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June 25, 2021

Mr. Steffen Waltz
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Re: Tier 1 Foundation Evaluation of a Residence at 15469 SH 135 S, Overton, Texas

Dear Mr. Waltz,

Per your instructions through your Realtor, Ms. Tina Holland, I have today inspected the above referenced residence to address certain concerns you have expressed regarding the unevenness in the finished concrete foundation and the foundation behavior in general. The following are my observations and conclusions:

Observations:

The residence (Figure 1) is a timber framed structure constructed on a monolithic cast-in-place reinforced concrete foundation with a modular masonry façade. The house was constructed in 1979 and faces approximately northwest. No geotechnical information regarding the engineering properties of the subsoil or structural drawings describing the construction of the concrete foundation were available.

Figure 1

Figure 2

In order to try to differentiate between the effects of foundation movement and construction quality it was necessary to evaluated the general foundation behavior by examining the exterior condition of the modular masonry façade and the exposed portion of the concrete foundation.

I began my inspection at the front of the house (Figure 1) and proceeded around in a counter clock wise direction to the southwest (Figure 8) elevation; thence to the southeast elevations (Figures 10, 15, and 16), thence to the northeast elevations (Figure 18) and returned to the place of beginning. My standard procedure is to record photographs of every masonry detail (e.g. Figures 2 and 3) whether or not the details show any evidence of distress and regardless of the degree of distress. This provides the Client with a basis for future observations should they become necessary. During my exterior inspection I recorded 99 photographs all of which are not included in this report since their inclusion would not improve its readability or thoroughness. The sequence of these photos follows precisely the path described previously.

Figure 3

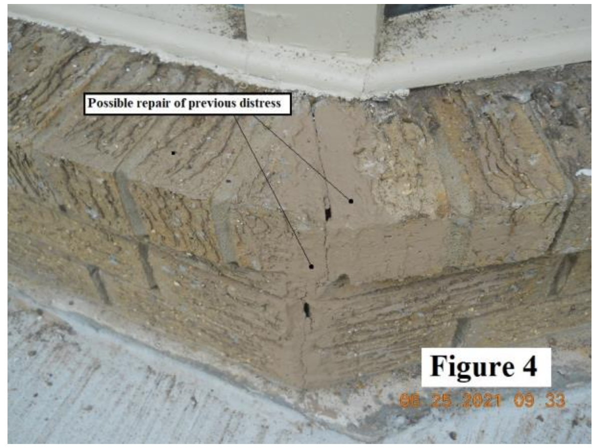

Figure 4

In some areas there was evidence of previous repairs (Figure 4 for example and other Figures where noted) to the masonry caused by past foundation movement. These repairs were made with such remarkable skill so as to be almost unnoticeable. It is arguable whether or not these are actual repairs or simply "touch up" by the original mason.

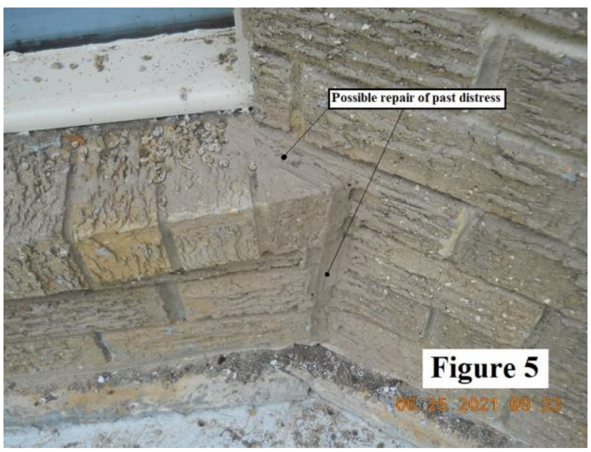

Figure 5

Figure 6

Figure 6 shows an extremely minor example of distress which could be shrinkage strain or very small foundation movement.

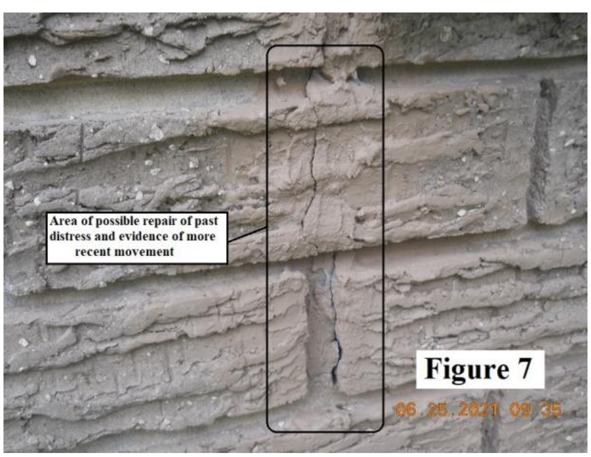

Figure 7

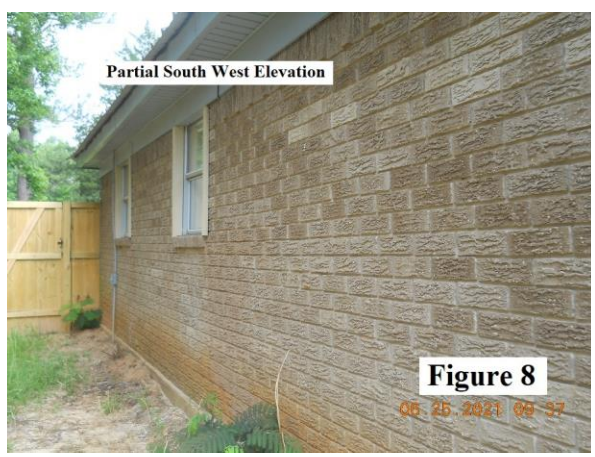

Figure 8

Figure 7 is an example of extremely minor additional movement after the suspected repairs were made. Figure 9 shows a possible example of a repair found along the southwest elevation in Figure 8.

Figure 9

Figure 10

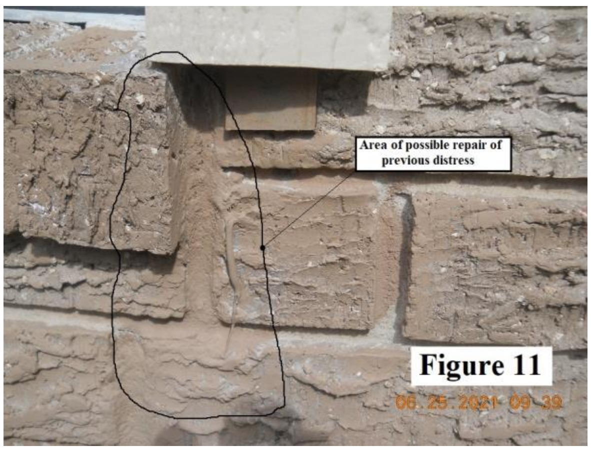

Figure 11

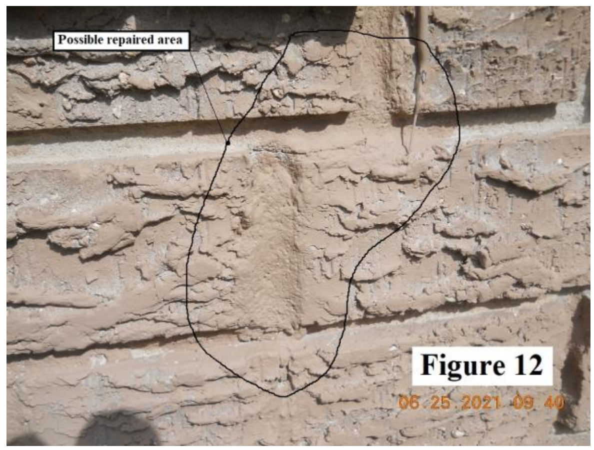

Figure 12

Figure 13 shows and example of the repair of the masonry which continues into the foundation concrete.

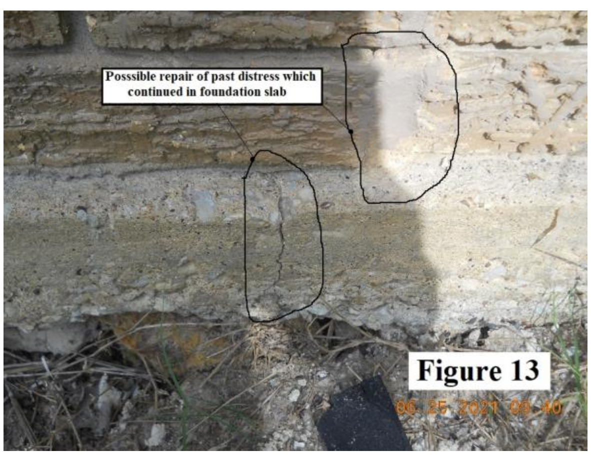

Figure 13

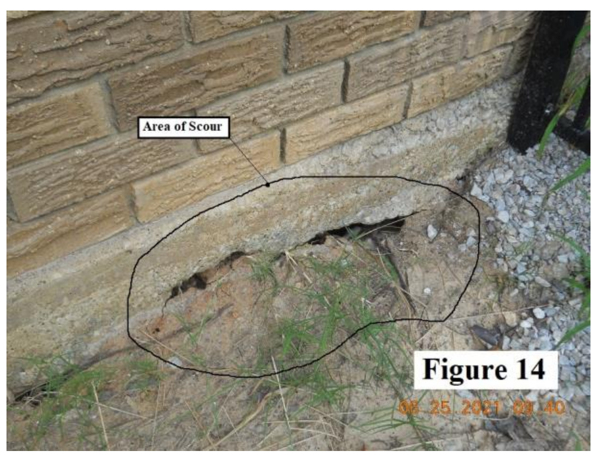

Figure 14

An area of scour was observed in Figure 14. Please refer to the Conclusions portion of this report for further discussion of this observation.

Figure 15

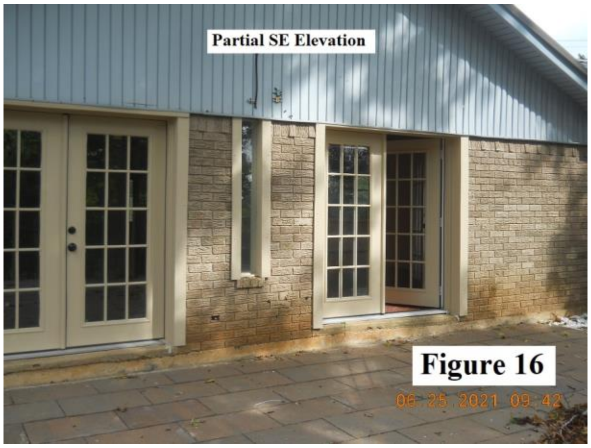

Figure 16

Figure 17 shows an example of distress due to very minor foundation movement.

Figure 17

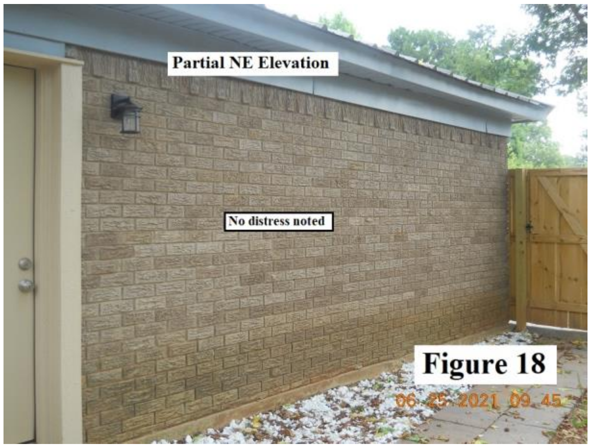

Figure 18

An area which shows evidence of standing water and an attempted repair can be seen in Figure 19.

As can be seen in several photographs, the foundation perimeter dimensions were greater than the architectural masonry dimensions. Refer to Figures 8, 13, 14, 17, 18, etc. for examples of this observation. Normally the masonry and the exterior of the foundation align vertically and there is no "step" of the foundation beyond the line of masonry. This can allow rainwater to dwell on this horizontal surface and potentially invade the interior. No evidence of this was seen on the interior but keep in mind that this interior had been recently painted. Please refer to my comments on this observation in the Conclusions section below.

I then proceeded to observe the interior of the residence to determine the extent that foundation movement had caused sheetrock finishes to show distress. The interior had been recently painted which possibly obscured past distress; however, no example of attempted repair of interior distress was noted.

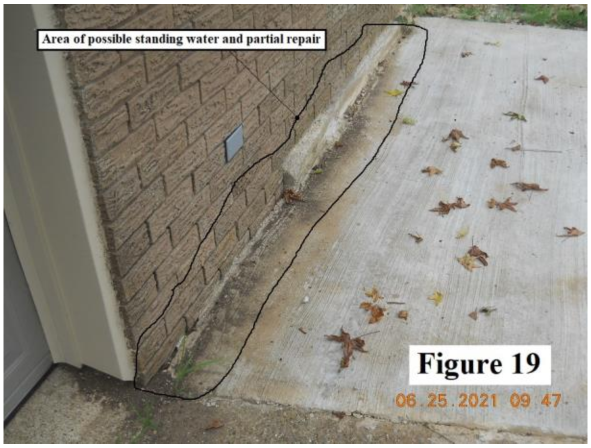

Figure 19


Figure 20

Figures 20 and 21 are examples of areas where this potential distress occurs. All similar details in the interior were examined with no evidence found of recently repaired distress.

I then inspected the uneven flooring which was quite obvious throughout **the residence but was much more noticeable in the entry and main living areas and immediately adjacent rooms. Please refer to my comments in the Conclusions section of this report for further discussion of this condition. Figures 22-27 document this unevenness and floor slope.**


Figure 21

Figure 22

Figure 23

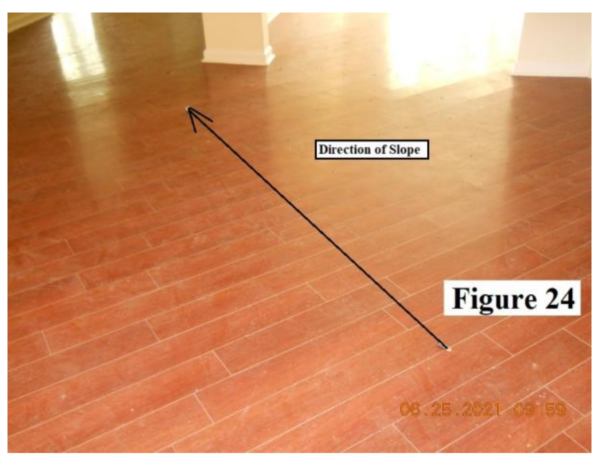

Figure 24

Figure 25

Figure 26

Figure 27

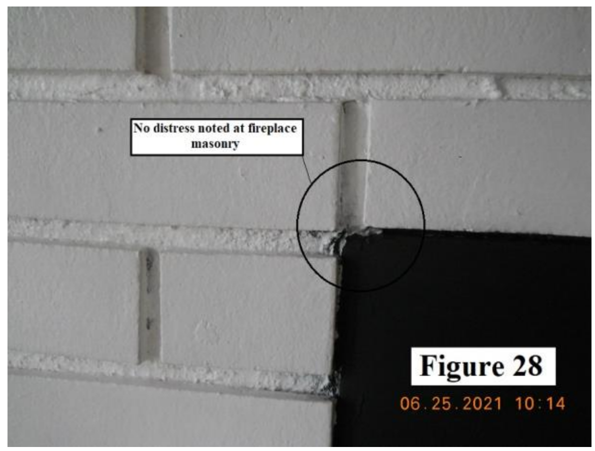

Figure 28

Interior masonry structures such as the fireplace in Figure 28 are notorious for displaying evidence of undesirable foundation behavior. A close examination of this element showed no evidence of this.

The garage slab showed only very minor evidence of typical shrinkage cracking common to many residences in this area.

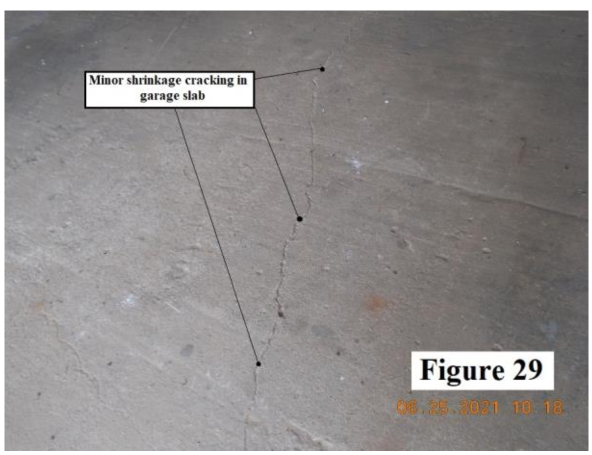

Figure 29

Conclusions:

All structures built upon earth move and distort to some degree even if only because of daily and yearly cycles of temperature and moisture. A house can be thought of as a large deformable structure whose flexibility is inversely proportional to the sum of the stiffnesses of its component elements. Brittle materials like masonry and concrete will show signs of distress because of their brittle nature; that is they have less ductility and are not able to sustain the degree of strain as that of ,say, steel or wood. They are very strong in compression and very weak in tension so that in areas of high stress concentration such as the corners of window and door openings in masonry will show signs of distress more readily than other materials.

When structures, including residential structures, are initially completed, the foundation, the supporting soil, and superstructure begin a process where together they seek a compatible equilibrium configuration. This process can take between 2 and 6 years to complete. Sometimes the process goes without incident. Sometimes there are conflicts between the three parties and there is little compatibility. This case results in moderate to extreme distress in masonry elements and interior components such as sheetrock. Then, of course there are the conditions between the two extremes.

There are two types of foundation movement which cause observable distress.

The first is an incremental displacement of the newly loaded soil. Over a period of time the soil compresses under the new loading imposed upon it and continues to do so for a certain time, During this time each increment of compressive displacement becomes smaller and smaller until there is virtually no additional observable movement.

The second is a cyclic displacement, the degree of movement being function of the inclination of the soil to change volume with changes in moisture content. As the soil becomes more moist due to increasing precipitation and/or poor site drainage, it swells in volume and can place enormous forces on foundation elements. As it becomes dryer, the opposite occurs and the supporting soil can shrink away from the foundation leaving parts completely unsupported. If the foundation does not have sufficient strength and stiffness to withstand these conditions, elements such as masonry and interior wall endure strains which are beyond their ability to tolerate.

The two are not necessarily independent of one another, cyclic changes in temperature and moisture can upset the incremental process.

Another point I usually make with foundations constructed before 2000-2002 is that during this period we endured one of the most severe droughts on record. The soils in this area lost moisture to the point of becoming dryer than ever before. Of course, they shrunk to their historically minimum volume and left many foundations unsupported over a large percentage of their plan area. This caused many foundations in the area to fail. Then a period of extreme precipitation followed. The soils began to absorb this moisture and swelled to their maximum volume causing further foundations to fail. It was a historically damaging cycle.

It is unknown precisely how well this foundation performed during this series of events since the repairs observed, if they are actually repairs and not original mortar, were so well made that it is difficult to determine the sequence of construction. Little additional movement has occurred during this unknown time interval.

The areas where the perimeter soil has been scoured by runoff should be repaired as soon as possible. It is unknown how much moisture has penetrated beneath the slab or the effect this moisture has had on the unevenness of the interior floor.

The possible moisture incursion due to the "step" in the masonry/foundation interface (Figures 8, 13, 14, 17, 18, etc.) can be minimized by cleaning the area during a period of dry weather with a wire brush and compressed air and applying several coats of masonry/concrete sealant according to the particular

manufacturer's instructions. This process should be repeated according to the manufacturer's recommendations.

To conclude, I doubt very much that the differential movement of the foundation has had much effect on the unevenness of the interior flooring. A large portion of the unevenness can be attributed to very poor workmanship in the finishing of the slab. The topography of the interior floor indicates a general slope to the exterior. If there exists problematic soil below the interior, the swelling of this soil could possibly cause the effects observed but there was no indication of this in any of the exposed concrete substrate. Most of the substrate was covered by tile or wood flooring however.

The lack of cracking in the lintel corner of the fireplace (Figure 28) also indicates lack of undesirable foundation movement, Likewise the very minor distress in the garage slab is a positive observation.

It is impossible to offer a quantitative prediction of future behavior of foundations without geotechnical data and exhaustive and expensive structural analysis, and without the knowledge of future environmental conditions and events. We can only put forth a qualitative probability for this behavior.

That having been said I believe that the probability of future unacceptable foundation behavior is extremely small. Conversely the probability is very high that the structure will continue to serve its primary purpose as a residence for many years to come assuming a normal program of maintenance is followed and no extreme environment or geological events occur.

I very much appreciate the opportunity to be of service to you in this matter. If I can provide any additional information of clarification, please do not hesitate to contact me. The complete collection of the photographs taken today are available in CD form. If you would like a copy for future reference please let me know.

Thank you again for your confidence and your business.

Respectfully Submitted,

Michael G. Huffman, P.E. M.ASCE

6.25.21
STATE OF TEXAS
MICHAEL G. HUFFMAN
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PROFESSIONAL ENGINEER

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Terms and Conditions for Engineering Services

June 25, 2021
Mr. Steffen Waltz
sewaltz@dominionadvisors.com
Re: Tier 1 Foundation Evaluation of a Residence at 15469 SH 135 S, Overton, Texas

This document shall be considered an integral part of the Engineering Report

Information Provided by Others

The Engineer is not responsible for the accuracy of information provided by others whether or not the information is utilized in conjunction with the Engineer's experience and judgment to render an opinion of the condition or suitability of a structure.

Applicable Scope of Inspection services

If a building owner, real estate agent, lending institution, insurance, underwriter, or broker is concerned about the general structural condition of a particular building, or is considering a renovation which will significantly alter the buildings use, or additional loading such as new mechanical equipment is anticipated, it may be necessary to perform an evaluation based upon the following varying degrees of thoroughness. Evaluations are also necessary after an extreme weather event such as wind or earthquake if the structure has sustained observable damage. After extreme cycles of rain and drought can also produce unusual foundation movements which cause significant damage in structures founded on soils which have moderate to high volume change characteristics. The following generally describe the various tiers of structural evaluation:

Tier (1) involves noninvasive visual observation of structural flaws and potential areas of concern. The conclusions and predictions we make in this case are based upon our observations, past experience and general engineering judgment. No calculations are performed; no material samples of subsurface soils and superstructure elements are collected and tested. This tier is sufficient for projects where changes in building use are not anticipated and no unusual additional loading is expected to be imposed on the structure beyond its historical loading. Additionally the local Building Official has not and will not require that the new owner bring the building up to the current local Structural Building Code. No calculations or estimates to establish lateral load capacity of structure for wind and seismic loading are performed.

Tier (2) Invasive exploratory inspection and observations in which finishes are removed in selected locations to reveal the condition of most structural elements. Material samples are taken and tested only where conditions are warranted by the Engineer of Record. If serious geotechnical problems are observed, exterior crack monitoring and soils investigation may be warranted. If interior superstructure elements are observed to be in a distressed state, collection of material samples may be taken and tested to determine their current engineering parameters if it is warranted and the collection of samples does not weaken the structure. As in (1.) above, the Building Official has not placed any additional burdens on the new occupant with regard to current Structural Building Codes. If new loading is imposed on the structure, field data collection and structural analysis may be required.

Tier(3) A combination of (1.) and (2.) above with an additional scope of services which may include significant crack monitoring, subsurface geotechnical exploration, sampling of superstructure elements, laboratory analysis of samples, engineering analysis of the existing load carrying capacity of existing elements, possible in-situ load testing of foundation and superstructure elements. Generally here the Building Official is requiring that the structure be certified as structurally code compliant by the Engineer of Record, or the Official or client has specific structural concerns regarding the current condition or its anticipated future use and occupancy. It should be noted that, without knowledge of the existing engineering parameters of the building's materials, any structural analysis is meaningless.

Current Geotechnical Information

Without current (within one year) geotechnical information such as but not limited to soil borings to required depth, laboratory analysis of samples, and a report by a Licensed Geotechnical Engineer, it is impossible to produce meaningful quantitative predictions about a structure's present or future behavior. Conclusions are based therefore on engineering experience and judgment. The Engineer is not responsible for the future behavior of structures without having performed analytical calculations based upon the above information.

Existing Foundation/Superstructure Material Information

The engineering properties of existing materials used in the original construction such as, but not limited to, unit weights, ultimate strengths, elastic modulus, allowable strengths, allowable stresses, material grades for concrete, steel, and lumber are necessary to

provide quantitative assessments of existing structural life/safety. Without sampling and laboratory analysis of the various materials involved, including geotechnical materials, the Engineer is not responsible for future behavior of the structural components or the structure as a whole. This includes wind loading for which the structure has been "designed" to the standard of the industry.

Professional Judgment, Experience and the Performance of Engineering Calculations

When existing material engineering properties are not available and the Client chooses not to obtain these values by sampling and laboratory testing, or by retaining the Engineer to perform a historical survey to determine the most probable values, the Engineer and the Client agree that, should the Client require engineering calculations, the results will be subjective in nature and may lead to inordinately conservative results. The Client further agrees that results obtained in such a case, including the data obtained by historical research, are only estimates of questionable accuracy and the Engineer shall not be held liable for the future behavior of the structure based on this data.

Extreme Environmental Events

The Engineer is not liable for the effects of extreme winds, tornados, hurricanes, and severe thunderstorms, floods, extended periods of drought or precipitation, or other extreme environmental events unless the scope of design work specifically includes any of the above.

Hidden flaws: Items and Areas not Inspected

The Engineer is not liable for the evaluation of structural elements hidden from view during a Tier (1) inspection. If an area is not mentioned in the Engineering Report it is assumed that this area was not inspected. If the Client chooses not to expose certain areas of structural concern during Tier (2) or Tier (3) inspections, the Engineer is not responsible for structural defects which would possibly have been observable.

The Engineer does not inspect or opine on roofing, architectural trim, siding, or any other element not considered a part of the structural system. The Engineer does not inspect or opine on the Mechanical or Electrical systems contained within the building.

Ethical Considerations

Licensed Professional Structural Engineers are required to adhere to certain Canons of Ethics as set forth by the American Society of Civil Engineers and the State Licensing Board of Professional Engineers.

The first and paramount of these is the Engineer's responsibility to protect the life, safety, and wellbeing of the Public at Large. In this respect, it is irrelevant whether the client is the buyer or the seller of a particular structure or property, the Engineering Report and the opinion of the Engineer will be the same in either case.

Another ethical consideration is the responsibility of the Engineer to be an honest and faithful servant of his client. This does not however absolve the Engineer from the responsibility set forth in the First Canon. Structural defects and conditions observable which could adversely affect the life, safety, or future wellbeing, including financial wellbeing, of future owners of the structure or property must be clearly revealed to all current stakeholders.

For Manufactured Housing

For Modular, Mobil, or other Manufactured Housing units it is imperative that owners and/or occupants understand that this type of structure offers only minimal protection during strong wind events including wind events from strong thunderstorms whether or not declared "Severe" by the National Weather Service. Downbursts, microbursts, and small tornados less than or in the range of the EF1 type generated by strong thunderstorms can generate winds that exceed the lateral load resisting capacity of walls, roof connections, stud to floor connections, and foundation elements such as Concrete Masonry Unit Piers and precast footings, and the metal strap tie downs and ground anchors which are the standard of the industry in this area. The precise axial (pullout) capacity of auger type anchors and the accurate bearing capacity of precast concrete footings cannot be established without a Geotechnical Investigation performed by a qualified testing laboratory.

Responsibility for Payment for Services

The person or persons addressed in the Engineering Report are considered the Client or Clients and are responsible for payment of services rendered. Persons accepting these Terms and Conditions in the name of another party are jointly responsible for payment. Payment is due within 30 days of the statement date or upon closing of the sale of the property; whichever occurs first. Unpaid balances will accrue an interest of 1.5% per month until paid in full.

June 25, 2021
Mr. Steffen Waltz
sewaltz@dominionadvisors.com
Re: Tier 1 Foundation Evaluation of a Residence at 15469 SH 135 S, Overton, Texas

Specific Conditions, Limitations of Scope of Services, Fees

Tier 1 Foundation Evaluation Only attic area not inspected, site visit, photographic documentation, report, discussions with Client(s)
Standard minimum fee $400.00

Acceptance of Terms and Conditions

Acceptance of the Engineering Report constitutes acceptance of these Terms and Conditions.