



L A S C E L L E S  
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Our file Reference: 200176

May 13, 2020

Thaila Riden  
3440 County Road 10  
Vankleek Hill, ON K0B 1R0

Attention: Thaila Riden, Owner

Subject: Foundation Inspection Report  
3440 County Road 10, Vankleek Hill, Ontario

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Further to your request, Lascelles Engineering & Associates Limited (Lascelles) has conducted an inspection of the foundation at 3440 County Road 10 in Vankleek Hill, Ontario. The inspection included herein was completed at the request of the owners insurance company due to substantial water accumulation in the basement and corresponding concerns with regards to the foundation condition and stability. The structure is a two-storey residence constructed of timber framing. The foundation is a 450-600mm thick rock and mortar wall founded directly on native soil. The average height of the foundation wall is approximately 2m.

As shown in the attached photo record, it was found at the time of inspection that the basement floor has been lowered by 250 to 300mm from original level, and the resulting average floor surface elevation is approximately 200mm below underside of footing. The soil was excavated flat with the face of the foundation wall. It is recommended that excavations below the underside of foundation wall begin no less than 100mm from the face of foundation wall, and that the soil be sloped at a 1:1 ratio of height to length until the desired elevation is achieved.

Water accumulation was observed inside the Eastern foundation wall, at the approximate mid-point between North and South facing walls. It appears that the lowest point of the basement floor has been excavated to below the water table elevation. A sump pump and bucket has been implemented at the low point of the basement to allow for extraction of the water. Based on the height of the water table, the pump is likely to run on a constant basis to maintain low water levels. The sump location is now the low point around the house, and therefore water will continue to migrate to this location unless the original floor height is restored.

Lascelles observed two locations where water was actively flowing beneath the foundation wall. The apparent primary infiltration point was located immediately adjacent to the sump pit area, passing underneath the Eastern foundation wall. Undermining of the foundation was observed around a point of water flow, suggesting that the water infiltration had resulted in erosion of soils beneath the foundation wall.

A secondary infiltration point was located beneath the South foundation wall near the basement entrance. The observable flow was much less than in the primary location, and minimal erosion/undermining was observed in any singular location.

The effects of water infiltration beneath a foundation wall are:

1. Soil Erosion – flowing water carries grains of soil away from the point of origin, eventually creating voids. As void size increases, water flow can increase, with the effect propagating until the supported elements become unstable.
2. Soil Instability – saturated soil can remain in place for some time, however sudden collapse of large chunks of soil can result in sudden instability of the building foundation.
3. Bearing Capacity – as a soil becomes over-saturated, the grains of soil separate from each other, and there is a corresponding reduction in overall soil bearing capacity. The soil bearing capacity is directly related to the strength and stability of the foundation.

Based on the inspection of visible elements conducted by Lascelles, the foundation appeared to be in sound condition at the time of inspection. As discussed herein, ongoing water infiltration can result in destabilization and undermining of the foundation, and therefore the foundation may be rendered unstable in the near future. Lascelles has the following recommendations for stabilization of the foundation and long-term limitation of water infiltration.

Lascelles emphasizes that water accumulation in a residence can pose a risk to the health and safety of the occupants. The presence of moisture on the floor results in additional moisture in the air. Excessive moisture can result in the development of mold and mildew on any surface. Mold and mildew can lead to the development of respiratory issues among other health problems. Another effect of increased moisture content in the air is the expedited deterioration of concrete, steel and wood elements. It is therefore not recommended that water be allowed to remain in the basement.

In the near term (<1 year), Lascelles recommends that the soil beneath and around the foundation walls be restored such that there is a berm extending 100mm from the interior face of foundation wall before being sloped at a 1:1 ratio to the basement floor elevation. See Figure 01 for a typical detail. As the sump pit is the low point around the house, water will continue to infiltrate under the foundation wall and accumulate at this location. Regular maintenance of the berm will be required.

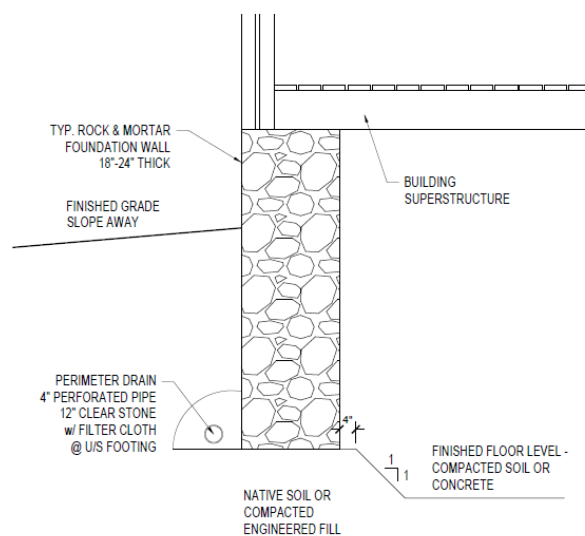


Figure 01 – Recommended berm at base of foundation wall

Two options are presented below for long term stability of the foundation, both of which are intended to be used in combination with the berm restoration noted above. One of the following two recommendations are to be implemented within 5 years to minimize erosion and eliminate accumulated water:

1. Installation of an exterior 100mm perforated perimeter drain with outlet to a nearby ditch. This drain will substantially reduce the amount of water around the perimeter of the foundation, and therefore reduce the infiltration into the basement. As the basement appears to be lower than the water table, there is still likely to be water accumulation in the basement. However, the perimeter drain will reduce the water flowing underneath the foundation wall, thus increasing the long-term stability of the structure.
2. Installation of an interior 100mm perforated perimeter drain with outlet to a designated sump pit. The basement floor is then to be backfilled with clear stone to underside of existing foundation wall to provide long-term soil stability beneath the wall. The drain will collect water that passes beneath the foundation wall to reduce accumulation, and the granular material will provide a dry basement floor surface.

We trust this letter report provides sufficient information for your present purposes. If you have any questions concerning this letter or if we may be of further services to you, please do not hesitate to contact our office.

Yours truly

Lascelles Engineering & Associates Ltd.



Mike Whiffin, P.Eng



Photo Record

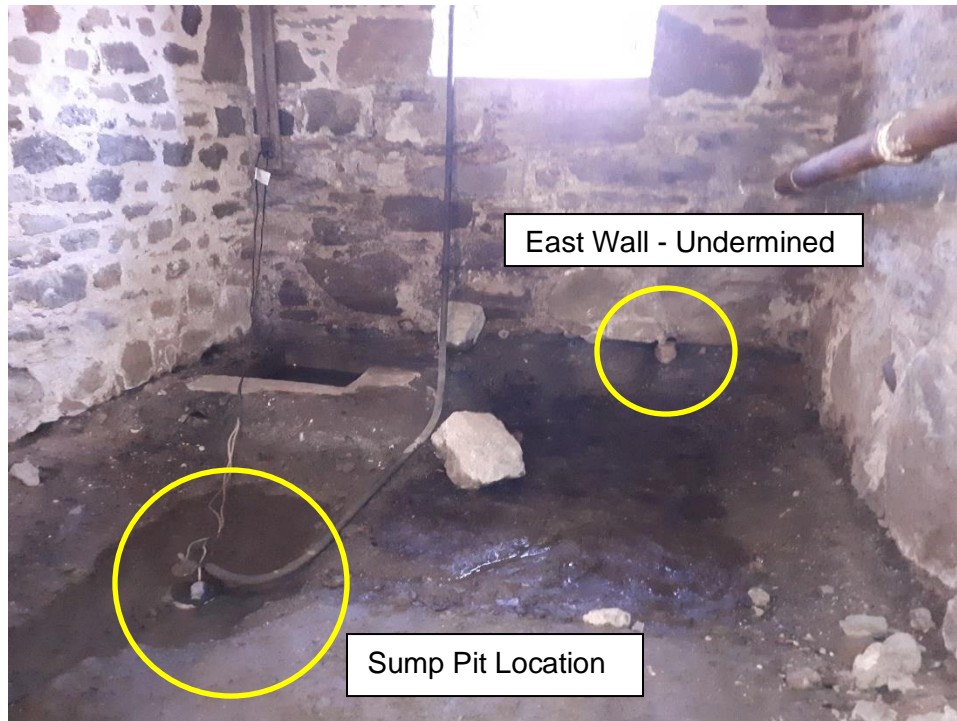


Figure 02 – Majority of water accumulation in middle basement segment along East wall.



Figure 03 – Water infiltration and erosion under East foundation wall, adjacent to sump pit area.



*Figure 04 – Foundation segment adjacent to access stairs (interior view). Water accumulation on the floor. Drainage has been dug with slope towards sump pump.*



*Figure 05 – Foundation segment adjacent to access stairs (exterior view). Water accumulation on the floor. Drainage has been dug with slope towards sump pump*



*Figure 06 – Water infiltration underneath South foundation wall is evident, although exact location could not be established.*



*Figure 07 – Middle basement segment facing East wall. Water drainage path dug in floor, sloping to sump pump.*



*Figure 08 – Basement floor dry along West foundation wall.*



*Figure 09 – Basement floor dry in Northern segment of basement.*