

# Structures North

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Friends of Swan Island  
PO Box 246  
Richmond, ME 04357

Attention: Bruce Trembly, President

Reference: Gardiner Dumaresq House  
Swan Island, ME

Dear Mr. Trembly:

On Thursday, 18 October 2007 I visited the Gardiner Dumaresq House on Swan Island to inspect the condition of the existing chimney. The following is a summary of my observations:

## General Description

The Gardiner-Dumaresq House is a 2 ½-story residence with a partial basement. Constructed in 1759 as a "saltbox", there are five timber bents, two of which flank a large interior chimney. This chimney serves fireplaces at the first and second floor with multiple flues that angle inward toward the top of the house forming a large, complex, tapered masonry mass that is emblematic of the construction of the time that it was built. The chimney lands upon an east-west-spanning brick arch within the basement that is buttressed by granite walls on three sides.

During recent years, the Gardiner-Dumaresq House has been abandoned, though sporadic efforts have been made to maintain the property and make repairs on an as-needed basis. The top of the chimney has been truncated and roofed-over, so it is presently not visible from the exterior.

## Noted Conditions

Several years ago, it was discovered that the base of the chimney had structurally shifted. This has had the following effects on the structure:

- The east side of the arch has shifted toward the east, causing the arch to crack in both the radial and diagonal directions. This spreading has pushed the granite that buttresses the east side eastward.
- The eastward moving granite has pushed against the first floor framing, spreading the east half of the floor eastward as is evident along the top of the east foundation.
- The eastward movement has forced the granite wall at the north end of the arch to elongate, causing it to crack. The crack has become wide enough that the chinkers (small stones) have fallen out of it and one can presently look through it.
- The eastward movement has also pushed a timber post at the southeast corner of the chimney off of its support- it presently hangs.
- The widening of the arch has also caused it to sag, allowing the supported chimney to compress downward and undergo stress redistributions that are inevitably resulting in internal cracks. The downward compression is also evidenced in the floors and walls that surround the chimney.
- A large timber has been placed below the arch as an attempt to stop its downward movement. The effectiveness of this isolated support is questionable.

If the above-noted movement continues unabated, it will result in the complete flexural failure of the arch, which will cause the east granite wall to topple or fold over and the arch to collapse. This may also damage the first floor framing to the east of the arch, which is currently undergoing significant stress as a result of the movements to date.

Because the brick arch and east wall support the major portion of the central chimney, loss of these elements will inevitably cause the collapse of the chimney into the basement, which would probably start suddenly and continue over a few hours to a few days, depending upon how much the house framing can restrain its lateral movement. If the chimney falls straight down, only the floor construction immediately around the chimney will likely be damaged. If the chimney leans toward the southeast, which is likely, the house may be irreparably damaged.

### **Recommendations**

Relatively simple and straightforward measures taken now can stop the further movement and eventual collapse, and stabilize the chimney for the foreseeable future.

Careful construction of several east-west-running concrete- or brick-masonry walls on a concrete footing under the bottom of the arch placed directly below the load points would relieve the arch of the present overburden and greatly reduce or even eliminate its tendency to spread. This would restore the arch to a safe condition where additional measures such as localized pinning, grouting and earthen benching could be undertaken to further ensure stability.

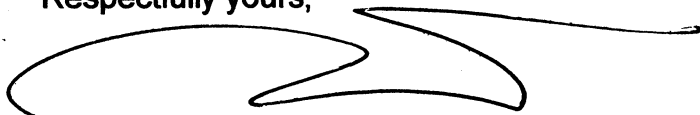
Also, the unsupported timber post should be replaced or at least re-supported on a new pier or small footing.

Such measures would represent a small investment in this property and would assuredly prevent its untimely demise. Other than for the chimney base, the Gardiner-Dumaresq House is in a relative state of good repair, much thanks to the diligent efforts that both Friends and the State have made to date.

I trust that the above summary is helpful in understanding the current condition and immediate intervention needs of this significant and otherwise relatively sound historic structure.

Please contact me if we can be of further assistance.

Respectfully yours,



John M. Wathne, PE, President  
Structures North Consulting Engineers, Inc.

