



GREENWORKS SERVICE COMPANY

855-349-6757

support@greenworksinspections.com

<https://greenworksinspections.com>



FOUNDATION CONSULTATION

2718 Lazy Spring Dr
Houston, TX 77080

Ariana White
08/31/2025



Inspector

Aidan Siener

TBPE FIRM #20170, MOLD FIRM #ACO1162,
TPCL FIRM #0761253

713-539-4115

aidan.siener@greenworksinspections.com



Inspector

Peter Donegan

TBPE FIRM #20170, MOLD FIRM #ACO1162,
LEAD FIRM #2110697, ASBESTOS AGENCY
#100576, TPCL FIRM #0761253

512-994-2323

peter.donegan@greenworksengineering.com

TABLE OF CONTENTS

1: Conclusions	3
2: Recommendations	4
3: Professional Engineer Stamp	9
4: General	11
5: Observations - Interior	14
6: Observations - Exterior	23

1: CONCLUSIONS

Information

Conclusions: Habitable and Safe for Occupancy

Based solely on our observation of the foundation, it is our opinion that the structure is habitable and safe for occupancy at this time.

Conclusions: Typical Distress

The interior and exterior of the structure showed typical signs of distress for a structure that has incurred differential foundation movement.

While foundation movement can cause interior and exterior cosmetic distress, it is not the only reason that cracks and separations may appear in a structure. Cracking may weaken materials, although 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 an indication of structural failure. In addition, some building materials, such as sealants, deteriorate over time and require regular maintenance. Cracking may weaken materials.

It should also be noted when analyzing distress that its location does not perfectly correlate with areas of foundation movement - distress may telegraph across locations based on material arrangement, locations of true movement versus observed differential movement, and reentrant conditions.

Conclusions: Foundation Movement Calculations

The below 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 (in inches)/ 360. The standard allowable tilt is based on 1% slope over the entire length, width, or diagonal of the foundation.

Structural concerns

1.1.1 Conclusions

FOUNDATION DEFLECTION EXCEEDS LIMITS

Based on our observations of the interior and exterior cosmetic distress, the floor elevations, and calculations, it is our opinion that the foundation has undergone an excessive amount of movement. The maximum differential deflection is 1.3 inches and occurred over an approximate distance of 21.0 feet. This amount of deflection exceeds the standard allowable deflection of 0.7 inches for this distance.

1.1.2 Conclusions

CONCLUSIONS - REMEDIATION REQUIRED

It is our opinion that remedial measures are required to bring the foundation to a more level condition. Furthermore, comprehensive implementation of the below foundation maintenance recommendations will help to moderate soil activity and minimize differential foundation movement and its resultant distress.

2: RECOMMENDATIONS

Information

Slab Foundation - Underpinning Repairs Required

Structural Repairs

To stabilize and lift the foundation, install 8 perimeter and 18 interior piles/piers as shown on the attached elevation survey. The underpinning may be concrete cylinders, steel pipe, helical screws, or drilled concrete piers – refer to the included details. Use mudjacking or similar to fill voids caused by the lifting of the foundation.

- Underpinning will not improve the performance of the foundation in non-underpinned areas. 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.
- Do not attempt to install the perimeter underpinning while omitting the recommended interior underpinning, as this may increase the bending on the slab resulting in a higher likelihood of increased damages.
- The repair plan we have provided has 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.

General Post-Underpinning Recommendations

1. Obtain a leak detection test by a licensed plumber after the foundation has been repaired to verify the condition of the plumbing. If any discrepancies are determined they should be repaired immediately to preserve the foundation repair. Trenchless plumbing repair is preferred when feasible as it is minimally invasive to the foundation slab.
2. Comprehensively implement the foundation maintenance recommendations.
3. Following completion of the foundation underpinning installation, 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.
4. Upon successful completion of the foundation repair, the interior and exterior cosmetic distress can be repaired.

If field conditions are discovered to differ, engineer to be contacted prior to repair implementation. Following underpinning installation, we recommend contacting our office to schedule a Foundation Repair Verification. The purpose of the Foundation Repair Verification is to produce a final elevation survey and 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. The Foundation Repair Verification includes a sealed report that can be filed for future proof of successful repair of the foundation.

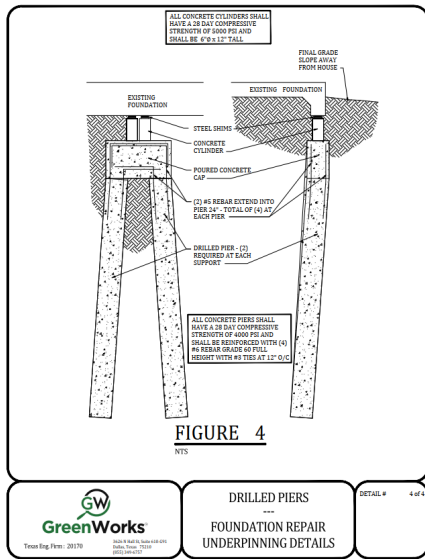
Frequently Asked Questions

If you'd like to speak to a member of the engineering staff regarding **technical** questions or concerns you may reach out to the front office to request a call. Please ensure that you have read the report prior to requesting or your call will be rescheduled.

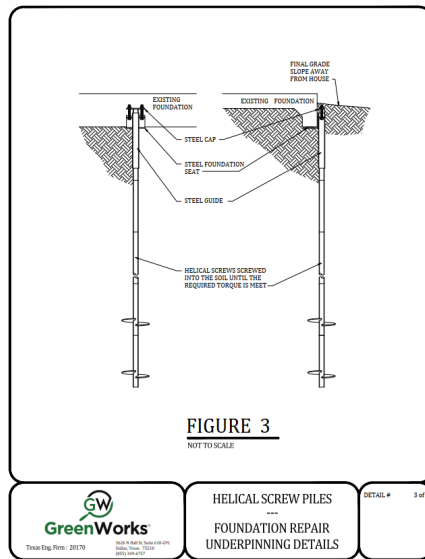
1. **Why am I getting different deflection values than the report when I'm adding and subtracting the elevation readings from the survey?**
 - There is not a set number (such as 1.0" for example) that serves as the limit for foundation movement. This is a common misconception - reference *Section 'Conclusions' Subsection 'Foundation Movement Calculations'* to learn more about how the limits are determined.
2. **If I call you can I get you to revise your opinion?**
 - If you believe you have pertinent data that was omitted from or misinterpreted in our analysis then you may contact our office to provide this and we can revise our analysis accordingly. In the case that you do not have any new data but still attempt to get changes, we remind you that it is prohibited to modify engineering reports for non-engineering reasons per The Texas Engineering Practice Act.
3. **What is the recommended timeline for underpinning installation?**
 - The general behavior of distressed foundations is the more that the foundation movement exceeds the limits and the longer you wait, the higher the risk for critical foundation damages, such as slab fracture, which generally require more expensive repairs than standard underpinning installation.
4. **What do I do if I believe that my structure falls within the "Builder's Warranty" timeframe?**
 - The statute of repose for structural repairs is 10 years from the date of substantial completion in the state of Texas. If you fall within this timeframe, we recommend forwarding this report to your builder and requesting the recommended repairs. We are not able to advocate for you if your builder does not comply; in this case, we recommend seeking legal representation.

5. Can you provide a quote for the cost of the recommended repairs?

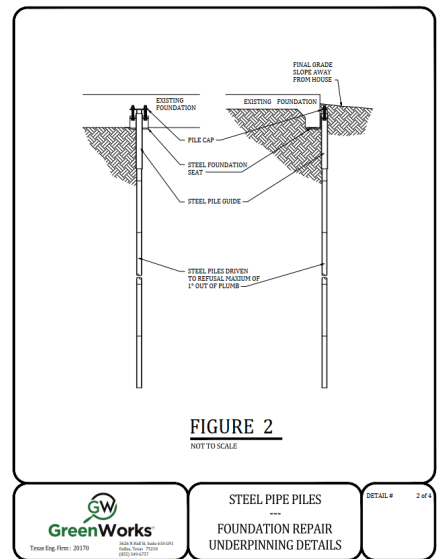
- We do not perform the work so we cannot provide a hard repair cost. The "ballpark estimate" for underpinning repairs is approximately \$500 for perimeter piers/piles and \$1,000 for interior piers/piles. To get a quote we recommend forwarding our repair plan to a foundation repair contractor.



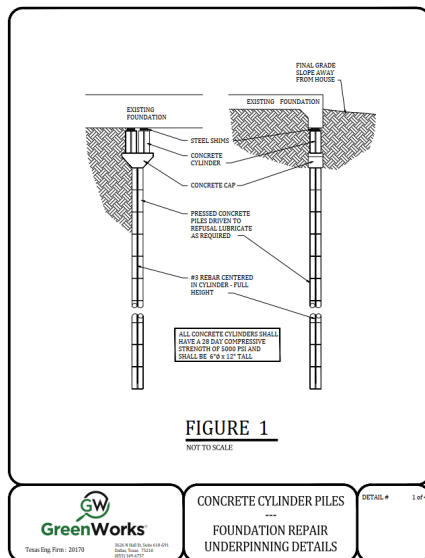
Drilled Piers



Helical Screw Piles



Steel Pipe Piles



Concrete Cylinder Piles

Foundation Maintenance Recommendations

Good foundation maintenance practices are the most effective solution to minimizing soil activity and should be implemented as soon as possible. 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.

1. 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. Gutters should have a slope no less than 6 inches in 10 feet (5% slope) and all seams shall be made weather tight if applicable and shall be equipped with screens to allow leaves and other debris to be washed off the roof. Downspouts should be installed at a minimum every 40 feet. The downspouts should discharge the water a minimum of 6 feet from the foundation or into a drainage system.
2. 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 (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. If widespread drainage issues are present, our office may be contacted to perform a Drainage Inspection of the lot and provide Drainage Remediation plans if necessary.
3. 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 affects. 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.
4. 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. Specific quantitative recommendations like "water the the yard for 1 hour twice a week" should be avoided in favor of a flexible, proactive approach of regularly observing the property for signs of moisture content extremities - for example, soil cracking/desiccation at the surface is a sign that the soil is too dry, whereas ponding water and spongy soil is a sign that the soil is too wet.

Subgrade Chemical Stabilization

If 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.

Seasonal Rainfall Effects

Seasonal rainfall cycles affect soil activity and the resulting movement pattern of the foundation. Generally, the dry seasons correlate to a foundation movement pattern where the perimeter is relatively low, whereas the wet seasons correlate to a foundation movement pattern where the perimeter is relatively raised. To help offset these effects it is recommended to utilize the Foundation Maintenance Recommendations. For example, in the wet seasons it would be prudent to focus on ensuring proper gutter/downspout function and maintaining the grading around the structure to combat water ponding, and in the dry seasons it would be prudent to focus on watering programs.

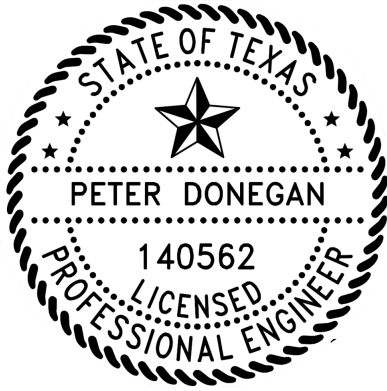
Here is a rainfall chart for Central Texas as an example of seasonal cycles, although it should be noted that variations are common year-to-year and location-to-location and the best maintenance approach includes routine observation of the property.

Month	Normal Rainfall (inches)	Relative Rainfall
January	2.22	Dry
February	2.02	Dry
March	2.76	Moderate
April	2.09	Dry
May	4.36	Wet
June	4.33	Wet
July	1.88	Dry
August	2.35	Dry
September	2.99	Moderate
October	3.88	Wet
November	2.96	Moderate
December	2.40	Dry

3: PROFESSIONAL ENGINEER STAMP

Information

Professional Engineer Stamp: Reviewed by Peter Donegan, P.E.



GreenWorks Service Company
Principal Engineer
Texas Registered Engineering Firm 20170

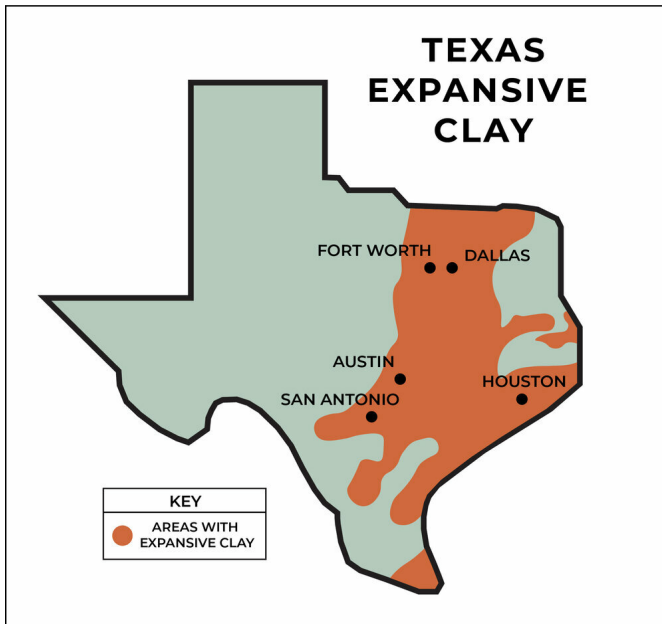
Reviews enable us to continue providing the best experience possible for you and they also help homeowners like you to make confident decisions about their engineering needs. [Click here to leave a review.](#)

Limitations

Limitations

TEXAS SOILS

Foundation movement is a prevalent phenomenon in Texas. Future foundation movement is likely to varying degrees 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 future movement is unlikely.



Limitations

GENERAL

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. GreenWorks has no obligation or contractual relationship to any party other than our client and their agents in regards to the subject property. This report was not prepared for litigation nor is the report permitted to be used for litigation.

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 engineer. It is known to all educated engineers with knowledge of differential foundation movement that the most effective long-term solution to foundation movement is deep foundation underpinning for the entire structure, however this method is rarely economically feasible and often causes unwanted cosmetic damage. This report provides engineering advice intended to correct the observed foundation deficiencies assuming normally expected subsurface conditions and conventional construction methods. The client agrees that GreenWorks is not responsible for knowledge of specific subsurface conditions at the subject property.

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.

No guarantee or warranty as to the future performance or need for repair of the building or foundation is intended or implied. 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 GreenWorks Service Company for all costs exceeding this fee.

4: GENERAL

Information

Project Information: GreenWorks	Project Information: Inspection	Project Information: Report Issue
Project Number	Date	Date
202103	08/31/2025	09/02/2025

Purpose

GreenWorks Engineering has completed an evaluation of the foundation at the address referenced above to determine its condition and any necessary repairs. This evaluation constitutes a Level B consultation, as defined by The Foundation Performance Association.

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.

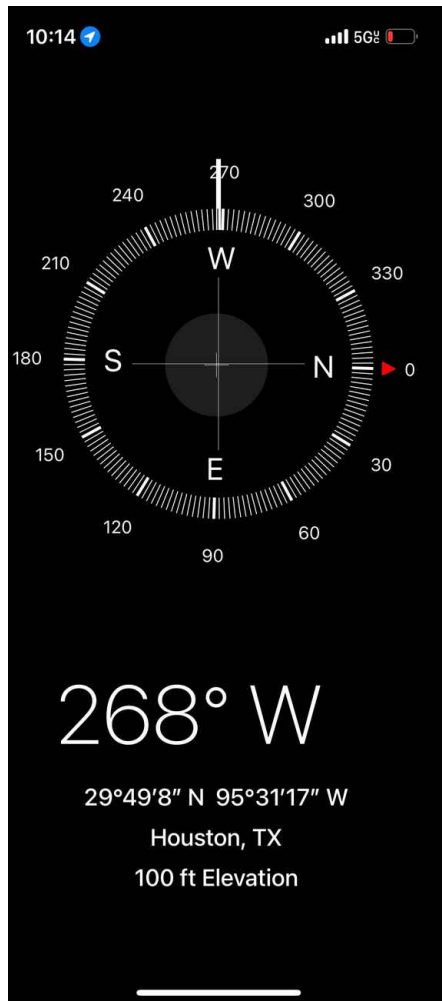
Level B Consultation

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

- Documenting visual observations made during a physical walkthrough
- Observation of factors influencing the performance of the foundation
- If possible, an interview of occupants/owners/managers regarding a history of the property and foundation
- Review of pertinent documents including geotechnical reports, construction drawings, field reports, and repair documents
- Deflection and tilt calculations to assess foundation performance and establish a baseline
- Description of factors that affect soil moisture

Property Faces

West

**Building Type**

Single Story Residential

Garage Type

Attached 2-car

Roofing Material

Composite Asphalt Shingles

Original Construction Date

1968

Framing Type

Wood-framed

Exterior Wall Type

Brick Veneer

Foundation Type

Concrete Slab-on-Grade

**Interior Elevation Survey:
Measurement Device**

The Elevation Survey was performed using a ZIPLEVEL PRO 2000 altimeter.

Interior Elevation Survey: General

An interior floor elevation survey was performed on the living area of the structure as shown on Figure 1, with the elevations recorded to the nearest 10th of an inch (0.1"). Adjustments were made to account for the thickness of the floor coverings. A benchmark elevation of 0.0 inches was established. The benchmark elevation is referential and its location will not alter the net elevation differentials - location of it was based on the inspector's best judgement.

Interior Elevation Survey: Garage Elevations

The elevations within the garage were recorded from the ceiling, as the slab slopes to the garage door. Elevations recorded from the ceiling are less reliable as they introduce elevation variables via framing and finishes.

Interior Elevation Survey: No Previous Elevation Surveys Available

No previous elevation surveys were provided to us. Determining the deflection and tilt of a foundation is an approximation without an as-built or previous floor elevation survey, because the original surface configuration is unknown. A single floor level survey yields the shape of the foundation at one instant.

Foundation History & Layout: Prior Foundation Underpinning Noted Per Observations

There was evidence of previous foundation underpinning, but we have not received any preexisting foundation reports or repair documentation. The exact location, depth, and type of any existing piers are not known.

**Reference Documents: Current
Applicable Code**

IRC 2021

**Reference Documents: Additional
Documents Provided**

N/A

Limitations

Project Information

PHOTOGRAPHS TAKEN ON-SITE

Some data collected in the form of photographs is presented in this report. These photographs are included for reference and are intended only to represent the distress generally found throughout the structure. They do not represent a comprehensive catalog of all of the distress present in the structure.

Foundation History & Layout

UNDERPINNING CONFIRMATION

Existing underpinning is typically concealed entirely below grade. No destructive investigation nor subgrade radar readings were performed to confirm the presence or absence of any existing foundation underpinning.

Foundation History & Layout

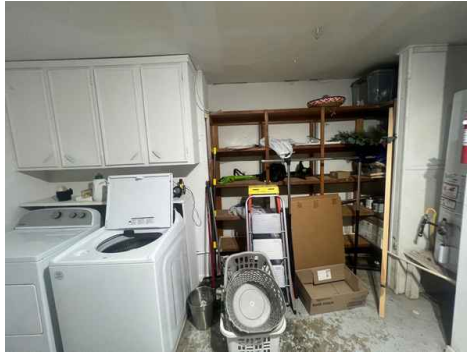
PLUMBING LEAK CONFIRMATION

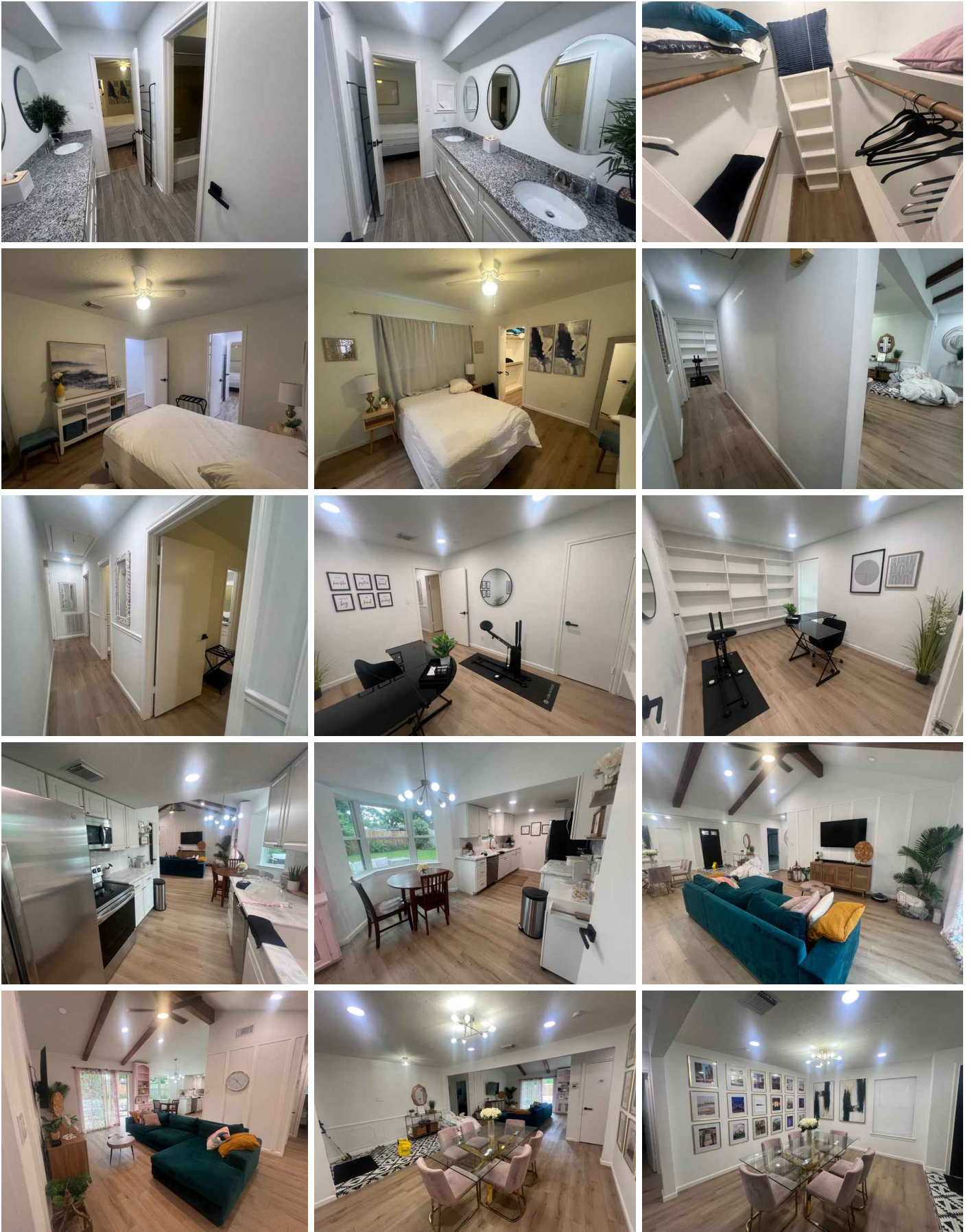
Our Foundation Investigation did not include a plumbing leak detection test to confirm the presence or absence of a plumbing leak. Leak detection testing must be performed by a licensed plumber. Warning signs of a plumbing leak include a significant increase in the water bill, warm spots on the floor, ponding water adjacent to the foundation, damp or musty odors within the interior of the structure, the sound of running water that can be heard while all taps are closed, and areas of foundation heave.

5: OBSERVATIONS - INTERIOR

Information

General Pictures





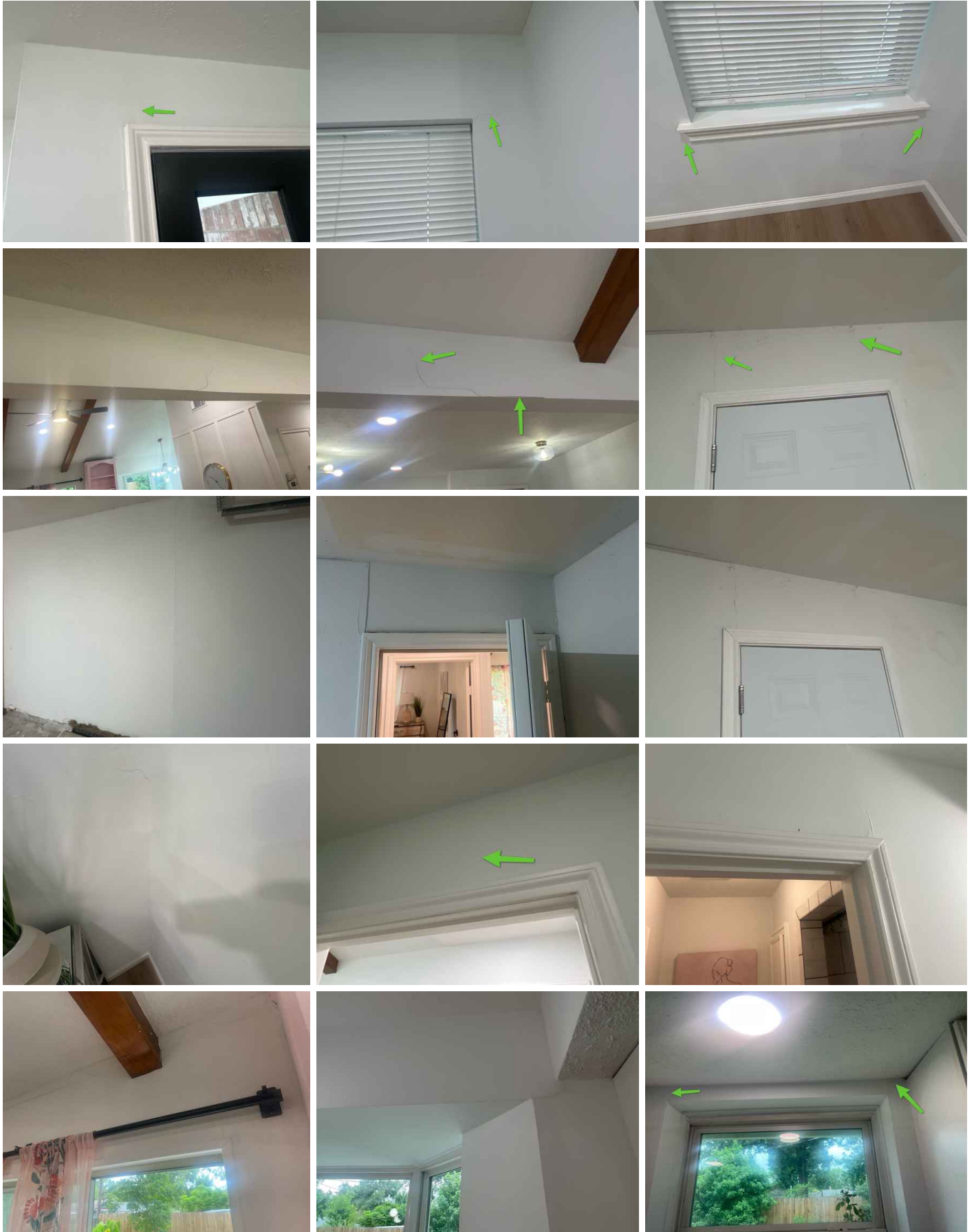
Cabinet Separation

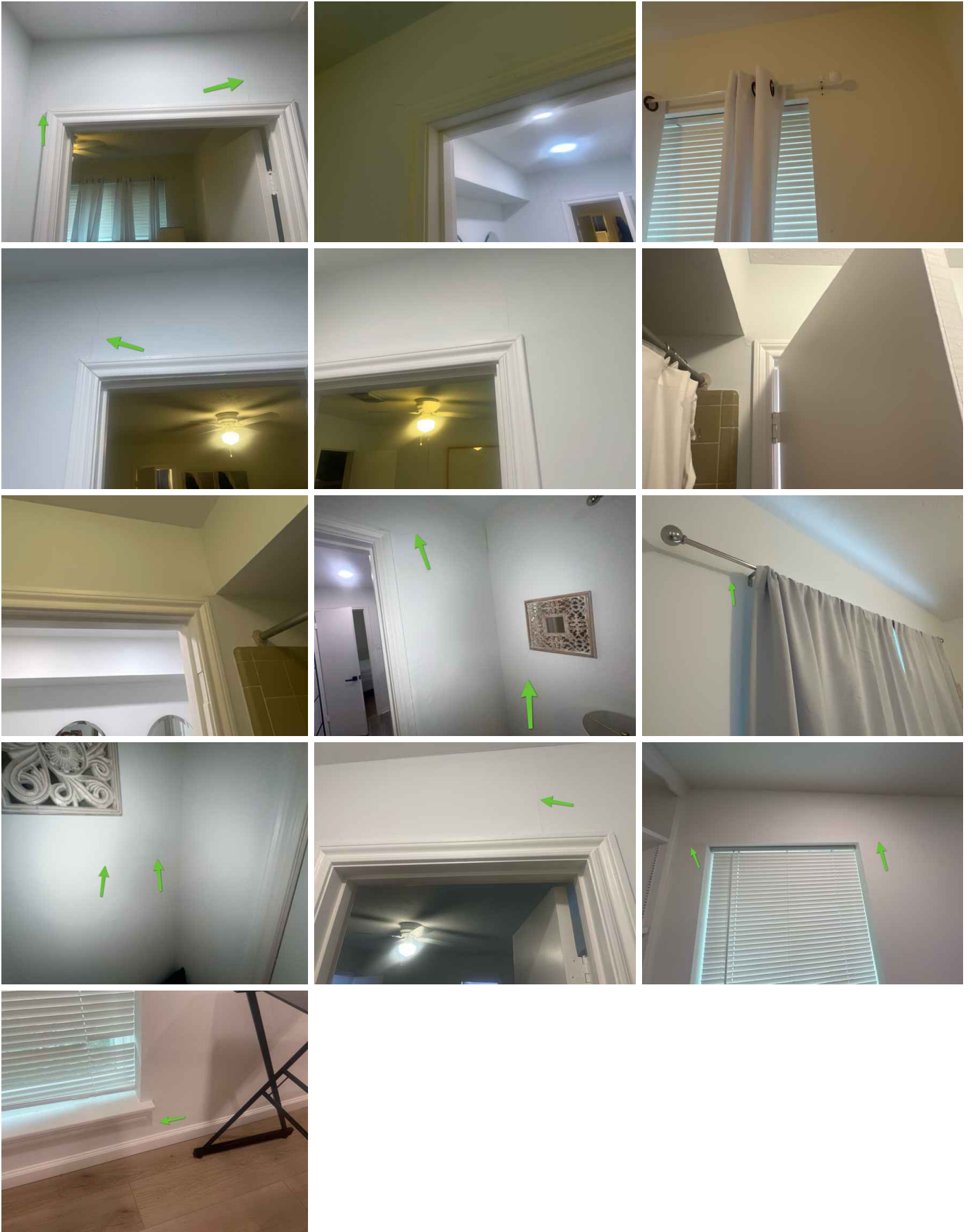


Trim Separation



Wall Cracks Present





Ceiling Cracks Present



Intersection Separation

Separation of the drywall at the ceiling and wall intersection



Tape Separation

Separation of the drywall tape from the drywall



Nail pops



Floor Distress: Cracking at Top Surface of Slab

We recommending injecting slab cracks of about 1/16" and larger in width with epoxy repair cement to restore stiffness across the crack.



Floor Distress: Flooring Separation / Deformation / Buckling



Floor Distress: Floors Out-of-Level / Spongy



6: OBSERVATIONS - EXTERIOR

Information

General Pictures



Front



Front Right



Front Left



Right



Rear Right



Rear



Rear Left

Slope of Grade

Positive, Flat



Front



Left



Right



Rear

Downspout Terminations

At foundation

A properly functioning gutter system will minimize ponding, soil loss and erosion, and can help control seasonal movement of the foundation. The gutter system should discharge the water a minimum of 5 feet from the foundation or into a below-grade drainage system.



Front Left



Rear Right

Trees Within 10ft

Yes



Front Right



Right

Bushes/Foliage Within 5ft

Yes



Front Right



Front Left



Rear



Rear Left

Foundation Corner Cracking

The foundation cracks at the corners of the house can be sealed and secured by injecting an epoxy into the cracks, such as Simpson Strong-Tie Crack-Pac or a similar product. Note, the broken foundation corners will not affect the overall performance of the foundation but could cause minor cracking in the veneer above that corner.



Front

Veneer Cracks

Brick/stone veneer cracks can be filled with mortar. Note, expansion joints in veneer should be filled with an elastic silicone caulk, not mortar.



Front



Front Right



Left



Left



Left



Rear



Rear



Rear



Rear



Rear Right



Right



Right



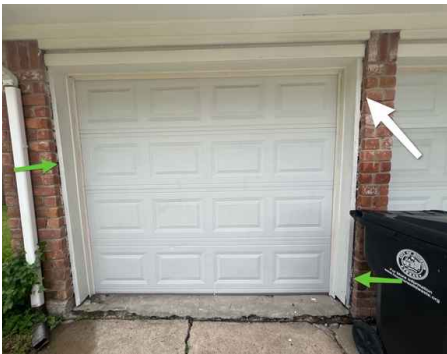
Right

Frieze Board Joint Separation

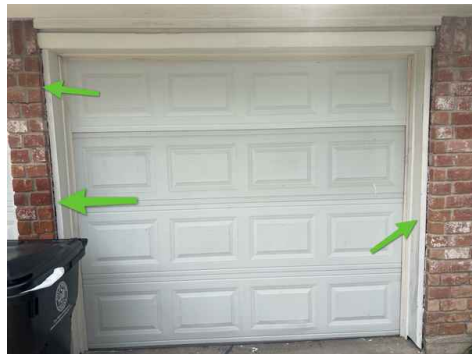


Front Right

Window/Door Frame Separation



Front Left



Front



Front

Trim Separation



Front Left



Front Left



Left



Left



Front Right

Siding-Trim Separation

Separation of the lap siding from the trim boards



Front

Driveway / Sidewalk Cracks



Front Left

Previous Repair



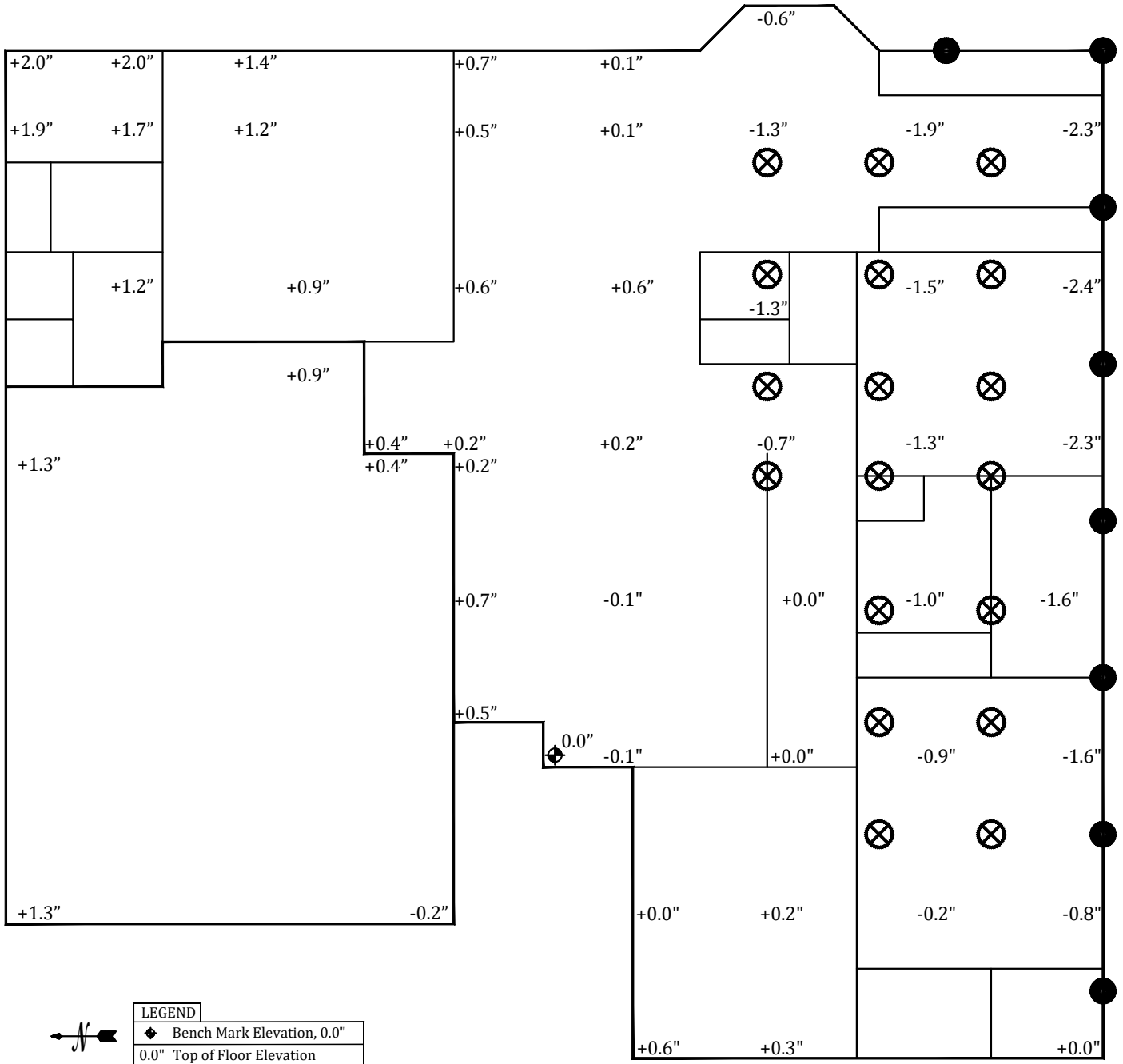
Rear

Limitations

Exterior Distress

PARGE COAT

The exposed areas of the foundation were covered with a parge, a cementitious mortar on the perimeter foundation wall, which limited our ability to visually evaluate the foundation.



LEGEND	
	Bench Mark Elevation, 0.0"
	0.0" Top of Floor Elevation
	Push Pile or Drilled Pier
	Interior Slab Pier

FIGURE 1

NOT TO SCALE



Texas Eng. Firm : 20170

3626 N Hall St, Suite 610-G91
 Dallas, Texas 75210
 (855) 349-6757

ELEVATION SURVEY

2718 LAZY SPRING DRIVE
 HOUSTON, TX

Project No:	202103
Figure No:	1 of 1
Date:	09/02/2025
Revision Date:	---