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Mr. Chris Reed
1807 Dorothy Circle
Longmont, Colorado, 80503

Subject: Soil investigation and LTAR evaluation for an OWTS for a proposed residence to be located at 34130 Whiffle Tree Trail, in Routt County, Colorado.

Dear Mr. Reed,

Per your request, we performed a soil investigation and evaluation on the subject site in late November of 2021. The investigation was performed for the purpose of providing soil design parameters for the construction of the foundation and the evaluation was performed for the purpose of designing an Onsite Wastewater Treatment System (OWTS) for a single family residence.

The proposed structure is anticipated to be of single story post and beam wood framed construction with a crawl space. The foundation is proposed to be constructed with reinforced concrete walls bearing upon reinforced concrete spread footers. The building site on the lot is nearly flat and is covered with grass and lodgepole pine trees. The site slopes gently downward toward the north.

A test pit was advanced on the parcel, in the immediate vicinity of the proposed residence. A second pit (a profile hole) was located toward the north, downhill from the proposed location of the residence and in the area where it is proposed to construct the absorption field portion of the OWTS, approximately 30 yards to the north from the proposed residence.

Both pits were advanced using a rubber tire mounted backhoe. The test pit revealed approximately one foot of very slightly moist, medium brown, silty fine sandy loam topsoil overlying a two foot thick stratum of moderately dense , very slightly moist, medium brown silty fine sand, which in turn overlay a very slightly moist, very dense, slightly clayey, silty, fine sand subsoil which extended to the maximum depth explored, seven feet. Conditions in the profile hole were

virtually identical to those observed in the test . No free ground water was observed in either pit, nor was any bedrock encountered.

Our experience with similar soils, taken together with our observations in the test pit, have led us to form the opinion that the lower, hard, silty fine sand subsoil will provide stable bearing for the foundation of a structure of the proposed type. Based on the soil conditions exposed in the profile hole, we also concluded that the site is, in fact, suitable for the installation of a typical OWTS absorption field.

Spread footers for the proposed structure should be designed to bear on the lower, very dense, silty, fine sand subsoil, with a maximum net bearing pressure of 4.0 KSF, as well as with a minimum dead load of 1.0 KSF, with the latter intended to control any tendency of the bearing soil to swell lest it ever experiences a significant increase in its moisture content. Any retaining structures should be designed to retain pressure equivalent to that which would be exerted by a fluid weighing 45 PCF.

The foundation's footers must be surrounded with a footer drain. This footer drain must be constructed using 4" diameter D-2729 perforated PVC pipe (with the perforations located at 4 and 8 'o'clock'), bedded and covered with ¾" screened rock with the rock underlain by a relatively impervious membrane and covered with a geo-fabric such as 'Mirafi' #140N. The footer drain must run from a pair of clean-outs, with a minimum 0.5 % slope around the foundation to a corner opposite the clean-outs, and there be wyed together to drain to daylight via a non-perforated 4" diameter PVC pipe. This drain must be located at a grade low enough to insure that it will prevent water which might penetrate the backfill from soaking the bearing soil beneath the footers. The daylighted end of this drain should be protected from intrusion by critters by means of a screen and cobbles.

Frost protection for the foundation must be provided by maintaining a minimum of 48" of earth cover over them, measured in any direction. The finish grade should provide for a minimum of 2% slope away from the structure in all directions for a minimum of 10 feet, as well as for positive and continuous drainage away from the building without any ponding. Native subsoil materials will provide appropriate backfill. This backfill may be capped with a maximum six inch thick layer of the native topsoil. The native backfill material must be placed in lifts a maximum of 10 inches thick, with each lift

moistened and compacted to 93% of its Standard Proctor density.

In order to control moisture as well as to minimize heating costs for the proposed residence the surface of the subsoil in the crawl space must be covered with a six mil thick sheet of visquene. For purposes of fire protection, this sheet of visquene must be covered with a minimum 1.5 inch thick layer of either crusher fines or 'flow-fill.'.

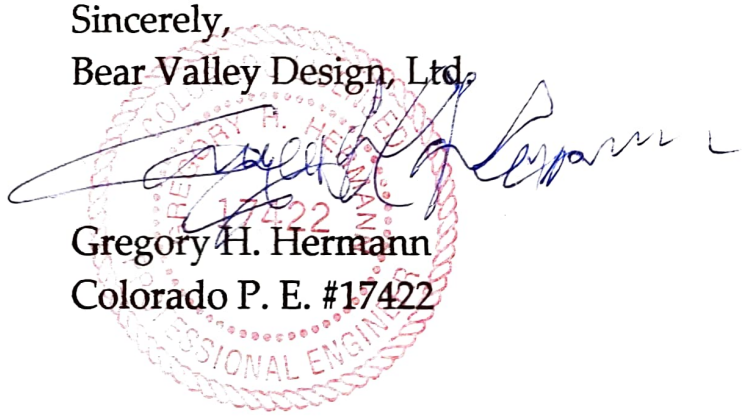
Provision must be provided for positive venting of radon gas from the crawl space should future testing, completed after construction of the residence prove such venting to be necessary. Because of the fact that radon gas is extremely more dense than air, our recommendation is to provide for gravity venting of any radon, and to provide for provision of a forced draft fan to assist with said gravity venting if such a fan were to prove to be necessary.

No slab on grade construction is anticipated in this residence.

The profile hole revealed conditions virtually identical to those described above in the test pit. Neither bedrock nor any free ground water was encountered in the profile hole nor in the test pit. Our evaluation of the soil exposed in this profile hole is that it classifies as a Type 3 silty sandy, slightly clayey loam, per Table 10.1 in Colorado's Regulation #43. Therefore, the leach field for the proposed OWTS should be designed based on a Long Term Acceptance Rate (LTAR) of 0.35 gallons per square foot per day

Thank you for the opportunity to have been of professional service to you in this matter.

Sincerely,
Bear Valley Design, Ltd.



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