



P.O. Box 8 Cape Neddick, ME 03902-0008

## **Specifications:**

### **Repair and Repointing of Brick Masonry, Keeper's House and Fuel House Cape Neddick Light Station**

September 2, 2016

#### **Introduction**

These specifications describe the materials and procedures required for repointing the brick foundation and support piers for the Keeper's House, and for the structural brick walls of the Fuel House at the Cape Neddick Light Station in Cape Neddick, Maine. The materials and procedures outlined below are consistent with accepted, national historic preservation standards and practices. For more information, see "Preservation Brief 2: Repointing Mortar Joints in Historic Masonry Buildings", published by the National Park Service, United States Department of the Interior.

#### **Part 1: General**

1. Contractor Selection
  - a. The contractor for masonry work will have at least five years of experience working with structures listed in the National Register of Historic Places.
  - b. All personnel working on the project for the contractor will have at least five years of experience with the tools, techniques and skills associated with historic masonry restoration.
2. Quality Assurance
  - a. All processes and procedures will be subject to inspection and approval by Town of York Parks and Recreation (YPR) staff or their designees.
  - b. All work will be completed in a neat, clean and workmanlike manner.
3. Certification and Compliance
  - a. All workmen will possess the requisite licensing, insurance and certification, particularly regarding EPA regulations for potential disturbance of lead paint.
  - b. All local regulations or ordinances regarding scaffolding, parking, public streets, right-of-way, and noise levels will be observed.

4. Documentation
  - a. Photographic documentation of existing conditions before, during and after each procedure, will be undertaken by the contractor for submittal to YPR.
  - b. The contractor will submit a brief report to YPR at the end of the project describing the final scope of work and treatment methods used.

## **Part 2: Procedures**

1. Mortar Formulation
  - a. Premixed masonry cement may not be used.
  - b. The pointing mortar must match as closely as possible the original in color, texture, and tooling.
  - c. Sand in particular should match; use natural or rounded sand of similar grade.
  - d. Mortar must be as soft or softer than the original material.
  - e. The lime must conform to the standard of the American Society for Testing and Materials (ASTM) C 207.
  - f. The mortar formulation will consist of the following components:
    - i. Five parts clean, round mason's sand with variable particle sizes, but no particles larger than 3mm.
    - ii. Three parts lime.
      1. Use only NHL 2 (Natural Hydraulic Lime), with a strength rating of 2. This material is ideal for situations where high vapor exchange in the masonry is expected.
    - iii. One part WHITE Portland cement
    - iv. Potable water must be used for mixing the mortar.
2. Mortar Preparation
  - a. The mortar will be mixed to a relatively stiff consistency, exhibiting minimal to no "slump".
  - b. During use, if unused mortar begins to set, it will be discarded and replaced with a fresh batch. No re-tempering by adding water is permitted.
3. Joint Profile
  - a. The joints of re-pointed areas will be dressed or struck using a pointing key or other appropriate tool to match exactly the design of surrounding joints identified as original.
4. Removal of Existing Mortar
  - a. Removals will include:
    - a. All areas of friable, crumbling, loose or missing mortar.
    - b. All areas identified as non-original re-pointing using hard modern mortars with high Portland content.
  - b. Mortar in areas to be repointed should be removed to a depth of 2 to 2 ½ times the width of the joint.
    - i. Any deteriorated or loose mortar should be further removed beyond that depth.
    - ii. All mortar removal is to be done with hand chisels and mash hammers. No power tools are to be used unless very hard material is encountered

in areas requiring greater depth for the installation of stitching rods (see Section 2c below).

- iii. Mortar should be removed neatly from between the bricks, leaving square corners at the back of each cut.

## 2. Stitching Rods

Several areas of the Keeper's House foundation exhibit "stair-step" cracking resulting from long-term differential movement. Most areas of the foundation are footed directly on bedrock. The movement does not appear to be a significant structural concern at this time. However, to prevent further deflection of brick joints over time, we recommend installation of stainless steel stitching rods in areas where stair-step cracks are present.

- a. Stitching rods will consist of ¼"-diameter stainless steel threaded rod.
- b. Where stair-step cracks exist, stitching rods will be installed at intervals of every three courses from the line of grade upwards.
- c. The horizontal joints passing through the cracks will be raked out to a depth of 1", and pass for ten inches on either side of the crack location.
  - i. A rotary grinder is permitted for raking out the joints, as long as contact with the edges of bricks is avoided.
- d. Prior to installation, the joints will be wetted (see Section 3a below).
- e. Prior to installation, a bed of wet repointing mortar ½" thick will be pressed into the back of the raked out joints.
- f. Stitching rods will be pressed into the wet bedding mortar, and then covered with additional pointing mortar to finish the repair.

## 3. Repointing

- a. The contractor will rinse the joints with a jet of water before filling, to remove all loose material and dust.
- b. Contractor will apply a continual mist of water for at least one hour, pending weather conditions, before filling joints. At the time of filling, the joints should be damp, but without standing water in them.
- c. All repointing should be done out of direct sunlight to prevent too-rapid, or "flash" drying. The contractor will provide shade as needed.
- d. Filling joints:
  - i. The deepest joints should be filled first with mortar packed well into the corners.
  - ii. Layers of approximately ¼ inch should be applied in succession, each when the layer before it is "thumbprint" consistency, to avoid shrinkage during setting.
  - iii. If the bricks have worn, rounded edges, mortar should stop short of being flush with the brick faces.
  - iv. The final layer of mortar can be tooled to match the original joints when it is thumbprint consistency.
  - v. Any mortar that gets on the brick faces should be removed with a natural- or nylon-bristle brush while it is thumb-print consistency. Metal-bristles may damage soft historic brick surfaces.
- e. Curing
  - i. After the tooled mortar has reached thumbprint consistency, it should be wetted periodically with a hand sprayer on a fine mist setting. In hot

weather, this should be done as often as hourly the first day, with the intervals gradually increasing to every three or four hours for another day.

- ii. The masonry should be covered with burlap for three days. As an alternative, plastic sheeting may be used, but it must not touch the masonry.
- iii. Trying to achieve a better match between older mortar and repointing by cleaning the old or coloring the new should not be done without the approval of the consulting building conservator.

#### 5. Repainting

- a. If project administrators plan to repaint the masonry after completion of repairs, they should wait a minimum of 21 days prior to doing so.

For information on painting materials and procedures, refer to “Exterior Paint Specifications: Wooden Structures at the Cape Neddick Light Station” prepared by Groundroot Preservation Group for the York Parks and Recreation Department in August, 2016.