

May 8, 2019
PanGEO File No. P-5115

Mr. David DiMarco
DiMarco Architecture
A 1319 East Howell Street
Seattle, WA 98122

Re: **Geotechnical Foundation Recommendation**
18 Brook Bay Road, Mercer Island, WA

Dear Mr. DiMarco:

Per our discussions, we understand that the home owner plans to construct a wardrobe addition off the main bathroom. The new addition will be two stories in height with a plan dimension of about 12 feet by 8 feet 7 inches. We also understand that the structural engineer plans to add two posts to support one side of the proposed addition; the opposite side of the proposed addition will be supported on the existing building.

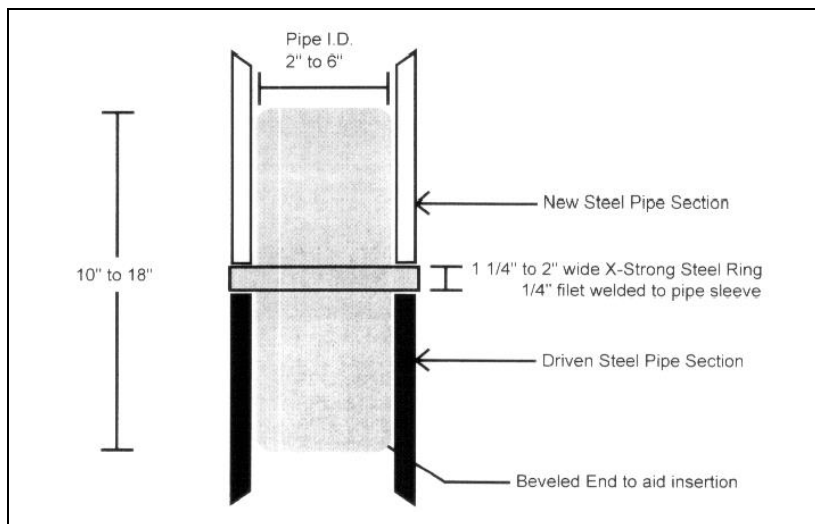
A previous geotechnical report was completed by Applied Geotechnology in 1987 for the existing swimming pool. Hand borings completed in 1987 encountered about 4 feet of loose soils underlain by glacially consolidated soils. As such, the use of conventional footings for the proposed wardrobe addition will likely require relatively significant over-excavation to reach competent soils. As such, it is our opinion that the use of pin piles is likely the most appropriate foundation option. We also understand that access for construction equipment is limited, hence we recommend that 2-inch diameter pin piles be used for this project.

The number of piles required depends on the magnitude of the design load. An allowable axial compression capacity of 3 tons (6 kips) may be used per 2-inch diameter pile, with an approximate factor of safety of at least 2.0. The tensile capacity of pin piles should be ignored in design calculations.

It is our experience that the driven pipe pile foundations should provide adequate support with total settlements on the order of ½-inch or less.

We recommend that the following specifications be included on the foundation plan:

1. 2-inch diameter piles should consist of Schedule-80, ASTM A-53 Grade "A" pipe.
2. 2-inch piles shall be driven to refusal with a minimum 90-lb jackhammer. Refusal is defined as no more than 1 inch of penetration for 1 minute of continuous driving.
3. Piles shall be driven in nominal sections and connected with compression fitted sleeve couplers (see detail below – Courtesy of McDowell Pile King, Kent, WA). We discourage welding of pipe joints, particularly when galvanized pipe is used, as we have frequently observed welds broken during driving.



4. The geotechnical engineer of record or his/her representative shall provide full time observation of pile installation and testing.

The quality of a pin pile foundation is dependent, in part, on the experience and professionalism of the installation company. We recommend that a company with experienced personnel be selected to install the piles.

Lateral capacity of vertical pin piles should be ignored in design calculations. Some resistance to lateral loads may be accomplished by battering the piles to a slope of 1(H):4(V), or steeper. Passive soil resistance values for embedded pile caps and grade beams may be determined using an equivalent fluid weight of 300 pounds per cubic foot (pcf). This value includes a factor of safety of at least 1.5 assuming that a properly compacted structural fill will be placed adjacent to the sides of the pile caps and grade beams. For the seismic condition, the recommended passive pressure may be increased by one third.

Geotechnical Foundation Recommendations
18 Brook Bay Road, Mercer Island, Washington
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We appreciate the opportunity to work on this project. Please call if there are any questions.

Sincerely,



Siew L. Tan, P.E.
Principal Geotechnical Engineer