12/9/2024

Client: Client Doe
123 Sample Address, Your City, TX, 12345

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Executive Summary

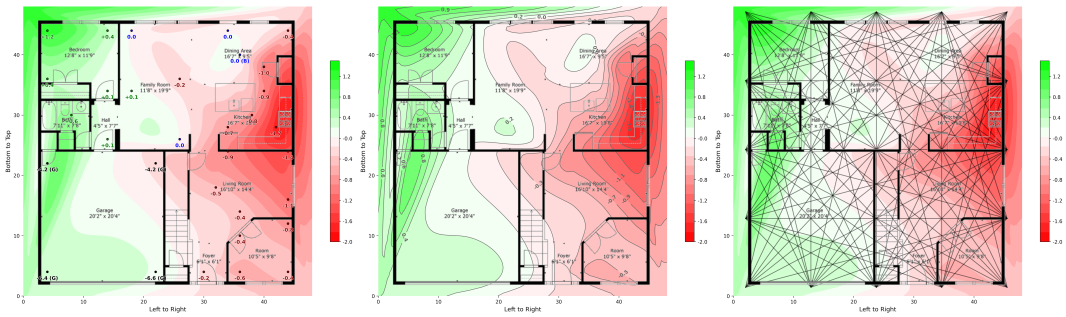
123 Sample Address, Your City, TX, 12345

This executive summary statement provides an abreviated and shortened overview of the key takeaway from the full report and is not intended to convey all details or complexities. It should not be the sole basis for decision making and is only provided as a courtesy for the purpose of clarity. For complete information and thorough analysis, refer to the full report.

This evaluation indicates clear signs of foundation issues. Calculations were not found to be within industry standard limits. Remedial measures are required to bring the foundation to a more level condition. It is recommended that foundation stabilization be completed as soon as possible, if possible within the next year. In addition, visual deficiencies noted should be resolved after foundation improvements have been completed. We also recommend you perform another house elevation plot after repairs have been completed to memoralize the elevation changes. Due to the nature that foundation work is recommended, it is imparative that you read the entire report in detail for a comprehensive explanation of this conclusion.

It is highly recommended that the client find, review, and comprehend these various colored Figures A, B, C, D, F located throughout the report, as these figures are instrumental in the development of the conclusions derived.

Figure A ***Figure B*** ***Figure C***



Engineer's Foundation Evaluation

123 Sample Address, Your City, TX, 12345

0.0 - Background and Purpose

On 4/1/2024 a foundation evaluation was performed at the property located at address 123 Sample Address, Your City, TX, 12345, which consists of a 2042 square-foot single family attached structure built in 2005 with a slab on grade foundation.

As shown in the attached inspection report (Appendix A dated 4/1/2024), a visual condition assessment and elevation plot of the structure's foundation was performed on-site by inspector Inspector Doe (Stellar Inspectors PLLC) for the purpose of this desktop engineering evaluation completed by Engineer Philip W. Bullock Jr., M.E., M.B.A., P.E. (TX) (Noble Engineering Services, LLC (TX)). This letter is written to document and memorialize the findings of both the field investigation and desktop evaluation focused on providing a clear performance analysis for the client.

The purpose of this evaluation is to investigate and determine, to the extent possible, the foundation's current condition and any necessary repairs that may be needed immediately and/or in the future (as calculations and predictions allow). This evaluation is considered a Level B evaluation, as defined by the "Guidelines for the Evaluation and Repair of Residential Foundations" by the Texas Section of the American Society of Civil Engineers (ASCE). Our evaluation involved collecting data and photographs of the structure to assess its performance and identify any signs of distress. Based on our findings, we will provide recommendations for repairs to ensure the long-term stability and safety of the structure. We understand that foundation issues can be a cause for concern for property owners, and we aim to provide clear and concise information to help you make informed decisions about any repairs needed for your property. The data and photographs presented in this report are intended to provide a representative sample of the types of distress observed throughout the structure, and are not a comprehensive catalog of all the distress present.

Per the Foundation Performance Association 'Guidelines for the Evaluation of Foundation Movement for Residential and Other Low-Rise Buildings', a Level B Investigation includes:

- Section 1: Documenting visual observations made during a physical walkthrough
- Section 2: Observation of factors influencing the performance of the foundation
- Section 3: If possible, an interview of occupants/owners/managers regarding a history of the property and foundation
- Section 4: Review of pertinent info including geotech reports, construction drawings, field reports, and repair docs
- Section 5: Deflection and tilt calculations to assess foundation performance and establish a baseline
- Section 6: Description of factors that affect soil moisture

A Note on Photo Captions: This report, including the inspection report attached, will use photo captions that indicate locations such as right, left, front, and back. These directions refer to how a person standing at the front of the property looking at it would see it. For example, the "front left" would be located on the front left side of the structure, as person would reference if standing at the front of the property looking at the structure.

1.0 - Visual Condition Assessment

This section of the report documents visual observations made during a physical walkthrough of this investigation. Herein are the discoveries of the visual condition assessment of the foundation aimed at assessing its structural integrity, stability, and performance. The foundation serves as the fundamental support system for any structure, playing a pivotal role in ensuring its longevity and safety. Through industry accepted analysis and examination, this evaluation delves into the key aspects of the foundation's overall condition to provide insights into its current state. By scrutinizing the visual condition assessed factors (such as foundation cracking, unevenness, misaligned doors, windows that won't open, etc.) this portion of the evaluation aims to elucidate any existing visual deficiencies or potential risks that may compromise the stability of the structure. The findings presented herein are crucial for informing decision-making processes regarding necessary repairs, maintenance interventions, or further investigations to uphold the structural reliability and safety of the structure.

The attached inspection report dated 4/1/2024 and completed by Inspector Doe should be reviewed in detail and should stand as the visual condition documentation of the foundation-related deficiencies discovered at the time of the site-visit inspection.

2.0 - Observation Summary

Below is a table that represents a summary of the observed deficiencies at the property discovered in the field that may be considered to be influencing the performance of the foundation. See attached property inspection report for photos, detailed locations, and other information about these visual deficiencies.

Visual Condition Report Summary Table

Foundation Cracks - Minor	Present	*Trees Near Structure*	Not-Present
Foundation Corner Cracks	Not-Present	*Misaligned Trim Areas*	Not-Present
Foundation Cracks - Major	Not-Present	*Wall Cracking*	Present
Areas Sloping and Uneven	Not-Present	*Floor / Ceiling Deficiencies*	Not-Present
Exposed Rebar or Anchors	Present	*Window Deficiencies*	Not-Present
Spalling Concrete	Not-Present	*Door Deficiencies*	Present
Visual Discovery of Previous Foundation Work			Yes

It should be noted that, while foundation movement can cause interior and exterior visual cosmetic distress, it is not the only reason that cracks and separations may appear in a structure. The majority of cracks do not compromise structural integrity. The normal and expected thermal expansion and contraction of dissimilar building materials (such as veneer, trim materials, windows, wood framing, and interior drywall on a typical exterior wall) can cause cracks and separations that are not necessarily an indication of structural failure. In addition, some building materials, such as sealants, deteriorate over time and require regular maintenance.

Note: garage elevations are excluded from tilt and deflection calculations, as accurate measurements are nearly impossible to gather. In general, garages can be non-monolithic or they are poured to purposefully slope toward the exterior garage door making any conclusions derived difficult to interpret.

3.0 - Interviews

The owner was briefly interviewed as part of this investigation. The owner has relevant knowledge of previous defects and/or foundation work; the documentation that the owner provided is attached and discussed in Section 4.0 below.

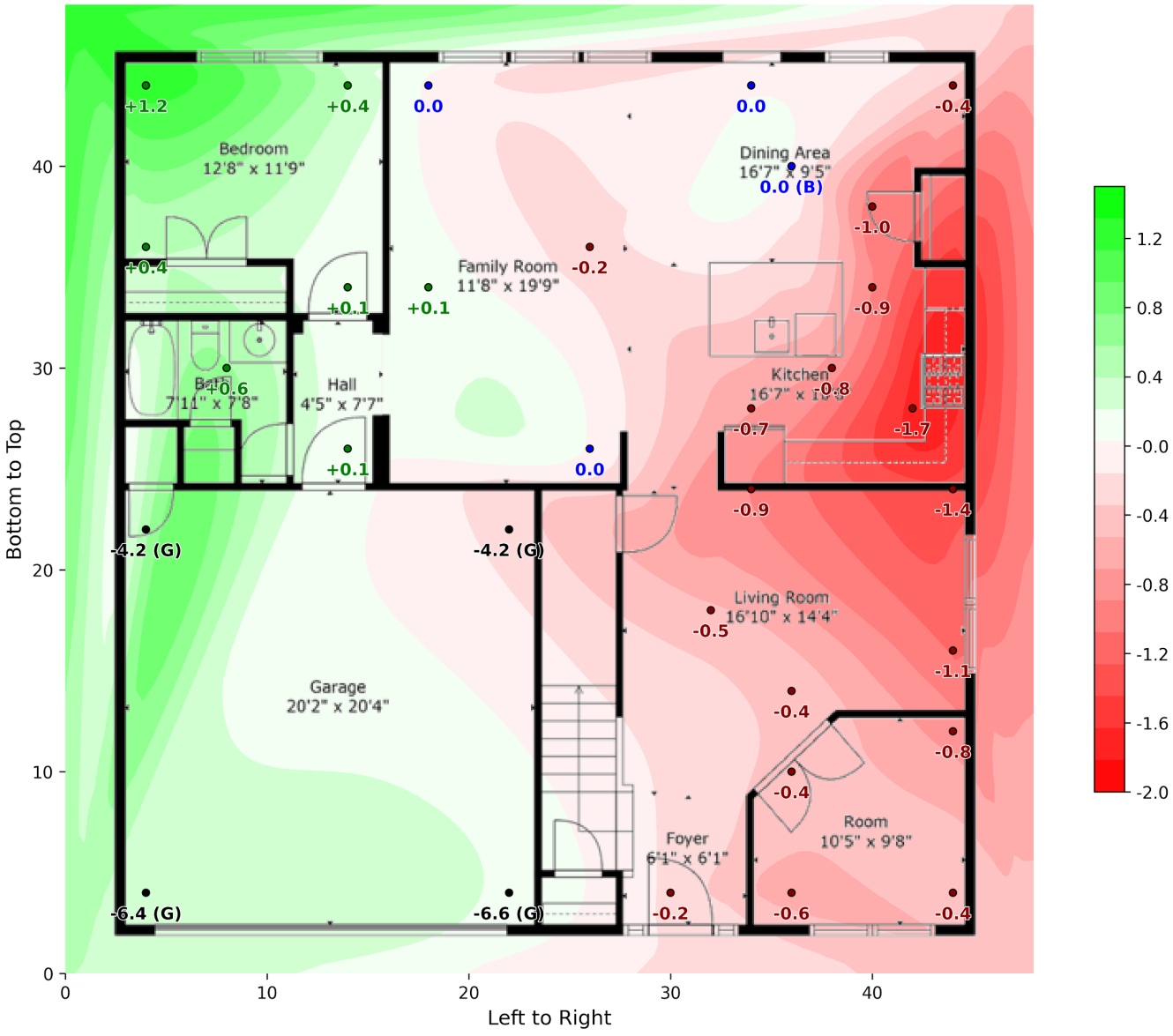
4.0 - Pertinent Documents

A previous elevation plot was provided and is attached to this report. See Section 4.0 for further discussion on comparisons.

5.1 - Elevation Plot

To calculate deflection and tilt of the structure, an elevation plot must be performed. An elevation plot determines the relative elevations of the structure comparative to a base elevation of zero (0.0) at a chosen and documented location in the structure. Foundation deficiencies are typically judged based on the following generally accepted criteria:

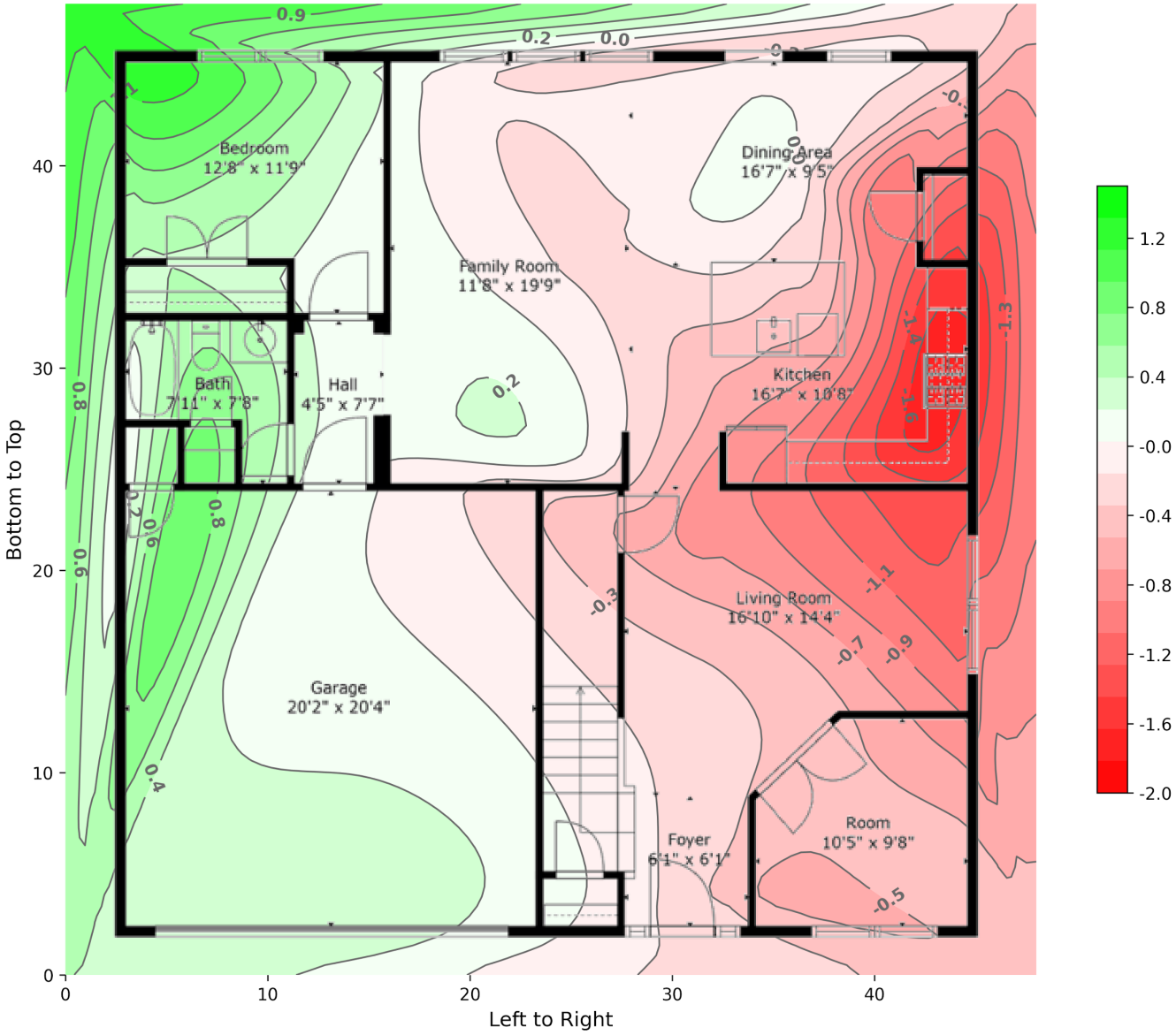
- The elevation deflection across an entire structure should remain within 0.5 to 1-inch depending on the age of the structure. Generally newer structure, should remain less than 0.5 inches or less of deflection across the entire structure. This is subjective depending on other factors (primarily visual condition and age of the structure).
- The elevation deflections measured as the bending of a straight line do not approach the generally accepted criteria for foundation performance and repair of 1.00/360 (1-inch of bend in 30-feet).
- The elevations measured as tilting of a level line across the foundation to not approach the generally accepted criteria for foundation performance (not repair) of 1.00% (2.4-inches of difference across 20-feet).
- The elevations measured as a slope of floors do not approach 2.00% (1.2-inches of difference across 5-feet).



Elevation Plot Graphic (Figure A)

The elevation plot resulted in the graphic as depicted above in Figure A. The red-points and areas are elevation measurements that were lower than the base station elevation (0.0). The green-points and areas are elevation measurements that were higher than the base station elevation (0.0). The blue-points (and white areas) are equal to the base station elevation (0.0). The maximum elevation point was determined to be 1.2 inches and the minimum was -1.7 inches, resulting in an elevation difference of 2.9 inches of difference across the structure.

A mesh contour is a graphic that is designed to look and feel like a geographic topography map. Some clients find the graphic useful and some find the graphic confusing and difficult to understand. In general, the client should envision walking the foundation where areas of red are lower than the base station elevation (0.0) and areas of green are higher than the base station elevation (0.0). The darker the color (both red and green) the higher/lower the elevation.



Mesh Contour Graphic (Figure B)

The mesh contours graphic depicted above in Figure B is similar to the elevation plot. The red, green, and white areas depict areas that are lower, higher, and equal to the base station elevation (0.0). The contour intervals are labeled.

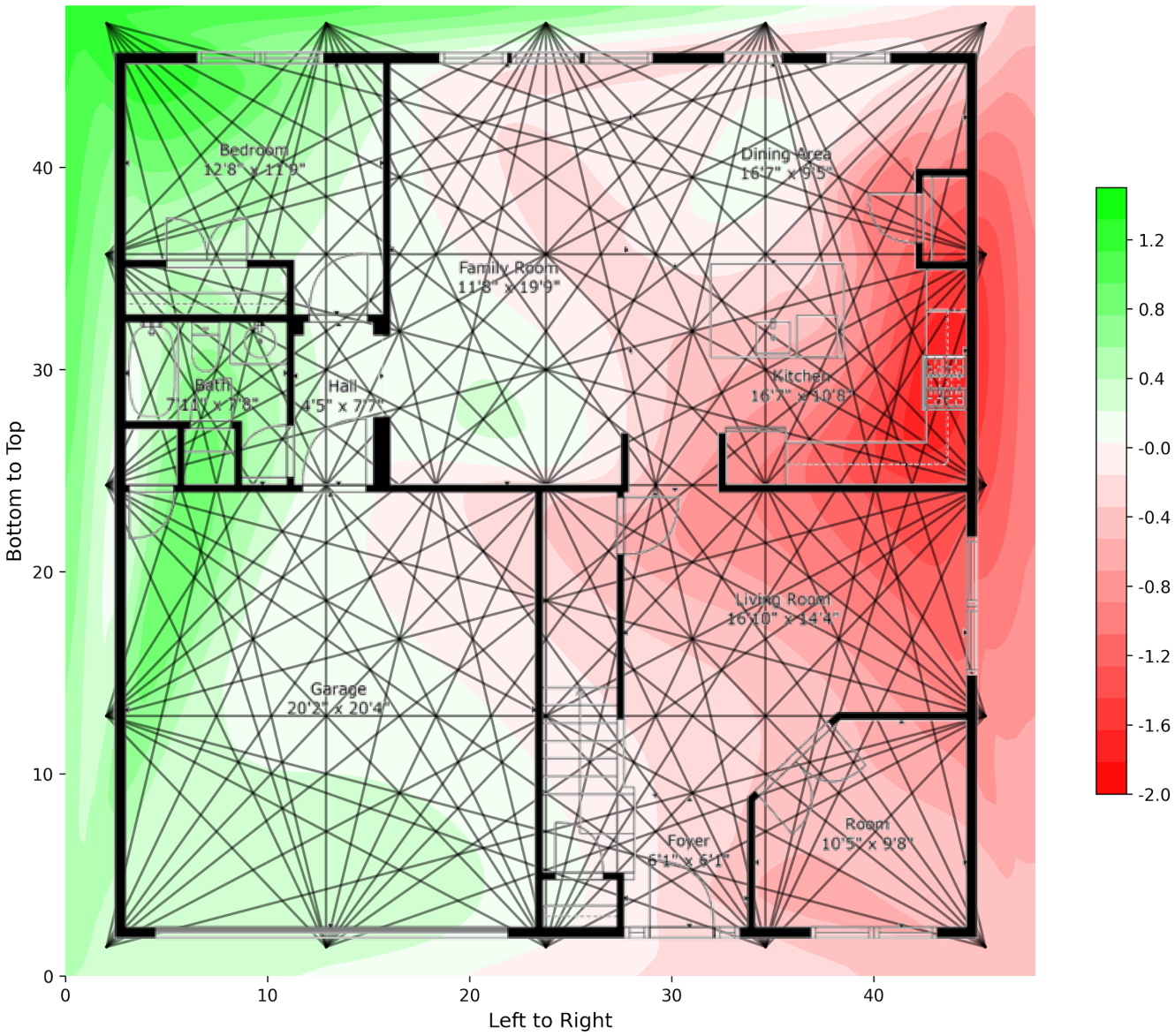
5.2 - Deflection and Tilt Calculations

In a level-B foundation evaluation, deflection and tilt calculations are essential components for assessing the structural integrity and stability of the foundation. Deflection refers to the degree to which a structural element, such as a foundation, bends or deforms under load. It is typically measured as the vertical displacement of a point on the foundation relative to its original position. Calculating deflection involves analyzing individual arc-deflections for each profile across the floorplan. Tilt, on the other hand, refers to the inclination or angular deviation of a structure from its intended level or vertical alignment. In the context of a level-B foundation evaluation, tilt calculations involve measuring the horizontal displacement of points on the foundation relative to a reference plane or datum. Tilt can result from various factors, including uneven settlement of the foundation, soil movement, or structural deficiencies.

Foundation movement calculations have been performed according # FPA-SC-13-1 'Guidelines for the Evaluation of Foundation Movement for Residential and Other Low-Rise Buildings.' The calculations separate foundation movement into foundation 'Deflection' (bending) and foundation 'Tilting' - straight line arithmetic of the elevation readings provided on the Elevation Survey will not yield the same results and should not be incorrectly compared. The standard allowable differential deflection is based on 1.0 inch of vertical movement, up or down, over a horizontal distance of 30 feet; expressed as Length (L in inches) / 360. The standard allowable tilt is based on 1% slope over the entire length, width, or diagonal of the foundation.

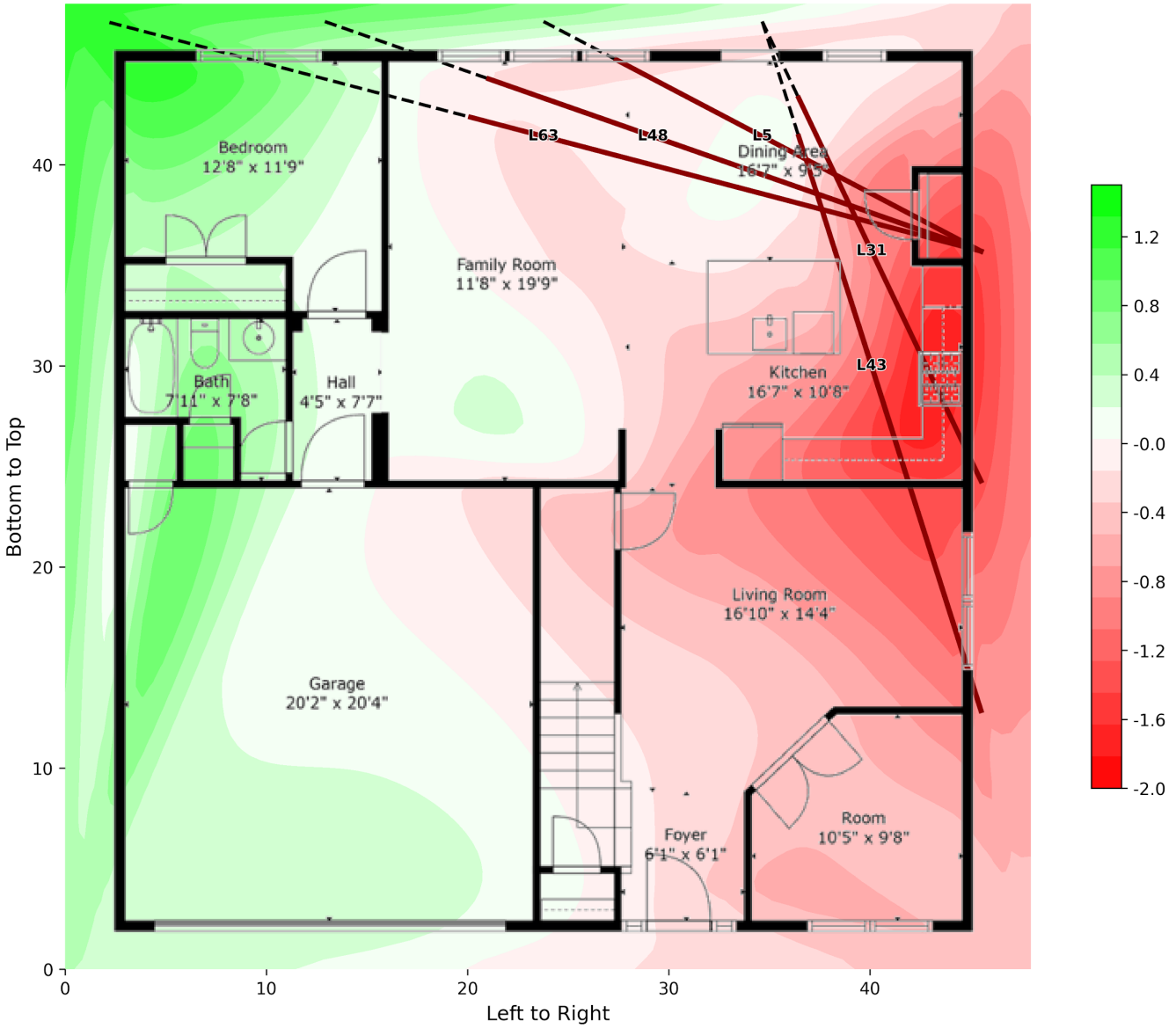
In layman's terms, the deflection calculations represent localized areas of concern where tilt calculations represent entire foundation movement as a singular plane. By accurately quantifying deflection and tilt, this evaluation can assess the overall performance of the foundation, identify potential issues such as excessive settlement or structural misalignment, and recommend appropriate remedial measures to ensure the foundation's stability and longevity. These calculations are crucial for safeguarding the structural integrity of buildings and mitigating the risk of foundation-related failures.

Below is a graphic that shows the locations of deflection and tilt profiles that were calculated. The total profiles calulated was 79 with a total usable profiles (above the effective length threshold) of 76.



All Profiles Graphic (Figure C)

Below is a graphic that indicates the locations of the 5 deflection calculation failures.

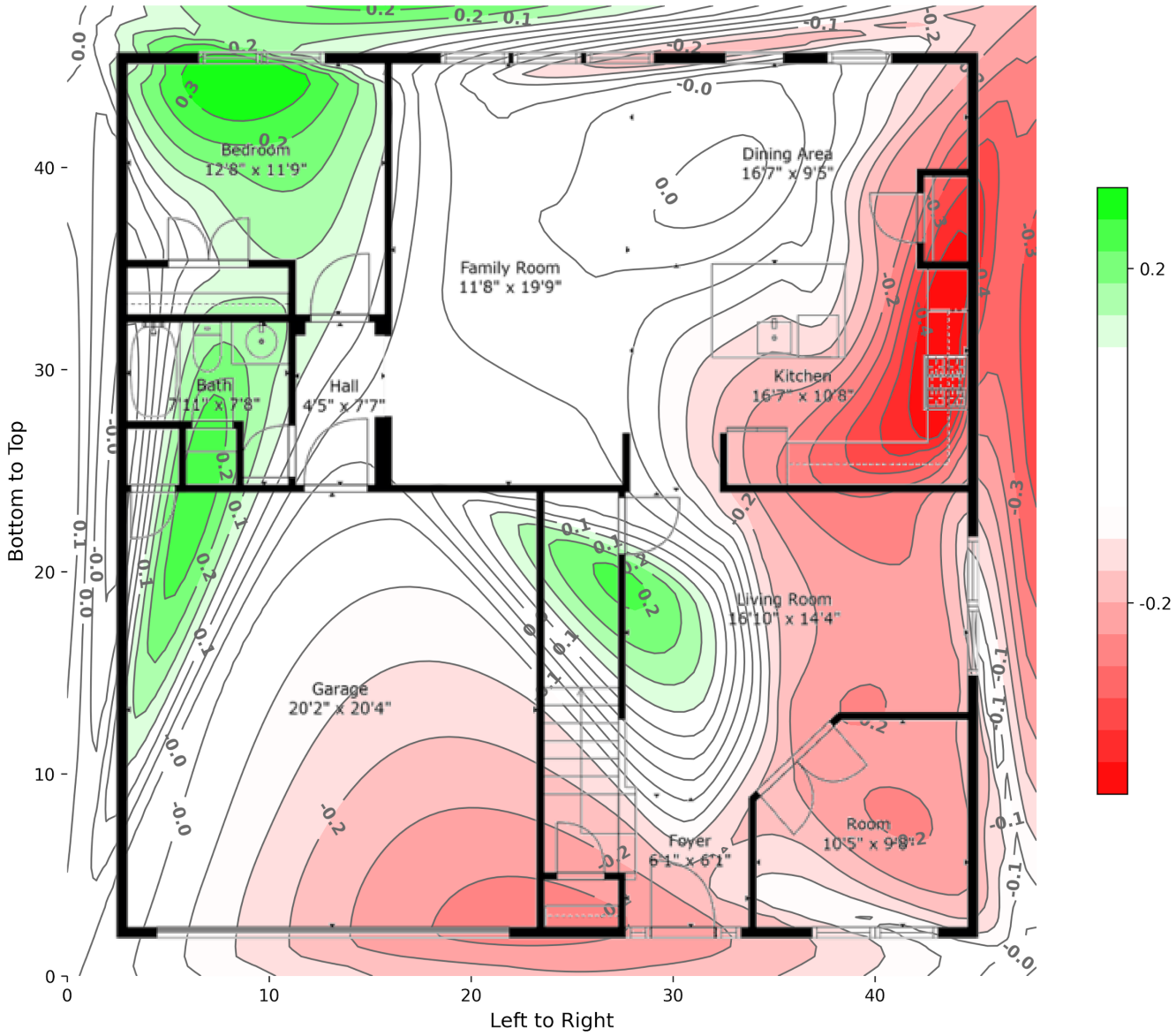


Deflection Failures Graphic (Figure D)

The above Figure D shows deflection failures along the foundation. Deflection failures can be considered localized failures in (sometimes) isolated portions of the foundation. The profile lines that were calculated are represented by a dashed black line and the areas that the deflection failures occur are represented by a dark red line segment. Of the 76 deflection profiles calculated, 5 profile failures were identified.

5.3 - Comparison of Other Elevation Plots

A previous elevation plot completed in 1998 was available to use as a baseline of movement progression. As part of this evaluation, a contour mesh showing the elevation differences between the current contour mesh and the baseline was processed and is shown below.



Elevation Plot Difference Graphic (Figure F)

The mesh contour graphic above in Figure F shows areas in red that are lower than the baseline elevation plot and areas of green that are higher than the baseline elevation plot (from the provided drawing completed in 1998). The darker the color (both red and green) the larger/smaller the elevation differences.

6.0 - Soils and Geotechnical

Foundation movement is a prevalent phenomenon in areas where poor soils exist due to expansive clays. Future foundation movement is always possible due to the shrink/swell characteristics of the soil. The foundation is prone to movement due to the moisture variation in the existing soil and total prevention of all future movement is unlikely.

7.1 - Results: Elevation Plot

As documented above, the maximum elevation point of this structure was determined to be 1.2 inches and the minimum was -1.7 inches, resulting in an elevation difference of 2.9 inches of difference across the structure. The elevation deflection across an entire structure should remain within 0.5 to 1-inch depending on the age of the structure. Measured differences approaching 2-inches are a sign of foundation fatigue. The maximum allowable elevation difference is subjective, depending on other factors such as the visual condition and age of the structure (19 year(s) old).

Based on observed elevations of the foundation from the elevation plot, the structure cannot be considered fully stable. Elevation differences do not fall within industry standards or tolerable limits. These findings indicate that the foundation does not have consistent and uniform elevation demonstrating continued movement of the foundation.

7.2 - Results: Deflection

Deflection failures can be considered localized failures of the foundation in (sometimes) isolated portions of the foundation. Of the 76 deflection profiles calculated, 5 failures were identified.

Deflection failures are above standard acceptable limits; they exceed industry-standard thresholds and the structure should be considered actively moving/settling in areas where deflection failures are occuring.

7.3 - Results: Tilt

Tilt failures can be considered structure-wide failures of the foundation. Of the 76 tilt profiles calculated, 0 failures were identified. The tilt calculations resulted in a maximum tilt profile of 0.64%.

As no tilt failures are present, these findings indicate that the foundation has consistent and uniform elevation demonstrating foundation settling that is within tolerable limits.

8.0 - Conclusion

There are many factors that weigh into the Engineer's overall statement of opinion about the existing stability of the foundation. These various factors, as documented in Sections 1-7 above, are all considered when applying overall conclusive statements about the existing condition of the foundation and the future likelihood of foundation fatigue/failure.

Based on field observations of the foundation and analytical calculations, as documented in this report, the structure should be considered habitable and safe for occupancy at this time.

Client should talk with the previous/current owner about previous foundation repairs and if any have been completed. Additionally, it is always good to assume that with the presence of onset foundation concerns, the client should budget for the possibility of a foundation remediation project at some point in the future.

This evaluation indicates clear signs of foundation issues. Calculations were not found to be within industry standard limits. Remedial measures are required to bring the foundation to a more level condition. It is recommended that foundation stabilization be completed as soon as possible, if possible within the next year. We also recommend you perform another house elevation plot after repairs have been completed to memoralize the elevation changes. In addition, visual deficiencies noted should be resolved after foundation improvements have been completed and may include:

- **Patch and monitor visible foundation cracks**
- **Patch/cover exposed tension anchors**
- **Patch and monitor exterior brick or siding cracking**
- **Patch and monitor interior sheetrock cracking/separation**
- **Repair and monitor door misalignment**
- **Windows that won't open to resolve and monitor**

Good foundation maintenance practices are the most effective solution to minimizing soil activity. The primary goal of foundation maintenance methods is to maintain a relatively constant moisture content in the soil around and below the foundation. The movement and drainage of water is a critical maintenance element that interacts with the shrink/swell properties of the expansive soil that the structure is supported upon. The goal of proper drainage is to remove excess water from around the foundation to keep the soil around and under the foundation at a stable moisture content. Gutters and downspouts are an effective method of directing rainwater away from the structure, but must be employed correctly. To better control the rainwater, ensure gutters, downspouts and extensions are present at each down-sloped area of the roof. The downspouts should discharge the water a minimum of 5 feet from the foundation or into a drainage system.To assist in the drainage of free water, the grade surrounding the foundation should be sloped away from the foundation for the first 10 feet around the perimeter where practicable. The slope should drop a minimum of 6 inches in 10 feet - a 5% slope. Swales should have longitudinal slopes of a minimum of 2 inches in 10 feet. If this cannot be done a French Drain may be required. Over-saturated soils can cause foundation heave and/or settlement and contribute to excessive foundation movement. Remediate ponding water immediately.

Consider removing any trees or large bushes within 6 feet of the foundation. The large vegetation can consume vast amounts of water which can cause active soils to shrink, potentially causing damaging foundation movement. Tree roots can also extend below the foundation and cause damage. Tree roots can typically extend as far as the extent of the tree's canopy. If trees are not to be removed, a root barrier may be used between the tree and the foundation - root barrier installation may negatively affect the vegetation and it is recommended to contact an experienced arborist for recommendations to minimize these effects. Removal of trees or large bushes may stop shrinkage or lead to partial restoration of settled areas of the foundation. Removal may result in upheaval caused by soil moisture increase, especially if the tree predates construction. If trees are removed, a suitable waiting period may be recommended to allow for soil heave. Periodic tree pruning may reduce future downward foundation movement but may not lead to foundation elevation recovery. Tree pruning or additional watering may be a prudent alternative to removal.Establish a watering program for the foundation soil to keep the soil moisture content constant during the dry months. Keeping the lawn healthy will help to reduce evaporation and dryness. Water the lawn and other vegetation consistently and evenly. Soil cracking/desiccation at the surface is a sign that the soil is too dry.

Subgrade Chemical Stabilization of the above conventional methods for minimizing soil activity prove to be less effective than desired, while costly, a final option of subgrade chemical stabilization may be explored. If this option is pursued we recommend contacting a geotechnical engineer and an experienced repair professional to facilitate the project. The injection should be shaped to the approximate profile of the subgrade prior to spreading the chemical so as to permit the construction of a uniformly compacted course of chemically treated soil. The addition of the chemical may raise the subgrade profile within approximately 1 inch - remove this excess material during the final grading. Spread the chemical uniformly on the subgrade using a mechanical spreader at the approved rate and at a constant rate of speed. Subgrade chemical stabilization work is not to be performed when the air temperature is less than 40 degrees Fahrenheit, when the soil is frozen, or during wet or unsuitable weather.

To stabilize and lift the foundation, install and/or adjust perimeter and interior piles/piers as shown in the attached Exhibit C - Proposed Repair Plan. The underpinning may be concrete cylinders, steel pipe, helical screws, or drilled concrete piers – refer to Exhibits D, E, F, and G. Underpinning will not improve the performance of the foundation in non-underpinned areas. Note, any foundation movement, even corrective, can cause additional cosmetic distress. The contractor shall determine the amount of elevation correction needed based on the reaction of the structure during the adjustment in order to minimize stress and additional cosmetic damages.

The repair plan we have provided may have been developed without location information on existing underpinning. If possible, we recommend locating documentation of any existing underpinning prior to implementation of the new underpinning. This documentation may be provided to us to analyze and adjust the repair plan as needed to maximize its effectiveness. Adjustment of the existing piers/piles that are in the same location as our recommended underpinning can be substituted for installation of new underpinning.

Following completion of the foundation underpinning installation, it is recommended that you obtain a final elevation survey to provide a post-repair elevation baseline. Review the performance of the foundation every 6 to 12 months. Compare all future foundation evaluations to the pre-repair and post-repair elevation baselines and to produce a final elevation survey with post-repair baseline and to ensure that the repairs have been performed in general accordance with our recommendations and in line with the Texas Section of the American Society of Civil Engineers (ASCE) guidelines.

9.0 - Limitations

This report documents a limited engineer's foundation evaluation scope inspection only. Inspector will only report deficiencies of the elements that are within the agreed-upon foundation-related scope, and will not perform an inspection of the entire property.

This report has been assembled by a team, each member bringing specialized expertise to ensure a comprehensive evaluation within the scope of our project. The team comprises a field-experienced home inspector, responsible for conducting thorough on-site examinations; a reviewer, who reviews and consolidates the findings; and a skilled engineer, who applies a desktop evaluation and calculations to the field data collected. The structuring of our team and the distribution of roles have been strategically designed to optimize both the quality and cost-efficiency of the provided services. The team may (or may not) be comprised of individuals working for different companies.

Verification of permitted construction activities through the correct jurisdictional authority is not part of the scope of this report. Photos here of permit-related documents and stickers are for informational purposes only.

10.0 - Liability

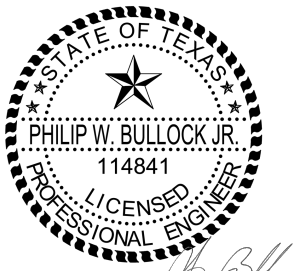
The contents of this report supersede any verbal communication regarding the subject foundation during or after the inspection. This report was prepared for the exclusive use of the client listed above. There is no obligation or contractual relationship to any party other than our client and their agents in regards to the subject property. The opinions and recommendations contained in this report are based on the visual observation of the then current conditions of the structure and the knowledge and experience of the inspector/engineer.

The most effective long-term solution to foundation movement is deep foundation underpinning for the entire structure, however these methods may not be economically feasible and often causes unwanted cosmetic damage. As such, this report may present options that consider factors such as viability, timeliness, and cost. This report provides engineering advice intended to correct the observed foundation deficiencies assuming normally expected subsurface conditions and conventional construction methods.

The company is not responsible for knowledge of specific subsurface conditions at the subject property. This report is only an engineering statement of opinion and report of findings based on the information available at the time of inspection. It does not provide any guarantee to the current state of the structure’s foundation. It does not “guarantee” against future foundation problems nor does it provide any warranty to the foundation itself. The report was based on the information that was available at the time. Should additional information become available, the engineer/inspector reserves the right to determine the impact, if any, the new information may have on the opinions contained herein and revise conclusions and opinions as necessary and warranted.The engineer is not responsible for knowledge of subsurface conditions without geotechnical data provided, including vertical differential displacement from clay soils.

Engineer/inspector is not responsible for concealed conditions where a visual observation was not possible or any other areas that are not readily available to the engineer or inspector for evaluation during the site visit. The evaluation was limited to visual observations and areas not visible, accessible, or hidden behind furniture and appliances were not included in the evaluation. The evaluation did not include any soil sampling or testing, nor any assessment of the existing framing, plumbing, or auxiliary structures and no implication is made on the compliance or non-compliance of the structure with old or current building codes. No verification was made of the existing concrete strength, thickness, location of interior grade beams, reinforcement, nor capacity to support any load.

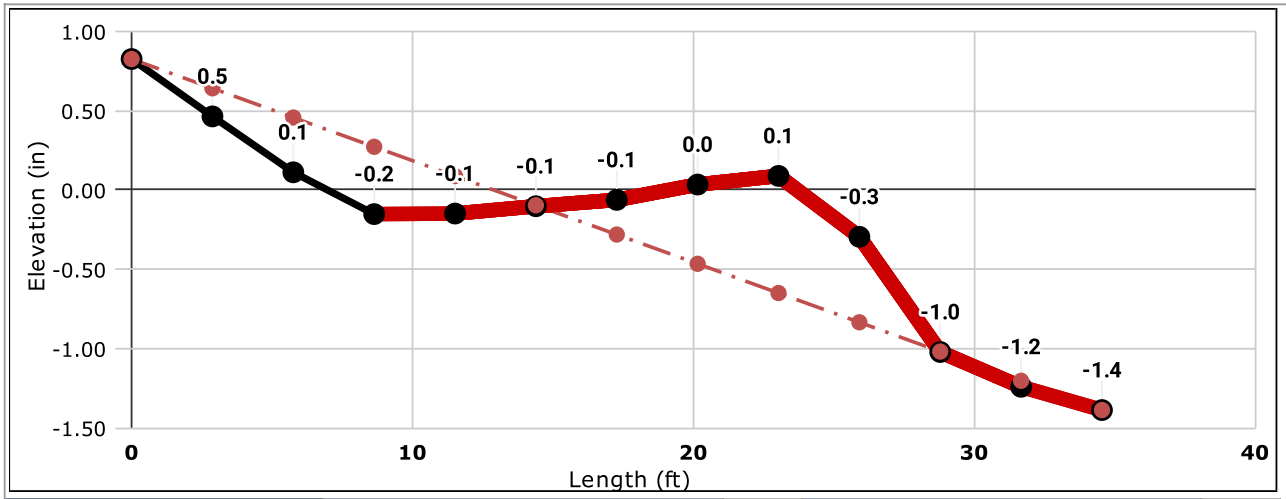
Limits of liability for any claims with respect to this report is limited to the fees paid for services and anyone relying on the content of this report agrees to indemnify the company for all costs exceeding the fee paid.

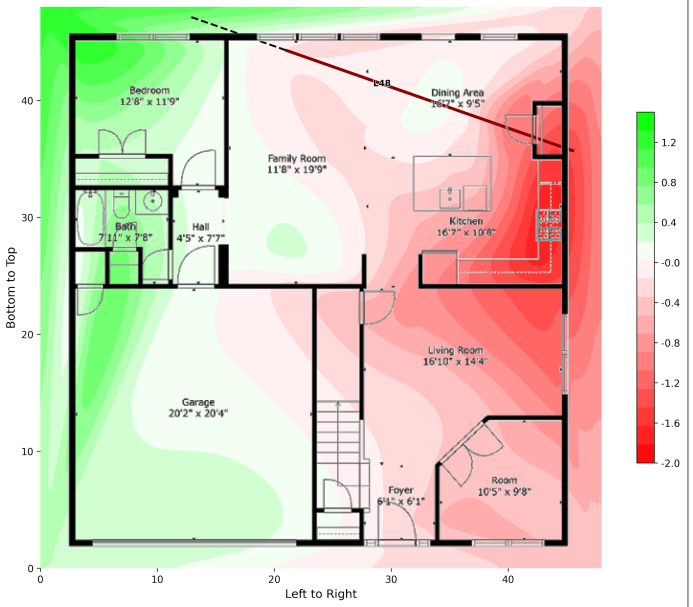
Engineer's Seal Philip W. Bullock Jr., M.E., M.B.A., P.E. (TX) TBPE #114841 | Firm #21369 Noble Engineering Services, LLC (TX) (In partnership with Stellar Inspectors PLLC) P: (832) 210-1397 E: engineering@noble-pi.com	 *12/9/2024*

Possible Attachments:

√ - *Provided*	Exhibit A	Identified Deflection/Tilt Failure
√ - *Provided*	Exhibit B	Table of Deflection and Tilt Failures
√ - *Provided*	Exhibits C/D/E/F/G	Proposed Repair Plan and Details
√ - Provided	Appendix A	On-Site Inspection Report with photos dated 4/1/2024
X - Not Provided	Appendix B	Other Pertinent Documents (repairs, previous plots, etc.)

Exhibit A: Identified Deflection/Tilt Failure (L48)





Profile Data for L48							Actual Length (ft)	35				Effective Length (ft)	20
Point (#)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
Length (ft)	0	3	6	9	12	14	17	20	23	26	29	32	35
Tilt (in)	0.8	0.6	0.5	0.3	0.1	-0.1	-0.3	-0.5	-0.6	-0.8	-1.0	-1.2	-1.4
Z (in)	0.8	0.5	0.1	-0.2	-0.1	-0.1	-0.1	0.0	0.1	-0.3	-1.0	-1.2	-1.4
Deflection 1 (Failures)				-0.2	-0.1	-0.1	-0.1	0.0	0.1	-0.3	-1.0		
Deflection 2 (Failures)					-0.1	-0.1	-0.1	0.0	0.1	-0.3	-1.0	-1.2	
Deflection 3 (Failures)				-0.2	-0.1	-0.1	-0.1	0.0	0.1	-0.3	-1.0	-1.2	
Deflection 4 (Failures)					-0.1	-0.1	-0.1	0.0	0.1	-0.3	-1.0	-1.2	-1.4
Deflection 5 (Failures)						-0.1	-0.1	0.0	0.1	-0.3	-1.0	-1.2	-1.4

k-factor Calculation							
Start Position (x,y) (ft)	12.91	0.88	End Position (x,y) (ft)	45.52	12.3	k-factor (1.00 to 1.41)	1.06
Length (ft)	32.61		Width (ft)	11.42		Limit	L / 340

Performance Output							
Deflection & Tilt	**Pass/Fail**	**Actual**		**Result Description**	**Point 1**	**Point 2**	**Point 3**
Deflection 1 (using k)	FAIL	L /	281	EXCEEDS THE kL/360 (L/340) LIMIT BY 21%	4	9	11
Deflection 2 (using k)	FAIL	L /	281	EXCEEDS THE kL/360 (L/340) LIMIT BY 21%	5	9	12
Deflection 3 (using k)	FAIL	L /	300	EXCEEDS THE kL/360 (L/340) LIMIT BY 13%	4	9	12
Deflection 4 (using k)	FAIL	L /	323	EXCEEDS THE kL/360 (L/340) LIMIT BY 5%	5	9	13
Deflection 5 (using k)	FAIL	L /	326	EXCEEDS THE kL/360 (L/340) LIMIT BY 4%	6	9	13
Tilt	PASS	0.53	%	USING 53% OF THE ALLOWABLE 1% LIMIT			

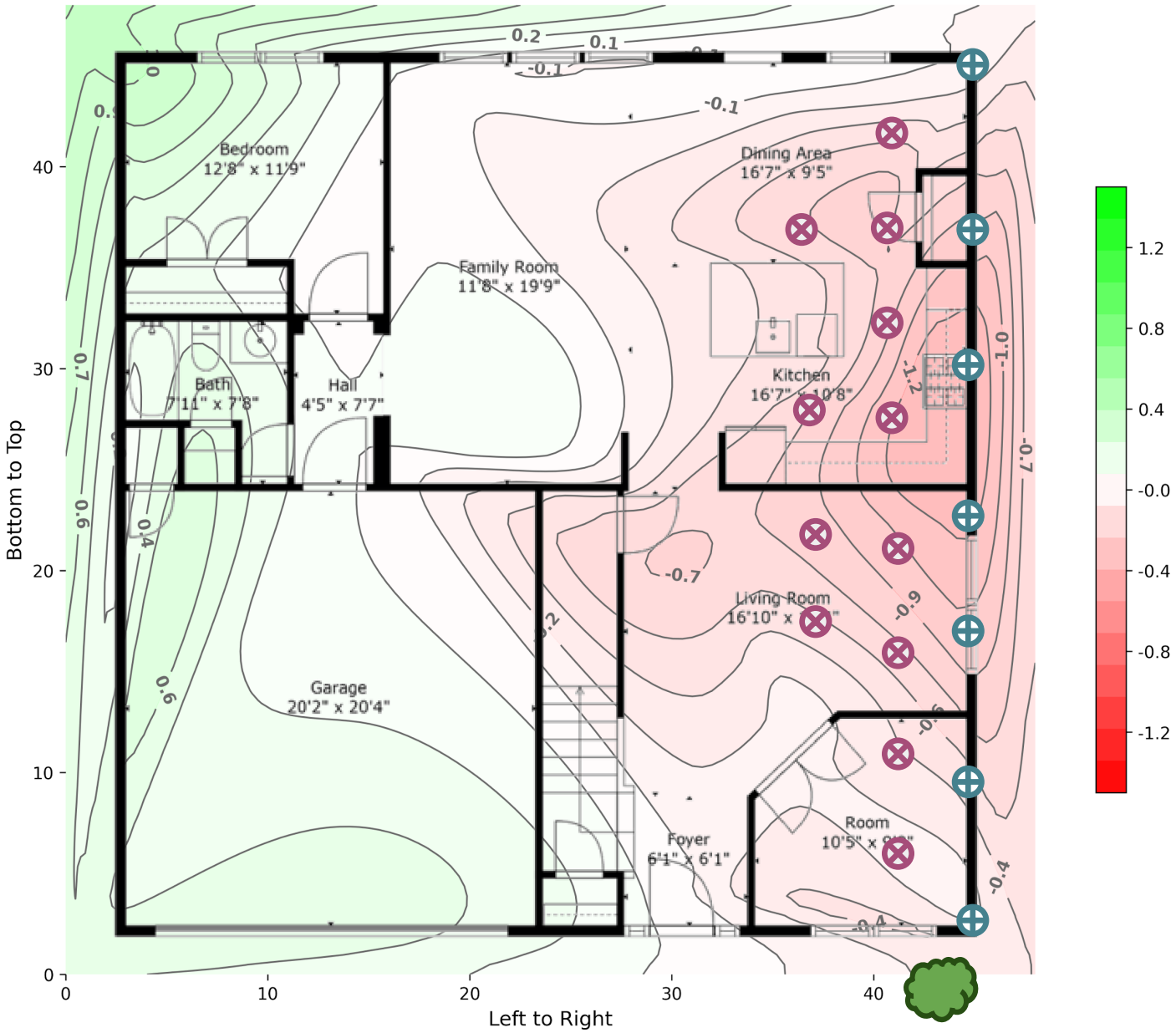
*Calculations developed by FPA for Document # FPA-SC-13-1 - Guidelines for the Evaluation of Foundation Movement for Residential And Other Low-Rise Buildings

Exhibit B - All Deflection and Tilt Failures Table

Profile	Deflection Calculation?	Tilt Calculation?	Lengths		Deflections 1-5										Tilt	
			Actual Length	Effective Length	Deflection 1		Deflection 2		Deflection 3		Deflection 4		Deflection 5			
					%	Exceeds	%	Exceeds	%	Exceeds	%	Exceeds	%	Exceeds	%	Exceeds
L5	FAIL	PASS	25	20	0.07%	YES	0.04%	YES	0.98%	NO	0.97%	NO	0.82%	NO	0.64%	NO
L31	FAIL	PASS	25	20	0.01%	YES	0.91%	NO	0.85%	NO	0.83%	NO	0.79%	NO	0.46%	NO
L43	FAIL	PASS	36	20	0.11%	YES	0.10%	YES	0.10%	YES	0.10%	YES	0.05%	YES	0.21%	NO
L48	FAIL	PASS	35	20	0.21%	YES	0.21%	YES	0.13%	YES	0.05%	YES	0.04%	YES	0.53%	NO
L63	FAIL	PASS	45	20	0.06%	YES	0.04%	YES	0.98%	NO	0.87%	NO	0.84%	NO	0.48%	NO

Exhibit C - Proposed Repair Plan

123 Sample Address, Your City, TX, 12345



Foundation Type: Slab on Grade

		PROPOSED	
Contour Line and Elevation	Exterior Push Pile or Drilled Pier	7	*piers/pilings*
Base Station (0.0)	Interior Slab Pier	12	*piers/pilings*
Zero Elevation (0.0)	Existing Pile/Pier to be Adjusted	0	*piers/pilings*
Negative Elevation (-)	Existing Support Areas to be Adjusted	0	*square-feet*
Positive Elevation (+)	Trees to be Removed	0	*trees*

Opinion of Probable Construction Cost (OPCC)

For budgeting and price-comparison purposes only

Foundation Repair Costs					
Item	Description	Amount	Units	Cost	Total
1	Exterior Push Pile or Drilled Pier(s) *Contractor to install 7 exterior push pile or drilled pier(s). See exhibit(s) D, E, F, and G for details. See foundation repair company notes below.*	7	pier/piling(s)	$750	$5,250.00
2	Interior Slab Pier(s) *Contractor to install 12 interior slab pier(s). See exhibit(s) D, E, F, and G for details. See foundation repair company notes below.*	12	pier/piling(s)	$1,100	$13,200.00
3	Existing Pile/Pier(s) to be Adjusted *Contractor to adjust 0 slab pile/pier(s). Adjustment may not be possible or rejected by the foundaiton company not responsible for the installation. Cost highly variable.*	0	pier/piling(s)	$550	$0.00
4	Existing Support Area(s) to be Adjusted *Contractor to adjust 0 square-feet of pier/beam foundation. Metal shims shall be used; replace wooden shims with metal. Use termite shields where possible. Cost assumes adequate accesibility without the need for tunneling*	0	square-feet	$6	$0.00
5	Tree(s) to be Removed *Contractor to remove 0 trees located too close to the structure. Installation of a root barrier system may also be possible if the tree (s) are considered a valuable addition to the property.*	0	tree(s)	$1,100	$0.00
Rehabilitation Costs					
Item	Description	Amount	Units	Cost	Total
1	Patch exterior and interior wall and foundation crack(s) *Contractor to patch exterior and interior wall cracks with concrete, mortar, caulk, mudd/tape/texture/paint, etc. depending on type of patch necessary after foundation work is completed.*	1	lump sum	$1,500	$1,500.00
2	Adjust door(s) and window(s) *Contractor to adjust doors to latch and/or lock after foundation work is completed. Adjust windows to open smoothly.*	1	lump sum	$750	$750.00

GRAND TOTAL: $20,700.00

Foundation Repair Company Notes

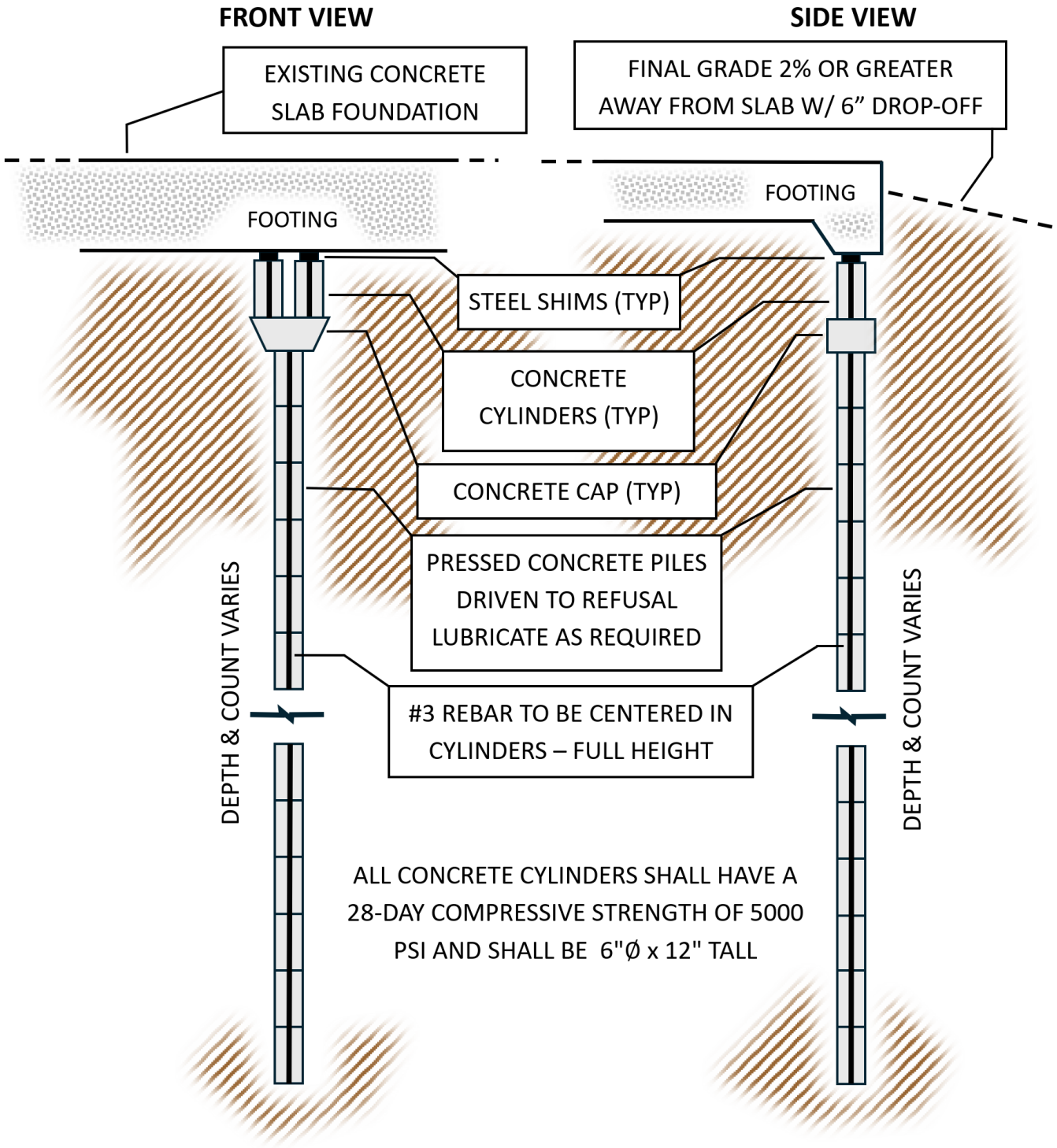
Diameter and Depth: *The diameter and depth should be designed by the contractor based on the load requirements of the structure and the bearing capacity of the soil or rock layer. Piers/pilings must extend to a depth where soil conditions are stable enough to support the structure's loads.*
Material Specifications: *High-strength concrete, reinforced with steel rebar, should be used where applicable. The specification of materials should comply with relevant standards and codes to ensure durability and strength.*
Load Distribution: *The design must consider the distribution of structural loads to the piers/pilings, ensuring that each pier can adequately support its portion of the total load without exceeding the bearing capacity of the underlying soil or rock. Contractor may recommend more or less pier/pilings depending on their means/methods.*
Lateral Stability: *In addition to vertical loads, the design must account for lateral forces due to wind and/or soil pressure. This may require additional reinforcement or specific pier/piling configurations.*
Construction Technique: *The construction process involves drilling, excavation, and concrete pouring techniques that minimize disturbance to surrounding soil and ensure the integrity of each pier/piling*
Water Handling: *If groundwater or water-bearing layers are encountered during drilling, appropriate measures must be taken to manage water inflow and prevent undermining of the pier's foundation.*
Inspection and Quality Control: *Continuous inspection during construction ensures that the piers/pilings conform to the design specifications. Quality control measures are crucial for verifying the integrity of materials and construction practices.*

Limitations to this Cost Estimate

Engineer does not warranty or guarantee the accuracy of the costs provided. The costs estimated in this OPCC are intended to serve as a guideline only and are subject to change based on various factors, including but not limited to, market conditions, the specific contractor's methods, materials, and costs, as well as unforeseen circumstances during the construction process. These costs are not bids or fixed quotes for the construction project. The final choice of contractors, subcontractors, materials, and methods, warranty, and any resulting cost implications, are the sole responsibility of the Client. Engineer shall not be held liable for any claims, disputes, or litigation arising from differences between the estimated costs and the actual costs incurred during the construction project. Rehabilitation costs are highly variable and depend on the fortification technique and other unpredictabilities.

Exhibit D - Concrete Cylinder Piles

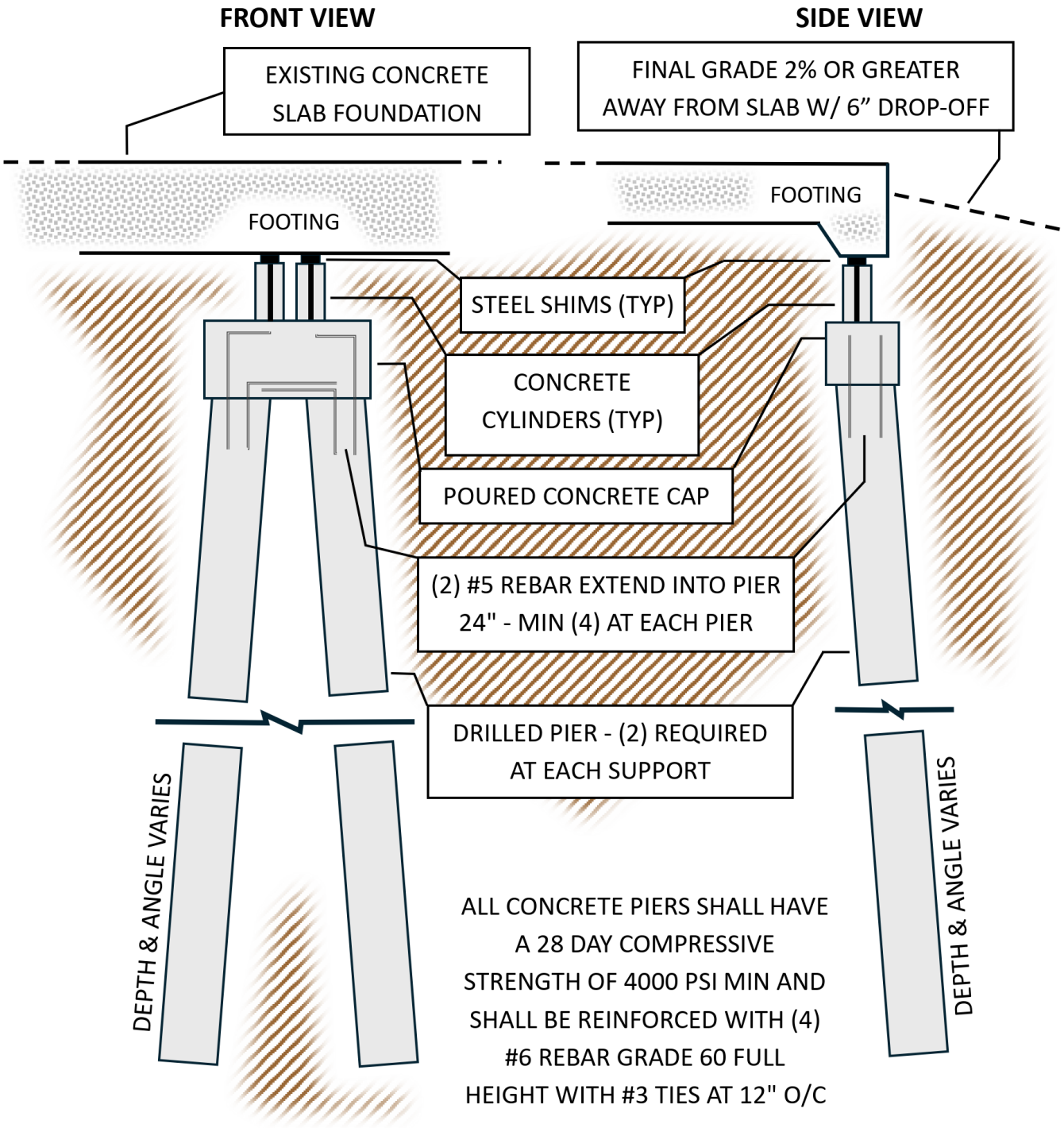
123 Sample Address, Your City, TX, 12345



Not to Scale | Drawings are provided for conceptual use only and are not considered engineering details

Exhibit E - Drilled Piers

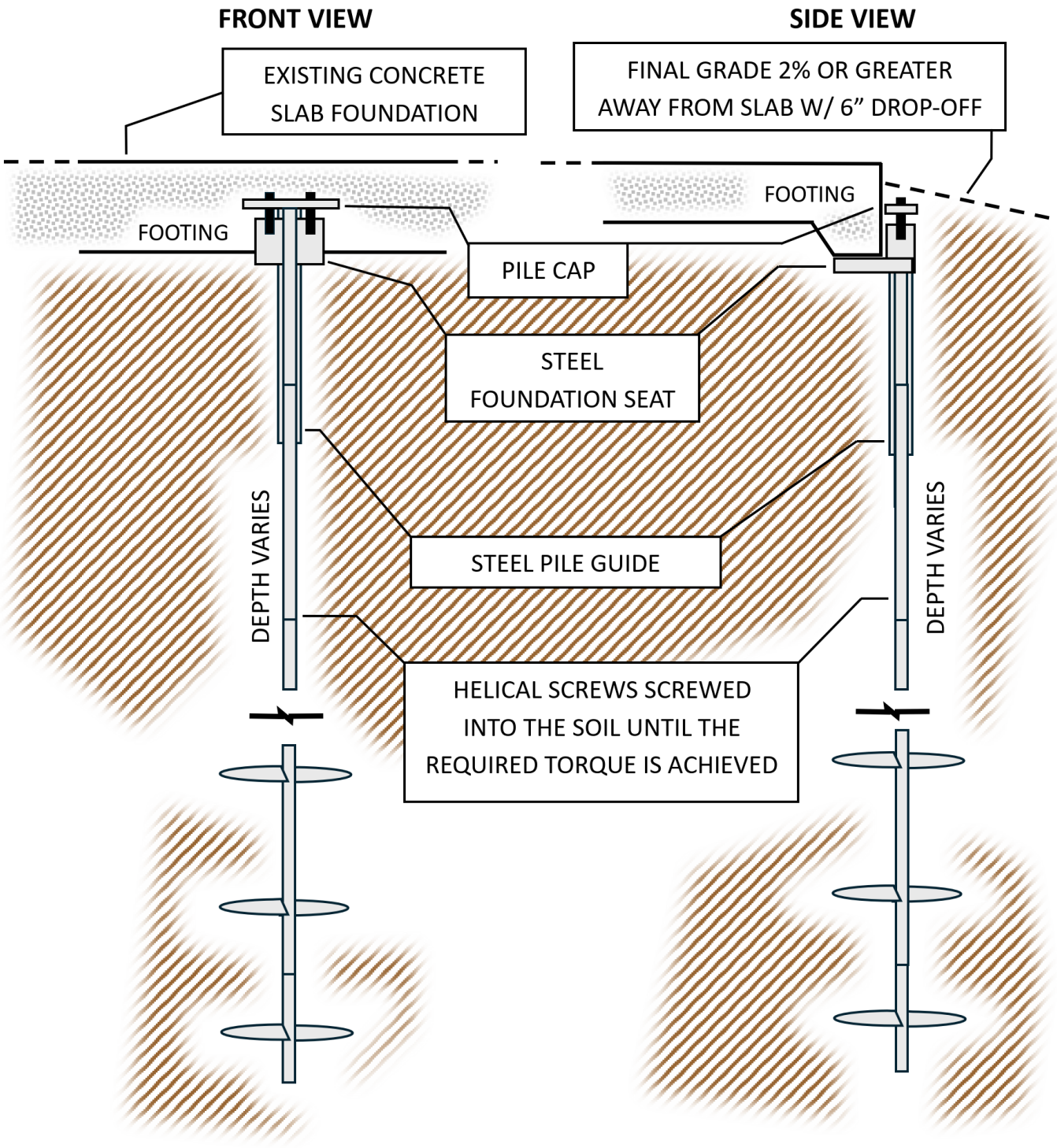
123 Sample Address, Your City, TX, 12345



Not to Scale | Drawings are provided for conceptual use only and are not considered engineering details

Exhibit F - Helical Screws

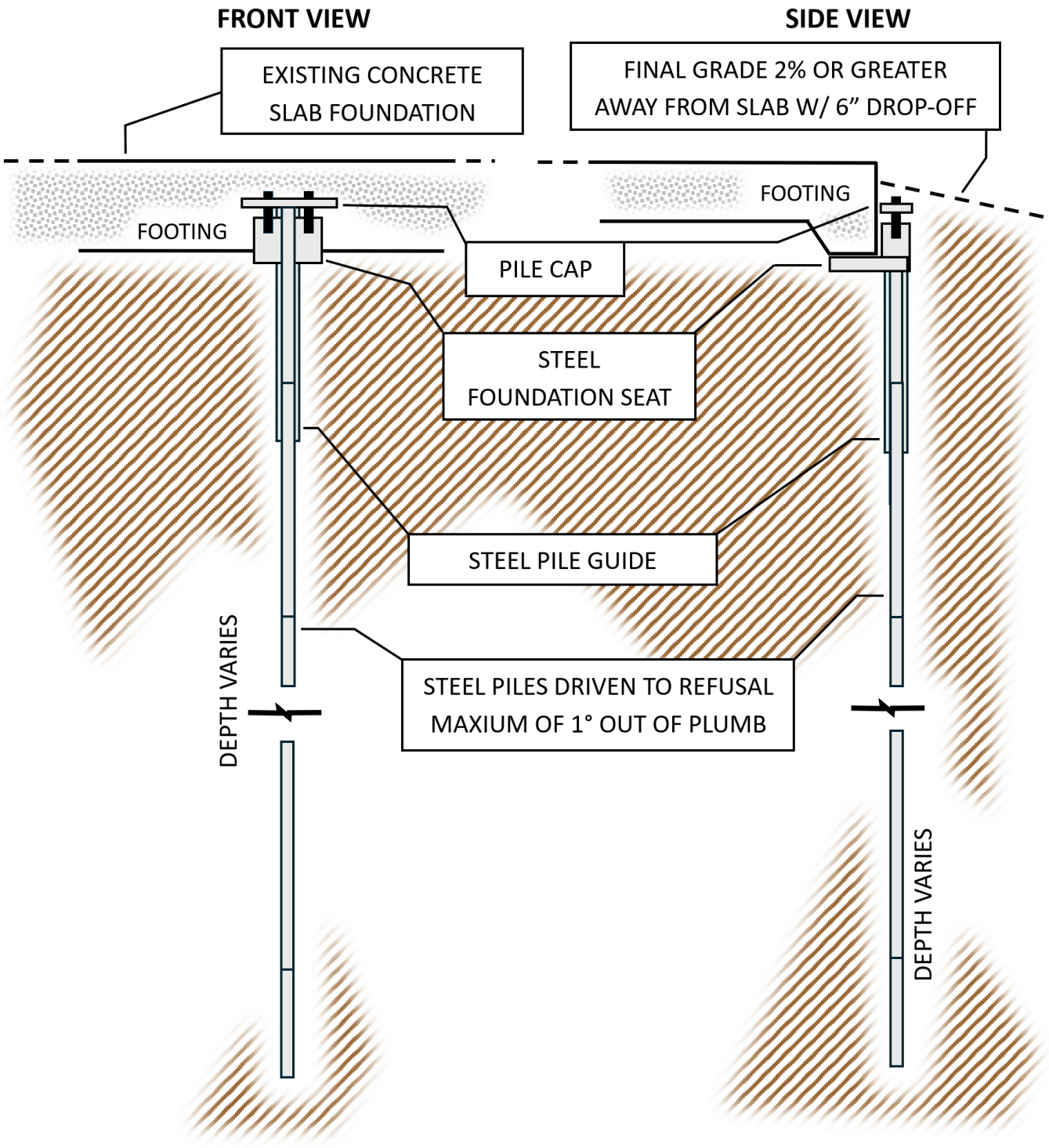
123 Sample Address, Your City, TX, 12345



Not to Scale | Drawings are provided for conceptual use only and are not considered engineering details

Exhbit G - Steel Piles

123 Sample Address, Your City, TX, 12345



Not to Scale | Drawings are provided for conceptual use only and are not considered engineering details

Appendix A

On-Site Inspection Report with Photos Dated 4/1/2024

123 Sample Address, Your City, TX, 12345