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MEMORANDUM

Date: November 26, 2018

To: David Keery, Principal,
Keery Design, LLC

From: Lisa J. O'Donnell, PE

Subject: 263 Water Street, Newburyport, MA

Re: Engineering Evaluation of Existing, Historic Building

This memo is intended to detail my observations of the existing conditions of the historic home at the above address, as well as consider the proposed renovations. We met, with the potential buyer Jan Schwarte, at the site on Thursday, November 15, 2018. My observations and opinions are based on the conditions observed at that time, as well as the proposed renovations detailed in the Keery Design drawings of November 24, 2018 and information supplied in the Home Inspection Report by Field Home Inspections, dated September 4, 2018.

First, I wish to outline my understanding of the situation, regarding both the location and the historic nature of the existing house. This is a historically significant structure for the Newburyport area. On the other hand, this waterfront house is in a FEMA velocity flood zone, at the edge of the Merrimack River. Therefore, it is imperative, for both safety and history, to balance the renovations in a manner that preserves the building, while providing protection for the occupants and the structure and ensuring that the proposed renovations present an economically viable option, which results in a preserved historic structure that is safe and suitable for 21st century living.

From a structural perspective, the foundation is the single-most important aspect of the renovation project, since this supports both the existing portions that are to remain and to be preserved, as well as interior renovations and a small addition, that will make the building safe and habitable.

It is important to note that, historically, structurally and logistically, it is not feasible to consider raising the structure above the FEMA flood elevation. From simply the historic perspective, this would be an inaccurate restoration. Logistically and structurally, it would present a challenge far beyond the value of the property, particularly with the northwest brick wall, which is an important component of the building's historic significance. Therefore, the proposed design considers renovations and supplements to the existing structure, to ensure safety and to preserve the historic nature of the house.

Foundations

The building foundation consists of several "phases", each of which I address in the following comments. These appear to be both original and subsequent additions. The original foundation

is rectangular and built from loose fieldstone. And subsequent fieldstone foundation appears to have been added to the northeast under the kitchen area at some time, likely after the original construction. Subsequent to that, smaller additions were made to the northwest and southeast and are founded on 'cinder-blocks'. These are the portions under the existing sunroom, at the northwest, and the pantry, at the southeast.

Regarding the original foundation under the main portion of the house, this extends to a depth below the frost line, as can be verified from the basement area, which is accessible although not full-height. The two side walls and the rear wall appear to be in adequate condition, needing only to be cleaned and repointed and perhaps sealed as the owner may wish. The brick foundation under the fireplace at the northwest wall is in poor condition and would need to be replaced if a stone hearth and/or fireplace is to remain in this location. Given the extent of framing renovations that are necessary, as addressed further below, the support of a future fireplace could be provided there, such that the existing brick fireplace foundation could simply be removed. This foundation appears to be inside of and distinct from the original fieldstone foundation.

The foundation wall under the front of the house is an entirely different matter and is in a condition that I would consider to be in failure. The wall is bowed and has moved inward considerably. I suspect that this movement is due to traffic on the roadway, only several feet in front of the house. Regardless of the cause, this wall requires either reconstruction or reinforcement. Due to the proximity of the street and the complications of an excavation that close to traffic, my recommendation is to construct a reinforcing wall on the inside of the existing, failed wall, which can be used to both retain the soil and roadway loads on the outside of the building and provide vertical support for the front wall.

Should any portion of the existing low-headroom basement area be deepened for access and potential use, this work should be undertaken with caution to prevent any undermining of the existing foundation walls. If any areas are planned, I suggest that these be coordinated with the reinforcement of the front wall, as this wall can then provide additional support if the construction sequence is properly planned and staged.

Regarding the three additions that appear to have been made to the foundation, under the sunroom, the kitchen, and the pantry, I suspect that these are not full frost foundations and do not extend to the required depth of four feet. Therefore, I would suggest, that for any renovations, these foundations be replaced with full frost walls, to four feet below grade, as is required by code. As part of the renovations, it would be necessary to investigate the depth of these walls, thereby disturbing the soil and making the excavations regardless. So, it makes sense, in order to meet required construction standards, that these walls be replaced and/or protected by a new foundation.

The frost wall foundation that is detailed on the Keery Design drawings dated 11-24-18 shows the proposed location of this foundation wall to match the existing cinder-block sunroom foundation line at the northwest, to be slightly outside of the existing fieldstone kitchen foundation line at the northeast and also slightly beyond the existing cinder-block pantry foundations at both the northeast and southeast edges (towards the rear and towards the street but not towards the side property line). I believe that this proposed alignment is sensible

solution for (1) replacing the cinder-block supported areas, since these likely have no historic significance, and (2) helping to protect the original fieldstone foundation under the original building footprint. The small portion of fieldstone foundation under the kitchen addition is not likely original to the building, however, building the frost wall to the north of this may provide and opportunity to preserve this wall, if it is deep enough (and not simply a shallow, at-grade support).

The concept of protecting the existing, historic components of the foundation that are to remain is important. Having one continuous foundation wall along the water side that wraps along the sides as well will serve to protect the entire foundation from surging river waters, during storms and high tides. In addition, when the excavation is completed for the rear wall, there will be an opportunity to provide backfill against the existing seawall that is stable, drainable and protected from erosion, by using filter fabric and crushed stone backfill that will allow water to drain more easily, without leaching soils from the area between the seawall and the house foundation.

Finally, the last component of the foundation work proposed for the renovation includes several piers or foundations (to be designed) that would support the mudroom addition. Since these are new in the flood zone, they would be designed to present minimal area to surging waters, with break-away walls on the first floor, in accordance with FEMA guidelines for construction in velocity zones. In addition, these narrow and low foundations (taken to below the frost line also) represent a very minimal disruption of the ground around the house.

Framed Structure

The wood framed structure of the house is, overall, in poor condition and mostly structurally inadequate, with undersized and deteriorated framing members. I see virtually no portions of this structure, after a preliminary review, that are worth saving or incorporating into new construction. Therefore, my recommendation on the house framing is to essentially replace the two floor decks with new construction, tying them into the foundation as necessary, while preserving and supporting the exterior, historic walls.

This work will require temporary support of the exterior walls, and some components of the original framing may remain (e.g. posts at exterior walls) as may be architecturally and/or historically appropriate. However, the final condition should have new floor systems that are independently supported, separate from any of the existing framing there now. The existing, historic exterior walls would then be tied to the new structure for support as well.

Regarding the roof, which is also to remain as part of the historic envelope, there are also undersized and deteriorated members here. Since these need to remain, additional framing should be provided under the existing members, to support current code loads and carry these to the new framing system, to be provided inside the building as described above.

Northwest Brick Wall

The single brick wall of the building is a unique element, not common to the original type of construction. My understanding is that, therefore, it is a particularly important component of the history of the building.

Fortunately, unlike other components detailed above, this wall remains in surprisingly good condition, remaining plumb and with little deterioration. In addition, the foundation under this wall is also in fair condition. For the final restoration, the wall should be repointed and sealed, which is work that can be easily accomplished by a mason skilled and experienced in historic renovations.

Given the height of the wall, it will be important to ensure that it is given adequate temporary support while the framing is replaced inside the building. The second floor, where this framed diaphragm no doubt provides an intermediate plane of support for this brick wall, is the most important area to consider temporary support. That is, the foundation and roof structure remain and will continue to provide support near the top and bottom of the wall. Temporary support for the midheight of the wall will need to be provided during the periods when the interior framing is being both removed and replaced.

I hope that my comments and observations are useful as you and the potential buyers consider the extents of the required renovations and as you present these plans to the officials in Newburyport. I believe that this proposed renovation is respectful of the historic nature of the building, while providing a much safer and stronger structure, that is planned to stand up to wind and weather as may develop along the river's edge.

Should you or anyone else involved with the project planning have further questions or concerns, please contact me at your earliest convenience, so that these may be addressed.