Geotechnical Solutions

2922 NW Loop 410, No. 105
San Antonio, Texas 78230 • (210) 209-4472 • geotechsltns@gmail.com
Firm No.: F-19672

Mr. Paul Wilson
122reserveway@gmail.com
410. 428. 5426

October 16, 2023
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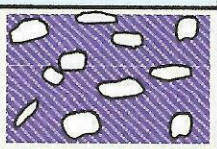
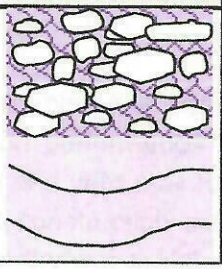
RE: Geotechnical Study (Proposed Wilson Residence)
122 Reserve Way – Lot 58
Lampasas, Texas 76550

Sir:

Pursuant to your request, a representative of our field exploration crew, traveled to the above referenced property on Oct. 12, 2023, to obtain soil samples for the purposes of determining the Atterberg Limits, soil classification/s, potential soil vertical movement estimations, and allowable bearing capacities, and to provide WRI-BRAB parameters and PTI foundation design recommendations. The laboratory test results and design criteria are summarized herein. **Representative Site Photos are attached.**

Boring Locations: (2) within vicinity of the proposed building envelope.

Typical Stratigraphy and Atterberg Limits (PI): Borings B-1 & B-2

Depth / Interval	*Soil Classification*	*Symbol*	LL, %	PL, %	PI
1/2" to (19" - 26")	Grayish-Brown, Clayey-Silt, semi-moist, with gravel & stone fragments (***Surficial Soil)***		39 33	13 11	**26** **22**
19" - 26" 3.4' 4.5'+	Tan, Stony/Cobbly-Soil stratum, **overlying** dense to very dense, weathered stone/ or Marlstone, semi-moist		23 --	9 --	**14** --

Overall Effective PI: 16 – 18 ; PVR/PVM: -1-3/4" to +1-1/2" (at soil surface)

Allowable q_a at minimum depth of 10" below existing grade: 1800 psf

Beam-and-Slab-on-Grade Foundation

A slab-on-grade foundation may be considered for the proposed building. Geotechnical and pertinent PTI design parameters, based on general design analysis methods in Chapters 3 and 4 PTI - 2004 Edition, along with the 2008 Supplement, were evaluated and are summarized in the following table. **BRAB-WRI** parameters are also provided.

CRITERIA BASED ON EXISTING PVR/PVM OF APPOX.: -1-3/4" to +1-1/4" (at soil surface)
(Design PI: 25)

Thornthwaite Moisture Index	**-16 to -15**
Allowable Bearing Capacity	**2000 psf**
Edge Moisture Variation Distance (Em)	**6.0' (center lift)**
	3.1' (edge lift)
Differential Vertical Soil Movement (Ym)	**1.28" (center lift)**
	1.69" (edge lift)
BRAB-WRI: Cw & Climatic Rating Factor:	**0.89 ; 0.11**
Site Slope Correction Coefficient, Cs	**Slope to Grade**
Minimum Perimeter Grade Beam Penetration into Existing Soil:	**18 in.**

The above design parameters assume that vertical moisture barrier (perimeter beam) is designed to extend to the recommended embedment depth and that subgrade soil / fill soil and excavated grade beam trenches are free of roots and loose soil and should be in a **moist and dense / well-compacted condition, prior to concrete placement/discharge.** Voids created by the removal of **trees or large cobbles / boulders** should be backfilled with moistened, low PI, sandy/gravelly soil and densely compacted. Prior to grade beam excavations, the building pad should be proof-rolled with a construction vehicle weighing at least **8 tons** in order to observe for weak-support areas / soft spots in the subgrade. Final design parameters are commonly at the discretion of the project structural engineer.

The PTI method of predicting soil movement is mostly applicable when site moisture conditions are controlled by climatic conditions. Of course, foundation performance can be significantly influenced by adding perimeter pavement/s, yard drainage and yard maintenance, rain gutters, utility line leaks, trees before and after construction, post construction subsurface or surface alterations near the foundation perimeter; and exceptional dry/wet prolonged conditions. ***The above criterion also assumes that proper irrigation methods and drainage will be maintained after construction. If proper drainage / irrigation is not maintained, potential vertical movements greater than that anticipated may occur.***

GENERAL SUPPLEMENT INFORMATION FOR THE PROPOSED STRUCTURE

Grading & Drainage Considerations

Positive drainage during and after foundation construction is particularly important to the long-term performance of the proposed structure. We suggest the following information be considered for perimeter drainage:

- The building pad should be elevated above grade to prevent surface water from entering the structure. Where possible extend paved surfaces up to the building line to serve as a barrier to water infiltration and evaporation. These surfaces should slope away from the building.
- Provide proper grading and drainage around foundations to prevent ponding and to facilitate the surface runoff away from foundation edges to minimize water infiltration to the soils below the foundation.
- Outlets for gutter systems should discharge water onto surfaces which quickly direct the water away from the perimeter of the buildings.
- Final grades within 10 feet of the buildings should be adjusted to slope away, preferably at a minimum slope of 3 percent.
- Planters located adjacent to structures should be self-contained, and sprinkler mains should be located a minimum of 5 feet from the building edge.
- Planter boxes placed/installed adjacent to the building should be configured so that concentrations of water are not available to underlying clay soils.
- Large trees/shrubs should not be allowed closer to foundations than a horizontal distance equal to their height due to their significant moisture demand as they mature.
- In those areas where grass ditches must be used to direct surface water away from building areas, the ditch/ditches must be designed hydraulically to accommodate the volume of water and to quickly direct the surface water away from building perimeters and pavement edges.

Potential Vegetation Effects

It is a known fact that in this region of Texas, vegetation effects--primarily tree roots, can have damaging effects on slabs, pavements and other structures founded on clay soils possessing shrink-swell properties. In general, tree roots tend to desiccate soils especially during arid periods; conversely, when trees are removed prior to construction, for example, transpiration is essentially eliminated, and then the surrounding soil/s could potentially have access to the moisture-abundant roots and possibly resulting in localized swelling.

Altering the Site & Climate

In general, construction activities (man-made conditions) will influence to some degree the extent of the shrink-swell process of the soils described herein. Construction and Post-construction activities, overall structure maintenance, future structural alterations and additions, drainage maintenance and cyclic weather patterns are factors that can influence the shrink-swell characteristics of the clay soils at this site.

Construction at Time of Season

It should be noted that foundations poured/repaired during an extended drought season or on desiccated clay soils could potentially result in perimeter vertical movements as the soils begin to gain moisture due to irrigation activities/after significant rainfall. Conversely, foundations poured/repaired on wet clay soils could result in downward movements around the perimeter edge due to the supporting soils shrinking/contracting as they begin to dry.

LIMITATIONS OF GEOTECHNICAL STUDY
Proposed Wilson Residence
122 Reserve Way (Lot 58)
Lampasas, Texas 76550

The analysis and recommendations contained in this report were based on the data from two (2) test borings / test pits, the laboratory test results, the observations associated with this site and our experience in the area. This report may not reflect precise variations of the soil conditions across the site. If different subsurface conditions are encountered at the time of construction/excavations, we should be contacted to evaluate the conditions encountered. This report was prepared for this project exclusively for the use of *Mr. Paul Wilson and his design team and the builder / foundation contractor.*

Again, thank you for the opportunity to be of service.
Geotechnical Solutions (F-19672)

Alan J. Vasquez
Geotechnical Consultant

Conan C. Bear, P.E.
Engineering Consultant



10/16/23

Representative Site Photos
(122 Reserve Way, Lot 58)



