

August 8, 2018

Michael J. Gallagher
Director of Public Works
Town of Vienna
127 Center St. S.
Vienna, VA 22180

Re: 444 Maple Avenue, West Vienna Virginia
Letter form D. W Kozera, Inc dated February 19, 2018 P

Dear Mike,

Per your request, we have reviewed the above referenced letter. We understand that there has been concern expressed by the community about how the proposed development at 444 Maple West might impact the water table and potentially damage surrounding properties.

We have reviewed the following documents:

- 1) 444 West Maple Avenue Rezoning Plan, dated June 25, 2018,
- 2) 2) Letter prepared by D.W. Kozera Inc dated February 19. 2018.
- 3) Geotechnical Report and Logs provided on 8/1/18.

The proposed development consists of a mixed use building consisting of:

- Underground parking with a finished floor elevation of 375'-0"
- Ground level consisting of parking on structure, retail space, residential lobby and leasing, and service areas
- Three levels of residential units

Recent geotechnical investigation has noted the water table at between elevation 372.8' and 379.5'. This would place the water table slightly above the proposed floor lowest floor elevation. As Mr. Kozera notes in his letter, this will require the installation of a permeant underslab drainage system to prevent water infiltration into the underground parking level. Mr. Kozera has calculated that this underslab drainage system can expect to collect up to 5 gallons per minute of groundwater. Mr. Kozera has shown calculations that indicate that the "draw down radius" is estimated to be less then 20 feet outside the building envelope.

We do question the formula used in the calculation of the draw down radius. The "figure 5.3" included in the letter and the accompanying formula are based on a single pumping well that extends considerably below the water table. The underslab drainage system will be distributed around the entire perimeter of the building and will be relatively close to the elevation of the water table. It would be prudent to address this inconsistency with the Developer. Based on our previous experience on similar projects, it is unlikely that the permanent underslab drainage will have any noticeable effect on the existing water table.

Mr. Kozera has not, however, addressed the conditions during the construction of the building foundations. The spread footings of the building will be between 4 to 5 feet below the lowest floor elevations. Some areas, such as elevator pits, will require even deeper excavations. It will be essential to control groundwater coming into these deeper excavations during the placement of footings. **We note that there are state and local permit requirements for the discharge of storm water (which includes groundwater) during construction. The Developer needs to comply with all submissions and permits.**

There are two ways to control groundwater during construction, active well points or passive sumps.

Active well points consist of multiple wells drilled outside the perimeter of the excavation. Pumps are installed at each well and are typically piped together to a common discharge. The purpose of the wells is to lower the ground water level around the excavation to a level below the bottom of the footings. To achieve this, we would expect the amount of water removed by a well point system to be considerably higher than the 5 GPM estimated. The well points are removed once the foundations are in place and the slab on grade has been poured in the lowest level. At that point the underslab drainage system would be in place to control the water and we would expect the water table to return to the original level.

Active well points will likely lower the water table on surrounding properties, including Nutley Street and Maple Avenue, during the period the system is in use. Extraction of water from soil can cause consolidation of material that may result in settlement of adjacent structures or surface areas. While the risk of damage is slight, we would recommend that the Developer be required to provide detailed plans and calculations if an active well point system is planned.

Passive sumps are essentially large holes, either dug or drilled, strategically placed inside excavation. The bottom of the sump is lower than the adjacent foundation work. A perforated pipe is installed vertically and gravel or other permeable material is placed around the pipe to encourage water to flow to the sump. A submersible pump then moves the water to a discharge outside the excavation. In addition to the sumps there are generally separate pumps placed in foundation excavations to help control any water that does not flow to the sumps.

Because passive sumps are only gathering the water that is flowing into the excavation, there is very little impact to the surrounding properties. If a passive system is used, we would not expect any adverse impacts on the surrounding properties.

Conclusions

- Stormwater discharge permitting requirements must be followed.
- If the Developer intends to install an active dewatering system for use during construction, we recommend the Town require a more definitive submission for review.
- No further study is necessary if passive dewatering is used.
- We do not expect impacts to the surrounding properties due to the permanent underslab drainage.

While we have recent experience with similar projects, we are not geotechnical engineers or geologist and our opinions are based on our experience as developers and construction managers. Please let us know if you have any questions.

Sincerely,

ORR PARTNERS



Dan Strotman
Vice President