FAIRVIEW MANOR

FOUNDATION EVALUATION

Prepared under the Supervision of:

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UPEA
ENGINEERS & ARCHITECTS

December 5, 2018

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[G38-19118]

December 5, 2018

Gladstone Housing Commission
Attn: Mike Lindahl, Executive Director
217 Dakota Avenue
Gladstone, MI 49837

RE: FAIRVIEW MANOR
FOUNDATION EVALUATION

Dear Mr. Lindahl:

U.P. Engineers & Architects, Inc. inspected the foundation conditions of the Fairview Manor located at 217 Dakota Avenue, Gladstone, Michigan on November 9, 2018. The purpose of the inspection was to determine if the foundation will be structurally adequate and functional for a minimum of 15 more years and to make any recommendations for maintenance, repair/renovation, or reconstruction. The inspection yielded the following OBSERVATIONS, CONCLUSIONS AND RECOMMENDATIONS.

I. OBSERVATIONS

1) The Fairview Manor was constructed in the late 1960's. The foundation consists of masonry block walls, masonry block columns, and a concrete floor slab.

2) Based on water markings along the walls and reported information, water has flooded the basement multiple times up to approximately 2'-6" above the basement slab (see photo 1).

3) The basement is housing boilers and electrical breakers among other things (see photos 2-3).

4) Water flows into the basement sump continuously, an approximate rate of 27 gallons per minute during average conditions. The sump contains two pumps in which the lower pump often has to run continuously since it cannot keep up with the flow. It is apparent that the water table elevation is higher than the basement floor slab elevation.

38,880 GALLONS PER DAY

5) The masonry columns in the basement have been patched up their faces with mortar to the approximate height of the apparent maximum water level of roughly

2'-6" (see photo 4). Although it was difficult to tell the condition of these patched up columns, it appeared that the masonry may have some loss of structural section based on soundings. No other structural deficiencies have been noted in the walls such as cracking or bowing.

6) At the basement door to the exterior, the walkway is steep and drains storm water directly toward the doorway. One small drain is located at the landing, but it was reported that water floods the basement in this manner as well (see photos 5-6).

7) Perimeter French drains have been installed in several locations in the basement to keep flood water levels down when the basement does flood (see photos 7-8).

II. CONCLUSIONS

1) It is questionable whether the foundation will last another 15 years in its current state. Reported information is that the groundwater has some contaminants that has worn out pumps quickly and has clogged discharge pipes. The presence of these contaminants could explain the wear of the masonry columns mentioned in #5 above. Masonry block is porous and therefore water can enter and when contaminated can cause adverse reactions with the cement mixture in the block and thus deteriorating the block.

2) The functionality of the basement is limited. As mentioned above, the basement is home to boilers and electrical breakers. Significant flooding in the basement would pose a severe threat to damaging expensive boilers or starting an electrical fire. Flooding of the basement will continue to happen during heavy rains or when the sump pumps fail.

III. RECOMMENDATIONS

1) It is recommended to reinforce the masonry columns with a 6 inch thick concrete "shell" with #3 vertical reinforcing bars for their lower 3'-0". This will give the columns good protection from further deterioration and add stability. It is not recommended to fill in the entire basement area with concrete up to the apparent water table level of 2'-6". This would add an extreme amount of weight to the structure and would likely cause the building to settle. The additional concrete weight would transfer through to the perimeter and interior footings and thus add loading to the underlying soil that it hasn't seen throughout its life. Additionally, filling in the basement would require that the boilers and electrical equipment are moved to an upper floor. This would be a very expensive and exhaustive process to move all of the piping, wiring, and equipment.

2) With the water table being so high, there is nothing else you can do to control the water besides what is currently being done with pumps. Therefore, in addition to reinforcing the columns as noted, it is recommended to enclose the boiler area with a water tight wall that is 2'-6" to 3'-0" high. That way the boilers are still accessible but are less susceptible to water damage. Another sump pit could also be installed within this wall so that any water that may come up through the floor could be drained into the pit and pumped out. Also, electrical wires and

breakers should be stored above anticipated flood waters. Additionally, the basement walls, floor, and columns should be coated with a waterproofing paint. These remedies do not prevent water from flooding the basement, but they help to resist problems due to those flood waters. Given that water would need to be continually pumped as it is currently, it may be cost prohibitive for the Housing Commission to continue building operations.

Sincerely,

U.P. Engineers & Architects, Inc.

Gust Junttila, P.E.

Encl.

- Inspection Photos

INSPECTION PHOTOS

Fairview Manor
Foundation Inspection 11-9-18

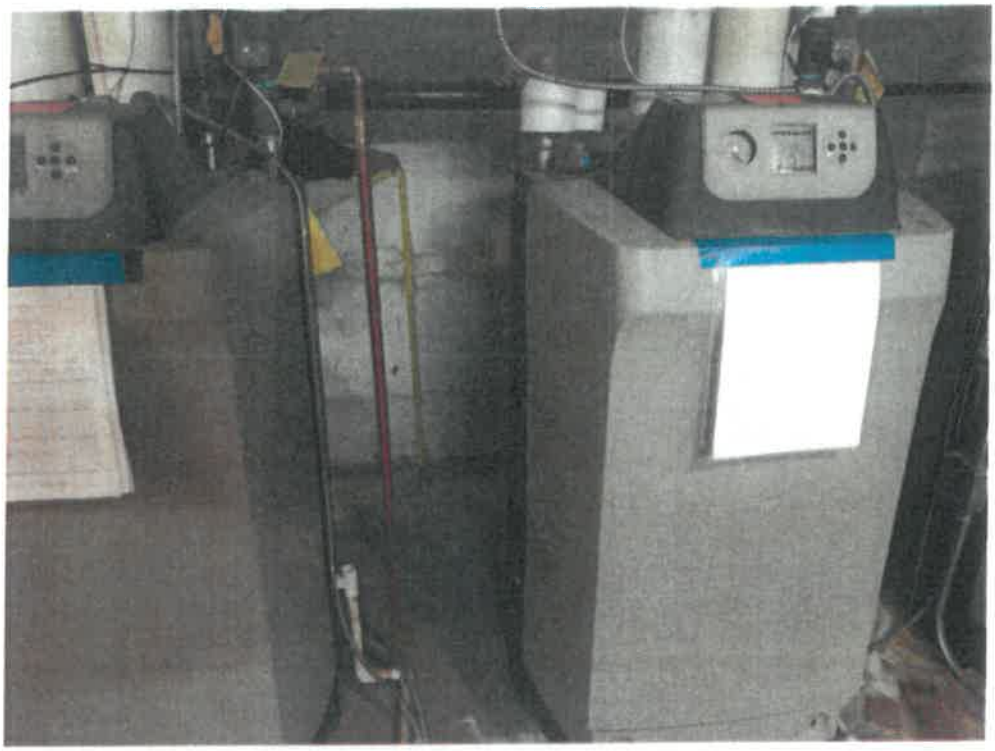

Photo 1: Height of water stains approximately 2'-6"

Photo 2: Boilers

Fairview Manor
Foundation Inspection 11-9-18

Photo 3: Electrical breaker boxes etc.

Photo 4: Patched masonry column (typ)

Fairview Manor
Foundation Inspection 11-9-18

Photo 5: Exterior drain at landing of exterior walkway

Photo 6: Exterior walkway from photo 5

Photo 7: Perimeter French drains or baseboard drains

Photo 8: Perimeter French drains or baseboard drains and floor drain