SECTION 07 32 13.03
CLAY TILE CLEANING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Stanford University Special Conditions for Water Discharge Management and Environmental Pollution Prevention
B. Stanford University Water Conservation Plan

1.2 WORK INCLUDED

A. This work includes providing the necessary labor, materials, equipment, and supervision to perform the following:

1. Clean terra cotta clay roof tiles utilizing a cold-water rinse applied with power washer to achieve the following:
   a. Effective removal of biological growth (e.g. lichen) and dark atmospheric carbon staining on the surface of clay roofing tiles.
   b. The gentlest cleaning means possible to achieve the desired effective result summarized in the Intent of Cleaning (1.3) and through visual evaluation.

2. Installation of cleaning mock-ups utilizing cold-water rinse to determine:
   a. Verification of water pressure required to achieve work stated above.

3. Contain and collect all rinsate (run-off) from cleaning and dispose in the sanitary sewer.

1.3 INTENT OF CLEANING

A. The objective of the tile cleaning is to:

1. Improve the appearance of the clay roof tiles roof by removing atmospheric staining (e.g. dirt, carbon deposits) and biological growth (lichen).

2. Cleaning is to result in an overall cleaner and uniform appearance without damage to the tile surface, substrate, adjacent materials, or landscape. Some minor staining may remain (as approved in the mock-up) and is acceptable as part of the historic patina of the roof tiles.

3. Minimize water usage and rinsate generation.
1.4 RELATED REQUIREMENTS

A. Stanford University Special Conditions for Water Discharge Management and Environmental Pollution Prevention

B. Stanford University Water Conservation Plan

C. Local and State water conservation ordinances.

1.5 REFERENCE STANDARDS


1.6 SUBMITTALS

A. Cleaning procedure(s): A summary of each cleaning procedure including technique(s), rinse pressure(s), and control of runoff (if required by SWPP).

B. Documentation of contractor qualifications.

1.7 QUALITY ASSURANCE

A. Contractor Qualifications
   1. Contractor performing this work must have at least five (5) years’ experience in the cleaning of masonry.
   2. Cleaning personnel must have at least three (3) years’ experience in performing this type of work.
   3. Work crew shall remain consistent for the duration of the project.

B. Manufacturers: Materials (if specified) shall be obtained only from manufacturers who will, if required, send a qualified technical representative to the project site, for the purpose of advising the Contractor of the procedures and precautions for the use of the materials.

C. Preconstruction (cleaning) conference: Attend a pre-cleaning conference to be held with the owner, contractor and the engineer involved in the cleaning to discuss cleaning practices and coordination with the project.

D. Planned Discharge Form to be completed in coordination with Water Resources & Civil Infrastructure group to ensure the proper water supply and discharge location are used and documented.
1.8 MOCKUPS

A. Execute at least two (2) 10 ft x 20 ft cleaning mockups of cleaning process(es) specified herein on tile surfaces to be cleaned. Mockups must be constructed by the contractor who will also perform the work. Notify the Engineer at least 48 hours before starting work on each mockup.

B. Note: Different buildings and/or roof heights may require separate mock-ups because of the effect on rinsing equipment and rinse pressures.

C. Install mockups at locations selected by the engineer or owner, following engineer's receipt, review, and approval of the submittals.

D. Installation of mockups must be available for observation by the engineer during daylight hours.

E. Document all mockup areas prior to mockup installation. Document installation of all mockups.

F. Mock-ups general instructions:
   1. Conduct cleaning of tile mockup area in accordance with 3.04 General Cleaning in this Section.

G. Do not proceed with general cleaning before review and acceptance of the mockups by the Engineer.

1.9 DELIVERY, STORAGE AND HANDLING

A. All cleaning products stored and used on the site must be clearly labeled with proper warning to prevent accidental use of the products by unauthorized persons.

B. All materials, cleaning products, and accessories when applicable, must be stored according to manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 GENERAL CLEANING

A. Water: Cold water, clean and free of deleterious impurities, acids, alkalis or organic matter. Water must be potable from the Stanford/city main.
2.2 ACCESSORIES

A. Pressure Washer Unit: commercial unit capable of delivering water at a base pressure at the unit between 3,500 and 6,500 psi with a flow rate of 6 gal/min. Adjustable pressure valve and pressure gauge fitted at the wand applicator.

B. Nozzle: rotary nozzle.

C. Hose: Heavy duty hose, 50-250 ft. max. from power washer to wand.

PART 3 - EXECUTION

3.1 GENERAL

A. The work is intended to include all areas referenced by the contract.

B. The purpose of the cleaning process is to remove dirt and biological growth without damage to or disintegration of the tile surface.

C. Use lowest rinse pressure, as directed herein, or approved by the engineer.

D. Minimize rinse time, water use, and rinsate generation.

E. The final rinse pressure and method shall be as approved in the mockup(s).

F. If the contractor equipment includes an adjustable pressure power washer and pressure gauge, maintain approved pressure at all cleaning locations. If a pressure gauge is not available, additional mockups will be required at each distinct building/roof location (e.g. different roof heights) to establish acceptable cleaning pressures and to verify that pressure washing is not damaging tiles.

3.2 EXAMINATION

A. Examine all surfaces scheduled for cleaning for roughness, contaminants, unsound structural substrates, loose tiles, or other conditions that may impair the application. Notify the engineer immediately of any such conditions; do not continue work until directed by the engineer on how to proceed.

3.3 PROTECTION

A. Protect windows and doors, decorative features, joints, and other openings from infiltration of particulates, water, and/or chemicals into the building.

B. Workers, Pedestrians, Automobiles, Other Property, etc.
1. Protect workers, pedestrians, animals, adjacent buildings, parked or moving automobiles, other buildings, street furniture, and other persons and objects that are vulnerable to damage by the cleaning operations.

C. Comply with all applicable safety codes and regulations that govern the work, including OSHA and EPA regulations covering waste tool use, water disposal, VOC regulations, and governing air quality management district.

D. Contain and collect all rinsate (run-off) from cleaning and dispose in the sanitary sewer. Do not allow water to undermine the building.

3.4 GENERAL CLEANING – POWER WASHING

A. Clean tiles from top to bottom.

B. Apply water from the tip of the nozzle at a minimum consistent distance of 12 in. from the tile surface. Do not hold or probe the nozzle tip less than 12 in. from the surface of the tiles.

C. Initially, apply water starting with a low pressure (1500 psi) from the top-to-bottom of the cleaning or mockup area. If low pressure is insufficient to remove materials to be cleaned (based on cleaning Intent of Cleaning 1.3), gradually increase pressures by 500 psi increments to 3000 psi or until objectives are achieved (Note: During mock-up installation, the Engineer will review surface of tiles following cleaning passes for any damage to tile surfaces. Stop cleaning and reduce pressure if cleaning produces chips, abrasions, or spalls in the tile surface). Maintain consistent cleaning pressures at sub-areas within mock-up area. Do not exceed 3000 psi for cleaning.

D. After Engineer has approved pressure to be used, maintain that constant pressure on entire roof.

E. Apply water in a side-to-side motion. Apply sufficient water to remove soiling as determined in the intent of cleaning and mock-up.

3.5 CLEAN-UP

A. Rinse the adjacent surfaces thoroughly of all chemicals, dirt, pollutants, and other materials washed off the building each day.

B. After cleaning has been completed, remove all protection including all tape, polyvinyl sheets, strippable mask, etc. Clean all glass. Replace glass, wood, or other materials damaged during the cleaning process at no cost to the Owner.

END OF SECTION