

June 6, 2013

Larry's Pool & Spas Inc.
2374 Harrison Blvd
Ogden, Utah 84401

**RE: Geotechnical Consultation
Proposed Swimming Pool
6531 Bybee Drive
Uintah, Utah
Job Number 13G-021**

Dear Larry's Pool & Spas Inc.;

This letter provides our evaluation of the proposed swimming pool at the above-indicated address. As requested, the undersigned engineer visited the site on May 30, 2013 to observe the conditions of the lot and rock faced slopes that will be around the pool area. This consultation does not address any areas except the proposed swimming pool itself and general conditions of the associated rock walls. Y² Geotechnical, P.C., has not performed a geotechnical investigation on this subdivision nor reviewed a geotechnical investigation for this subdivision prepared by another firm and makes no statement regarding the allowable design characteristics of the native soil, the stability of the native slopes, or any comments regarding the proximity of the mapped trace of the fault line.

At the time of our visit, we observed that multiple rock faced slopes "walls" had been constructed around the house. These walls varied in height from 2 feet to an effective height of 12 feet. Relatively level terraces between 3 and 40 feet wide were located between the tiers. The walls appeared to have been constructed in general accordance with our standard recommendations and should be stable under normal conditions. It should be understood that the rocks used for facing can topple during earthquake events. It will be important to maintain proper drainage behind the wall, excessive water being allowed to accumulate behind the wall could lead to wall failure.

Based on the soil conditions exposed at the surface on the site, our experience in the area and geologic maps of the area, the native soils appear to consist of a gravel soil with silt and sand. Cobbles up to 6 inches in diameter are expected. We have assumed that the native soils have a minimum friction angel of 33° and a moist unit weight of 130 pcf. Using these assumptions, we have calculated that the current rock wall on the downhill side of the proposed pool area we have calculated a minimum factor of safety against overturning of 2.88 and a minimum factor of safety against sliding of 1.60 for the wall under static conditions. Factors of safety greater than or equal to 2.0 for overturning and 1.5 for sliding are generally considered safe by the engineering industry.

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In order to evaluate the impact of the proposed pool on the downhill rock wall, we evaluated the proposed pool being at several different locations between 4 and 12 feet away from the wall, at its closest point. The overall unit weight being applied to the wall will be reduced if the pool is less than 12 feet away from the back of the wall. We calculated minimum factor of safety of 3.15 against overturning and 1.75 against sliding for static conditions with the pool in place. The reduction in the unit weight from the replacement of a volume of soil with an equal volume of water resulted in an increase in the calculated factor of safety.

Based on our calculations, the proposed pool will not have a detrimental impact to the existing rock walls on the lot. Maintaining proper drainage behind the wall and monitoring the pool for leaks will be critical for the long-term performance of the walls. Again, it should be understood that rock walls are not designed to handle seismic loads and the wall is likely to be unstable during a seismic event.

General Conditions

Our scope of work consisted only of observation of the rock walls around the proposed swimming pool to and evaluation of the impact of the proposed pool on those walls. The observations presented in this letter were conducted within the limits prescribed by our Client. This consultation does not address any areas except the proposed swimming pool itself and general conditions of the associated rock walls. Y² Geotechnical, P.C., has not performed a geotechnical investigation on this subdivision nor reviewed a geotechnical investigation for this subdivision prepared by another firm and makes no statement regarding the allowable design characteristics of the native soil, the stability of the native slopes, or any comments regarding the proximity of the mapped trace of the fault line. No other warranty or representation, either expressed or implied, is intended in our proposals, contracts, reports, and letters.

We appreciate the opportunity of providing our services on this project. If we can answer questions or be of further service, please contact us at (801) 546-6505.

Respectfully;
Y² GEOTECHNICAL, P.C.
Not official unless stamped and dated.

Lori S. Yahne, P.E.
Principal Geotechnical Engineer

