GEOTECH
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BLDS-0130

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February 11, 2015

JN 15056

White River Valley Museum
918 H Street Southeast
Auburn, Washington 98002

Attention: Patricia Cosgrove
via email pcosgrove@auburnwa.gov

RECEIVED
MAY 14 2015
CITY OF AUBURN
PERMIT CENTER

Subject: ***Geotechnical Engineering Study***
Proposed New Pedestrian Bridge
Mary Olson Farm
28728 Green River Road Southeast
Auburn, Washington

Dear Ms. Cosgrove:

This report presents our geotechnical findings and conclusions related to the new pedestrian bridge to be constructed on the Mary Olson Farm property. The scope of our services consisted of visiting the site to observe the existing conditions in the development area and reviewing the results of explorations conducted previously in the vicinity. This work was authorized by your acceptance of our **Contract for Professional Services**.

Based on the provided information, we understand that a small pedestrian bridge will be constructed across the stream located to the south of the existing farmhouse. This bridge will only support light loads, such as from people or livestock. It will not carry heavy loads, such as from vehicles. There will be small cast-in-place concrete abutments on either side of the stream, with a maximum span of approximately 40 feet. Very limited earthwork and site disturbance is anticipated for this project, and no work will occur in the stream itself.

If the scope of the project changes from what we have described above, we should be provided with revised plans in order to determine if modifications to the recommendations and conclusions of this report are warranted.

SITE CONDITIONS

The proposed bridge will be constructed across a narrow, west-flowing stream located to the south of the main entrance road that leads to the existing farmhouse. The steambanks are only a few feet in height, and are not steep. The work area is set over 65 feet away from the toe of the steep slopes that occupy the eastern side of the Mary Olson Farm property.

The bridge site lies in the Green River Valley, which is underlain by alluvial soils deposited by the Green River and other watercourses that have flowed through the Auburn Valley after the last glaciers receded from the area. Our firm has conducted many explorations in the vicinity, finding the alluvium to consist of loose silt and silty sand, which occasional zones of organics. Previous borings conducted to the north and south of the Mary Olson Farm have found loose alluvium to

depths of 20 to 40 feet. We expect that the regional groundwater table is close to the level of the Green River, which flows in a northerly direction to the west of the farm.

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

The site is underlain by loose alluvial soils that are moderately compressible. Additionally, the loose soils that lie beneath the water table are potentially susceptible to liquefaction (soil bearing loss) in the event of the design earthquake. As a result, we recommend that the bridge be supported on small-diameter pipe piles that would be driven into dense, non-liquefiable soils. These piles can be installed with small equipment, which will minimize site disturbance. The use of pipe piles will also limit the amount of excavation needed for construction of the foundations, as the grade beams supporting the piles can be set close to the existing ground surface.

For the planned work, we expect that only limited temporary erosion control measures should be needed. Wire-backed silt fences will probably have to be installed between the work areas and the streambanks on both sides of the stream. Laying approximately 12 inches of clean crushed rock, 1-2 inch railroad ballast rock, or quarry spalls over the work area will prevent muddy conditions from developing. The limited amount of soil that may be excavated for the construction of the abutments should either be hauled away, or be kept under plastic sheeting in a stockpile away from the stream. As with any project, additional temporary erosion control measures may be appropriate to deal with site or weather conditions.

PIPE PILES

Three-inch-diameter pipe piles driven with a 650- or 800- or 1,100-pound hydraulic jackhammer to the following final penetration rates can be assigned the following compressive capacity.

INSIDE PILE DIAMETER	FINAL DRIVING RATE (650-pound hammer)	FINAL DRIVING RATE (800-pound hammer)	FINAL DRIVING RATE (1,100-pound hammer)	ALLOWABLE COMPRESSIVE CAPACITY
3 inches	12 sec/inch	10 sec/inch	6 sec/inch	6 tons

Note: The refusal criteria indicated in the above table are valid only for pipe piles that are installed using a hydraulic impact hammer carried on leads that allow the hammer to sit on the top of the pile during driving. If the piles are installed by alternative methods, such as a vibratory hammer or a hammer that is hard-mounted to the installation machine, numerous load tests to 200 percent of the design capacity would be necessary to substantiate the allowable pile load. The appropriate number of load tests would need to be determined at the time the contractor and installation method are chosen.

As a minimum, Schedule 40 pipe should be used. We recommend that galvanized steel pipe be used, due to the potential increased corrosion from the organic soils.

Subsequent sections of pipe can be connected with slip or threaded couplers, or they can be welded together. If slip couplers are used, they should fit snugly into the pipe sections. This may require that shims be used or that beads of welding flux be applied to the outside of the coupler.

Lateral loads due to wind or seismic forces may be resisted by passive earth pressure acting on the vertical portions of the foundation. For this condition, the foundation must be either poured directly against relatively level, undisturbed soil or be surrounded by level compacted fill. We recommend using a passive earth pressure of 250 pounds per cubic foot (pcf) for this resistance. If the ground in front of a foundation is loose or sloping, the passive earth pressure given above will not be appropriate. We recommend a safety factor of at least 1.5 for the foundation's resistance to lateral loading, when using the above ultimate passive value.

SEISMIC CONSIDERATIONS

In accordance with the International Building Code (IBC), the site soil profile within 100 feet of the ground surface is best represented by Soil Profile Type E (soft soil). The loose soils that underlie the water table are susceptible to liquefaction during a large earthquake. This liquefaction assessment is based on the Maximum Considered Earthquake (MCE) required by the IBC. The use of pipe piles embedded into dense, non-liquefiable soils mitigates the potential for catastrophic settlement in the event of seismic liquefaction.

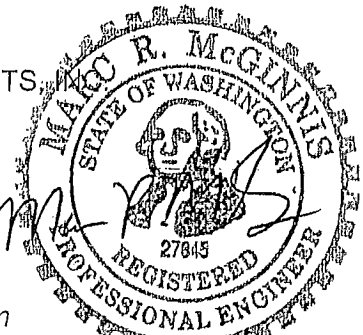
LIMITATIONS

The conclusions and recommendations contained in this report are based on site conditions as they existed at the time of our site visit. If the subsurface conditions encountered during construction are different from those described in our report, we should be advised at once so that we can evaluate the conditions and advise you if our recommendations should be changed. Unanticipated soil conditions are commonly encountered on construction sites, and can require making additional expenditures to properly complete the project. As a result, we recommend that the owner consider providing a contingency fund to accommodate such potential extra costs and risks. In addition, anyone using this report to estimate construction costs or select construction methods or techniques assumes the risk of unanticipated soil conditions.

This report has been prepared for the exclusive use of the White River Valley Museum, and its representatives for specific application to this project and site. Our recommendations and conclusions are based on the site conditions observed and on previous experience with sites that have similar observed conditions. The conclusions and recommendations are professional opinions derived in accordance with current standards of practice within the limited scope of our services. No warranty is expressed or implied.

Please contact us if you have any questions regarding this report, or if we can be of further service.

Respectfully submitted,
GEOTECH CONSULTANTS, INC.



Marc R. McGinnis, P.E.
Principal

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Auburn Park, Arts & Recreation – Jamie Kelly *via email jwkelly@auburnwa.gov*
MRM: at

2/11/15