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## GROUNDWATER AND DEWATERING

EAL have developed estimates of the impacts of raising the building on the amount of groundwater that might be encountered during construction dewatering or during the life of the building.

To carry out the estimates EAL considered the onsite and off site wells.

Egmond Associates Ltd attended the site on July 25, 2024 to take readings of water levels at three (3) well by EAL as set out in the table below.

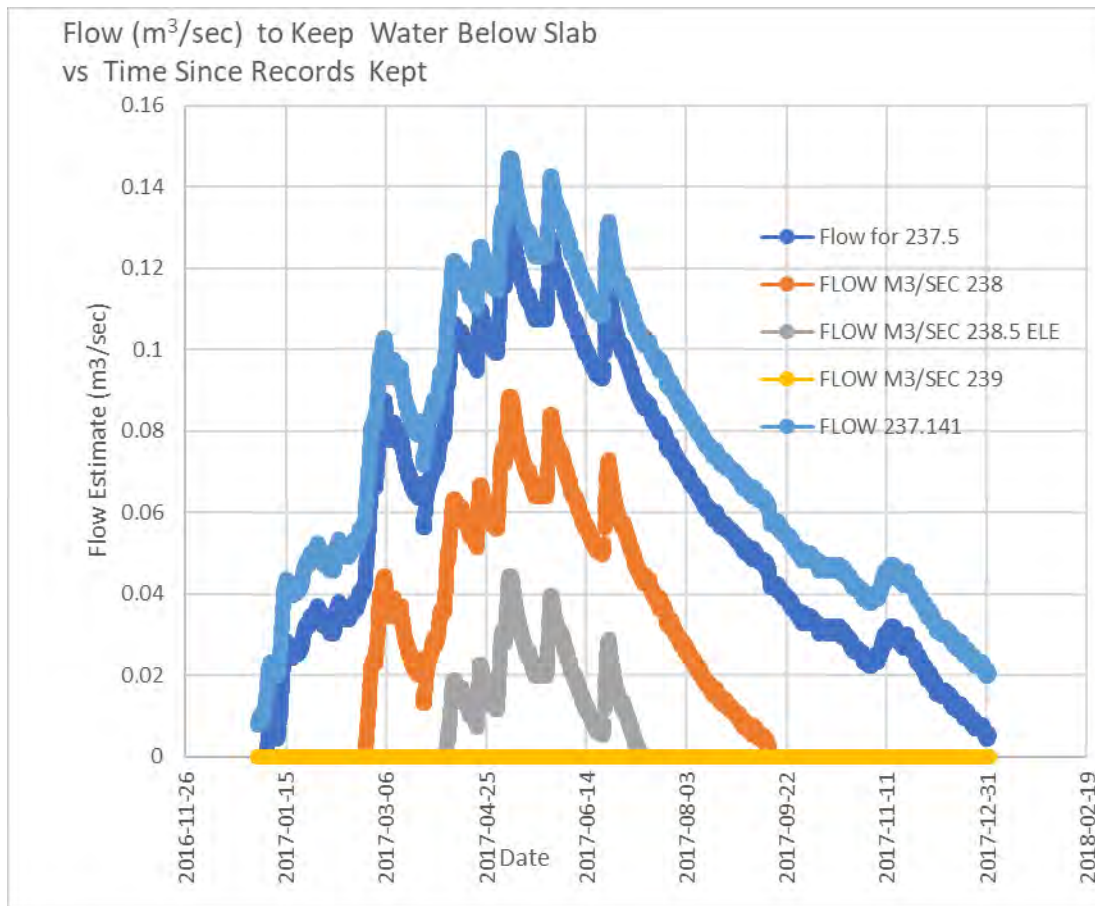
EAL Well #	Surface Elev (m)	Date	Water depth (m)	WL Elevation (m)
BH5	244.68	2024-07-25	7.36	237.32
BH13	244.9	2024-07-25	7.66	237.24
BH16	244.7	2024-07-25	7.55	237.15

Rising and falling head tests were completed with a two (2) litre volume Delrin Waterra Well Slug (WWS-2X3) in all three test wells. The elevation of the water was determined from water level readings taken by hand lowered water level gauge. Results were analysed by various models (Bower & Rice (NavFac 7), Craig (modified Hvorslev), Hvorslev (US EPA, Cherry). Results varied by analytical method and we note that several test responses were too fast to provide data. Based on the testing EAL selected a permeability estimate of  $3.5 \times 10^{-4}$  m/sec.

The water table in three Regional Wells just off the property (MW 20A, 20B, and 20C), stretching back a number of years was also considered for the years 2007 to 2019. Regional well elevations have varied considerable over the years, showing results reflecting seasonal and daily impacts.

EAL used the highest site recorded elevation to estimate possible flows that would arise for the site assuming various basement floor level elevations, assuming the on site well would closely mimic the Regional Wells.

EAL considered the basement floor surface to be at five (5) elevations (239 m, 238.5 m, 238m, 237.5 m and 237.32 m ASL respectively. Using the model of the excavation as being a circular well, EAL then calculated the flow rate for dewatering the basement for the period of the regional well record. The results are shown below.



From the figure above, it is clear that moving the building higher can result in zero flows emanating from the building basement and even dewatering, if the seasonal water table is below about 273 m ASL or the lowest floor is kept at about 1.5 m to 2 m higher elevation at 238.5 m to 239 m ASL. At 239 m ASL for the top of floor it appears no water will need to be pumped. Noting that the foundations will be lower than the top of the slab so that there may be a need for dewatering to be used for the foundations, particularly in wet seasons.

Seasonal Influence - One notes the seasonal influence of spring waters.

Impact on Groundwater - If no water is pumped, or even drained by gravity if possible, then there will be no exfiltrations from aquifers near the site nor overland discharges to the nearby creek.

This letter report is an addendum to previous works and must be read as part of the previous works.

Egmond Associates Ltd

John Van Egmond, P.Eng.

