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Date: Wednesday, December 19, 2018

Structural Warranty Claim Evaluation
Centricity Warranty Group
P.O. Box 33026
St. Petersburg, FL 33733-8026

RE: Engineering Evaluation – Distress Inventory Report and Structural Performance
Express Limited Major Structural Defect Warranty

Homeowner - Jacqueline Yoo (Current Homeowner)
Subject Address: 2001 Faro Drive (Unit 13), Austin, TX 78741
Work Order # - W10054
Certificate # - 760931
Enrollment Date - 07/26/12
Case # - G75476

The following report constitutes the engineering opinion requested on the foundation and/or structural superstructure of the subject residence. The purpose of this investigation and report is to determine if the current foundation and/or structural superstructure performance meets the “Performance Standards for Slab Foundations” and “Major Structural Defect” criteria outlined in the Warranty Documents. This report has been prepared in general accordance with the requirements of a “Level B” survey as defined by the American Society of Civil Engineers (ASCE) and according to the requirements of the Centricity Express Limited Major Structural Defect Warranty Documents (Documents). This report is provided for the exclusive use of the person or persons this report was prepared for as shown above. We have no contractual relationship with, or obligation to, any party other than the party for whom this report was prepared. The foundation and/or structural superstructure was visually inspected and a floor elevation survey was performed. The opinions contained herein are based on the experience and judgment of the writer, as well as conditions observed without taking soil samples, performing plumbing leak tests, removing floor or wall coverings, or performing invasive tests or procedures. The opinions offered herein are based solely on the observations made at the time of the inspection, and do not take into consideration any changes in the condition of the foundation and/or structural superstructure after that date. This report does not predict or warrant the performance of the subject foundation and/or structural superstructure. You are encouraged to review the “Agreements and Limitations” attached to the end of this report for other important limitations and standard recommendations.

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EXECUTIVE SUMMARY:

The purpose of this investigation and report is to determine if the current foundation performance meets the “Performance Standards for Slab Foundations” and “Major Structural Defect” criteria outlined in the Centricity Express Limited Major Structural Defect Warranty Document.

Based on our observations, measurements, calculations, data analysis results and our experience and judgment, we conclude that the magnitude of the deflections and tilts in the slab foundation **do not exceed** the criteria for “Performance Standards for Slab Foundations” of the Warranty Document. The magnitude and severity of the deflections in the foundation are not causing any designated load bearing component to be cracked, bowed, distorted or deteriorated such that it compromises the structural integrity of the component or the performance of any structural system of the Home.

We also conclude that the magnitude and severity of the observable physical indicators of damage **do not exceed** the criteria for “Major Structural Defect”. There were no actual observable physical damages to the designated load bearing portions of the Home such that the Home becomes unsafe, unsanitary or otherwise unlivable.

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PROPERTY DETAILS:

1. This structure is a two - story wood framed, townhome (shared foundation) with brick and stone veneer and stucco siding on the exterior. The home has a gable and/or hip roof and composition asphalt shingles type of roof covering. The interior walls are sheetrock with various finishes. The foundation is a monolithic slab on ground. The home was constructed in 2012 per the Travis County Appraisal District Records. The total square footage of the foundation footprint is 1480 sq. ft. (including all garages and monolithic patios). All directions in this report are annotated by left, right, front and rear as if looking at the front door.



Picture 1: General View of Subject Property

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INSPECTION DETAILS:

1. Michael Gandy, PE physically inspected the above referenced home on Monday, December 10, 2018 to determine if the current performance of the foundation and/or structural superstructure meets the “Performance Standards for Slab Foundations” and “Major Structural Defect” criteria outlined in the Warranty Documents. I performed a Level “B” engineering analysis as defined by the American Society of Civil Engineers (ASCE). I made careful observations of the interior and exterior for signs of structural distress and I visually evaluated the drainage surrounding the structure. I performed an interior elevation survey as shown on Drawing No. 1001. The Homeowner was not available for interview at the time of this inspection.

EXTERIOR OBSERVATIONS - DISTRESS INVENTORY:

1. There were no indications of adverse structural foundation performance or actual physical damage to any designated load bearing component such that the Home becomes unsafe, unsanitary or otherwise unlivable.
2. Continue to monitor these cracks as normal seasonal movements.



Pictures E1 - E2: Sight down the siding lines along the left and right sides showed siding line deflections.

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Pictures E3 - E4: No vertical driveway/garage displacement.



Pictures E5 - E6: Minor stucco and trim separations in various locations.

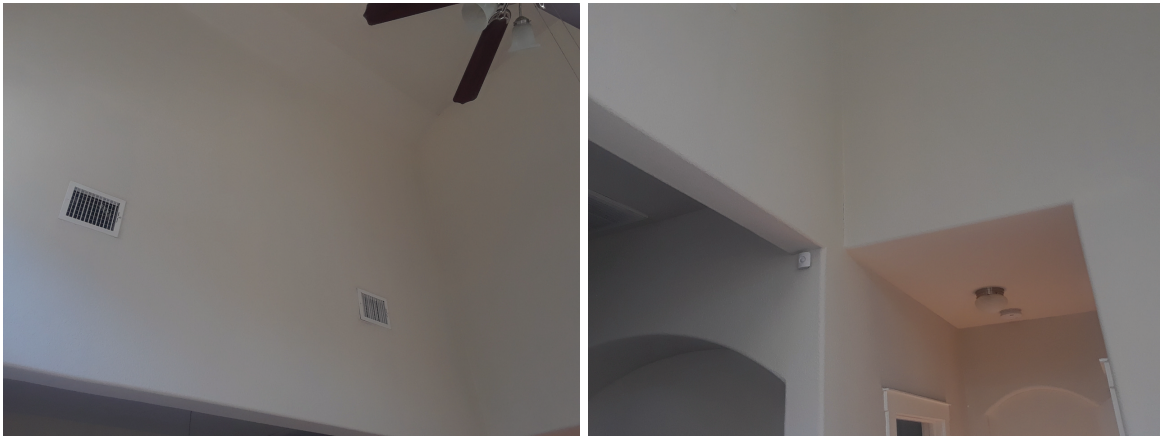
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INTERIOR OBSERVATIONS - DISTRESS INVENTORY:

1. There were no indications of adverse structural foundation performance or actual physical damage to any designated load bearing component such that the Home becomes unsafe, unsanitary or otherwise unlivable.
2. Continue to monitor these cracks as normal seasonal movements.



Pictures I1 - I2: Minor out-of-square door at the front entry. Interior doors opened, closed and latched within reasonable expectations. Minor sheetrock cracking various locations.



Pictures I3- I4: Minor sheetrock cracking various locations.

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DRAINAGE, DOWNSPOUTS AND WATERING SYSTEMS:

1. Drainage around the perimeter is positive away from the foundation.
2. Surface drainage was concluded to not be a contributing factor to the overall foundation performance.



Left Side

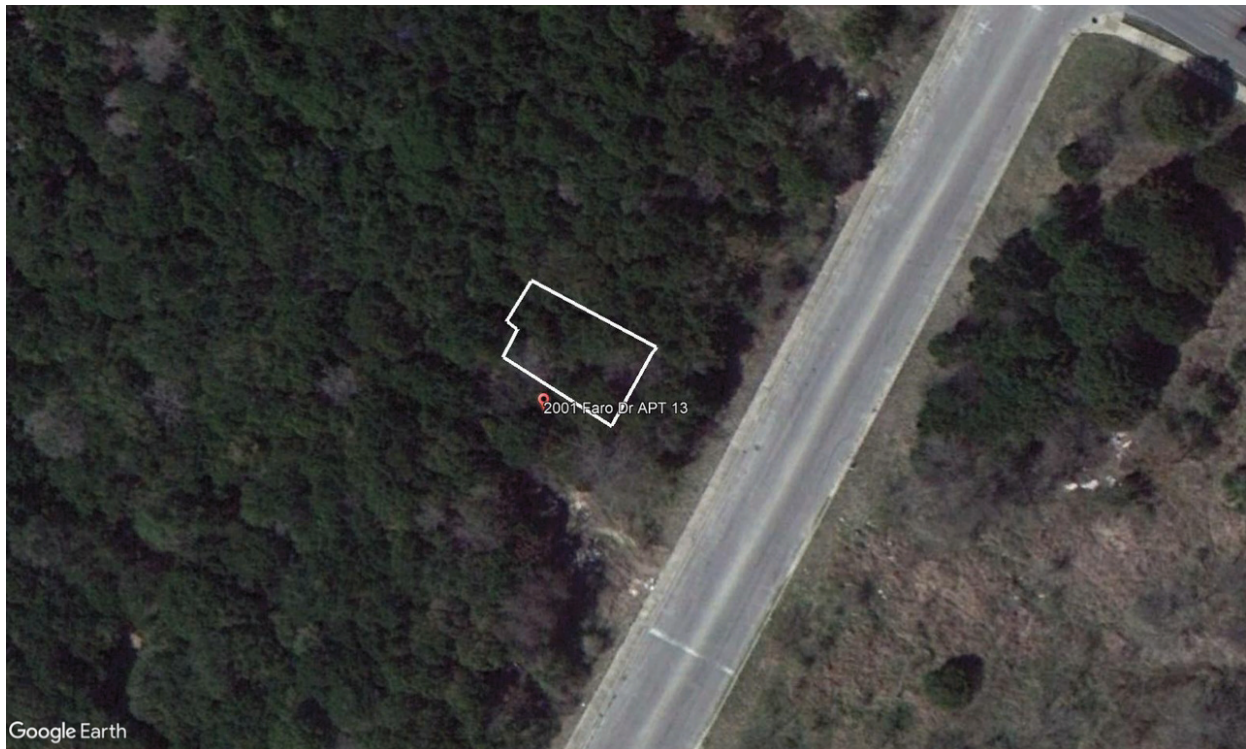


Left Side

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HISTORICAL LOT DEVELOPEMENT:

1. There were no obvious negative contributing factors to the lot development prior to construction. This photo was taken 03/2011 prior to the development of the lot.
2. The subject Home is constructed on the Houston Black Clay soil group. These soil properties were reviewed pertinent to the subject property. (WebSoilSurvey)



Picture 1: Pre lot development prior to construction.

Report — Engineering Properties														
Absence of an entry indicates that the data were not estimated. The asterisk "*" denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.gov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).														
Travis County, Texas														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	
HnC2—Houston Black clay, 3 to 5 percent slopes, moderately eroded														
Houston black, moderately eroded	90	D	0-6	Clay	CH	A-7-6	0-0-0	0-0-0	96-98-100	92-96-100	81-92-100	71-81-90	63-70-76	38-44-49
			6-70	Clay, silty clay	CH	A-7-6	0-0-0	0-0-0	98-98-100	96-96-100	85-92-100	74-81-90	63-70-71	38-44-49
			70-80	Clay, silty clay	CH	A-7-6	0-0-0	0-0-0	94-96-100	86-92-100	74-88-100	65-78-95	61-71-75	37-45-50

Excerpt 1: Department of Agriculture Natural Resources Conservation Service
 LINK: [WebSoilSurvey for 2001 Faro Drive \(Unit 13\), Austin \(LINK\)](#)

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ELEVATION SURVEY AND PERFORMANCE STANDARDS:

Interior floor elevations were taken with a Technidea Pro-2000 Zipllevel. Elevations were recorded to the nearest 0.1-inch throughout the home. A benchmark of 0.0 was established within the footprint of the home and is shown on Drawing No. 1001 with a star. An adjustment was made for floor coverings if they were a different elevation than the floor covering at the benchmark location. Elevation differentials varied by a maximum of 2.9" vertical inches in 30' horizontal feet. It should be noted that the elevation measurements include effects of elevation variation in the original construction which normally are 0.6 inches to 1.0 inches.

The deflection and tilt criteria for edge-to-edge (overall) foundation performance (as defined by the American Society of Civil Engineers) is less than L/360 in deflection and less than 1.0% tilt. This criteria, and my experience and judgment, was used to evaluate the performance of the foundation. Figure 1 below shows a graphical depiction of the actual deflection and tilt across the profile Section A-A as shown on Drawing No. 1001.

Across Section A-A:

- The allowable edge-to-edge deflection is $\Delta_1 = L/360" = 708"/360" = 2.0"$.
The actual edge-to-edge deflection measured is $\Delta_1 \approx 1.7"$.
This is within the ASCE guideline tolerance of L/360 for foundation deflection.
- The actual edge-to-edge tilt measured is $\approx 0.34\%$.
This is within the ASCE guideline tolerance of 1.0% for foundation tilt.

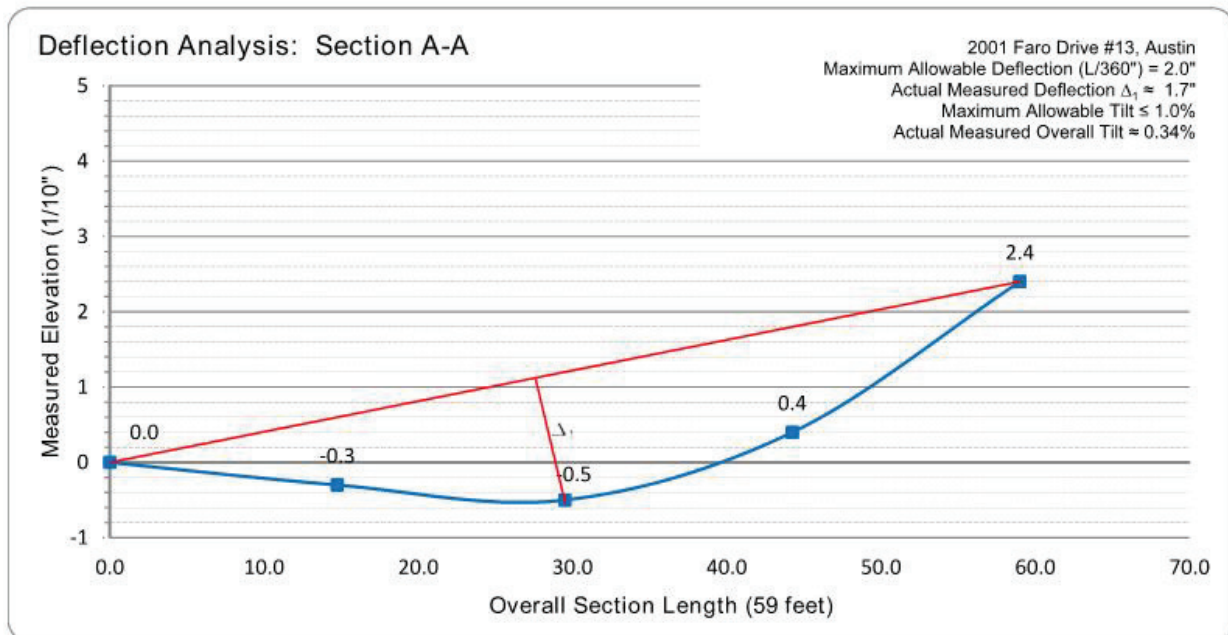


Figure 1: Deflection Analysis Across Section A-A

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CONCLUSIONS:

Based on our observations, measurements, calculations, data analysis results and our experience and judgment, we conclude that the magnitude of the deflections and tilts in the slab foundation **do not exceed** the criteria for “Performance Standards for Slab Foundations” of the Warranty Document. The magnitude and severity of the deflections in the foundation are not causing any designated load bearing component to be cracked, bowed, distorted or deteriorated such that it compromises the structural integrity of the component or the performance of any structural system of the Home.

We also conclude that the magnitude and severity of the observable physical indicators of damage **do not exceed** the criteria for “Major Structural Defect”. There were no actual observable physical damages to the designated load bearing portions of the Home such that the Home becomes unsafe, unsanitary or otherwise unlivable.

SPECIFIC RECOMENDATIONS: (2001 Faro Drive (Unit 13), Austin, TX 78741)

In addition to the Suggested Foundation Maintenance below and regardless of any warranty coverage provided by Centricity Warranty Group, Lighthouse Engineering offers the following specific recommendations for the benefit of the Homeowner to maintain the residence and to address the existing distress that was observed and reported in this Distress Inventory Report, dated December 19, 2018.

The Homeowner should consult with competent contractors to implement any of the below recommendations if they deem themselves unqualified to perform these recommendations. All construction contractors shall be competent and qualified in their trade of repair and meet the intent of these engineering recommendations and the Family of International Code Council (ICC) Building Codes as adopted by the City (or Town) of Austin. If unexpected or adverse field conditions are discovered during the repair, stop all repairs and contact Lighthouse Engineering.

1. Make cosmetic repairs to seasonal distress such as, exterior cladding cracks, trim separations, sheetrock cracks, out-of-square or binding doors and striker plates. It is recommended to adjust doors, windows and striker plates to accommodate for seasonal movements.
2. There are no practical engineering methods to help prevent continued movement.
3. Monitor the foundation for indications of reoccurring or active movement.

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SUGGESTED FOUNDATION MAINTENANCE:

1. [Foundation Maintenance from the Foundation Repair Association \(FRA\) \(PDF Link\)](#)
2. Make cosmetic repairs to seasonal distress such as, exterior cladding cracks, trim separations, sheetrock cracks, out-of-square or binding doors and striker plates. It is recommended to adjust doors, windows and striker plates to accommodate for seasonal movements. All emergency egress doors and windows should fully open at all times in the event of a necessary emergency egress.
3. Monitor the foundation for indications of reoccurring or active movement.
4. Maintain consistent soil moisture around the foundation perimeter. The amount and locations of soil watering should be zoned, monitored and regulated based on seasonal requirements with consideration of, foundation proximity to large or actively growing trees/vegetations, locations of sun and wind exposure, locations of extended floorplan features (that extend away from the main body of the foundation) and locations of drainage, downspouts and frequency of sprinkler activities. Lighthouse Engineering recommends the XFS Subsurface Dripline system from Rainbird ([XFS Subsurface Dripline System](#)). We do not recommend the soft black soaker hoses (they only last for one year and they get damaged by landscaping activities). We recommend the dripline system be set at 12" to 18" inches away from the foundation and be buried below the surface by 3" to 6".
5. Maintain positive drainage away from the foundation. Water should never be allowed to pool or pond within 10 feet of the foundation. It is recommended to maintain a 5% slope away from the foundation (6" in the first 10'). It may be required to swale or grade down the soils to achieve this desired positive drainage.
6. Manage roof water runoff. Roof water run off should never be allowed to splash up on the exterior cladding.
7. Discharge ALL gutter downspout water to at least 10 feet away from the foundation and water should never be allowed to flow back towards the foundation. It is preferred that all gutter downspouts be connected into solid 4" PVC drain pipe and be discharged via gravity to daylight to the public street drainage.
8. Repair ALL plumbing leaks immediately. Leaks in the sub-surface plumbing systems and landscape sprinklers are major contributors to foundation movement and damage. Plumbing systems prior to 1970 are more susceptible to plumbing leaks due to deteriorated cast iron drain piping. In our experience, the majority of foundation damaging plumbing leaks occur on the drain side of the system - drain side leaks do not register movement at the meter. For homes of any age, it is recommended to periodically check the plumbing system and landscape sprinklers for leaks.
9. Repair any locations of exposed steel reinforcement in the foundation. Cracks in the foundation grade beam can expose post-tensioning cable ends and conventional reinforcing steel rebar. If left unprotected, rust and corrosion will slowly reduce the originally intended strength of these reinforcing steel members and will continue to allow for more rusting and corrosion. Remove all loose concrete and clean with a stiff wire brush, coat the exposed steel with a Rust-Oleum paint and repair the concrete with a non-shrink epoxy grout to protect the reinforcement.

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AGREEMENTS AND LIMITATIONS:

Use of this report for any reason implies consent to all agreements and limitations of this report. This report is the professional opinion of Lighthouse Engineering, LLC and is based upon a limited evaluation of the property. This report is provided for the exclusive use of the addressee. We have no contractual relationship with, or obligation to, any party other than the addressee of this report.

This report does not constitute a structural warranty or performance contract with the purchaser of this report to or with any other party. It only states conditions observed at the time of the inspection. The evaluation of the property included a visual examination of the exposed interior and exterior finishes of the structure and the ground surfaces adjacent to the structure and to the taking of relative floor elevations. The taking and testing of soil samples was not included. Unless written in the report, the original design drawings and any design conditions were not known. Determination of construction to Building Code is best done during the original construction and is not a part of this evaluation. Testing for plumbing leaks was not performed but is recommended after foundation work is performed.

It is possible that future repairs could be required for the subject foundation. This evaluation only addresses the current condition of the foundation. Lighthouse Engineering, LLC does not offer or imply any warranty for the repairs or for the repair company's acts or omissions or for any other person conducting the repairs.

The fee collected is for this inspection only. Additional engineering services are available at an additional cost. Requests for these services must be made in a timely manner before commencement of work. Please contact this office for additional inspection scheduling and fee arrangements.

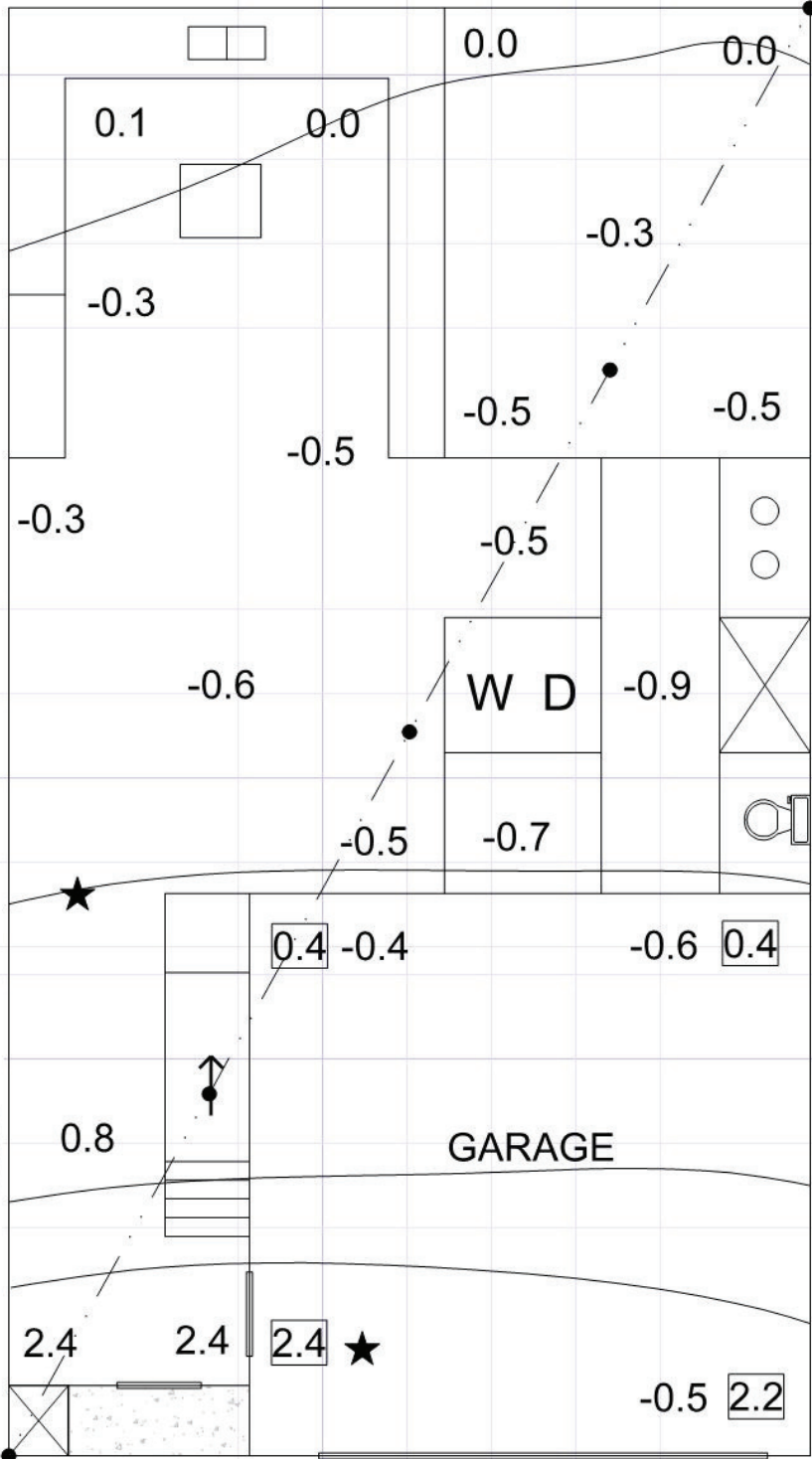
Sincerely,



Michael Gandy, P.E.
Wednesday, December 19, 2018
Registered Texas Engineering Firm F-9334

THIS REPORT DOES NOT PREDICT OR WARRANT THE FUTURE PERFORMANCE OF THE FOUNDATION

X.X ELEVATIONS TAKEN FROM CEILING
X.X ELEVATIONS TAKEN FROM FLOOR



Michael Gandy

DECEMBER 11, 2018

2001 FARO DRIVE #13, AUSTIN

ELEVATION SURVEY DRAWING

DRAWING NO. 1001

FILE NO. 20012018

★ BENCHMARK ELEVATION 0 INCHES
ELEVATIONS ARE SHOWN IN TENTHS OF AN INCH



LIGHTHOUSE ENGINEERING

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