber, "American Westward Expansion and the Breakdown of Relations Between *Pobladores* and 'Indios Bárbaros' on Mexico's Far Northern Frontier," *New Mexico Historical Review* 56, No. 3 (July 1981): 221–38.

In response to these depredations, the U.S. established military outposts throughout the region — such as Fort Fauntleroy (later Fort Wingate) and Fort Stanton — intended to assert federal control and protect settler interests. These local engagements formed part of the larger Indian Wars, during which the U.S. military conducted extended campaigns to suppress resistance by the Apache, Navajo, and Comanche peoples. Among the most devastating of these campaigns was the Long Walk of the Navajos, carried out under Union officers General James Henry Carleton and Colonel Kit Carson.

Frequent scouting missions further antagonized tribes, often leading to direct confrontations between soldiers and Native communities, and these engagements appear to be what the Santa Fe Soldiers' Monument is commemorating

The same March 14, 1867 document that recorded Union soldiers killed in conflicts with Confederate forces also included a tally of soldiers "Killed by Indians . . . while on Scouts and Skirmishes in the Territory of New Mexico."[38] The 25 individuals listed—including one civilian—were a mix of Anglo and Hispanic soldiers, and likely one African American. The entry for Private Juan Lucero notes that he was killed on June 24, 1863, "in a fight with Indians on the Jornada del Muerto." First Lieutenant Henry W. Gilbert was killed on August 25, 1864, in what is described as an "Ambush in the Sacramento Mountains."[39]

The background of these scouting-type deaths was elaborated in various federal reports addressing frontier conditions and the so-called "Indian problem." The entry for Lieutenant Gilbert lays out the chronology of the incident and is significant for signaling the asymmetrical nature of these conflicts:

> August 25.—Captain Francis McCabe, 1st cavalry New Mexico volunteers, reports that while on a scout after Indians in the Sacramento mountains, he detached a party under Lieutenant Henry W. Gilbert, of the same regiment, to follow the trail of the Indians. Lieutenant Gilbert took with him twenty men. The party, although warned by the guide, marched in a body directly into an ambush, when Lieutenant Gilbert was killed at the first fire. The guide Sanches and Private Ma. Sandoval were killed and three men wounded. One Apache killed and five

[38] Ledger of entries for deceased Union soldiers and one citizen involved in Indian War skirmishes in New Mexico, RSMC.
[39] Ibid.

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> wounded. This command were leading their horses when the attack was made. The men, after the fall of their officer, shamefully abandoned their horses. The Indians got the most of the horses and equipments.[40]

If, based on the short list of soldiers included in the monument commission's records, the objectionable text on the north tablet was meant to memorialize soldiers killed in these small scouting skirmishes and not in larger, pre-planned battles such as those against the Chiricahua Apache — in which, over time, hundreds of soldiers were killed, some quite brutally — then this context suggests a different historical intent behind the inscription.[41]

Within this context, the Santa Fe Soldiers' Monument can be compared to another western monument: the memorial at the site of the Bear River Massacre erected in 1932, near present-day Preston, Idaho—a monument that still stands and has not had to be physically altered or removed. On January 29, 1863, U.S. Army forces under Colonel Patrick Connor attacked a winter encampment of the Northwestern Band of the Shoshone, killing an estimated 250 to 400 people—most of them women, children, and the elderly.[42]

For decades, the commemorative marker at the site described the event as a "battle," focusing solely on the loss of soldiers and omitting any recognition of the Shoshone victims. This erasure became a focal point for criticism, as it reframed a massacre as a military victory and excluded the profound human cost to Native communities.[43]

By contrast, the Santa Fe Soldiers' Monument—while deeply problematic in one panel's use of the word *savage* —was not originally conceived as a memorial to Indian conflict.

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[40] Joint Special Committee of the two Houses of Congress, *Condition of the Indian Tribes: Report of the Special Committee*) Washington, D.C. Government Printing Office, 1867), 263. Interestingly, neither Sanches nor Sandoval appears on the March 14, 1867, list of deceased soldiers.

[41] Historian Megan Kate Nelson describes an 1862 incident during a Chiricahua campaign in the Dragoon Mountains, where combatants captured two Union escorts, tied them to poles, started a fire beneath them, shot their torsos with arrows, and slashed their arms and legs with lances (*The Three-Cornered War* (2020), 136–137

[42] See Kass Fleisher, *The Bear River Massacre and the Making of History* (Albany, N.Y.: State University of New York Press, 2004).

[43] "Kerry's Indian Killer," *Gloryhunter*, hosted by Jerry O'Sullivan, August 8, 2023, podcast, https://open.spotify.com/show/57T37XxHcdkdqV62eeLen9.

Rather, it began as a Union war memorial, with later additions expanding its commemorative scope.

Completion and Dedication

On January 29, 1868, the territorial legislature approved revised wording for the monument's four tablets and appropriated $1,800 to complete the work with the new inscriptions.[44] They also restructured oversight, establishing a new body—now called the Board of Monument Commissioners—composed of the territorial secretary, the territorial treasurer, and likely the judge of Santa Fe County, to supervise the monument's completion.

As before, the new board contracted John & M. McGee to carry out the construction. A newspaper article dated March 24 reported that the firm had "commenced the work of cutting the slabs and the inscriptions," suggesting that the earlier tablets, fabricated by E. W. Warne's St. Louis marble works, had been scrapped or possibly repurposed to accommodate the revised wording.[45] This likely also explains the misspelling of "February"—a lapse unlikely to have occurred under the hand of the professional monument maker from St. Louis.

By the end of May, the marble work was completed, and the Soldiers' Monument stood finished by the following month. A short article in the *New Mexican* praised the result as a "beautiful and chaste memento of the brave men who fell in New Mexico that the nation might live" (Fig. 4).[46]

A Place of Mourning and the Center of the City

The early use of the Soldiers' Monument was overseen by the Grand Army of the Republic (G.A.R.), a veterans' organization established in 1866 that played a significant role in commemorating the Civil War through the early twentieth century. Like many

[44] New Mexico House of Representatives, *Journal of the House of Representatives of the Territory of New Mexico*: Session of 1868-69, 72.
[45] "The Monument," *The New Mexican*, March 24, 1868, 2
[46] "The Soldiers Monument," *The New Mexican*, June 9, 1868, 2.

communities sympathetic to the Union, Santa Fe formed a G.A.R. post, which established a hall on the west side of the Plaza.[47]

Following the death of General Benjamin Clark Cutler in October 1868—then serving as Assistant Adjutant General of the Department of New Mexico and a veteran of the Union Army— the G.A.R. draped the Santa Fe Soldiers' Monument in black mourning crepe as a public tribute.[48] Contemporary newspaper accounts indicate that the G.A.R. similarly adorned the monument with black funeral bunting on other occasions to honor fallen Union soldiers (Fig. 5). Based on accounts of similar G.A.R. commemorations elsewhere, local officials and veterans in blue uniforms attended these ceremonies, which were conducted in a solemn, almost reverential atmosphere.

Erected eight years before the creation of the Santa Fe National Cemetery—and prior to the formal exhumation and reinterment of many wartime dead—the monument served as a symbolic collective grave marker for Union soldiers from the New Mexico and Colorado territories.

Beginning in 1869, the monument became a central gathering place for Decoration Day, an observance introduced by the G.A.R. to honor fallen soldiers, which later evolved into Memorial Day (Fig. 6). An article reporting on the event described the use of the Soldiers' Monument for this purpose in detail:

> The base of the monument was draped with white and black, the national flag being interwoven; the shaft was entwined by evergreens, surmounted by the national flag bearing upon it 'G.A.R.' Wreaths of evergreens also clustered about the base and shaft of the monument, indicating doubtless that the crown of ever-living green belongs to those who died for our country.[49]

This elaborate decoration underscored the community's deep reverence and solemn respect for those who sacrificed their lives, transforming the monument into a powerful focal point of civic unity and collective memory. In later years, Santa Feans gathered at

[47] "Kit Carson Post No. 1," *The Daily New Mexican*, September 3, 1868, 1.
[48] "Death of General Cutler," *The New Mexican*, October 19, 1868, 1.
[49] Untitled article about Decoration Day, third column, first item. *The Daily New Mexican*, May 31, 1869, 1.

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the monument to mourn the loss of national figures such as Presidents Garfield and Grant.

At the turn of the twentieth century, the Soldiers' Monument played a pivotal role in shaping Santa Fe's future development. When the U.S. Government Land Office surveyed the original Spanish town grant—formally conveyed to the city by act of Congress on April 4, 1900—it designated the monument as the central point of reference.

From this fixed location, surveyors projected the four Spanish leagues (each roughly 2.6 to 2.7 miles square) that defined the extent of the original town grant, later formalized through a United States patent to the City of Santa Fe.[50] Using this geographical data, the city platted 23 new blocks and, in 1909, officially extended its corporate limits by approximately 10.6 square miles. For many years, the Soldiers' Monument was quite literally the center of Santa Fe. Attached to the monument's base is a 1932–33 National Geodetic Survey marker, which is still used for surveys.)

The Soldiers' Monument remained a central gathering place for public mourning and national celebration through the early twentieth century. However, its role began to shift after World War I. As the Civil War receded from living memory and national focus turned toward global conflicts, the influence of the G.A.R. and the cultural prominence of Civil War monuments declined.

At the same time, the Santa Fe Plaza was reimagined as a prime tourist destination, prompting several efforts to remake it in the style of an idealized Spanish Colonial Plaza. The monument, with its solemn origins and neoclassical form, clashed with these aesthetic visions. It was after this period that people began to refer to the monument as "The Obelisk"—a verbal distancing that signaled a fading connection to its original meaning. This conflict between meaning and commercialization would prompt several attempts to relocate the monument to create a more palatable, tourist-friendly object in the center of the Plaza.

[50] Patent, United States of America to City of Santa Fe, recorded March 8, 1901, Book G1, Page 612, Instrument # 1901000225, Santa Fe County, New Mexico.

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Efforts to Remove the Monument

Predating the efforts to recast the Plaza in the image of a romanticized past, the Soldiers' Monument faced early demands for removal—not over the word "savage," as might be assumed today, but over the term "rebel."

Although "rebel" and similar epithets were widely used during the Civil War to describe Confederate soldiers, the term was rarely—if ever—employed on memorials. Santa Fe's monument was a striking exception. In 1880, the city even boasted that its obelisk was the only Civil War monument in the country to include the word "rebel."[51] Postcards from the 1940s continued to note this unusual phrasing, with some sensationally referring to the Soldiers' Monument as the "Rebel Monument."

But by the early 1900s, the term began to offend some, including John Y. Hewitt, a former New Mexico G.A.R. commander and Democratic representative from White Oaks, in Lincoln County. During the 1909 legislative session, Hewitt introduced Joint Council Resolution No. 13, proposing that the word "Confederate" replace "rebel" and that the misspelling of "February" on the south tablet be corrected.[52]

Former territorial governor L. Bradford Prince publicly opposed the resolution. In his speech to the legislature, Prince questioned the justification for what he called an attempt to "mutilate the monument and blot its words."[53] He closed his address with a firm warning: "Let us build what structures we choose and inscribe as we desire. But let us not presume, in 1909, to substitute our words for those which the representatives of the people chose to use in 1867." Prince's influence was enough to kill the bill, but the issue did not disappear.

The debate resurfaced again in 1931, when Gertrude Harris Cook, a part-time Santa Fe resident and contributor to the *Dallas News* Sunday magazine, objected to the term

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[51] "From Thursday's Daily" [tenth item down], *Weekly New Mexican*, 24, 1880, 1.
[52] "To Build a Stone Arch," *Santa Fe New Mexican*, March 8, 1909, 8.
[53] L. Bradford Prince, "Soldiers' Monument in the Plaza of Santa Fe," reprint of March 8, 1909, speech to the New Mexico Territorial Legislative Assembly. Miscellaneous copies of historical documents collected by the City of Santa Fe employee, Mary Grzeskowiak in 1994, and collected under the name, Plaza Research December 1994. Hereafter, PRD94.

"rebels," which she argued was offensive to those with Confederate ancestry.[54] The *Santa Fe New Mexican*, in an editorial titled "Leave Texas at Home," mocked Cook's concern and tied it to what it called the "Texas Invasion."[55] Cook responded in kind, igniting a war of words over the monument's phrasing.

The issue quieted but reemerged in 1935 during renewed discussions about the need to renovate the Plaza. The Santa Fe Planning Association, a volunteer civic group, sought to use federal New Deal funding to reshape the public space. They launched a public contest soliciting ideas to "improve" the Plaza, with the *New Mexican* publishing citizen suggestions that ranged from preserving the Soldiers' Monument to relocating it elsewhere.

One writer proposed relocating the monument to Fort Marcy Hill—"where it has always belonged"—and replacing it with a sunken pool.[56] Others suggested moving it to a different location within the Plaza. Gertrude Harris Cook reappeared, again objecting to the word "rebels," and proposed relocating the monument to Glorieta or Valverde, reflecting the idea of the original 1867 legislation. In its place, she suggested rebuilding the nineteenth -century bandstand.[57] This was something that architect John Gaw Meem would agitate for some 40 years later.

Given that the project was funded by the Federal Emergency Relief Administration—precursor to the Works Progress Administration—it's unlikely the federal government would have approved the destruction of a historic monument. Instead, the 1935 redesign enhanced the monument's surroundings. Obtrusive metal lights attached to it were removed, a circular seating wall was added, and artist Will Shuster designed new lighting.[58] The landscaping improved radial walkways, added flagstone paving, cleared overgrowth, and planted evergreens around the structure (Fig. 7).[59]

The monument—now more often referred to as "The Obelisk"—remained largely unchallenged for the next 30 years, until another Plaza renovation again stirred public

[54] "Humiliating" [editorial], *Santa Fe New Mexican*, September 12, 1931, 4.
[55] "Leave Texas at Home" [editorial], *Santa Fe New Mexican*, September 15, 1931, 4.
[56] Letter published by Alice M. Crook, *Santa Fe New Mexican*, July 12, 1935, 2.
[57] "Texas Lady Again Wants to Remove Soldiers' Monument," *Santa Fe New Mexican*, July 19, 1935, 8.
[58] "Rapid Work on the Plaza," *Santa Fe New Mexican*, August 22, 1935, 6.
[59] "The Plaza," *Santa Fe New Mexican*, July 10, 1935, 6.

debate. As before, the controversy began with words, again playing out in the *New Mexican*.

Columnist Spuds Johnson, writing in 1961 in his "Gadfly" column, claimed that 99% of the population didn't know of the Soldiers' Monument origin.[60] What began as a casual musing quickly turned contentious. Johnson's defense of the phrase "savage Indians" sparked outrage with some (Fig. 9).

In response, the *New Mexican* published an editorial condemning the term and endorsing the removal of the obelisk to make space for a statue of Don Diego de Vargas—arguing that such a monument would allow Santa Fe to "advertise the real source of our civic pride."[61] The suggestion of erecting a statue of de Vargas was uninformed, given that under his leadership numerous Pueblo Indians were killed or enslaved during the Reconquest and subsequent conflicts.[62]

More personal was a letter from Carlos Vigil, a member of Tesuque Pueblo, who wrote that since childhood, the language etched on the monument's north panel had made him feel like "a second-class citizen living in an alien land—a land which I had always previously thought of as being my own, and that of my forebearers for untold centuries."[63]

The page on which Vigil's letter appeared also included a cartoon depicting an older man in overalls and a brimmed hat, speaking with a much younger Native American youth. With an air of local authority, the man tells the youth that the obelisk represents "the exact center of the world," an oblique commentary on the ongoing controversy surrounding the Soldiers' Monument (Fig. 10).

Weighing into the controversy, Oliver La Farge argued that the offensive phrase should be understood within the "crudity" of frontier language and the historical violence of the time."[64] The monument is authentic," he wrote in the New Mexican, "it's

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[60] Spuds Johnson, "The Santa Fe Gadfly," *Santa Fe New Mexican*, June 11, 1961, 4.
[61] "The Place of Honor" [editorial], *Santa Fe New Mexican*, July 10, 1961, 4.
[62] See Jessie B. Bailey, *Diego de Vargas and the Reconquest of New Mexico. 1692-1704* (Albuquerque: University of New Mexico Press, 1940).
[63] "More Heroes," letter published by Carlos Vigil, Santa Fe New Mexican, July 9, 1961, 9.
[64] Oliver La Farge, "Obelisk Relic of Frontier," *Santa Fe New Mexican*, June 16, 1961, 15.

unpretentious, it is a true recording of an important passage in New Mexico history." He insisted the phrase "means exactly what it says, and furthermore is accurate," adding that he knew of no "recorded case of the Comanches killing anyone with kindness."[65]

The monument survived this early battle of ideology and emotion but would be threatened again by a powerful architect who wanted to remake the Plaza to suit his vision.

The Monument Stays

In January 1966, concern about the town's lackluster economy led to the formation of the Santa Fe Development Committee. The group, an offshoot of the Chamber of Commerce, aimed to transform downtown Santa Fe into "a dynamic and efficient center of commercial and [civic] activities."[66] Its multi-pronged program initially focused on the Plaza, with the goal of making it more attractive to both locals and tourists.

Architect John Gaw Meem saw in the business-friendly initiative a way to revive his long-held desire to re-introduce *portales* to the public square. The architect was sympathetic to the committee's cause, finding some parts of the Plaza had become, in his estimation, "shoddy."[67] He also wanted to remove the Soldiers' Monument so that he could rebuild the bandstand he remembered when he first relocated to Santa Fe in 1920.

As noted by Bainbridge Bunting, "Meem's efforts to improve the Plaza span[ned] his entire professional career."[68] His involvement began in 1931, when Cyrus McCormick Jr.—son of the famed industrialist and inventor—announced a design contest to remake the Plaza in the new Santa Fe Style. According to the New Mexican, the contest aimed to "center the 'Santa Fe Style' in the Plaza as the heart of the City Different."[69] Meem, serving both as a contest committee member and McCormick's local architect, won the prize for his plan.

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[65] Ibid.
[66] "Development Committee Reports of Its Progress," *Santa Fe New Mexican*, March 22, 1966, 1.
[67] "Renovation of Historic Plaza Under Study," *Santa Fe New Mexican*, April 7, 1966, B6.
[68] Bainbridge Bunting, *John Gaw Meem: Southwestern Architect* (Albuquerque: University of New Mexico Press, 1983), 17.
[69] "Plaza Prize," *Santa Fe New Mexican*, April 22, 1931, 1.

First drafted in 1931, Meem's scheme proposed block-long portales along the east and west sides of the Plaza, with a partial portal on the south side. Nostalgic in tone, the plan also called for renaming surrounding streets to evoke a more Spanish character. Meem's original scheme blended Spanish-Pueblo and Territorial Revival elements, creating a hybrid stylistic template. Although the plan was never implemented—largely due to the Great Depression—his interest in reshaping the Plaza's commercial façades and public space persisted.

Thirty-six years later, at the request of Mayor Pat Hollis, Meem prepared a renovation study for the Plaza. His proposal called for new portal structures along each side of the public space—except at the Palace of the Governors, where the existing portal would be retained—and included new brick sidewalks and other improvements.

For the second phase, Meem envisioned installing his long-desired bandstand at the Plaza's center, which would require the removal of the Soldiers' Monument. He believed both changes would help declutter and unify the Plaza's landscape (Fig. 11).[70] Meem proposed relocating the Soldiers' Monument to the new capitol grounds, as he and the city concluded it was a state-owned structure.

The architect's proposal was not universally embraced. In a letter to the *New Mexican*, Jeffrey Ingram, a member of the Sierra Club, criticized the plan for promoting excessive conformity and questioned the rationale for removing the monument merely "so that a spurious symmetry may be imposed."[71]

A more influential voice, Dr. Myra Ellen Jenkins—state archivist and noted historian—offered a pointed critique in an October 1967 issue of *Pasatiempo*. Jenkins challenged Meem's justification for moving the monument to the state capitol complex as "far-fetched," since it was a product of territorial history and played an important role representing the geographical center of Santa Fe.[72]

Given the public pushback—and the position of then-Mayor Joseph Valdes,

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[70] "John Gaw Meem Proposes Plan to Revamp Old Santa Fe Plaza," *Santa Fe New Mexican*, September 17, 1967, D-8.

[71] "Dismay with Plaza Proposal," *Santa Fe New Mexican*, April 19, 1966, 4.

[72] "Archivist Opposes Plans to Change Santa Fe Plaza," *Santa Fe New Mexican, Pasatiempo*, October 1, 1967, 1.

who would not permit the monument's removal as it was state property—Meem revised the second phase of his plan to retain the Soldiers' Monument. In a 1970 memo, Meem explained his decision:

> It is recommended the Frontier or Soldiers Monument be retained in its present position in the center of the Plaza. It is true this is a State and not a City Monument and that its removal to a position of equal honor in the State Capitol complex would enable the City to utilize the site for a gayer more functional use. This removal was recommended in a previous pre-revision issue of this Phase II project. However, in view of the strong protest evoked, and in view of the fact that part the historicity of this Monument is due to the fact of its present location, it is recommended that it not to be moved.[73]

Meem went on to recommend that the monument should be "restored to its original condition."[74]

AIM Confronts the Past

While the Plaza was undergoing its second round of renovations — including new brick paths, a seating wall around the Soldiers' Monument, a performance platform, and other enhancements — the wording of the north panel became, for the first time, a significant public controversy involving both state and city governments. Notably, this challenge did not originate locally but came from the American Indian Movement.

The formation of the American Indian Movement (AIM) in 1968 had galvanized Indigenous communities across the country to challenge systemic racism, broken treaties, land dispossession, and generational poverty. The movement gained national attention with the two-year occupation of Alcatraz Island (1969–1971), followed by the 1973 standoff at Wounded Knee.

A few months after the Wounded Knee Occupation, the City of Santa Fe began receiving communications from AIM calling for the removal of the monument's north panel.

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[73] John Gaw Meem, "Phase II (Revised April 22, 1970), Santa Fe Plaza Renewal Project" [typed report], PRD94.
[74] Ibid.

David Hill, a Choctaw leader and AIM member, wrote to the city, stating that the inscription represented "a source of perpetuating racism and prejudice through the character assassination of our forefathers."[75]

Responding swiftly, on July 25 the Santa Fe City Council voted unanimously to remove the entire monument. Mayor Joseph Valdes declared his support. Yet reality soon intervened: it was determined that removing the monument would jeopardize the second phase of federal funding for the Plaza's renovation.[76] The council immediately rescinded its vote, and the monument—along with its objectionable panel—remained.

Governor Bruce King, acknowledging the controversy, initially proposed replacing the word "savage" with "fierce," but this substitution was dismissed by historians as superficial.[77] King then tasked the Cultural Properties Review Committee (CPRC), the state's preservation authority, with drafting a contextual plaque to explain the term's nineteenth-century usage.

This "solution," as it was called, was reportedly endorsed by a majority of Native American representatives in New Mexico. As a state planner involved in the project explained to a constituent, Pueblo leaders and historians agreed to approach the problem with the idea that 'the present can try to explain the past, but should never pressure to try to change it."[78] David Hill of AIM rejected the plan, describing it as a "tokenistic action" and likening it to "an attempt to squelch the desires of Indian people seeking an end to racism."[79]

Despite AIM's objections, the CPRC moved forward with the explanatory text, continuing the effort into the following year. But before the plaque could be installed,

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[75] John Gillis, "Plaza Monument Removal Sought," *The New Mexican*, July 26, 1973, 1.
[76] "State Aid Says Monument, Grant Tied," *The New Mexican*, September 25, 1974, 1. The City of Santa Fe entered into dialogue with the United States Department of Housing and Urban Development in 1972 about securing a grant to restore the Plaza. The grant, formalized in 1974 under Title IV of the Housing and Urban Development Act of 1970, required the City to consult under Section 106 of the National Historic Preservation Act for any proposed work in the Plaza or adjacent areas that might affect historical resources. This included future work and "conversions" beyond the original grant timeline and remained a practice for many years. Various documents, PRD94.
[77] Ibid., "Plaza Solution Seen," *Sunday New Mexican*, July 29, 1973, 1.
[78] David L. King, letter to Ronald A. Brinkman, December 18, 1973, PRD94.
[79] "Plaza Monument Dispute Reopened," *The New Mexican*, November 11, 1973, 6.

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on the morning of August 8, 1974, a man—described as wearing a worker's uniform and having long blond hair—methodically chiseled the word "SAVAGE" from the north panel.[80]

Interviewed by the *Santa Fe New Mexican*, Del Lovato, chairman of the All-Indian Pueblo Council, remarked: "Somebody finally did illegally what we couldn't do legally."[81] And for nearly fifty years, the space where the offensive word once stood remained blank, serving as both a curiosity and a regular stop on historical walking tours where the controversy was retold and debated.[82]

"Decolonize"

Following the murder of George Floyd on May 25, 2020, the country entered what many in the media described as a "national reckoning," a moment marked by widespread reexamination of public symbols linked to racial injustice and white supremacy. The immediate focus was on Confederate statuary, prompting a wave of removals that ranged from orderly, city-led actions to spontaneous vandalism and topplings by protestors.[83] However, the anger and demand for racial justice quickly extended beyond Civil War monuments to encompass a broader set of figures—both real and perceived—associated with conquest and violence.

In Albuquerque, the city preemptively removed a statue of Juan de Oñate, the Spanish colonial governor known for brutal campaigns against Indigenous peoples. In Madison, Wisconsin, angry protestors tore down and decapitated a statue of Hans Christian Heg, a Norwegian immigrant, abolitionist, and Union officer who died fighting in the Civil War. By the end of 2020, more than 90 monuments had been taken down across the country.[84]

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[80] Joe Schubert, "Monument's Word Removed," *The New Mexican*, August 8, 1974, 1.
[81] Ibid.
[82] Santa Fe tourist guides explained the event, which was also discussed in local histories and city guidebooks.
[83] See Kristin Ann Hass, *Blunt Instruments: Recognizing Racist Cultural Infrastructure in Memorials, Museums, and Patriotic Practices* (Boston: Beacon Press, 2023).
[84] Michelle Boorstein, "Destroying Confederate Monuments Isn't Erasing History—It's Learning It," *Washington Post*, June 19, 2020, https://www.washingtonpost.com/outlook/2020/06/19/destroying-confederate-monuments-isnt-erasing-history-its-learning-it/.

Santa Fe was not immune to this reckoning. In June 2020, following the removal of the Albuquerque Juan de Oñate statue and the relocation of another in Española, the city's Soldiers' Monument became the next target. Although its most inflammatory word, "savage," had been removed years earlier, the monument remained, to many, a potent symbol of colonial and racial injustice.

On June 13, protestors gathered around it, calling for its removal. Red paint was smeared on the obelisk in the shape of handprints, and a handmade sign—depicting two shackled arms breaking free and reading "DECOLONIZE"—was propped against its wall.[85]

That afternoon, Mayor Alan Webber arrived at the Plaza and delivered a brief, ambiguous speech on freedom, stating, "Freedom is not a noun. Freedom is verb. Freedom is not something we have. It's something we do. It's something we practice, or we risk losing it."[86] He then declared a "state of emergency due to civil unrest stemming from institutional racism," issuing a proclamation that called for the monument's removal by daybreak. A private contractor was hired for the task, but the effort was ultimately abandoned after it became clear that the monument could not be dismantled without causing significant damage.[87]

The issue simmered throughout the summer, with the *New Mexican* publishing letters almost daily, either supporting or opposing the monument's removal. For those in favor, the monument's transgressions went far beyond the already-removed word on the north panel; they viewed the entire structure as a symbol of colonial subjugation. By fall, as Indigenous Peoples' Day approached, the simmer turned to a hard, rolling boil.

The occasion culminated in a three-day occupation of the Plaza, marked by speeches, chants, and a growing call to tear down the Soldiers' Monument. Around 1:00 p.m. on

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[85] Daniel J. Chacón and Amanda Martinez, "Demonstration and Celebration, *Santa Fe New Mexican*, June 19, 2020, A1.

[86] Ibid.

[87] Daniel J. Chacón, "Obelisk in Plaza Vandalized," *Santa Fe New Mexican*, June 23, 2020, A-5. A plan to remove the monument in the middle of the night has been variously — and sometimes sensationally — reported. Determining what occurred would likely require an IPRA request.

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October 12, with the Plaza crowded with activists, onlookers, and tourists, protestors looped a chain around the obelisk.[88]

Using multiple yellow hauling straps—some held by hand, others tied to a pickup truck—they pulled down the first section of the shaft, which fell into the fenced enclosure. They repeated the effort, ultimately bringing the remaining segments crashing to the ground (Figs. 12 & 13). As a final gesture, protestors climbed atop the now-empty monument base and unfurled a large black-and-white "Land Back" banner, signaling the end of the action.

Following the vandalism, eight individuals—Lily Schweitzer, Ryan Witt, Dawn Furlong, Melissa Rose, Lauren Straily, Zachary Young, Sean Sunderland, Dylan Wrobel, and Stephen Fox—were arrested on various charges, including criminal damage to property and trespass, with one individual additionally charged with battery upon a peace officer.[89]

Most of the defendants were diverted into a restorative justice program, resulting in the dismissal of charges upon completion. In their collective statement, they acknowledged the harm caused and noted that, through the program, they had "endeavored to play a part in the healing of that trauma locally, and as a fragment of the larger national mosaic."[90]

The city quickly enclosed the base of the monument in a protective plywood box, sheathed in cement board (Fig. 14), and later painted to resemble adobe. Potted plants were arranged inside the surrounding fence to soften the site's appearance.

By the following year, a framed proclamation appeared on the monument's south face, contextualizing the toppling and outlining the city's CHART initiative—Culture, History, Art, Reconciliation, and Truth (Fig. 15). According to the city, the $265,000 program was

[88] Alex De Vore, "The Monument Comes Down," *Santa Fe Reporter*, originally reported via Facebook, October 12, 2020, reissued March 9, 2023, https://sfreporter.com/news/obelisk-comes.
[89] Katherine Lewin, "*The Sixth Charged, Santa Fe Reporter*, November 20, 2020, https://sfreporter.com/archives/sixth-charged.
[90] "Statement of the Defendants," *State of New Mexico, County of Santa Fe First Judicial District Court, State of New Mexico v. Dylan Wrobel, et al.*, signed February 1, 2022.

intended "to foster mutual understanding of shared values among individuals and groups with diverse backgrounds."[91]

In response to a 2021 civil lawsuit filed against Mayor Webber and the City of Santa Fe by Union Protectiva de Santa Fe—a longstanding Spanish heritage fraternal organization—District Judge Matthew Wilson ruled in December 2024 that the plywood enclosure be removed within 30 days. This decision led to the monument's first public exposure in over four years on January 13, 2025.[92]

The Santa Fe Soldiers' Monument was subsequently surveyed in early March to document its present condition and to evaluate its potential Contributing status within the Downtown and Eastside Historic District.

[91] City of Santa Fe, "Culture, History, Art, Reconciliation, and Truth (CHART)," https://santafenm.gov/chart?utm_source.

[92] Carina Julig, "Coming Back into View," *Santa Fe New Mexican*, January 14, 2025, A1 & A4.

Historic Cultural Properties Inventory (HCPI) Detail Form (FORM 2)

Historic Preservation Division, New Mexico Department of Cultural Affairs

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Evaluation of Historical Status

The Santa Fe Soldiers' Monument is of great significance, both historically and in the present day. At over 150 years old, it is one of the most authentic historical resources in the City of Santa Fe. It is already listed under both the State and National Register designations for the Santa Fe Historic District.[93]

While the monument has been affected by its long and complex history — culminating in the 2020 vandalism and toppling of its obelisk — it retains its overall form and design. Based on common practices outlined in the Secretary of the Interior's Standards, the obelisk could be reconstructed or replicated in kind without adversely affecting the monument's historical integrity.

Accordingly, the Santa Fe Soldiers' Monument is eminently eligible for Contributing Structure status within the Downtown and Eastside Historic District.

The monument could be evaluated for Significant Structure status in the future, once the obelisk is repaired or reconstructed and returned to its base.

[93] Steven Moffson, letter to Virgil J. Vigil, April 24, 2025.

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Illustrations

Figure 1: Bull Run, Va. Dedication of the battle monument; Judge Abram B. Olin of the District of Columbia Supreme Court, who delivered the address, stands by the rail," William Morris Smith, June 10, 1865, Courtesy of the Library of Congress.

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Figure 2: 1863 Kensington Soldiers' Monument, Berlin, Connecticut, ca, 1920s, public domain.

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Figure 3: 1907 14th New Jersey Volunteer Infantry Monument, Monocacy National Battlefield, John W. Murphey, June 25, 2025.

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Figure 4: Early photograph of the Santa Fe Soldiers' Monument. This image is cropped from "East side of Plaza, Santa Fe, New Mexico," Nicholas Brown, ca. 1868-69, Negative No. 011252. Courtesy of Palace of the Governors Photo Archives, New Mexico History Museum.

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Figure 5: "Soldiers Monument on the Plaza, Santa Fe, New Mexico," Nicholas Brown, ca. 1860-70s, Negative No. HP.1974.25.21. Courtesy of Palace of the Governors Photo Archives, New Mexico History Museum.

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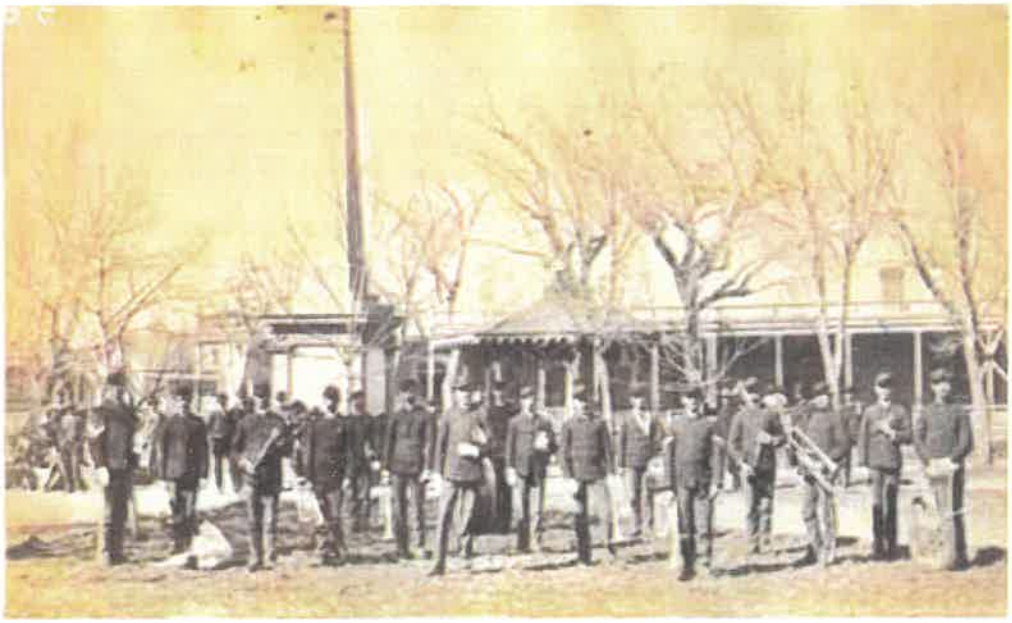

Figure 6: "13th United States Infantry Band, Plaza, in front of Palace of the Governors, Santa Fe, New Mexico," James R. Riddle, ca.1868, Negative No. 001705. Courtesy of Palace of the Governors Photo Archives, New Mexico History Museum.

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Figure 7: Ca. 1940s postcard of the Plaza showing 1935 New Deal improvements, including introduction of flagstone section and a circular wall around the Soldiers' Monument. Courtesy of Curt Teich Postcard Archives Collection.

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Figure 8: 1950s photograph of Santa Fe Plaza. Note steel fence. Courtesy of Medwick Closet.

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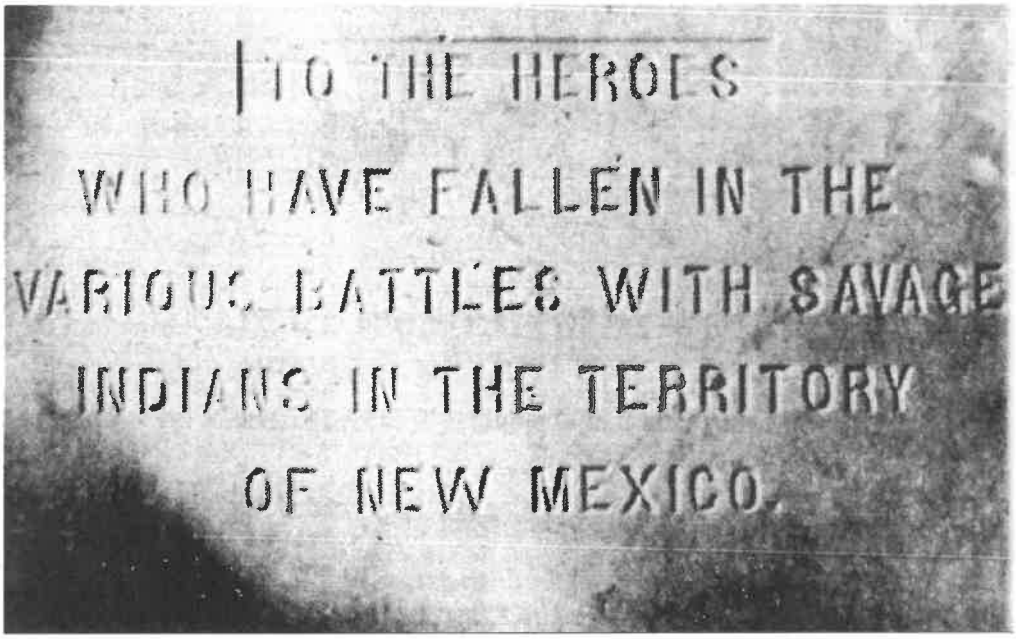

Figure 9: North panel inscription, ca. 1968. Courtesy of the Santa Fe New Mexican.

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Figure 10: Editorial cartoon drawing, July 1961. Courtesy of The Santa Fe New Mexican.

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Figure 11: 1968 aerial photograph showing plantings and circular seating bench. Architect John Gaw Meem found this arrangement to be too cluttered. Courtesy of the New Mexico Department of Transportation.

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Figure 12: Last piece of four-part obelisk being torn down, Katherine Lewin, October12, 2020. Courtesy of the Santa Fe Reporter.

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Figure 13: Toppled obelisk. Adrianna Vigil, October 12, 2020. Courtesy of Adrianna Vigil. See Figure 16.

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Figure 14: South and east elevations. John W. Murphey, June 28, 2021.

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Figure 15: South elevation. John W. Murphey, July 18, 2021.

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Figure 16: Four pieces of Santa Fe Soldiers' Monument obelisk in storage at the Santa Fe Regional Airport. David Rasch©, May 22, 2024. Courtesy of David Rasch.

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Survey Photographs

(All images taken by John W. Murphey, with the specific date noted.)

Photo 2: East approach and context. Camera facing west. May 24, 2025.

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Photo 3: South elevation. Band rehearsing. Camera facing north. May 24, 2025.

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Photo 4: Seating wall. South elevation. Camera facing north. March 14, 2025.

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Photo 5: East elevation and picket fence. Camera facing west. March 7, 2025.

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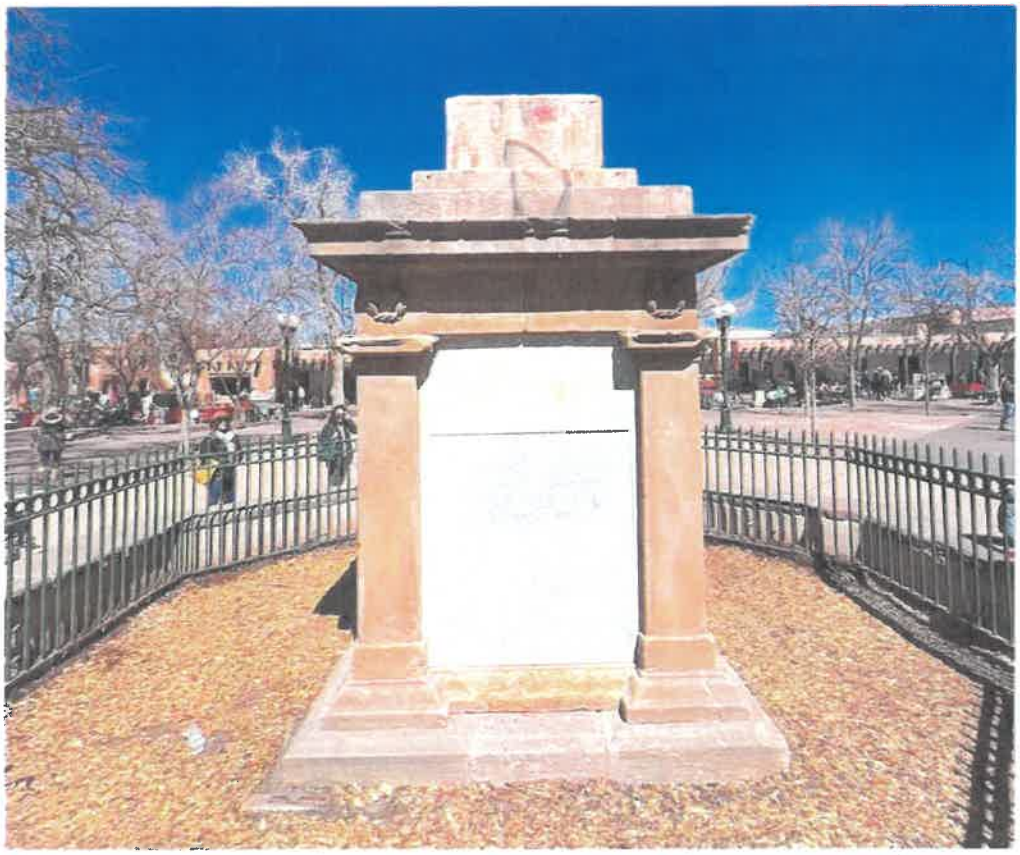

Photo 6: South elevation. Monument composition. Camera facing north. March 16, 2025.

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For HPD Office use only: HCPI No._____ District No._____	***Please complete HCPI FORM 1 before completing FORM 2*** NRHP ___SRCP Criteria __A __B __C __D	
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Photo 7: South elevation. Base. Camera facing down. March 16, 2025.

Historic Cultural Properties Inventory (HCPI) Detail Form (FORM 2)

Historic Preservation Division, New Mexico Department of Cultural Affairs

For HPD Office use only HCPI No._____ District No._____	*Please complete HCPI FORM 1 before completing FORM 2* ___NRHP ___SRCP Criteria __A __B __C __D	
1. Name of property: Santa Fe Soldiers' Monument Soldiers' Monument The Obelisk	2. Location: Santa Fe Plaza Downtown and Eastside Historic District –Santa Fe	3. Local Reference Number: Santa Fe ID: N/A 4. County: Santa Fe 5. Date of Survey: March 14, 2025

Photo 8: South elevation. Main shaft and tablet. March 16, 2025.

Historic Cultural Properties Inventory (HCPI) Detail Form (FORM 2)

Historic Preservation Division, New Mexico Department of Cultural Affairs

For HPD Office use only: HCPI No._____ District No._____	***Please complete HCPI FORM 1 before completing FORM 2*** NRHP __ SRCP Criteria __A __B __C __D	
1. Name of property: **Santa Fe Soldiers' Monument** **Soldiers' Monument** **The Obelisk**	**2. Location:** **Santa Fe Plaza** **Downtown and Eastside Historic District –Santa Fe**	**3. Local Reference Number:** **Santa Fe ID: N/A** **4. County: Santa Fe** **5. Date of Survey: March 14, 2025**

Photo 9: South elevation. Architrave. Camera facing northwest. March 16, 2025.

Historic Cultural Properties Inventory (HCPI) Detail Form (FORM 2)

Historic Preservation Division, New Mexico Department of Cultural Affairs

For HPD Office use only: HCPI No._____ District No._____	*Please complete HCPI FORM 1 before completing FORM 2* NRHP SRCP Criteria A B C D	
1. Name of property: **Santa Fe Soldiers' Monument** **Soldiers' Monument** **The Obelisk**	**2. Location:** **Santa Fe Plaza** **Downtown and Eastside Historic District –Santa Fe**	**3. Local Reference Number:** **Santa Fe ID: N/A** **4. County: Santa Fe** **5. Date of Survey: March 14, 2025**

Photo 10: East elevation. Wreath motif. Camera facing east. March 7, 2025.

Historic Cultural Properties Inventory (HCPI) Detail Form (FORM 2)

Historic Preservation Division, New Mexico Department of Cultural Affairs

For HPD Office use only: HCPI No._____ District No._____	*Please complete HCPI FORM 1 before completing FORM 2* ___NRHP ___SRCP Criteria __A __B __C __D	
1. Name of property: Santa Fe Soldiers' Monument Soldiers' Monument The Obelisk	2. Location: Santa Fe Plaza Downtown and Eastside Historic District –Santa Fe	3. Local Reference Number: Santa Fe ID: N/A 4. County: Santa Fe 5. Date of Survey: March 14, 2025

Photo 11: South and east elevations. Camera facing northwest. June 20, 2020.

Historic Cultural Properties Inventory (HCPI) Detail Form (FORM 2)

Historic Preservation Division, New Mexico Department of Cultural Affairs

For HPD Office use only: HCPI No._____ District No._____	***Please complete HCPI FORM 1 before completing FORM 2*** ___NRHP ___SRCP Criteria __A __B __C __D	
1. Name of property: **Santa Fe Soldiers' Monument** **Soldiers' Monument** **The Obelisk**	**2. Location:** **Santa Fe Plaza** **Downtown and Eastside Historic District –Santa Fe**	**3. Local Reference Number:** **Santa Fe ID: N/A** **4. County: Santa Fe** **5. Date of Survey: March 14, 2025**

Photo 12: North elevation. Tablet. Camera facing south. March 16, 2025.

Historic Cultural Properties Inventory (HCPI) Detail Form (FORM 2)

Historic Preservation Division, New Mexico Department of Cultural Affairs

For HPD Office use only: HCPI No._____ District No._____	***Please complete HCPI FORM 1 before completing FORM 2*** NRHP SRCP Criteria A B C D	
1. Name of property: **Santa Fe Soldiers' Monument** **Soldiers' Monument** **The Obelisk**	**2. Location:** **Santa Fe Plaza** **Downtown and Eastside Historic District –Santa Fe**	**3. Local Reference Number:** **Santa Fe ID: N/A** **4. County: Santa Fe** **5. Date of Survey: March 14, 2025**

Photo 13: North elevation. Cracking of northwest pilaster. Camera facing south. March 16, 2025.

SITE VISIT
January 13, 2025

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IMG_1601.HEIC

IMG_1602.HEIC

Original Monument BW.jpg

Original Monument.jpg

SITE VISIT
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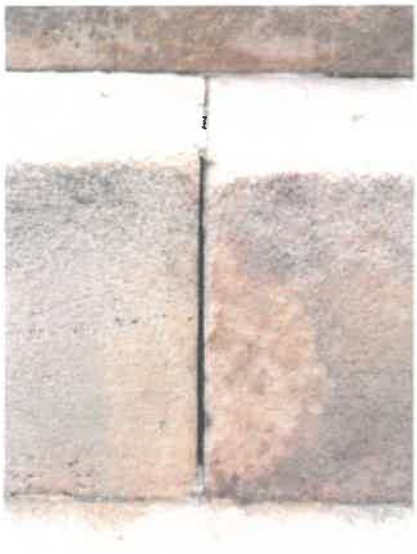

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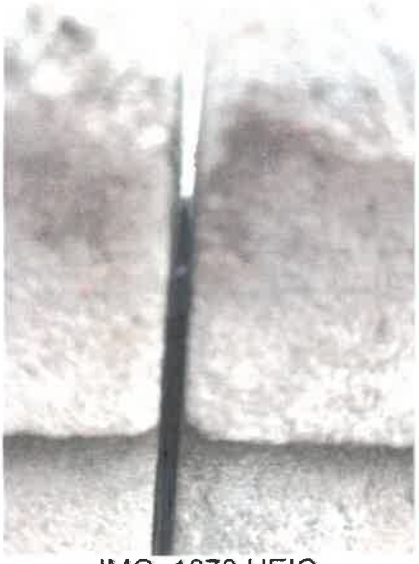

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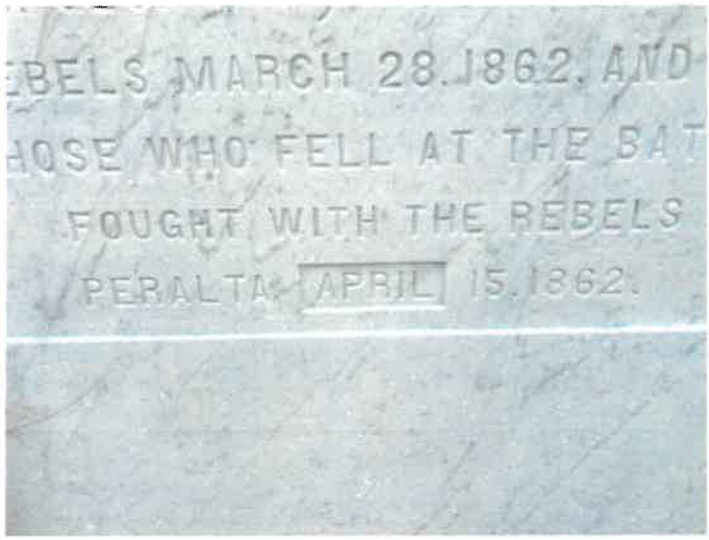

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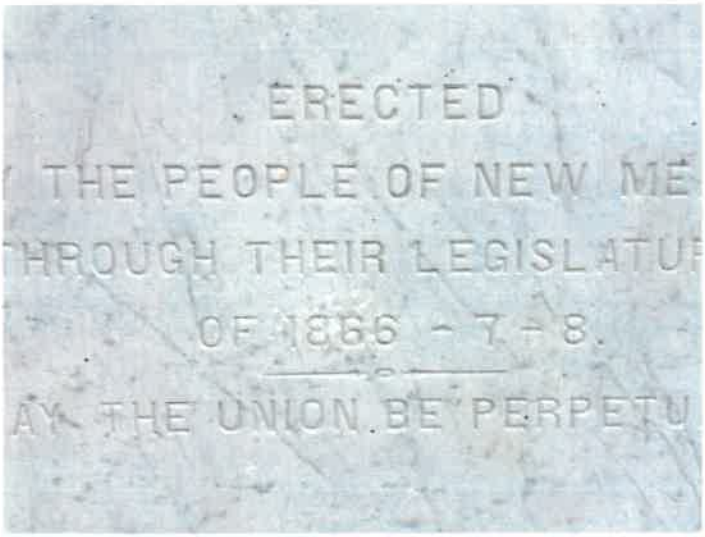

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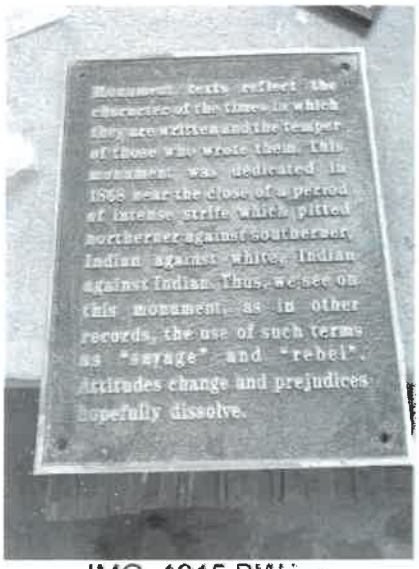

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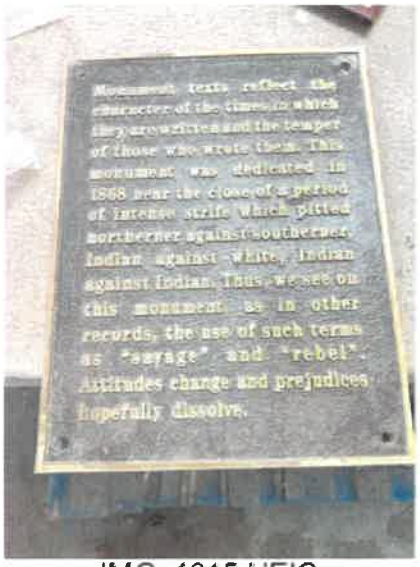

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SITE VISIT
May 20, 2025

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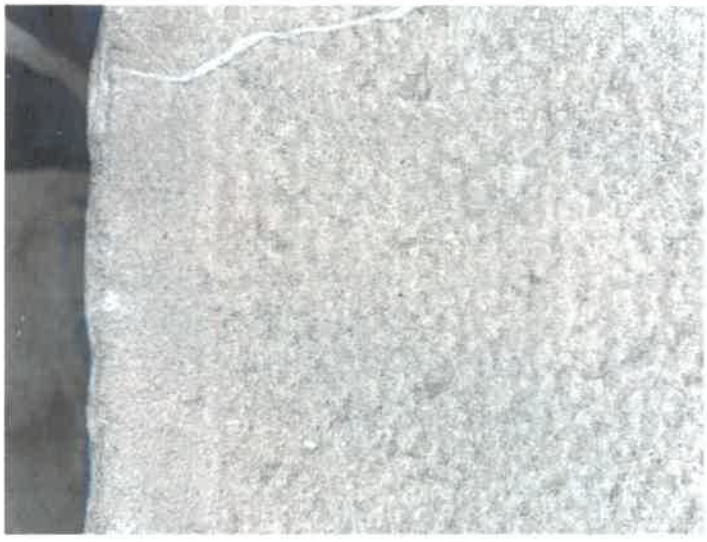

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SITE VISIT
August 7, 2025

Foundation BW.jpg

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42 PRESERVATION BRIEFS

The Maintenance, Repair and Replacement of Historic Cast Stone

Richard Pieper

U.S. Department of the Interior
National Park Service
Cultural Resources
Heritage Preservation Services

An Imitative Building Material with Many Names

The practice of using cheaper and more common materials on building exteriors in imitation of more expensive natural materials is by no means a new one. In the eighteenth century, sand impregnated paint was applied to wood to look like quarried stone. Stucco scored to simulate stone ashlar could fool the eye as well. In the 19th century, cast iron was also often detailed to appear like stone. Another such imitative building material was "cast stone" or, more precisely, precast concrete building units (Figs. 1, 2 and 3).

Cast stone was just one name given to various concrete mixtures that employed molded shapes, decorative aggregates, and masonry pigments to simulate natural stone. The basic mixtures included water, sand, coarse aggregate, and cementing agents. Natural cements, portland cements, oxychloride cements, and sodium silicate based cements were all used as binding agents. The differences in the resulting products reflected the different stone aggregates, binding agents, methods of manufacture and curing, and systems of surface finishing that were used to produce them. Versatile in representing both intricately carved ornament and plain blocks of wall ashlar, cast stone could be tooled with a variety of finishes.

During a century and a half of use in the United States, cast stone has been given various names. While the term "artificial stone" was commonly used in the 19th century, "concrete stone," "cast stone," and "cut cast stone" replaced it in the early 20th century. In addition, Coignet Stone, Frear Stone, and Ransome Stone were all names of proprietary systems for precast concrete building units, which experienced periods of popularity in different areas of the United

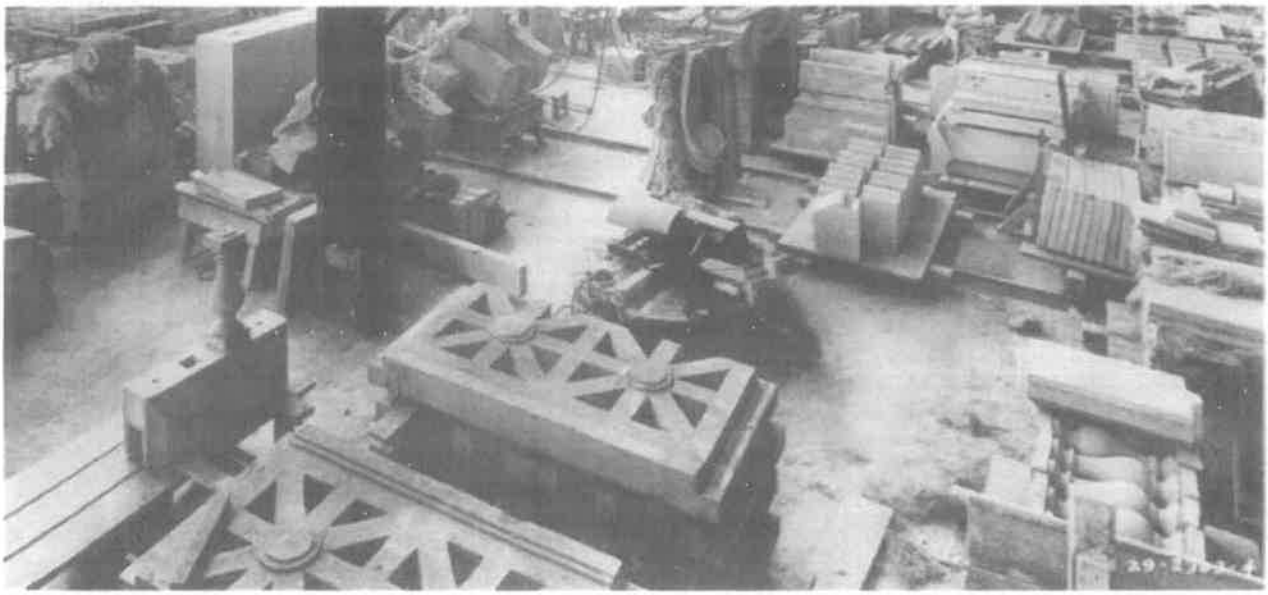


Figure 1. In the early 20th century, elaborate custom building ornament was frequently produced in cast stone. Here, at the Benedict Stone Company's plant in Chicago, cartouches, balustrade panels, railings, and balusters await finishing and shipment. Photo: Courtesy, National Building Museum.

Figure 2. The prominent Delaware and Hudson Building in Albany, New York (1916) made extensive use of cast stone as trim combined with a random ashlar facing of natural granite. The elaborate gothic trim was produced by the Onondaga Lithokite Company of Syracuse, New York.

States in the 19th century. These systems may be contrasted with "Artistic Concrete," decorative molded concrete construction, both precast and cast-in-place, which made little effort to simulate natural stone (Fig. 4).

Having gained popularity in the United States in the 1860s, cast stone had become widely accepted as an economical substitute for natural stone by the early decades of the 20th century. Now, it is considered an important historic material in its own right with unique deterioration problems that require traditional, as well as innovative solutions. This *Preservation Brief* discusses in detail the maintenance and repair of historic cast stone—precast concrete building units that simulate natural stone. It also covers the conditions that warrant replacement of historic cast stone with appropriate contemporary concrete products and provides guidance on their replication. Many of the issues and techniques discussed here are relevant to the repair and replacement of other precast concrete products, as well

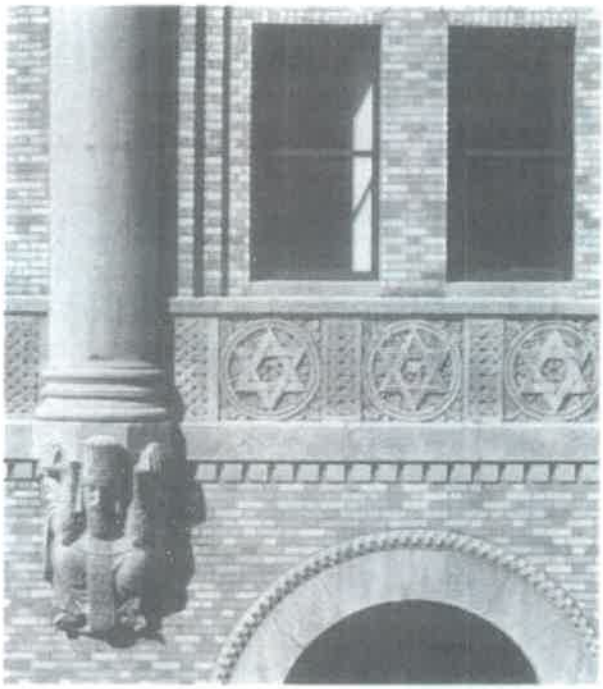


Figure 3. Sculptural ornament was frequently produced in cast stone. Repetitive detail, such as these banding course panels on the Level Club in New York City (1926), were produced much more economically than they could be in natural stone.

Figure 4. As shown in this Sears, Roebuck and Co. concrete machinery catalog, artistic concrete used standard concrete mixes to produce precast and cast-in-place concrete in molded forms, but made little effort to simulate natural stone.

History of Use and Manufacture

Early Patented Systems

While some use of cast stone may be dated to the Middle Ages, more recent efforts to replicate stone with cementitious materials began in England and France at the end of the 18th century. Coade Stone, one of the best known of the early English manufactures, was used for architectural ornament and trim, and saw limited use for interior decoration in the United States as early as 1800. Significant advances in the artificial stone industry in the United States were tied to the production of natural cement or hydraulic lime, which began about 1820.

A large number of patented American, English, and French systems were marketed immediately after the Civil War. One of the earliest American patents for cast stone was awarded to George A. Frear of Chicago in 1868. Frear Stone was a mixture of natural cement and sand, to which a solution of shellac was added to provide initial curing strength. Frear's system was widely licensed around the country, and the resultant variation in materials and manufacturing methods apparently resulted in some significant failures.

Another product which utilized natural cement as its cementing agent was Beton Coignet (literally, "Coignet concrete," also known as "Coignet Stone"). Francois Coignet was a pioneer of concrete construction in France. He received United States patents in 1869 and 1870 for his system of precast concrete construction, which consisted of portland cement, hydraulic lime, and sand. In the United States the formula was modified to a mix of sand with Rosendale Cement (a high quality natural cement manufactured in Rosendale, Ulster County, New York). In 1870 Coignet's U.S. patent rights were sold to an American, John C. Goodrich, Jr., who formed the New York and Long Island Coignet Stone Company. This company fabricated the cast stone for one of the earliest extant cast stone structures in the United States, the Cleft Ridge Span in Prospect Park, Brooklyn, New York (Fig. 5).

Some proprietary systems substituted other cements for the portland cement or hydraulic lime. The British patent process of Frederick Ransome utilized a mixture of sand and sodium silicate, combined with calcium chloride, to form blocks of calcium silicate. The sodium chloride by-product was intended to be removed with water washes during the curing process. The Sorel cement process, developed in 1853 and later applied to the manufacture of grindstones, tiles, and cast stone for buildings, combined zinc oxide with zinc chloride, or magnesium oxide and magnesium chloride, to form a hydrated oxychloride cement mixture that bound together sand or crushed stone. The Union Stone Company in Boston manufactured cast stone using the Sorel process. Ultimately, however, alternate cementing systems were abandoned in favor of portland cement, which proved to be more dependable and less expensive.

Figure 5. Constructed in 1868 of Beton Coignet, the Cleft Ridge Span in New York City's Prospect Park is one of the earliest extant cast stone structures in the United States.

Late 19th and 20th Century Development

The use of cast stone grew rapidly with the extraordinary development of the portland cement and concrete industries at the end of the 19th century. In the early decades of the 20th century, cast stone became widely accepted as an economical substitute for natural stone. It was sometimes used as the only exterior facing material for a building, but was more often used as trim on a rock-faced natural stone or brick wall (Fig. 6). In most early 20th century installations, cast stone was used for exterior window and door surrounds or lintels, copings, parapets and balustrades, banding courses, cornices and friezes, and sculptural ornament. On occasion, decorative interiors were also finished with cast stone, although elaborate interior cornices and ornaments were more frequently fabricated of plaster.

Manufacture

Manufacturers of cast stone used graded mixes of crushed marble, limestone, granite, and smelting slag to produce a variety of stone effects. A light cement matrix with an aggregate of crushed marble could replicate limestone, while a mix of marble and small amounts of smelting slag would give the effect of white granite (Fig. 7). Some manufacturers added masonry pigments and varied colors on the faces of the stone to give a somewhat stylized effect of variegated sandstone. Each manufacturer prepared a variety of stock mixes as well. Not surprisingly, aggregates varied in different localities. In New York State, for example, crushed Gouverneur and Tuckahoe marbles were popular facing aggregates; in other areas, crushed feldspar or granite and even silica sand were commonly used.

The two basic cast stone production systems were "dry tamp" and "wet cast." The dry tamp process employed a stiff, low-slump concrete mix that was pressed and compacted into the molds. The decorative aggregate mix was frequently distributed only on the exterior facing of the cast units (typically 3/4" to 1 ½" thick), while the cores of the units were common concrete. Because of the stiff mix, dry tamp units required a relatively short period of time in the molds, which could then be used several times a day. After removal from the molds, the dry tamp units were often cured in steam rooms to assure proper hydration of the cement. The wet cast process, on the other hand, used a much more plastic concrete mix that could be poured and vibrated into the molds. This system used significantly more water in the mix, assuring proper hydration of the cement mix without elaborate curing, but requiring that the units be left in the molds for at least a day. Because of this method of fabrication, wet cast products necessarily distributed their decorative aggregate mix through the entire unit, rather than simply an outer facing.

Concrete was cast in molds of wood, plaster, sand and, early in the 20th century, even hide glue or gelatin, depending upon the production method, the intricacy of the piece to be cast, and the number of units to be manufactured. Metal molds were sometimes used for stock ornamental items, less frequently for custom architectural work. When the units were adequately hard, finish surfaces were worked to expose the decorative stone aggregate. When removed from the mold, wet cast units exhibit a surface film of cement paste, which must be removed to expose the aggregate. Partially cured units could be sprayed with water, rubbed with natural bristle brushes, etched with acid, or sandblasted to remove the cement layer. The surface of dry tamp products required less finishing.

Figure 6. Cast stone was commonly used for molded trim in conjunction with brick or natural stone. This brick building in Rochester, New York, uses cast stone for the entry surround, and natural stone for ornamental window sills, thresholds, and water table units.

Figure 7. A combination of crushed white marble and black smelting slag was frequently used to give the appearance of a "white granite". The hammered finish on this early twentieth century cast stone would have been produced with a pneumatic chisel.

High quality cast stone was frequently "cut" or tooled with pneumatic chisels and hammers similar to those used to cut natural stone (Fig. 9). In some cases, rows of small masonry blades were used to create shallow parallel grooves similar to lineal chisel marks. The results were often strikingly similar in appearance to natural stone. Machine and hand tooling was expensive, however, and simple molded cut cast stone was sometimes only slightly less costly than similar work in limestone. Significant savings could be achieved over the cost of natural stone when repetitive units of ornate carved trim were required.

Finally, cast stone is sometimes used today to replace natural stone when the original historic stone is no longer available, or the greater strength of reinforced concrete is desired. Reinforced cast stone columns, for instance, are frequently used to replace natural stone columns in seismic retrofits of historic structures. Fine-grained stones, such as sandstones, may be very successfully replicated with cast stone. Coarse-grained granites and marbles with pronounced patterns or banding are, for obvious reasons, not so successfully matched with cast stone. The replacement of natural stone with cast stone requires careful attention to selection of fine aggregates and the pigmentation of the cementing matrix (Fig. 8). Coarse aggregate, which is generally used in cast stone to control shrinkage and assure adequate compressive strength, can present an aesthetic problem if it is visible at the surface of cast stone elements which simulate sandstone. Careful control of aggregate sizes in the mix formulation can reduce this problem.

Figure 8. For this column, the appearance of a "pink granite" was simulated by using a reddish matrix with white and black aggregate. Erosion of a tinted matrix results in a significant lightening of the cast stone surface.

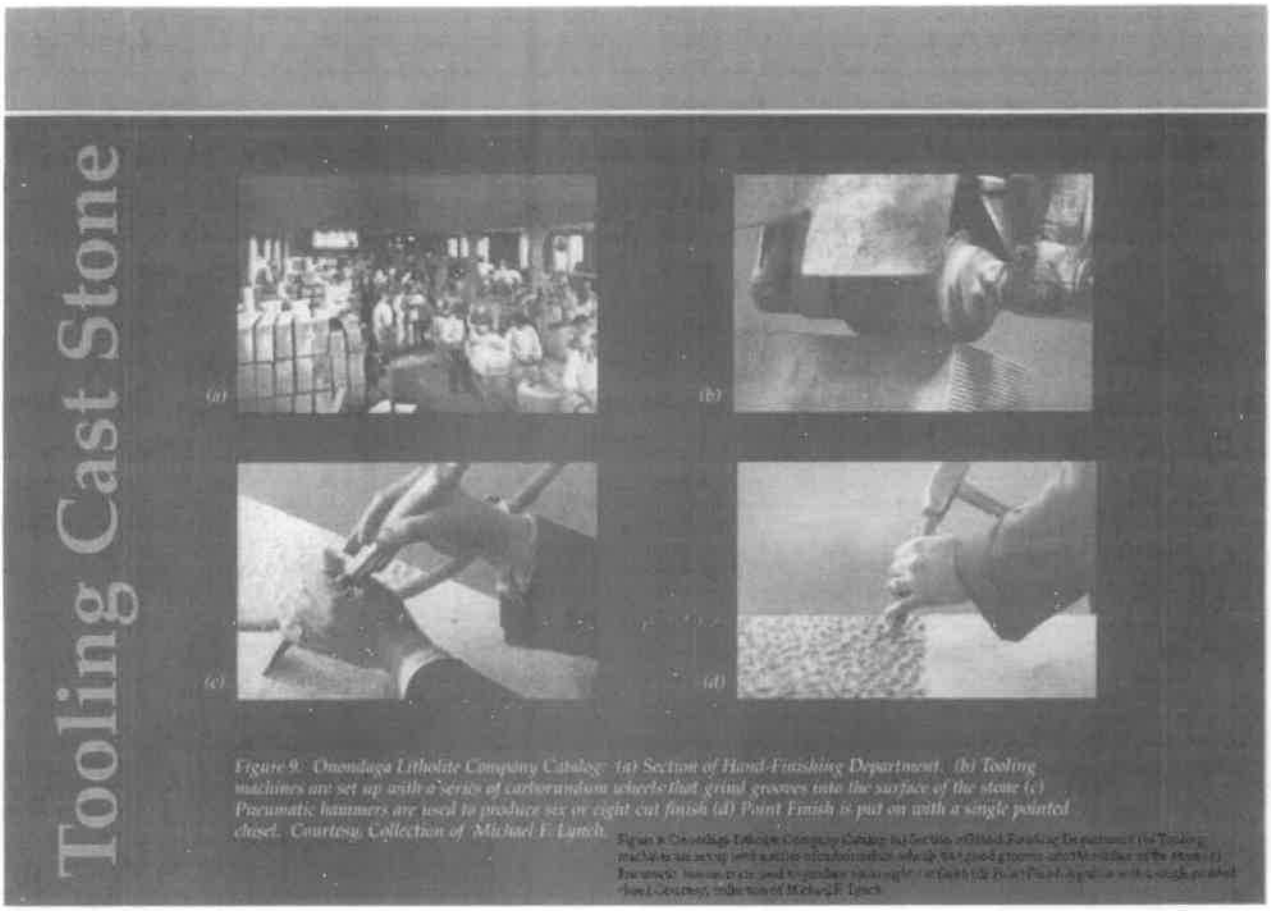


Figure 9. Onondaga Litholite Company Catalog: (a) Section of Hand-Finishing Department. (b) Tooling machines are set up with a series of carborundum wheels that grind grooves into the surface of the stone (c) Pneumatic hammers are used to produce six or eight cut finish (d) Point Finish is put on with a single pointed chisel. Courtesy, Collection of Michael F. Lynch.

Mechanisms and Modes of Deterioration

The best historic cast stone can rival natural stone in longevity. Many quality cast stone installations from the first decades of the twentieth century are still in excellent condition, and require little repair. Like any other building material, however, cast stone is subject to deterioration, which may occur in several ways:

- **Separation of the facing and core layers**
- **Deterioration of the aggregate**
- **Deterioration or erosion of the cementing matrix**
- **Deterioration of the iron or steel reinforcement**
- **Deterioration of cramps and anchors used in its installation**

Separation of the Facing and Core Layers

Separation of the facing and core layers of dry tamp units is not uncommon, and often reflects fabrication defects such as poor compaction, lengthy fabrication time, or improper curing. Where separation of facing and core layers is suspected, cast stone units may be "sounded" to establish the extent of delamination.

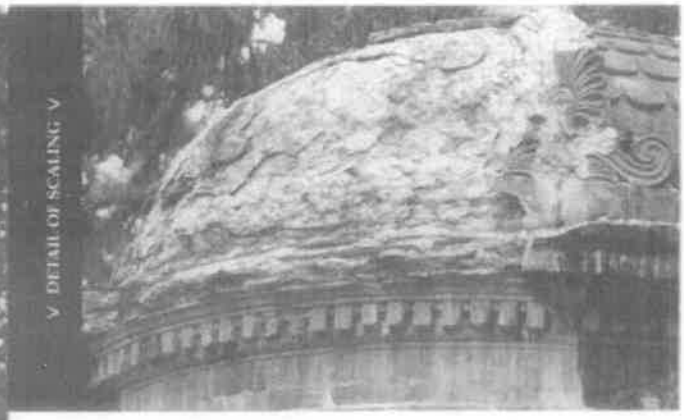


Figure 10. Scaling of cast stone units signals problems with the cementing mix and method of manufacture. Serious deterioration of cast stone, such as this, warrants replacement.

Deterioration of the Aggregate

Cast stone failure caused by deterioration of the aggregate is uncommon. Granites, marbles, and silica sand are generally durable, although limestone and marble aggregate are subject to the same dissolution problems that affect quarried units of these stones. In rare instances, a reaction between the alkalis in the cement matrix and the stone aggregate may also cause deterioration.

Deterioration or Erosion of the Cementing Matrix

While it is relatively uncommon in twentieth century cast stone, serious deterioration of the cementing matrix can cause extensive damage to cast stone units (Fig. 10). A properly prepared cementing mix will be durable in most exterior applications, and any flaking of exterior surfaces signals problems in the cementing mix and in the method of manufacture. The use of poor quality or improperly stored cement, impure water, or set accelerators can cause cement problems to occur years after a structure is completed. Improper mixing and compaction can also result in a porous concrete that is susceptible to frost damage and scaling. Severe cement matrix problems may be impossible to repair properly and often necessitate replacement of the deteriorating cast stone units.

More common and less serious than flaking or scaling caused by deterioration of the cementing matrix is the erosion of the matrix surface (Fig. 11). This usually occurs on surfaces of projecting features exposed to water runoff, such as sills, water tables, and window hoods. In these areas, the matrix may erode, leaving small grains of aggregate projecting from the surface. The resultant rough surface is not at all the intended original appearance. In some historic cast stone installations, the thin layer of cement and fine sand at the surface of the cast stone units was not originally tooled from the molded surface, but was finished with patterns of masonry pigments in a stylized imitation of highly figured sandstones or limestones (Fig. 12). Erosion of the pigmented surface layer on this type of cast stone results in an even more dramatic change in appearance.

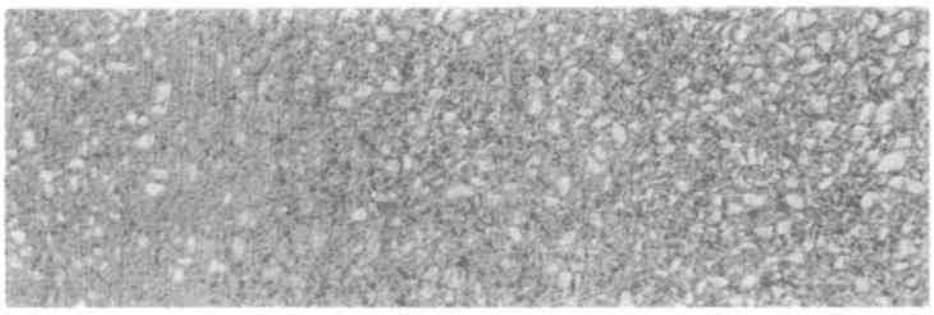


Figure 11. Erosion of the cementing matrix on the surface of cast stone is common in areas exposed to water runoff, such as window sills and copings. If no other deterioration is present this condition does not warrant repair or replacement, but should be considered normal weathering. The unweathered surface at the left of this photograph shows the appearance of the original hammer-dressed finish. At right, the matrix has eroded, and the aggregate is much more prominent than on the unweathered surface.

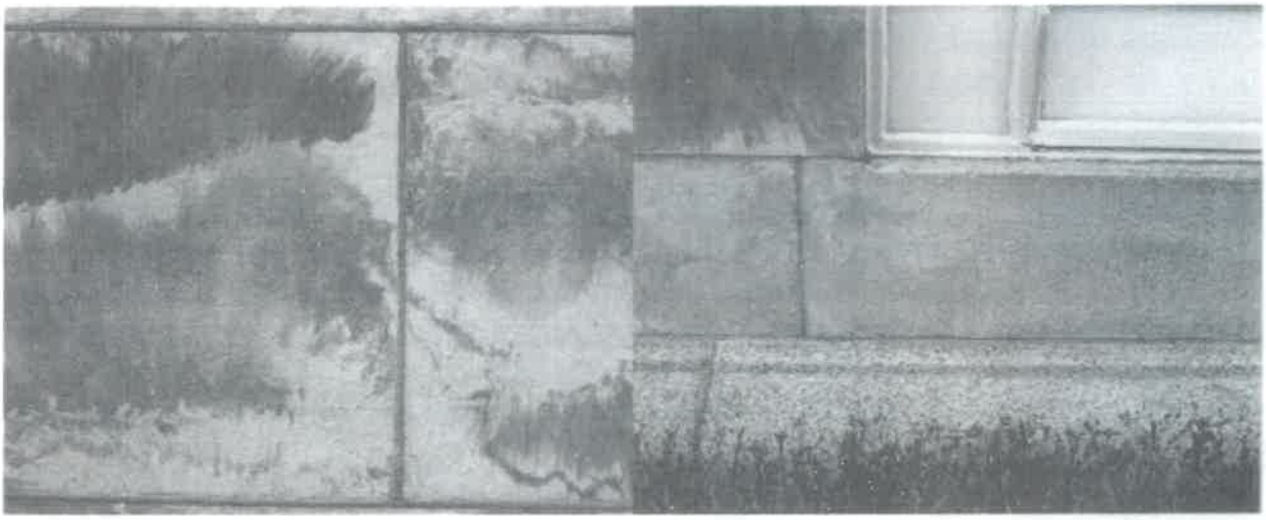


Figure 12. Elaborate pigmentation of the cementing matrix sometimes gave a rather stylized or unnatural appearance to the finished cast stone (left). Texts state that effects like this were sometimes produced by drawing strings dipped in masonry pigments across the surface of the uncured units. Cast stone, such as this, has its coloration only at the outer surface of the stone, and was not intended to be brushed or tooled to expose the aggregate. Erosion of the cementing matrix of this type of cast stone, as seen on the base of the wall (right), will result in a significant alteration of appearance.

Deterioration of the Iron or Steel Reinforcement

During their original manufacture, unusually long and thin cast stone units, such as window sills or balustrade railings and units requiring structural capacity, such as lintels, were generally reinforced with mild steel reinforcing bars. Large pieces sometimes had cable loops or hooks cast into them to facilitate handling and attachment. On occasion, this reinforcement and wire may be too close (less than 2") to the surface of the piece and rusting will cause spalling of the surface (Fig. 13). This frequently happens to sills, copings, and water tables where repeated heavy wetting leads to loss of alkalinity in the concrete, allowing the reinforcement to rust. If damage from the deteriorating reinforcement is extensive, as for instance, the splitting of a baluster from the rusting of a central reinforcing rod, the cast stone unit may require replacement.

Figure 13. Rusting of reinforcement near the surface of the stone may result in spalling. Sections of reinforcement, such as this, may be cut out and the spall repaired with a matching composite mortar.

Deterioration of Cramps and Anchors

Even when reinforcement has not been added to individual cast stone units, mild steel cramps may have been used to anchor a cast stone veneer to backup masonry. Where spalls have occurred primarily at the tops of ashlar or frieze units, this is generally the cause.

Maintenance of Cast Stone Installations

Cleaning

Cast stone installations with marble or limestone aggregates may sometimes be cleaned with the same alkaline pre-wash/acid afterwash chemical cleaning systems used to clean limestone and other calcareous natural stones. If no marble or limestone aggregates are present, acidic cleaners, such as those used for natural granites and sandstones, may be used. In either case, dark particulate staining in protected areas may be persistent, however, and require experimentation with other cleaning methods. Some micro-abrasive cleaning techniques used under very controlled circumstances by skilled cleaning personnel can be appropriate for removing tenacious soiling. Ordinary sand blasting or wet grit blasting can seriously damage the surface of the cast stone and should not be used (Fig. 14).

Figure 14. Sandblasting and wet grit blasting can seriously erode the surface and should not be used to clean cast stone surfaces.

Repointing

Early cast stone installations may have been constructed with natural cement mortars, but in late 19th century and 20th century installations, cast stone units were generally bedded and pointed with mortars composed of portland cement, lime, and sand. When repointing or replacement of the historic mortar is required, a Type N mortar (about one part cement, and one part lime to six parts of sand) is generally appropriate. When repointing any historic masonry, it is important to match both the character and color of the sand and color of the cement matrix in the historic mortar. Cement matrix color can often be adjusted by using combinations of white, "light," and gray portland cement in the mortar.

Joints in historic cast stone installations can be quite thin and the dense mortar thus difficult to remove. Unnecessary repointing can cause significant damage to historic cast stone. Cracked and open joints will most often be found on exposed features, such as balustrades and copings, and, of course, require repointing. When a hard and tenacious mortar was used in the original installation or a later repointing, the removal of the mortar can easily chip the edges of the cast stone units.

While the careless use of "grinders" to remove mortar has damaged countless historic masonry buildings, a skilled mason may sometimes use a hand held grinder fitted with a thin diamond blade to score the center of a joint, and then remove the rest of the mortar with a hand chisel. If this method is not done carefully, however, wandering of the blade can widen or alter joints and cause significant damage to the cast stone. Care must be taken to prevent damage from over cutting of vertical joints by stopping blades well short of adjacent units. The use of small pneumatic chisels, such as those used to tool stone, can also work well for mortar removal, but even this method can cause chipping to the edges of cast stone units if it is not done carefully.

Methods of Repair

Much historic cast stone is unnecessarily replaced when it could easily be repaired *in situ*, or left untreated. This is especially true of areas that exhibit isolated spalls from rusting reinforcement bars or anchorage, or installations where erosion of the matrix has left a rough surface of exposed aggregate.

The weathering of cast stone, while different from that of natural stone, produces a patina of age and does not warrant large-scale replacement, unless severe cement matrix problems or rusting reinforcement bars have caused extensive scaling or spalling. Severe rusting of reinforcement bars on small decorative features, such as balusters, may signal carbonation (loss of alkalinity) of the matrix. Where carbonation of the matrix has occurred, untreated reinforcement will continue to rust. Replacement may be an acceptable approach for exposed and severely deteriorated features, such as hand railings, roof balustrades, or wall copings, where disassembly is unlikely to damage adjacent construction. Conversely, small areas of damage should generally be repaired with mortar "composites", or left alone.

Re-securing Separated Surface Facing

Where the decorative facing of dry tamped cast stone has separated from core layers, injected grouts may be used to re-secure the facing. Re-attachment of a separated facing layer may be time consuming, and should be undertaken by a conservator, rather than a mason (Fig. 15). This technique may be the best, most economical, approach for repair of figurative sculpture or unique elements that are not repeated elsewhere on a building. Theoretically, cementitious grouts are most appropriate for re-attaching separated facings, but hairline fissures may require the use of resin adhesives. Low-viscosity epoxies have been used

for this purpose, and may be applied through small injection ports. Cracks that would allow the adhesive to leak must be repaired prior to injection, of course. Holes made for adhesive injection will require patching after re-attachment is complete.

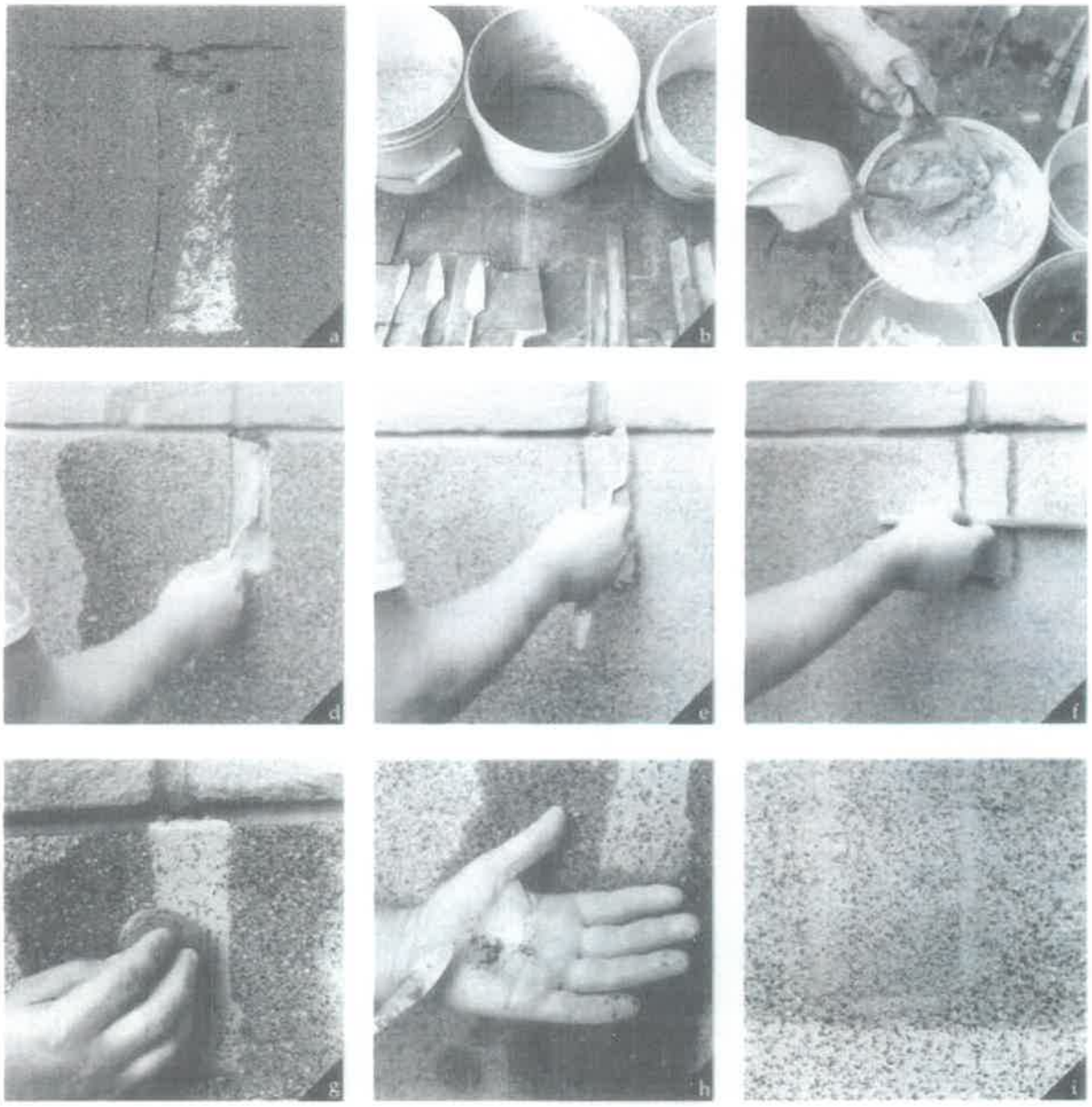
Repairing Spalls from Rusting Reinforcement Bars and Mechanical Damage

Drilled holes, mechanically damaged corners, and occasional spalls from rusting reinforcement bars and anchorage are repairable conditions that do not warrant the replacement of cast stone. Small "composite" repairs to damaged masonry units can be made with mortar formulated to visually match the original material, and may be successfully undertaken by a competent and sensitive mason. If deterioration appears widespread, however, or if large surface areas are spalling or cracking and replacement appears necessary, the owner may wish to consult a preservation architect or consultant to determine the cause of deterioration and to specify necessary repairs or replacement, as appropriate.

The methods of composite repair used for stone masonry are also generally applicable for the repair of historic cast stone. For repairs to damaged cast stone to be successful, however, both the cement matrix color and the aggregate size and coloration must match that of the historic unit. Crushed stone and slag (such as "Black Beauty" abrasive grit), which are similar to many common traditional aggregates, are widely available, although some additional crushing and/or sieving may be necessary to obtain aggregate of an appropriate size. Remember that half or more of a weathered surface is exposed aggregate, so careful aggregate selection and size grading is extremely important for patching. Even differences in aggregate angularity (rounded pebbles vs. crushed stone) will be noticeable in the final repair. If more than one aggregate was used in the cast stone, the ratio of the selected aggregates in the mix is, of course, equally important. Variation in coloring of the cement matrix may be achieved through the use of either white, "light," or gray portland cement. If additional tinting is required, only inorganic alkali-resistant masonry pigments should be used. Because most historic cast stone was manufactured primarily from portland cement and aggregate (with a less than 15% lime/cement ratio), it is not necessary to add large amounts of hydrated lime to cast stone composite repair mixtures. Small amounts of lime may be added for plasticity of the working mix.

To repair a spall caused by deterioration of a ferrous reinforcement bar or anchorage, it is necessary to remove all cracked concrete adjacent to the spall; grind and brush the reinforcement to remove all rust and scale; and paint the metal with a rust-inhibiting primer prior to applying the cast stone composite. If the reinforcement bar is much too close to the surface of the stone, it may be advisable to cut out the deteriorating section of reinforcement after consultation with a structural engineer. If deteriorating cramps are removed, it may be necessary to install new stainless steel anchorage.

Figure 15. A delaminated layer of ornamental cast stone on the Orpheum Theater, San Francisco, California (1925), was successfully re-attached using epoxy. The multiple delivery ports for the epoxy are removed after treatment and the holes patched. Photo: David P. Wessel.



Composite Repair of Damaged Masonry Units

Figure 16. The (a) damaged area is cut out to create a shallow void of even depth, ½" or more. Undercutting the sides of the void may provide better adhesion while the composite is being applied. A small grinder fitted with a diamond blade may be used to prepare the void. (b) A range of aggregates matching those in the cast stone is required. Matching aggregate size and angularity is very important. Small spatulas and trowels are used for application of the composite. The aggregates are mixed to a ratio approximating that in the cast stone. (c) Matching the color of the cementing matrix may require numerous tests. Only small amounts are required for any one repair. Lime may be added to the mix for workability. (d) The composite mortar is applied to the void with a small spatula or trowel. An aggregate rich mix may not adhere properly, and it may be desirable to apply a more cement rich mix directly to the substrate. (e) The composite mix is pressed into the void, leaving the patch slightly proud of the surface. (f) The composite is struck flush with the adjacent surfaces. (g) Patting the patch with a moist sponge removes matrix and exposes the aggregate. (h) It may be desirable to impress additional aggregate into the surface of the patch to achieve a better match to surrounding surfaces. If so, the mix aggregate should be crushed to a smaller size. Leaving in larger aggregate may result in a mosaic appearance which does not match adjacent surfaces. (i) This completed composite repair could have been improved by brushing to remove the matrix residue at the edges of the repair before the surface cured.

Where spalls have a feather edge, it will be necessary to cut back the repair area to a uniform depth (1/2" or more). As with natural stone composite repairs, a bonding agent may assist adhesion of the repair material to the original concrete. For unusually large or deep patches, mechanical anchoring of the repair with small nylon or stainless steel rods may be required. If the adjacent cast stone is tooled or weathered, it will be necessary to scribe or brush the repaired area to give it a matching surface texture. Adding enough coarse aggregate to match adjacent original material will sometimes interfere with adhesion of the composite, and it may be necessary to press additional aggregate into the applied patch prior to finishing. If this is not skillfully done, however, the surface of the patch may take on a mosaic appearance. For this reason, it is advisable to undertake test composite repairs in an unobtrusive location first (Fig. 16).

Figure 17. Unlike natural stone, cast stone generally may not be tooled in place to reduce lippage of uneven surfaces at joints. Tooling often exposes coarse aggregate from below the surface.

Surface Refinishing

While re-tooling deteriorated natural stone may sometimes be appropriate, restoring the original appearance of cast stone where surface erosion has occurred is difficult or impossible. Tooling or grinding of the cast stone surface may expose coarse aggregate and will not, in any case, restore original patterned pigmentation that has weathered away (Fig. 17). Silicate paints or masonry stains may be applied in patterns to replicate the original appearance, but may not be durable or completely successful aesthetically.

Where matrix has eroded, it is advisable to accept the weathered appearance of the cast stone, unless extensive replacement is mandated by other factors.

Because cast stone depends on exposed aggregate to achieve its aesthetic effect, the use of an applied cementitious surface coating dramatically alters the visual effect of the material and is inappropriate as a cast stone repair technique. A cementitious surface coating can also trap moisture in the cast units and cause surface spalling.

Figure 18. Long or thin cast stone elements require reinforcement. When possible, reinforcement of new cast stone should be made of stainless steel.

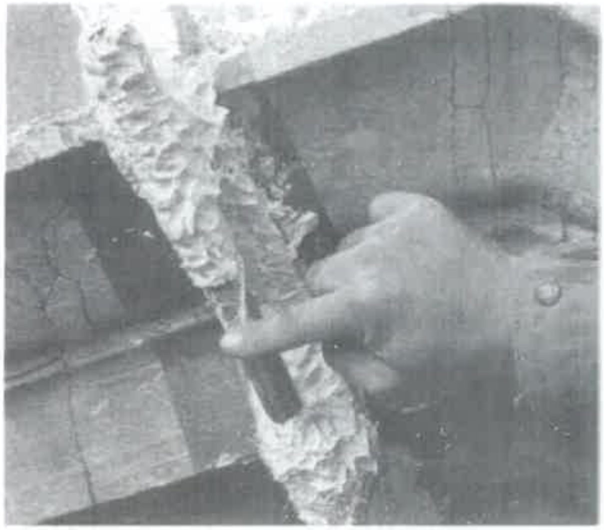


Figure 19. Molds for the replication of cast stone may be made on site using rubber materials and reinforcement. The molded profile of this window pediment will be used to run a plaster mockup, from which a production mold will be made. Photo: Michael Devonshire

Replacement of Historic Cast Stone Installations

Individual cast stone units, which are subject to repeated wetting (such as copings, railings and balusters) and exhibit severe failure due to spalling or reinforcement deterioration, may require replacement with new cast stone (Fig. 18). Fortunately, a number of companies custom manufacture precast concrete units and can replicate deteriorated units in existing buildings (Fig. 19). The variables involved in manufacture are considerable, and it is wise to use a firm with experience in ornamental and custom work rather than a precast concrete firm which manufactures stock structural items, concrete pipe, or the like. Several trade organizations, including the Cast Stone Institute, the National Precast Concrete Association, and the Architectural Precast Association, have developed recommendations and/or guide specifications for the manufacture of cast stone and precast concrete. These specifications set standards for characteristics such as compressive strength and water absorptivity, and discuss additives such as air entraining agents and water reducing agents, which influence the longevity of new cast stone. Trade references and guide specifications should be consulted before contracting for replacement of historic cast stone.

Fabrication Defects in New Cast Stone

While the cement matrix coloration and aggregate considerations previously described require the most careful attention, project staff should also look for defects which are common to cast stone fabrication:

Air bubbles. Small pits on the surface of the stone may form if the unit is not given adequate vibration to release trapped air during pouring. Bubbles can also be a problem

Figure 20. (top) After removal from the mold, [illegible] such as columns or sculpture, may have numerous air bubbles at the surface. (bottom) The holes on the surface of the casting are filled with a mortar similar to the concrete mix used to cast the element.

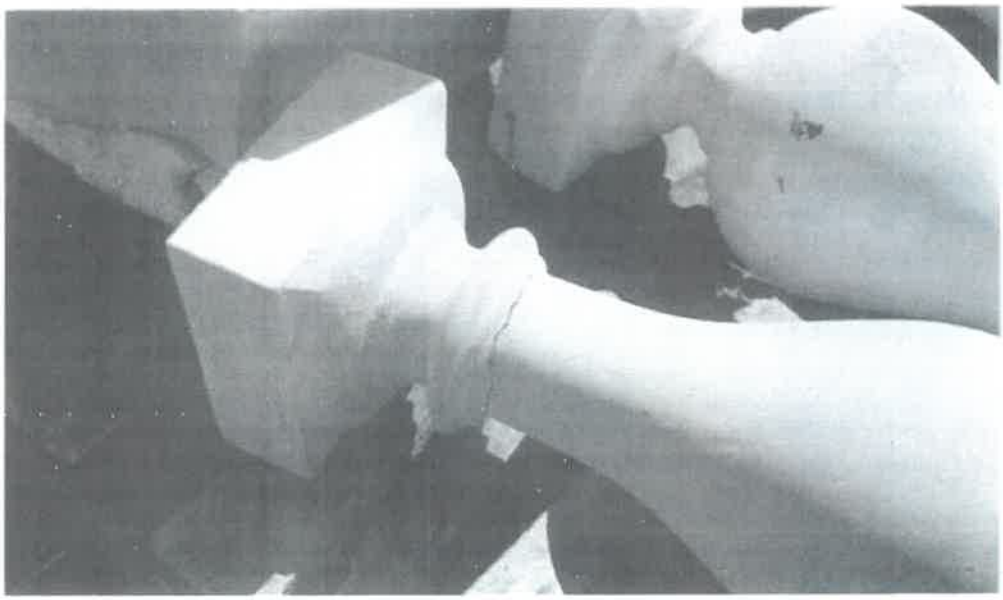


Figure 21. Surface cracking may reduce the durability of cast stone units. Cracking is often problematic on reinforced elements with thin "necks," such as balusters, unless curing is carefully controlled.

when end casting long items such as columns or railings, where it is difficult to vibrate bubbles away from the finish surface of the unit (Fig. 20).

Surface cracking or checking. Overly wet mixes and insufficient moisture during curing can result in surface cracking of large castings, such as columns. Such cracking dramatically reduces the durability of new cast stone. Small reinforced elements, such as balusters, also frequently crack at thin "necks" in the castings (Fig. 21).

Aggregate segregation. Cast stone formulations generally include a range of coarse aggregates (crushed stone) and fine aggregates (sand) (Fig. 22). When units are vibrated to assure compaction of the mix and liberate trapped air bubbles, coarse aggregates may begin to settle and separate from the paste of cement and sand. Aggregate segregation results in a visible concentration of coarse aggregate at one end of the casting. Segregation is more problematic when end casting long pieces, such as columns.

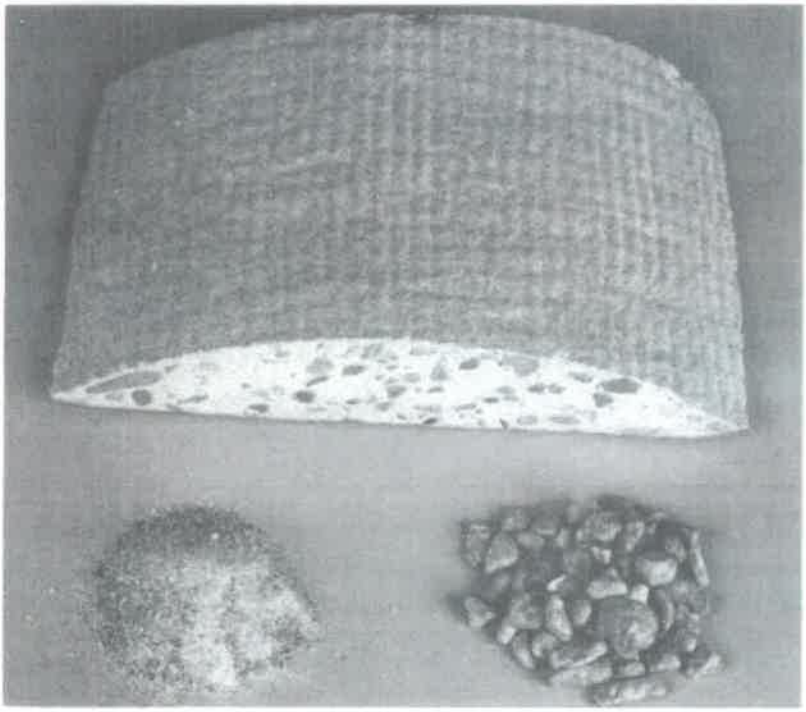
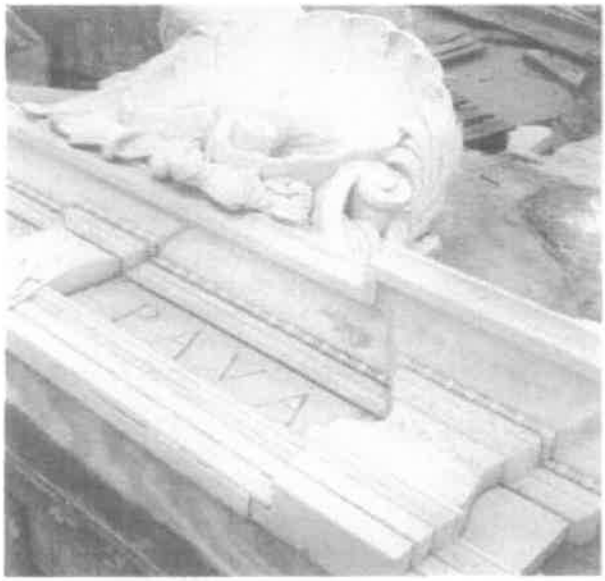


Figure 22. Most cast stone formulations use a mixture of coarse and fine aggregates. Coarse aggregates are not usually as visible from the surface, but may settle in end cast pieces.

Surface rippling or irregularity. Production molds for fabrication are often made of rubber mold facings encased in larger "mother molds" of plaster and wood (Fig. 23). Vibration can loosen the rubber facing from the outer mold and result in rippling or irregularities on the surface of the finished casting (Fig. 24). Even when rippling is not noticeable, irregularity caused by mold movement can make it difficult to line up surfaces of adjacent units when assembling cast stone installations.

Mold lines. Freestanding elements, such as columns, must be cast in two-part molds, which are separated to release the completed cast piece. If the mold parts do not join tightly, some leakage of cement paste will occur at the mold joint, resulting in a projecting line on the surface of the casting. This is generally tooled off before the casting completely cures. A mold line will be visible on the completed piece if the projecting material is not completely removed, or if the tooling at the mold line does not match the adjacent surface of the casting. Tooling at mold lines may also expose contrasting coarse aggregate beneath the surface of the casting.

Figure 23. Production molds (left) made of durable rubbers backed with wood and plaster supports are used to fabricate new cast stone. Production molds may be made from original elements which have been repaired with epoxies and plaster, or from new plaster mockups. (below)



Other Considerations for Replacement of Cast Stone

Several other considerations are worth noting when it is necessary to replace historic cast stone elements with matching new cast stone.

Reinforcement. The alkalinity of new concrete generally provides adequate protection to steel reinforcement. In exposed areas where deterioration due to rusting of reinforcement has previously been a problem, however, the use of stainless steel reinforcement is recommended.

Surface finishing. Post-fabrication surface tooling of new cast stone is not currently common. Sandblasting is typically used to remove the surface film of cement and expose the aggregate. For replacement units replicating historic cast stone pieces in highly visible locations, it is sometimes possible to make a mold of a sound or repaired existing piece to incorporate the original tooling in the casting process. If the historic unit is too deteriorated to use as a pattern, a plaster model may be made to replicate the damaged piece. This is tooled to replicate the desired surface treatment or appearance, and a production mold is then made from the plaster model.

Moist curing. Surface crystallization of soluble salts (efflorescence) during curing may lighten the surface of some precast units, especially those simulating darker stone. Some manufacturers use a series of wet/dry curing cycles or washing with acetic acid to remove soluble salts that might otherwise discolor finished surfaces. For most wet cast products, simple moist curing under a plastic cover is sufficient.

Appropriateness of Glass Fiber Reinforced Concrete as a Replacement Material

Light-Weight Alternative

Glass fiber reinforced concrete (GFRC) is more and more frequently encountered in building rehabilitation and is used to replicate deteriorated stone and cast stone, and even architectural terra cotta (Fig. 25). This is a relatively new material that uses short chopped strands of glass fiber to reinforce a matrix of sand and cement. GFRC has become a popular low-cost alternative to traditional precast concrete or stone masonry for some applications. Fabricators use a spray gun to spray the mortar-like mix into a mold of the shape desired. The resulting concrete unit, typically only ¾" thick, is quite rigid, but requires a metal frame or armature to secure it to the building substrate. The metal frame is joined to the GFRC unit with small "bonding pads" of GFRC.

GFRC has a dramatic advantage over traditional precast concrete where the weight of the installation is a concern, such as with cornices or window hoods. Many cast stone mixes can successfully be replicated with GFRC. Where it is used to simulate natural stone, GFRC, like cast stone, is most appropriate for simulation of fine-grained sandstones or limestones.

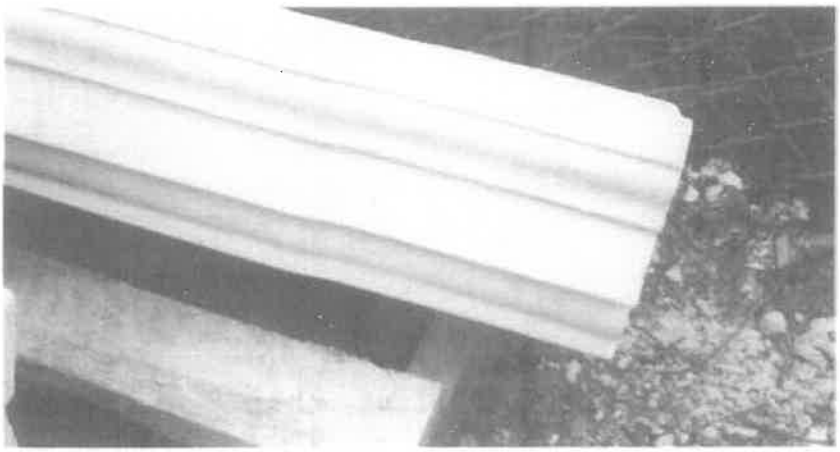


Figure 24. Separation of an interior rubber mold from a plaster mother mold during casting may result in rippling or irregularity of the completed casting.

Not for Use in Load Bearing Applications

Because the GFRC system is in effect a "skin," GFRC cannot be used for load bearing applications without provision of additional support. This makes it unsuitable for some tasks, such as replacement of individual ashlar units. It is also not appropriate for small freestanding elements, such as balusters, or for most columns, unless they are engaged to surrounding masonry or can be vertically seamed, which may significantly alter the historic appearance. GFRC units must also allow for expansion and contraction, and are generally separated by sealant joints, not by mortar. A sealant joint may be unacceptable for some historic applications; however, substitution of GFRC for cast stone may be appropriate when an entire assembly, such as a cornice, roof dormer, or window hood, requires replacement. Great care must be taken when detailing a GFRC replacement for existing cast stone.

Deterioration of GFRC

Because it is a relatively new material, the long term durability of GFRC is still untested. When GFRC was first introduced, some installations experienced deterioration caused by alkaline sensitivity of the glass fiber reinforcement. Alkali resistant glass is now used for GFRC manufacture. Even when the GFRC skin is well manufactured, however, the steel armature and bonding pad system used to mount the material is vulnerable to damage from leakage at sealant joints or small cracks in wash surfaces. The use of galvanized or stainless steel armatures, and stainless steel fasteners and bonding pad anchors is advisable.

Figure 25. Glass Fiber Reinforced Concrete (GFRC) is sometimes used to replicate deteriorated elements of cast or fine grained natural stone. Because the GFRC element is a rigid, but relatively thin shell, it must be supported and attached with an interior framework of steel. The attachment hardware inside this GFRC cartouche (left) will not be visible when the unit is installed (armature visible at right). Photos: Traver House Restorations, Inc.

Summary

Cast stone--a mixture of water, sand, coarse aggregate, and cementing agents--has proven over time to be an attractive and durable building material, when properly manufactured. It gained popularity in the 1860s and, by the early decades of the 20th century, became widely accepted as an economical substitute for natural stone. Unfortunately, much historic cast stone is unnecessarily replaced when it could easily be repaired and preserved *in situ*, or left untreated. Appropriate repair of damaged units can extend the life of any cast stone installation. Because of the necessity of matching both matrix color and aggregate size and ratio, conservation projects which involve repair or replication of cast stone should allow adequate lead time for the assembly of materials and the preparation of test samples. Understanding which conditions require repair, which warrant replacement, and which should be accepted as normal weathering is key to selecting the most appropriate approach to the protection and care of historic cast stone.

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Precast/Prestressed Concrete Institute. *Architectural Precast Concrete*. 2nd ed. Chicago, Illinois: Precast/Prestressed Concrete Institute, 1989.

Whipple, Harvey. *Concrete Stone Manufacture*. Detroit: Concrete-Cement Age Publishing Company, 1918.

Helpful Organizations

Cast Stone Institute
10 West Kimball Street
Winder, GA 30680-2535

National Precast Concrete Association
10333 North Meridian Street, Suite 272
Indianapolis, IN 46290

Architectural Precast Association
P.O. Box 06669
Fort Myers, FL 33908-0669

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48 PRESERVATION BRIEFS

Preserving Grave Markers in Historic Cemeteries

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National Park Service
U.S. Department of the Interior

Technical Preservation Services

Cemeteries found across the country are not only places of burial, but they also provide a vivid record of community history. Whether large or small, well maintained or neglected, historic cemeteries are an important part of our cultural landscape. The vast richness of expression through form, decoration and materials informs our understanding of the individuals buried in historic cemeteries and their cultural significance.

While cemeteries are often considered to be perpetual, their most prominent feature—the grave markers—are not. They weather, naturally decay, often are poorly maintained and repaired and, on occasion, are vandalized (Fig. 1). Grave markers are usually noteworthy not only for their inscriptions but also for their craftsmanship. Exceptional markers are considered works of art.

This Preservation Brief focuses on a single aspect of historic cemetery preservation—providing guidance for owners, property managers, administrators, in-house maintenance staff, volunteers, and others who are responsible for or are interested in preserving and protecting grave markers. Besides describing grave marker materials and the risk factors that contribute to their decay, the Brief provides guidance for assessing their conditions and discusses maintenance programs and various preservation treatments.

Figure 1. Sandstone and slate grave markers in the Ancient Burying Ground in New London, CT, display a variety of weathering conditions. Markers in the cemetery date from the mid-17th to the early 19th centuries. Photo: Jason Church.

Also identified are a number of excellent references that address materials used in all grave markers, including several other Preservation Briefs (listed in Additional Reading). This Brief highlights particular issues that should be considered with historic grave markers.

Types of Traditional Grave Markers

The great variety in the types of grave markers is a fascinating aspect of the study and appreciation of historic cemeteries. Three broad categories can be used to describe grave markers—(1) single-element, (2) multiple-element, and (3) structures. Single-element grave markers are stone, cast iron, or wood elements that are set in a vertical position or placed as a horizontal slab on the ground (Fig. 2). Early examples of this simplest type of grave markers are field stone and basic wooden or wrought iron crosses, with the name of the deceased person scratched into or engraved on the marker. Often, these rudimentary grave markers are overlooked, significantly deteriorated, or lost. Vertical stone slabs and large stone ledgers laid horizontally over the gravesite are more sophisticated examples of this type.

Multiple-element grave markers are found in a number of different forms. In the most typical form, a grave marker would consist of two stones—an upper headstone placed on top of a base stone. The upper headstone may be secured in a number of different ways to the base. In the simplest of forms, the upper stone was placed on the base, set in a bed of mortar on top of the base, or joined with pins and mortar. With a "tab-and-

Figure 2. These mid-19th century, single-element stone grave markers in the Grove Cemetery in Bath, NY, are set in a vertical position. Photo: Jason Church.

slot" grave marker, the tabbed upper stone was set in a slotted base (Fig. 3). More common today, the upper headstone is secured with a technique that uses small spacers set on the base and a setting compound. This technique or one that uses an epoxy adhesive may be found on older markers where the stones have been reset.

Figure 3. A multi-element grave marker from the early 19th century in the St. Michael's Cemetery, Pensacola, FL, consists of a vertical element with tabs (left image) into a slotted base (right image). Photo: Fran Gale.

Stacked-base grave markers use multiple bases to increase the height of the monument and provide a stable foundation for upper elements. Tall, four-sided tapered monuments, known as obelisks, are typically placed on stacked bases. Columns or upright pillars have three main parts – a base, shaft, and capital. Multiple-element grave markers may also include figurative or sculptural components. Traditionally, stacked base grave markers were set on lead shims with mortar joints or with lead ribbon along the outer edges.

Grave markers can also be engineered structures. Examples of grave marker structures include masonry arches, box tombs, table tombs, grave shelters, and mausoleums (Fig. 4). The box tomb is a rectangular structure built over the gravesite. The human remains are not located in the box itself as some believe, but

Figure 4. This sandstone table tomb, located in Cedar Grove Cemetery, New London, CT, is an engineered grave marker structure consisting of a horizontal stone tablet supported by four vertical table "legs" with and a central column,. Photo: Jason Church.

rather in the ground beneath the box structure. The table tomb is constructed of a horizontal stone tablet supported by small corner supports or columns. Grave shelters, also called grave houses, can be simple or elaborate wooden structures built over the gravesite. Mausoleums are above-ground buildings with compartments for multiple burials. Engineered structures also include hillside and underground tombs.

Guidelines for Evaluating and Registering Cemeteries and Burial Places, National Register Bulletin 41, provides a concise review of grave marker types.

Materials

Stone, brick, concrete, metal, and wood are the most common materials used for grave markers and for fences and gravesite enclosures in historic cemeteries. This section briefly describes the composition and properties of these diverse materials

Masonry materials

There is a wide variety of masonry materials used in historic cemeteries; some are naturally occurring and others man-made. Although there are notable exceptions, most masonry materials are durable, have high compressive strength, and are resistant to weathering. As grave markers, they typically represent the work of masons and stone carvers.

Stone is a naturally occurring material with a wide range of properties and is available in a variety of colors (Fig. 5). Geologists classify stone according to the way in which it was formed with the three categories being igneous, sedimentary and metamorphic rock. Stone found in cemeteries is predominantly quarried, though the use of field stones is not uncommon. The mineralogy and chemical composition of stones vary. Some are composed primarily of silicate minerals; granites, sandstones, slate, and schist are examples. Other stones contain calcium carbonate with marble and limestone in this group. Mineralogy, chemical composition, and

Figure 5. A variety of colors of natural stone are found in historic cemeteries, such as this pink granite marker in the Cedar Grove Cemetery, New London, CT. Photo: Jason Church.

physical structure of the stone influence weathering and the selection of materials and procedures for its cleaning and protection.

Man-made masonry materials are manufactured from naturally occurring raw materials. For example, the raw materials used to make brick include clay, sand, and shale. During firing, clay minerals and sand melt and come together forming silicates, aluminates, and metallic oxides. The resulting brick material has a hard-fired outer surface with a softer interior.

Concrete is a man-made material composed of cement, sand, gravel, and water. Most concrete produced after 1870 contains Portland cement, another manufactured product. In its plastic or wet state, concrete can be cast or poured. It hardens by hydration, a chemical-curing process. The resulting product has excellent compressive strength, but much lower tensile strength. Reinforcing concrete with steel helps compensate for this limitation.

All masonry materials are porous with an interior network of pores. The porosity of sedimentary rocks such as limestone and sandstone can be as high as 20 percent while the pore volume of granite is very low. Because moisture is a key factor in many deterioration processes, porous masonry materials are more vulnerable to weathering.

Metals

Metals are solid materials that are typically hard, malleable, fusible, ductile, and often shiny when new (Fig. 6). A metal alloy is a mixture or solid solution of two or more metals. Metals are easily worked and can be melted or fused, hammered into thin sheets, or

Figure 6. Decorative cast-iron grave markers like this late-19th century one in Oakland Cemetery in Shreveport, LA, are produced by heating the iron alloy and casting the liquid metal into a mold. Photo: Jason Church.

drawn into wires. Different metals have varying physical and mechanical properties, aesthetics, and weathering characteristics.

Ferrous metals and alloys, including cast iron, wrought iron, and steel, all contain iron. Cast iron also contains carbon and silicon and has a relatively low melting point. When heated to a liquid state, it can be molded into a variety of shapes. Wrought iron is an alloy with low carbon content. Its fibrous inclusions (called slag) are sometimes visible to the naked eye. Unlike cast iron, wrought iron is heated to the point where it becomes soft and then is hammered or "worked" into desired shapes. Most of the wrought and cast iron in historic cemeteries is ornamental rather than structural. While cast iron, steel, and wrought iron all contain iron, steel and wrought iron are more resistant to corrosion. Paint was often applied to ferrous metals to help protect them from corrosion and for decorative purposes. Metal elements were painted in a variety of colors including black, white, and green, among others.

Nonferrous metals and alloys, such as bronze, zinc, and lead, do not contain iron. Bronze contains about 85% copper, 10-15% tin, and sometimes lead. Historic bronze cemetery markers were created by casting processes that involves pouring liquid bronze into a mold. The completed casting is hollow. Bronze work may comprise a single molded component, such as a plaque, or multiple molded components welded or fitted together as with large statuary. Chemical patinas were applied to enhance color, and clear coatings for protection. Cast zinc monuments were popular from 1870 through the early 20th century. Most cast zinc is bluish-gray in color. Although cast zinc is resistant to corrosion, it is a brittle material with a tendency to "creep" or deform, especially when exposed to high outdoor temperatures.

Wood

Wood is a porous organic material composed of tubular cells in a parallel arrangement. The structure

Figure 7. As shown by this 1877 marker in Silver Terrace Cemetery, Virginia City, NV, exposure to sunlight can damage wood grave markers, making the wood more susceptible to water damage and cracking. Photo: Jason Church.

and characteristics of these cells determine the wood's appearance and influence wood properties. Wood-cell walls and cavities contain moisture. Oven drying reduces the moisture content of wood. After the drying process, the wood continues to expand and contract with changes in moisture content. The loss of water from cell walls causes wood to shrink, sometimes distorting its original shape (Fig. 7).

Hardwoods come from deciduous trees such as oak, maple, and walnut; softwoods from conifers such as pine, cedar, and fir. In general, hardwoods have higher density than softwoods, which makes them more durable materials, and are darker in color. Wood cut at different orientations affects its strength and weathering. As an organic material, wood is also particularly vulnerable to termites, carpenter ants, and other wood-destroying insects and fungi. Paints, coatings, and fungicides such as borates are used to help protect wood from various insect damage and fungal rot.

Other materials

Old cemeteries often include a wide variety of other materials not normally associated with contemporary grave markers, such as ceramics, stained glass, shells, and plastics (Fig. 8). As with masonry, metals, and wood, each has its own chemical and physical properties

Figure 8. A fired ceramic, this cameo is set in a marble grave marker, located in Elmwood Cemetery, Memphis, TN. Different materials may require different conservation approaches. Photo: Mary Striegel.

which affect durability and weathering. These materials present unique challenges and their properties must be understood before establishing appropriate maintenance and repair. Documentation of unusual materials is critical when repair is not possible.

Weathering

All grave marker materials deteriorate when they are exposed to weathering such as sunlight, wind, rain, high and low temperatures, and atmospheric pollutants (Fig. 9). If a marker is composed of several materials, each may have a different weathering rate. Some weathering processes occur very quickly, and others gradually affect the condition of materials. Weathering results in deterioration in a variety of ways. For example, when exposed to rainwater some stones lose surface material while others form harder outer crusts that may detach from the surface.

Figure 9. The limestone and sandstone grave markers in this historic cemetery have different weathering processes. On the left, the limestone shows surface loss in areas exposed to rainwater and gypsum crust formation below. The sandstone marker on the right displays uniform soiling, but surface hardening may be occurring. Photo: Fran Gale.

Granite is a durable grave marker material considered resistant to weathering. It is a compact, hard rock with low porosity, and granite deterioration can be imperceptible for many years. Slate also has low porosity, but its layered structure can result in delamination. Some stones used to make grave markers, like sandstone, limestone and marble, are softer than granite and more porous. These materials are more vulnerable to weathering with deterioration noticeable during the initial years of exposure. With slate and other stones with layered structures, weathering sometimes results in delamination, defined as the separation of layers along bedding planes. Different rates of weathering are related to the chemical composition and physical structure of the material.

Deterioration affects other grave marker materials in different ways. With brick, durability is related to its firing temperature, which influences the brick's compressive strength and absorption. Brick fired at high temperatures has a protective fire skin. The weathering of concrete also is variable, and largely depends on the materials used in its manufacture. For example, Portland cement concrete is generally more resistant to weathering than lime concrete. With wood, grave markers fashioned from heartwood (the dead inner wood) are more durable than those of sapwood (the living exterior wood), and some wood species such as cedar, Osage orange and black locust contain extractives that provide decay resistance.

The term "inherent vice" is used to describe a material with a naturally occurring problem that leads to premature deterioration (Fig. 10). An example of this problem is marble that has cracked due to natural locked-in stresses. Inherent vice also describes grave markers that are composed of incompatible materials, where decay is accelerated in one or both materials because of chemical interactions caused by their close proximity. An example is the galvanic corrosion that occurs when dissimilar metals, such as copper and iron, are in contact and exposed to moisture.

Risk Factors

There are two major categories of risk factors that can impact historic grave markers. The first comprises naturally-occurring deterioration phenomena known as the forces of nature, including weathering. The list of natural risk factors includes climate, biological issues, and natural hazards such as fire and floods. The other category includes the many degradation phenomena that are related to human activities. The results of humans and their actions include pollution, lack of maintenance, inappropriate repairs, arson, and vandalism. While some of the factors related to human activities, such as improper repair, may not be intentional, the results can be just as damaging to grave markers.

Figure 10. The sandstone cross (carved to look like wood) in this grave marker in St. Michael's Cemetery in Pensacola, FL, provides an example of inherent vice – the severe delamination affecting the sandstone has occurred along its natural bedding planes. Photo: Fran Gale.

Often, it is not possible to separate natural risk factors from those related to human activities. For example, pollution is deposited on grave markers by rain and other forms of precipitation, resulting in discoloration and often material degradation. Whether due to natural risk factors, human activities or both, "synergism" occurs when the result of two or more risk factors is greater than the sum of the individual effects. An example is the damage that occurs to salt-laden masonry materials during freeze/thaw cycles. The combined effect of these two deterioration factors is severe.

Natural Risk Factors

Climate plays an important role in weathering processes. Depending upon the climate, cemetery grave markers are exposed to rain, snow, sleet, ultraviolet (UV) light, humidity, high and low temperatures, and wind. All of these forces can damage masonry, metals, and wood. For example, with wood, the UV rays present in sunlight accelerate the weathering process.

Exposure to repeated changes in temperature can have an adverse effect on materials such as stone and other porous masonry. High temperatures deteriorate and weaken many materials while low temperatures cause materials to become brittle. In some climates there are rapid changes during spring and fall that

Figure A. Cemeteries are cultural landscapes made up of a variety of features. Grave markers are but one component of cemeteries that also include walkways, drives, fences, coping, trees, shrubs, and other vegetation. Each component adds to the understanding of the cemetery landscape. Photo: Debbie Dietrich Smith.

Vegetation Management

Carefully monitoring and managing of trees and other vegetation is an integral part of a cemetery preventive conservation program. Mature trees and ornamental shrubs can add character, shade, and seasonal color to historic cemeteries (Fig. A). However, if not properly maintained, they can damage grave markers, fencing, and other historic features. Mature trees may fall during storms and drop large limbs that topple grave markers and mangle fencing. Overgrown vegetation creates wet, shaded areas and fosters biological growth than can accelerate deterioration of stone, iron, and wood objects.

A treatment plan for cemetery vegetation should address trees, shrubs, vines, and "volunteer" growth. For the assessment and treatment of trees that pose hazards, consult an International Society of Arboriculture (ISA) certified arborist. Prune trees and shrubs adjacent to grave markers to allow air circulation and light penetration. Certified arborists and master gardeners should carry out this work or direct others in pruning trees and shrubs, as many may be historic features integral to the cultural landscape and worthy of preservation.

Regarding lawn care, historic cemeteries were not designed for today's large riding lawnmowers, yet this is the mower of choice for many cemeteries, as mowing is one of the most time-consuming and costly maintenance tasks generally undertaken. Mowing between tight spots with a large riding mower deck is destined to cause damage. Best practices include using a smaller, push mower between particularly sensitive features, and outfitting riding mower decks with protective bumpers. Low-cost options include using fire hose padding or a foam swimming 'noodle' (Fig. B). Additional damage is caused by riding over low stones or coping, especially when the blade height is set low. If rolling over these features is unavoidable, many riding mowers have a hand-control adjustment to temporarily raise and lower the blade height.

Improper use of a string-trimmer is also potentially destructive, especially when it comes into contact with soft materials such as marble, limestone, and wood. Using the lightest trim line and angling the trimmer head towards the ground will help reduce damage if the trimmer hits unintended targets. Consider hand trimming around the most significant, fragile features.

As a time-saving measure, herbicides are sometimes used around the base of features to remove unwanted grass and weeds. In most cases, use of herbicides for this purpose is not recommended, as salts within the herbicide can wick into the stone (especially soft stones) and cause spalling and deterioration. The removal of vegetation also exposes soil around the base of the grave marker, which, in a heavy rain, can cause soil splashing that may result in staining.

If fertilizer is applied, choose a natural organic fertilizer to minimize salt content for the reasons stated above. For any chemical application, be sure to rinse away residue from grave markers, etc., with water using a low pressure hose or spray bottle, to minimize continued contact.

Ongoing maintenance of cemetery vegetation is essential to conserve grave markers and fencing. Periodic inspections may warrant removing trees; trimming tree limbs, shrubs, and vines; and removing volunteer vegetation. All trees should be inspected at least every five years. Annual inspections are necessary to assess the condition of shrubs and vines, and to identify volunteer growth for removal. Mowing and trimming around the hundreds of stone, brick, iron, and wood features found in many cemeteries is a weekly or bi-weekly chore. Lawn care is the most time-consuming and, if not done carefully, potentially destructive maintenance activity in historic cemeteries.

Figure B. A pool 'noodle' can be fitted to the deck of a lawnmower to prevent damage to grave markers. Photo: Debbie Dietrich Smith.

cause damaging cycles of expansion and contraction. Adjacent dissimilar materials may respond differently to temperature changes, resulting in distortion. High winds can carry water and abrasive particles causing abrasion and erosion, especially to soft materials. Wind may also drive rain water into masonry joints and permeable elements and materials.

Water, in liquid, solid or vapor form, plays a critical role in the deterioration process. Most grave marker materials are porous, and moisture from precipitation, ground water, or frequent landscape watering can enter the pore system. If temperatures drop below the freezing point, water in interior pores, joints and cracks freezes, and its increased volume often applies internal pressure, resulting in damage to the grave marker such as cracks or spalling.

Ferrous metals are particularly vulnerable to water-related deterioration. Iron increases in size when it corrodes, sometimes as much as 20 percent. As the corrosion process proceeds, the ferrous metal eventually weakens. When embedded within concrete or masonry materials, the corroding iron often causes cracks and spalls in the masonry.

Woody vegetation can damage grave markers in a variety of ways (Fig. 11). Trees, bushes, and vines can shade grave markers, extending the time that the markers are exposed to moisture. Tendrils and roots may burrow into mortar joints and openings, causing mechanical damage and large plants may lift up or shift markers. Even leaves and twigs, when allowed to collect on the ground near grave markers, can affect water drainage and evaporation (Fig. 12).

Microorganisms such as algae, fungi, and lichens may affect grave markers. Microorganisms hold in moisture and some produce acids. With acid-sensitive materials such as limestone and marble, the result is surface erosion. Sometimes the organisms use the material as a food source, dissolving minerals in the stone and attacking the cellular structure of wood. Wood is especially vulnerable to fungi, algae, and other microorganisms when its moisture content is above 25%.

Infestation by termites, carpenter bees and ants, and other insects can affect the appearance and structural integrity of wood. Unsightly bird droppings can also affect paint and other surface finishes.

Human Activities

Aside from vandalism and purposeful neglect, most risk factors attributable to human activity are unintentional. Sometimes damage to grave markers is the result of cleaning or repair done with the best of intentions. These unfortunate mistakes can be the result of insufficient training and funding, misuse of tools and equipment, and poor planning. With proper training and supervision, human risk factors can be lessened.

Figure 11. Woody vegetation can damage grave markers and pose a risk to visitors unless well managed and maintained. Photo: Jason Church.

Deferred maintenance usually accelerates the deterioration of grave markers and can be a safety hazard. All materials have a service life with mortar, paints, and other coatings requiring periodic upkeep to be effective. For example, unless ferrous metal has a sound protective coating, exposure to weathering can result in corrosion. Loose, misaligned or detached grave markers may lead to further damage or deterioration if not corrected in a timely manner. When nearby trees and shrubs are overgrown and invasive vegetation is present, needless risks to historic grave markers may also occur.

Inappropriate maintenance activities can be devastating. One of the most common threats stems from improper lawn care, particularly the misuse of mowing equipment and string trimmers (weed whackers). The use of large mowers or mishandling them can lead to displacement of markers. Scrapes, gouges and even breakage also can occur. Improper use of string trimmers in areas immediately adjacent to grave markers can result in

Figure 12. A cemetery professional undertakes a tree inventory in American Cemetery, Natchitoches, LA, to determine the health of trees in the cemetery. Management decisions for trimming or removal are based on the inventory. Photo: Debbie Dietrich Smith.

Avoiding 10 Common Maintenance Mistakes

1. Maintain records on conditions and treatments of historic markers

2. Seek advice from persons experienced with preserving historic markers when initiating a major maintenance or repair program.

3. Discourage visitor use of chalk, shaving cream, and other materials to highlight carvings and lettering.

4. Train grounds crews in methods to avoid damage to historic markers, including flat grave markers which can be easily damaged by machinery, fertilizers and weed killers.

5. Remove graffiti as quickly as possible, using appropriate methods, so as not to encourage further marker disfiguration and vandalism.

6. Maintain ground cover around cemetery markers to avoid surrounding dirt from splashing back and staining grave markers.

7. Never use rotary grinders to resurface or "clean" historic markers.

8. Avoid the use of coatings on masonry without proper investigation.

9. Avoid high pressure water washing to clean historic markers.

10. Repair rather than replace damaged and deteriorated grave markers. For markers encased in cement, leave any repair work to trained conservators.

scratching and even cutting into softer stone and wood. Generally, the use of chemical weed killers at the base of grave markers should be avoided, especially if there is a risk that the marker would absorb the chemicals.

Repointing masonry grave markers using Portland cement mortars that are harder than historic mortars often results in accelerated deterioration of the masonry material. Mortar should be softer than the adjacent masonry, enabling trapped moisture to migrate out, and serve as the sacrificial material when cracking occurs to relieve excessive stress. Problems also result when using impervious "protective" coatings that can trap moisture within the masonry, resulting in damage during wet/dry and freeze/thaw cycles (Fig. 13).

Figure 13. The impervious coating used to "protect" this sandstone grave marker trapped moisture within the stone, eventually resulting in deterioration and surface loss. Photo: Fran Gale.

Figure 14. High-pressure water washing can damage grave markers. The photograph shows "wand marks" on the headstones produced by inappropriate pressure washing. Photo: Jason Church.

Harsh cleaning products and techniques can have a detrimental effect on grave markers. Acidic cleaners such as muriatic acid can dissolve minerals in many masonry materials and can attack metals. Alkaline cleaners, such as bleach, are notorious for leaving residual salts that are deposited on the surface (a process called efflorescence). Both acidic and alkaline cleaning can result in staining, especially if rinsing is inadequate. Using high-pressure water, above 500 to 1,000 psi, can needlessly damage materials as well, increasing their vulnerability to weathering (Fig. 14). If the marker is fragile, even low pressure water can be damaging. Techniques to avoid include aggregate blasting with sand or other harsh media and the use of power tools with abrasive wire or NyloxTM brushes.

Pollution

Grave markers can be both visually and materially affected by pollution. Most readily apparent is the discoloration that takes place when airborne pollutants are deposited on markers. Depending on the exposure, how water is shed, and the marker material and intricacies, discoloration on markers will usually appear uneven and in streaks.

While the visual effect of pollution is often discoloration, less apparent is the potential damage caused by pollution to the grave marker materials themselves. Most rain is slightly acidic, and its pH (a measurement of acidity) becomes more acidic when pollutant gases, such as sulfur dioxide and nitrous oxides, are present. Acid rain damages materials containing calcium carbonate, such as limestone and marble, resulting in surface loss or erosion. When erosion is severe, the grave marker inscription, carvings and sculptural elements may become discernable. Recarving the inscription is not recommended. Instead, a small stand-alone interpretative sign could be placed nearby.

Acid rain also damages bronze grave markers. Pollutant gases alter the composition of exposed bronze, often producing water-soluble minerals. These minerals are washed away during subsequent rains, resulting in surface erosion. If the bronze element is positioned on a masonry pedestal or plinth, the minerals are deposited on the masonry below. These effects of acid rain are disfiguring to the bronze element and associated masonry.

Condition Assessments

Condition assessments help identify potential safety hazards, required preservation work, and any additional conservation that is needed for stabilization and protection of grave markers. Assessments also provide important baseline information about deterioration affecting grave markers. The collected information is helpful in determining and prioritizing maintenance tasks, identifying unstable conditions that pose an immediate threat, and for developing a plan for any needed repair or conservation work. Assessments should be recurring, preferably every spring. Condition assessments also help determine the extent and severity of damage following a disaster.

Depending upon the size of the cemetery and funding available, the initial assessment may be carried out by a team consisting of cemetery staff, a materials conservator, and, where necessary, an architect or structural engineer for cases involving large monuments and mausoleums (Figs. 15a and 15b). For smaller cemeteries without large monuments and mausoleums, and where funding is problematic, volunteers can be trained to prepare a condition assessment under the guidance of an experienced individual.

The first step in any condition assessment is to gather background information, including cemetery records and documents, historical photographs, records of previous repair and maintenance work, and current practices. The next step is to conduct an on-site survey. Following the survey, recommended maintenance procedures should be provided. If the team or individual conducting the survey is experienced in repairing historic grave markers, their assessment should include information about appropriate materials and techniques for restoration and stabilization.

Survey forms facilitate both recording of field conditions and needed maintenance or repair work. Most forms include sections for marker type (headstone, obelisk, etc.), construction materials, orientation, dimensions, soil type, and grave marker deterioration. There are a number of excellent examples of survey forms available for download, including the National Park Service Condition Survey Form at www.ncptt.nps.gov However, because each cemetery is unique, it may be necessary to modify an existing form.

A tool kit for the condition assessment may include binoculars, digital camera, magnifying glass, measuring tape, clipboard, carpenter's rule, level, magnet, and flashlight. For large monuments, a ladder or aerial lift may be required. Photographs of each marker, including overall shots and close-up details, are an essential part of the documentation process. Photo logs are helpful for

Figure 15a. Condition surveys are undertaken to document current conditions, determine safety issues, and plan both emergency stabilization and future treatment plans. There are a variety of survey forms available that can be tailored to the specific cemetery. Photo: Mary Striegel.

Figure 15b. Photographs are used to document the condition of the grave marker as part of a condition assessment. Photo: Fran Gale.

recording the date, direction, and photographer. Digital photographs should be captured in a standardized size and format (.tif, .jpg, .raw).

Defining conditions can be challenging, especially for cemetery staff and volunteers who are new to the process. There are a number of illustrated glossaries that can assist with determining accurate terminology for describing conditions. The ICOMOS Illustrated Glossary on Stone Deterioration Patterns http://www.international.icomos.org/ and the NACE International Resource Center Corrosion 101 http://nace.org/ are excellent resources.

Where deterioration is apparent, the assessment should address questions such as:

- What are the physical characteristics of the defects? Has deterioration obscured ornamental work or made the inscription difficult to read?
- What is the extent of the affected area? Are all areas of the marker affected by deterioration or is there a pattern?
- Do the conditions appear to be stable or getting worse.
- Are the defects affecting other materials or impacting the safety of visitors?
- Is deterioration contributing to loss or theft?
- Is further investigation required?

Maintenance

The old axiom that an ounce of prevention is worth a pound of cure certainly applies to the preservation of historic cemeteries. Maintenance is essential to the long-term preservation of historic grave markers. The principal components of a maintenance program include regular inspections, cyclical and prioritized maintenance work, and annual reports and budgeting. An important first step is the development of a support team, including staff, conservators, engineers, skilled masons, and other professionals. In most cases, the cemetery manager should initiate this process.

The cemetery manager can use the information from the condition assessment report to develop a maintenance plan with a list of cyclical maintenance work. Many tasks can be carried out by in-house staff. For example, maintenance cleaning of metal and stonework can often be accomplished by rinsing with a garden hose. Applications of wax coatings can be used to protect bronze elements. Trained staff can undertake these tasks. Teaching graffiti removal techniques to cemetery staff may also be necessary if vandalism is an on-going problem. Staff should have access to written procedures

Figure 16. A professional mason works to insert a new piece of stone. Often referred to as a "dutchman", this repair technique requires replacing the deteriorated stone section with a new finished piece of the same size and material. Photo: Jason Church.

that include lists of appropriate materials and forms for recording the work completed.

Some work is best done by specialists (Fig. 16). For example, unless there is a trained mason on staff, replacing deteriorated or missing mortar will require a skilled masonry contractor. Services of a conservator or trained cemetery specialist should be used for removing severe soiling and staining from grave markers and for carrying out adhesive repair work such as selectively replacing a piece of stone when a marker is damaged by mechanical equipment. Care should be taken to clearly define the scope of work when hiring a contractor. It is useful to reference guidelines and preservation standards, such as those provided by the Secretary of the Interior or the American Institute for Conservation, whenever possible.

Treatments

In historic cemeteries, preservation treatments are used to preserve grave markers and protect them from future deterioration. Tasks such as cleaning, where appropriate, painting, or lime washing may be undertaken both as an initial treatment and on a cyclical basis as part of the maintenance program for the site. Other treatments, including repointing, patching and filling, and resetting, should be undertaken on an as-needed basis.

It is important to note that the Secretary of the Interior's Standards for Treatment of Historic Properties provide concepts and guidelines for maintaining, repairing, and replacing historic materials. The Standards promote best practices that will help to protect grave markers in historic cemeteries and other irreplaceable cultural resources. If replacement is required, the new material should match the old in composition, design, color, and texture. With chemical and physical treatments, the Standards recommend using the gentlest means possible.

Cleaning

Cleaning is carried out to remove soiling, staining, and contamination from grave markers (Fig. 17). Cleaning improves the visual appearance of the marker and sometimes reveals existing problems such as erosion and cracks. For various protective treatments, cleaning may be a necessary step in surface preparation. Although cleaning often is desirable and beneficial, the use of improper materials and techniques can cause great damage; when cleaning historic grave markers is undertaken, one should keep in mind the principle, "first do no harm."

To avoid a heavy build-up of soiling that might require aggressive cleaning procedures, regularly scheduled cleaning should be carried out by cemetery staff. The frequency of cleaning depends on a number of factors, including climate, location and vegetation. Before cleaning, an on-site inspection should be conducted to identify monument materials, including those not designated for cleaning since they may inadvertently come in contact with cleaning products and could be harmed. Temporary protective measure may be needed to safeguard nearby grave markers. Identifying the types of soiling present, including pollutants and contaminants, is important in deciding what cleaning procedures to use.

For some monuments, existing conditions may preclude cleaning. Even gentle cleaning may not be recommended for conditions such as severe erosion, advanced deterioration, or fragile areas. Additionally, open joints, unstable repairs, and large cracks may require alternate cleaning procedures.

General maintenance may involve low-pressure water washing. In most cases, surface soiling can be removed with a garden hose using municipal water or domestic water supply from a well. To avoid risks due to freezing, air temperature above 40° F is recommended for the time of treatment and subsequent 24 hours. To help remove stubborn soiling and dirt, soft, natural bristle scrub brushes are best. Avoid metal bristle brushes or firm nylon brushes and wrap metal elements with masking tape to avoid scratching grave markers.

Figure 17. Volunteers can undertake cleaning of grave markers once they have received initial training. Cleaning methods may include wetting the stone, using a mild chemical cleaner, gently agitating the surface with a soft bristle brush, and thoroughly rinsing the marker with clean water. Photo: Jason Church.

Selecting A Conservator or Preservation Professional

A conservator or preservation professional can provide valuable assistance in preserving historic cemeteries by documenting and surveying cemetery conditions, assisting with work plans and prioritizing work, and recommending specific maintenance and repair procedures. More commonly, they recommend more specialized preservation treatments for historic markers and carry out the actual work.

Specialized skills are required for undertaking certain treatments on historic grave markers or where markers are highly significant or are in more advanced states of disrepair. When contracting for grave marker conservation, it is important to interview conservators who have worked in cemeteries. They should be experienced with the historic materials and nature of the conditions where the work is to be undertaken. Prior to selecting a conservator, details about their previous work and training should be obtained and confirmed. Most conservators will provide sample reports and photographs of previous work.

The American Institute for Conservation of Historic and Artistic Works (AIC) offers information about selecting a conservator and what to expect once you have contracted with a conservator. Searching the "Find a Conservator" database provides a list of local and regional AIC members who have attained Professional Associate or Fellow status in the organization. More information can be found on the AIC website at http://www.conservation-us.org/

A conservator will inspect grave markers before designing appropriate treatments and submit a written plan for their proposed conservation work that includes materials to be used, a cost estimate, and a schedule for the project. As part of the contract, the conservator should be required to submit a written completion report that clearly describes their treatment of the marker/s and includes maintenance and care recommendations.

Soaking and/or spraying water in a fine mist are effective methods to remove natural growth. Water also has a "swelling action" for some soiling, making it easier to remove with gentle scrubbing. With cyclic spraying, a fine mist of water is directed at the targeted area for a short time (e.g., 20 minutes or less), followed by a short "off" period. This on/off process is repeated several times. Because high-pressure water can abrade the surface, this treatment is not recommended for masonry monuments.

For stains that are not water soluble or where organic solvents are ineffective, it is sometimes necessary to use chemical cleaning. Chemical cleaners include acids, alkalis, detergents and organic solvents. Each has advantages and disadvantages. Acids dissolve the interface between the stain and substrate while alkalis allow for longer dwell periods but must be neutralized. Some detergents are near-neutral in pH (neither acidic nor alkaline) and easier to rinse.

Before selecting or using a chemical cleaning agent, the manufacturer's Safety Data Sheet (SDS), available with the product and online, should be reviewed. The SDS provides information about the product's composition, including identified hazards, proper handling and storage, disposal, and required personal protective equipment. Once a chemical cleaning product has been selected, the manufacturer's instructions should be followed. Before undertaking large-scale cleaning, it is always advisable to undertake small-scale tests (approximately 6" x 6"areas in discrete locations), and then waiting several days before assessing the results.

Chemical cleaning is used to remove metallic stains and other contaminants such as old coatings and graffiti. For severe staining, poultice cleaning is useful as it extends contact time with the cleaner. A poultice is a mixture of clay or other inert material, such as paper pulp, and a cleaning agent. The mixture is applied to the surface and allowed an extended dwell period. The chemical cleaner dissolves the stain and the clay draws the stain out to the surface. When using a poultice, it should be applied just beyond the stained area and covered with polyethylene. The best practice is to leave the treatment on the surface for 24 hours and then remove the polyethylene cover and allow the poultice to continue drying. Once the poultice is dry, the mixture is then collected and the surface is thoroughly rinsed. For some stubborn stains, the application may need to be repeated.

Chemical cleaning also may be required if biological growth (algae, fungi and lichen) is severe. A study conducted by the National Park Service provides guidelines for cleaning government-issued marble headstones and recommends biocidal cleaners that contain quaternary ammonium compounds. Like all cleaning methods, chemical cleaning can accelerate deterioration. Adverse effects include efflorescence, stains, and etching.

Graffiti Removal

Markers with graffiti tend to be targets for further vandalism (Fig. 18). Timely removal helps deter future vandalism and improves the marker's appearance.

If the graffiti is water soluble, it can be removed using water and a soft cloth or towel. Rinsing the cloth frequently helps to avoid smearing graffiti on unaffected areas. If the graffiti is not water soluble, organic solvents or commercial graffiti removal products suitable for the grave marker material are recommended. Products should be tested prior to use. General cleaning of the entire marker is a good follow-up for a more even appearance. For deep-seated graffiti, poultice cleaning (previously described) may be required to extract staining materials.

Figure 18. Graffiti is carefully removed using a low-pressure dry-ice misting instrument. Photo: Jason Church.

Repointing

Missing and deteriorated mortar in old cemetery grave markers is a common condition, and the mortar should be replaced to prevent water intrusion and potential damage (Fig. 19). Several questions should be considered when selecting materials for repointing. Most importantly, what is the masonry substrate that

Figure 19. Masonry markers like this box tomb may require the repointing of mortar joints. It is important to use a mortar that is softer than the historic brick. In this case a conservator uses a lime putty-based mortar to repoint. Photo: Jason Church.

requires repointing? What mortar mix is suitable for the historic masonry? How quickly will mortar need to cure? Soft mortars contain traditional lime putty or modern hydrated lime. Harder mortars contain natural or Portland cement. If necessary, mortars can be tinted with alkali-stable pigments to match historic mortar colors. The selection of the mortar to be used is critically important to the success of the project. An inappropriate mortar can result in unattractive work and accelerate the deterioration of the historic grave marker. Always avoid the use of bathtub caulk and silicone sealants for repointing mortar joints.

Prior to repointing, any loose and deteriorated mortar needs to be removed from the joint, preferably using hand tools. Following joint preparation, the mortar materials (lime, cement, and sand) are mixed, and then water added to form a stiff paste. The repointing mortar is applied using a tuck pointing trowel, typically with a narrow 1/8"- 1/2" flat blade. Mortar is compacted into the joint, and then excess mortar is removed and the original joint profile replicated. Good repointing requires skill. Generally, a mason or person with masonry training should repoint mortar joints.

Resetting

Resetting is recommended for grave markers when their foundations are unstable or out of plumb (Figs. 20a through 20c). This often complex activity involves lifting the grave marker, leveling its foundation, and returning the marker to its original upright position. Workers can be injured and the grave marker damaged if resetting is not carried out properly and safely.

Inexperienced staff or volunteers should not attempt resetting without training from a conservator, engineer, or other preservation professional. When dealing with fragile or significant grave markers, or those with large

Figure 20a. This slate grave marker in the Ancient Burying Ground in Hartford, CT, is a ground-support stone. Resetting requires digging a hole that will hold the base of the stone and then compacting the soil at the bottom of the hole by hand. Photo: Fran Gale.

Figure 20b. To facilitate drainage, crushed stone, gravel, and sharp sand line the hole and are hand-tamped around the stone after placement. Photo: Fran Gale.

Figure 20c. The reset ground-supported grave marker should be level and plumb. Photo: Fran Gale.

Safety

Encouraging the public to visit and explore public burial grounds and cemeteries increases awareness of the value of these sacred sites. If visitation is promoted, owners and property managers must be responsible for ensuring that their sites are safe for staff and visitors. This responsibility includes monitoring the condition of grave markers.

Historic cemeteries can be hazardous workplaces for staff members, consultants, contractors, and volunteers. Awareness of potential hazards in a historic cemetery and careful planning are essential to avoiding injury. Maintain an appropriate first aid kit on site for minor injuries and have an emergency plan in place that includes contact information for medical assistance.

Creating a safe work environment in historic cemeteries requires appropriate planning for each project, starting with personal protective equipment. Suitable clothing and personal protective equipment should be fundamental safety requirements. Supportive shoes such as steel toe work boots or sturdy lace-up shoes help protect ankles and feet from injury, just as good work gloves help protect hands from cuts, scrapes, and splinters. Whether using a chipper, drill and other power tools or equipment, safety glasses or goggles are essential. A back brace often is recommended for heavier lifting tasks. Do not work alone or, if you must, tell someone where you are and when you expect to return.

During hot weather, heat stress is a present risk. Besides knowing the signs of heat stress, preventive measures should be taken by each worker:

- Wear light, loose-fitting, breathable clothing and a broad-brimmed hat.
- Use sunscreen, reapplying as needed.
- Take frequent breaks in the shade.
- Make sure fresh water is available and drink to stay hydrated.
- Eat small meals before and during work.
- Avoid caffeine, alcohol, and large amounts of sugar.

Trip and falling hazards include uneven ground, holes, open graves, toppled grave markers, fallen tree limbs, and other debris (Fig. C). Sitting, climbing, or standing on a grave marker should be avoided since the additional weight may cause

Figure C. Gophers and other burrowing animals produce uneven ground and holes that are trip and falling hazards to visitors and staff of historic cemeteries. Photo: Jason Church.

deteriorated and structurally unstable monuments to break or collapse with serious injury potentially occurring to the worker and damage to the marker. To help prevent injuries that can result from unstable grave markers, it is important to routinely identify and flag severely damaged and unstable grave markers for corrective work and to rope off any marker considered to be in immediate danger of collapse. Prior to beginning work, the immediate area around the job site should be rechecked for safety hazards.

Snakes, wasps, and burrowing animals inhabit historic cemeteries (Fig. D). Snakes sun on warm stones and hide in holes and ledges, so it is important to be able to identify local venomous snakes. An appropriate venomous snake management plan should be in place, and

Figure D. Yellow jackets that are nesting below the projecting molding of this grave marker pose a hazard to visitors and staff because, if disturbed, they will vigorously defend their nest. Yellow jacket, paper wasp and hornet nests should be removed from grave markers by trained staff or specialists. Photo: Jason Church.

all workers should be familiar with it. Workers and volunteers should be instructed as to safety measures to be taken in regards to snakes, including proper clothing where there is an identified risk.

The imported red fire ant is an invasive pest, prevalent in the southern United States. They attack en masse, resulting in painful bites that can be potentially life threatening to people with allergic reactions. It is important to be able to identify the presence of red imported fire ants; be informed as to safety measures to take when working in areas known to be infested with them; and take steps to control them as necessary. A rescue medicine is available for those with serious allergic reactions.

Paper wasps, yellow jackets, and hornets are another concern, building nests around and on ledges and lips of box tombs, mausoleums, and other grave markers. They are very territorial around their nests and will vigorously defend them. There are non-toxic sprays that can be used in and around the work area. Nests should be safely removed.

Burrowing animals like armadillos, groundhogs, gophers, and moles disrupt the ground with their digging and tunnels and can create tripping hazards or undermine grave markers. Prairie dogs have been known to dig up bones and destroy gravesites. Sinkholes created by these animals can also be perfect places for other creatures like snakes to inhabit.

Proper work practices and lifting techniques need to be used whenever lifting or resetting grave markers. Many markers are surprisingly heavy. For example, a common upright marble headstone measuring 42" long, 13" wide, and 4" deep weighs over 200 pounds. Volunteers and workers should work in pairs, be able bodied, and have training in safe lifting techniques. Lift equipment and ergonomically correct tools should be routinely used to lift heavy markers (for most people this includes markers that weight more than 50 pounds). For smaller grave markers, a simple wooden clamp system can be constructed for a two-person lift (Figs. E1 and E2).

Figure E1. The simple wooden clamp system allows two people to safely lift a marble grave marker. Photo: Sarah Jackson.

Figure E2. The clamp system is constructed from off-the-shelf wooden boards. Photo: Sarah Jackson.

stacked bases, a specialist should be contracted for resetting.

It is important to check state and local regulations to make sure that digging around the grave marker is authorized before starting any resetting effort. Also, grave markers should be documented and cleaned before resetting. It is also a good time to measure and record the overall size of the marker and note any stone carver's marks or inscription of the company that made the marker. The company name is often found on buried portions of the base and revealed during the resetting process.

Typical materials required for resetting include a hoist, shovels, plumb lines, levels, tamping devices, wooden stakes, and boards. To improve drainage, sand and small gravel or small stones are commonly used when resetting.

Prior to resetting, it is important to establish the type of base. Most grave markers have one of three main base types: (1) ground supported, (2) slotted base, or (3) stacked base. Similar tasks are undertaken for each base type.

Ground-supported stones are a common type of historic grave marker. This type includes the traditional New England slate and brownstone markers and government-issued marble headstones. The primary goal with any ground-supported marker is to have it level and plumb. To reset the marker, a few inches or more of soil is first removed from around the stone. This is usually sufficient to enable a stone marker to be straightened.

The enlarged hole is then filled and compacted around the marker.

If a grave marker has fallen over and has been covered with soil or turf, it must first be inspected for attached concrete or other anchoring system. If this system is still attached, the grave marker may break during lifting. After removing the stone, it can be cleaned and then temporarily set on wood supports.

The hole left from removal of the marker will need to be enlarged to hold the base of the stone. Soil at the bottom of the hole should be compacted by hand, not with a power tamper. In most cemeteries, crushed stone or sharp pea-size gravel mixed with angular sand can be used to line the hole and then hand-tamped around the stone after it is placed in the hole. The gravel helps facilitate drainage and keeps the stone from settling. A bubble level can be used to ensure that the stone is plumb. Markers should not be set in concrete.

The second type of monument base is the slotted base where the upright element is secured to the base using mortise-and-tenon style construction. The upright element in the slotted base may be leaning or loose. In any case, the upright element should be removed from the base, the base leveled, then the element returned to the base. It is important to keep in mind the depth that the base was intended to be set into the ground. This may be indicated by the style of the base or the observed soil- line staining. Many bases were intended to sit flush on grade while some were set a few inches below ground.

Prior to resetting, the upright element should be disengaged from the base and carefully set aside. In most cases, the base will need to be removed to properly prepare the hole before resetting the grave marker. After doing so, four to six inches of soil should be removed from the hole and the soil then tamped by hand to make a proper bed or foundation. The foundation area can be filled with crushed stone or sharp pea-sized gravel and sand, checking to make sure that the base is plumb and level as resetting proceeds. Clean the headstone prior to resetting. Old mortar, concrete or epoxy should be removed from the slot and the bottom of the upright element using a hammer and small chisel. Once the stone elements are cleaned and the base is level and plumb, the next step is placing the upright element into the slot. A lime mortar can be used to fill any gaps in the slot. This prevents water intrusion that may cause marker movement related to freeze-thaw cycles.

A third common base type is the stacked base. This style includes at least one element placed on a base or a series of bases of varying sizes. Resetting a stacked-base grave marker usually requires special skills and lifting equipment. Depending upon the complexity of the marker, a conservator, experienced masonry contractor, or preservation professional with engineering skills is usually needed.

The sections of a stacked-base grave marker often are pinned together for support. If deteriorated, the pins should be replaced. Using a hammer and chisel, a conservator or person experienced in working with historic grave markers should remove any corroded iron, copper, or bronze pins, as well as the old mortar or adhesive adhered to each section. Replacement pins should be stainless steel all-thread, and sized slightly shorter and smaller than the existing hole. The replacement pins then can be set with epoxy, lime mortar, or packed in lead. Once the pins are in place, the sections of the stacked base can be individually reset using traditional or contemporary materials. These include lead, shims, mortars, and setting compounds. Finally, each gap or seam between sections should be pointed with a setting compound or appropriate mortar to prevent water intrusion.

Filling and Patching

Hairline masonry cracks may be the result of natural weathering and require no immediate treatment except to be photographed and recorded. However, larger cracks often merit further attention. Repairing masonry cracks involves several steps and typically a skilled hand (Fig. 21). The repair begins with the removal of loose material and cleaning. Materials that are used for crack repair include grouts for small cracks and epoxy for large cracks affecting the structural integrity of the monument. Gravity or pressure injection is used to apply grout or epoxy. Crack repair can be messy, so careful planning and experience are helpful. If the crack is active, a change in size of the crack will be noted over time. Active cracks require further investigation to ascertain the cause of the changes, such as differential settlement, and to correct, if possible, the cause prior to repairing the crack.

Figure 21. Cracks in a stone marker should be filled to keep water and debris out and prevent the crack from becoming larger. A patching mortar is designed to be used, in this case, with historic marble. Photo: Mary Striegel.

Repairing masonry markers with severely damaged or missing pieces requires a skilled mason or conservator. The materials used for patching are similar to those used for repointing mortar joints. With patching, it is critical that the physical and mechanical properties of the patching material be appropriate for the masonry material. Work includes designing a durable patch compatible with the substrate. Proper curing is especially critical for large patches and often involves procedures to protect the patch from premature drying. Repairs to stucco-covered surface should be carried out by a skilled plasterer using a stucco mix that is compatible with the original material.

Repairing delaminated slate and brownstone grave markers also requires a skilled mason or conservator. With this condition, there are openings along bedding planes which expose the stone grave marker to moisture intrusion. Treatments are design to eliminate or reduce moisture intrusion that would accelerate deterioration. The selection of appropriate repair materials and procedures depends on the severity of the condition. Traditionally, delaminated slate or brownstone grave markers were "capped" with a strip of lead or other metal. Today, this repair technique is seldom used, in part because the drilling procedure used to attach the cap can be damaging, if the stone is brittle. Also, there are toxicity issues associated with the use of lead. An alternative approach is to fill the openings exposed by delamination with grout or patching material that is compatible with the stone. Adhesion of the repair material to the delaminated surfaces is particularly important.

The decision whether to use patching material or undertake a dutchman repair with matching materialdepends on the grave marker material, location of the damaged area, size, and other factors. A successfully executed dutchman usually results in a repair that has long durability and maintains a similar weathering pattern to the adjacent historic material. When working with stone grave markers, repairs using dutchman techniques are best done by a skilled stone craftsman.

Detached fragments should be collected, documented and stored in a suitable facility. Reattachment of these fragments should be undertaken by a conservator or mason. This work often requires pins to reinforce the joints and patching to compensate for losses.

Protective treatments

Protective treatments for metal, stone, and wood grave markers stabilize corrosion and protect the monument from rainwater, pollutants, and other contaminants. Treatments may vary not only due to material differences, but also to specific site conditions.

Wax coatings are often used for bronze markers (Fig. 22). Wax provides a protective barrier against moisture, soiling, and graffiti. There are several steps in the wax application process. Where there is little corrosion, gentle cleaning of the marker is undertaken prior to applying the wax coating. Apply a thin layer of wax to the marker using a stencil brush or chip brush.

Figure 22. A protective coating must be maintained on metal elements. Wax or lacquer coatings help preserve the bronze patina and slow corrosion. Conservators apply a microcrystalline wax to this bust at St. Mark's Church in-the-Bowery, New York, NY. Photo: John Scott.

Mineral spirits can be added to the wax to facilitate brush application. A soft, clean cloth is used to remove excess wax and buff the surface. A second coat of wax is sometimes needed.

In most climates, iron objects require coatings to protect them from corrosion. Clear coatings are sometimes used to protect wrought iron objects. A corrosion inhibitive primer and topcoat are used for cast iron and steel objects. Direct-to-Metal (DTM) coatings combine the two. Because of their durability, acrylic enamels, urethane, and fluoropolymer coatings are preferred. Proper surface preparation is important, including the removal of surface soiling, flaking paint, and loose rust. This can be accomplished with compressed air, wire brushing, solvent rinsing, or other cleaning method. Next the surface is cleaned with a damp cloth, repeatedly rinsing the cloth as needed. While the surface needs to be thoroughly dried before painting, it is important to repaint as soon as possible since even overnight condensation deposits are not desirable.

Another approach for iron objects is using a rust converter to stabilize corrosion that involves less surface preparation. Commercially available rust converters contain tannin or phosphoric acid and react with rust to form more stable iron compounds. The surface must be painted following surface preparation with the rust converter.

Limewash is a traditional coating that brightens stucco-covered grave markers (Fig. 23). Like paint coatings, it needs to be periodically applied. Limewash is prepared with lime putty or hydrated lime and water. Curing begins following application. The lime putty or hydrated lime reacts with carbon dioxide in the air in a process called carbonation. This reaction eventually forms calcium carbonate, a stable hard coating. Limewash is a "green" coating with no volatile organic compound content and is "breathable," i.e., it allows for water vapor transmission. Although commonly white, limewash can be colored or tinted with alkali-stable pigments such as iron oxide.

Figure 23. Limewash is a breathable coating sometimes used to protect the surface of the grave marker and provide a decorative finish. Limewash is applied by brush in five to eight thin coats with each coat about the consistency of skim milk. The surface is allowed to slowly dry between coats. Sometimes the surface is covered by damp burlap to slow the drying process. Photo: Sarah Jackson.

Before applying the limewash, the masonry surfaces should be inspected for coating residues that need to be removed and any required repair work undertaken. Stucco-covered surfaces should be repaired and allowed to fully cure before applying limewash. If the original color has been determined, the renewal coating can be formulated to match. In preparing the wash, enough water is added to lime putty or hydrated lime to produce slurry with the consistency of skim milk. A mixture of four parts water and one part lime usually works well. A Zahn or Ford cup can be found at a hardware store and used to measure the thickness of the limewash and ensure consistency with each batch. Although many traditional recipes include additives, a simple mixture of lime and water performs best. Using a power drill with a paddle attachment to stir the limewash will help ensure that the lime particles are fully suspended in the mixture. Any pigment for coloration is added during the final mixing.

The surface must be cleaned of old coating residues, soiling, and other contaminants. After dampening the surface, the limewash is applied in 5-8 thin coats, allowing each coat to dry between applications. Limewash is translucent immediately after application and then becomes opaque when dry.

Proper curing of limewash is critical to its durability. To prevent premature drying, the treated surface may need to be covered with damp burlap. Limewash must not be applied when frost or freeze conditions are predicted or in temperatures above 90° F. Ideally, limewash should be applied during spring or fall when temperatures are around 70° F, avoiding direct sunlight where possible.

Clear water repellents and consolidation treatments are sometimes considered for severely deteriorated grave markers, including unpainted wood markers and masonry. For wood markers, epoxy consolidants are used to patch and repair. For masonry materials, it is important to remember that they are porous, and water vapor and liquid water can travel through their internal network. Protective treatments must allow for water vapor transmission to prevent trapping moisture inside the marker. Although a wide variety of water repellents have been employed on masonry (wax, acrylic, epoxy resins, etc.), silane and siloxane treatments have been the most successful. These organosilicon compounds are "breathable," penetrate below the surface, and form chemical bonds with silicate minerals.

When erosion is severe, consolidation treatments (e.g., ethyl silicate) have been used to replace mineral binders lost to weathering (Fig. 24). Because these treatments are not reversible, laboratory and on-site testing are essential. Application by a conservator or other experienced preservation professional is advised.

Figure 24. A severely deteriorating monument or grave marker can be treated with a stone consolidant. The treatment is usually applied using a spray system. The consolidant soaks into the stone and replaces mineral binders that hold the stone together. On-site and laboratory testing and evaluation are performed prior to using this non-reversible type of treatment. Photo: Lucas Flickinger.

Conclusion

Maintenance is the key to extending the life of historic cemetery grave markers. From ensuring that markers are not damaged by mowing equipment and excessive lawn watering, to proper cleaning and resetting, good cemetery maintenance is the key to extending the life of grave markers. Whether rescuing a long-neglected small cemetery using volunteers or operating a large active cemetery with paid staff, the cemetery's documentation, maintenance and treatment plans should include periodic inspections. Only appropriate repair materials and techniques that do not damage historic markers should be used and records should be kept on specific repair materials used on individual grave markers. A well-maintained cemetery provides an attractive setting that can be appreciated by visitors, serves as a deterrent to vandalism, and provides a respectful place for the dead. A community history recorded in stone, wood and metal markers, cemeteries are an important part of our heritage, and are deserving of preservation efforts (Fig. 25).

Figure 25. Involving the community in activities helps to develop an appreciation for the cemetery and serves to deter vandalism. Events may include children through school or scouting organizations and can help teach across the curriculum. Photo: Debbie Dietrich Smith.

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Whether large or small, well maintained or neglected, historic cemeteries are an important part of our cultural landscape. This historic cemetery at Cape Lookout National Seashore, NC, provides a record of the families who lived in Portsmouth Village during the 19th and early 20th centuries. Photo: Fran Gale.