GREENWORKS SERVICE COMPANY
855-349-6757
support@greenworksinspections.com
https://greenworksinspections.com

FOUNDATION INVESTIGATION

[redacted]

MARCH 22, 2025

Inspector
Julie Kennedy
TREC #24960, TBPE FIRM #20170, MOLD FIRM #ACO1162, TPCL FIRM #0761253
julie.kennedy@greenworksinspections.com

TABLE OF CONTENTS

1: Conclusions 3

2: Recommendations 4

3: Professional Engineer Stamp 7

4: General 9

5: Observations - Interior 11

6: Observations - Exterior 18

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: Minor Distress

The interior and exterior of the structure appeared to be in relatively good condition; however, there were minor signs of distress.

It should be noted that, 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.

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.

Conclusions: Foundation Deflection Within Limits

Based on our observations of the interior and exterior cosmetic distress, the floor elevations, and calculations, it is our opinion that the foundation appears to be in relatively good condition. The maximum differential deflection is 0.3 inches and occurred over an approximate distance of 22.0 feet. This amount of deflection is within the standard allowable deflection of 0.7 inches for this distance.

Conclusions: Mild Foundation Tilt

The foundation has experienced a mild amount of tilt. Tilt is the percentage of elevation change divided by the length between those elevations. The maximum elevation change measured across the foundation is 2.0 inches over an approximate distance of 31.0 feet for a maximum tilt of 0.3%. This amount of tilt is within the standard allowable tilt of 6.2 inches for this distance.

Conclusions: Conclusions - Foundation Performing Adequately

It is our opinion that the foundation is structurally performing as designed. 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

[redacted] [redacted]

Slab Foundation Recommendations - No Structural Slab Repairs

No Structural Slab Repairs Recommended at This Time

General Recommendations

1. Comprehensively implement the foundation maintenance recommendations.
2. Review the performance of the foundation as a proactive foundation maintenance program every 6 to 12 months. Retain this report as an elevation baseline for the foundation. Compare all future foundation evaluations to this baseline.
3. The cosmetic distresses may be repaired; however, future foundation movement will likely cause similar cosmetic distresses to reoccur to some degree so it is recommended to ensure that the foundation maintenance recommendations are fully implemented first, as they are the most effective solution to moderating future foundation movement. At minimum, we recommend repairing any exterior cosmetic distress that compromises the building envelope. Reference the 'Observation' sections of the report for guidance on repairs.

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 your call or it 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. Why did your report conclude that the foundation is performing adequately but I'm seeing distress, such as cracking, to my structure?
   - "Adequate performance" does not mean that there is no foundation movement nor distress. The presence of distress is not an indicator that the foundation requires *structural* repair. The negative effects of swelling soil tend to be cosmetic rather than *structural*, and cosmetic repairs are usually more economical than rebuilding structural elements, as long as the structure remains sound. Structural repairs are intended to restore critical damage or prevent impending critical damage. This report catalogs distress and makes recommendations regarding repair of it where appropriate. Reference the 'Foundation Maintenance Recommendations' to help moderate cosmetic distress occurrence.
3. Why did a distress item that I'm specifically concerned about not have photo documentation in the report?
   - Refer to *Section* 'General' *Subsection* 'Project Information' for the limitation regarding comprehensive photograph cataloging. If you believe a *critical* distress item has been omitted from the analysis then you may submit it to us for review.
4. Why did a foundation repair contractor provide me a quote for underpinning installation but this report is not recommending one as well?
   - Our engineering evaluation was performed per the "Level B" standard (refer to *Section* 'General' *Subsection* 'General Information' for more explanation). This type of evaluation differs typically in scope and sometimes conclusion versus that of a repair contractor's evaluation. Sending us a repair quote/proposal will not alter our analysis unless new, pertinent information is provided.
5. What do I do if the report does not recommend repairs but I want to structurally modify the foundation (e.g. install underpinning)?
   - Our report does not prohibit repairs if they are desired. Our opinions and recommendations are based on experience and industry standards but ultimately you as the owner are welcome to proceed with repairs on your own terms.
6. If I call you can I get you to revise the report?
   - 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.
7. What do I do if I believe that my structure falls within the "Builder's Warranty" timeframe?
   - The statue 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. Note that the Limitations of this report prohibit its inclusion in litigation.

Foundation Maintenance Recommendations

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.

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. Soil cracking/desiccation at the surface is a sign that the soil is too dry.

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.

3: PROFESSIONAL ENGINEER STAMP

Information

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

[redacted]

GreenWorks Service Company

Principal Engineer

Texas Registered Engineering Firm 20170

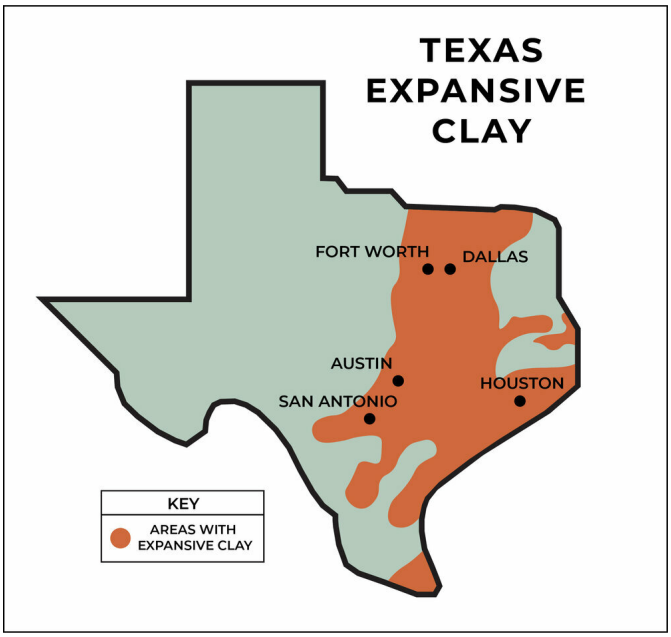
Reviews enable us to continue providing the best experience possible for you and they also help homeowners like you to make confident decisions about their engineering needs. Click here to leave a review.

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 Number
[redacted]

Project Information: Inspection Date
03/22/2025

Project Information: Report Issue Date
03/25/2024

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 is a Level B evaluation, as defined 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.

Level B Evaluation

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

Building Type
Single Story Residential

Framing Type
Wood-framed

Garage Type
Attached 2-car

Exterior Wall Type
Brick Veneer, Lap Siding

Roofing Material
Composite Asphalt Shingles

Foundation Type
Concrete Post-Tensioned Slab-on-Grade

Original Construction Date
2007

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: No Known Foundation Underpinning Repairs

The structure has no known existing foundation underpinning that can be seen, and we have not received any previous foundation reports.

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

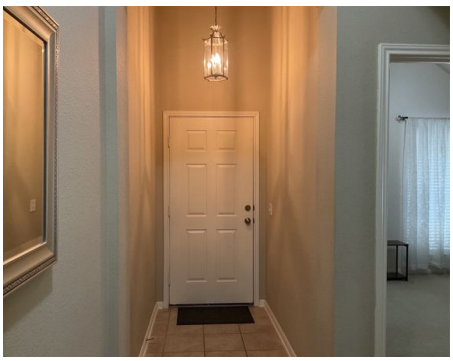
Our Foundation Investigation did not include a plumbing leak detection test to confirm the presence or absence of a plumbing leak. Leak detection testing must be performed by a licensed plumber. Warning signs of a plumbing leak include a significant increase in the water bill, warm spots on the floor, 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

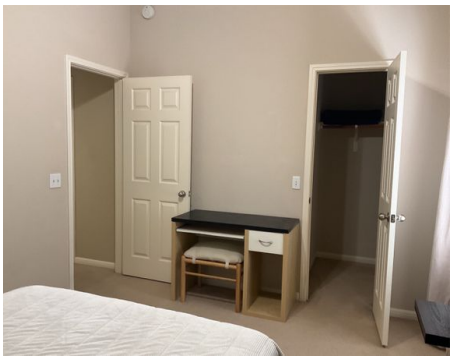
[redacted] [redacted]

General Pictures

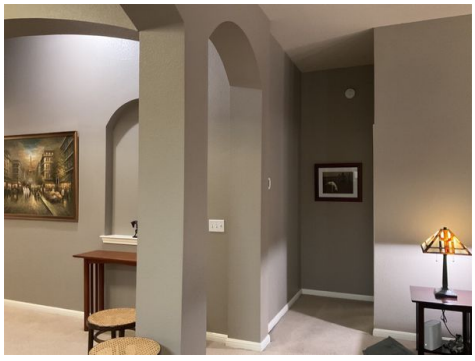






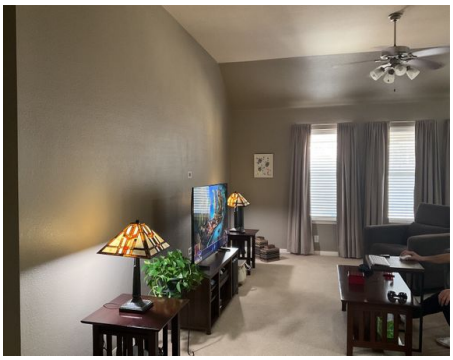






BOUTIQUE

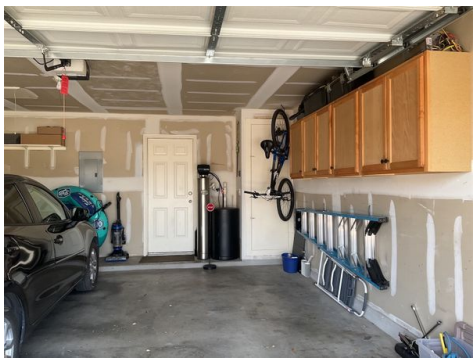
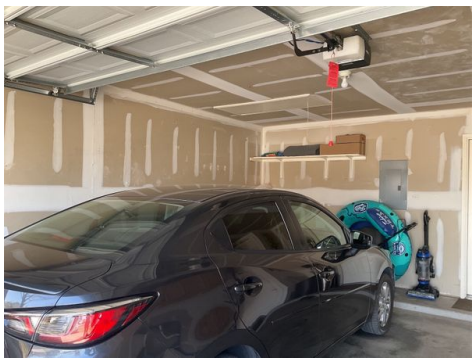



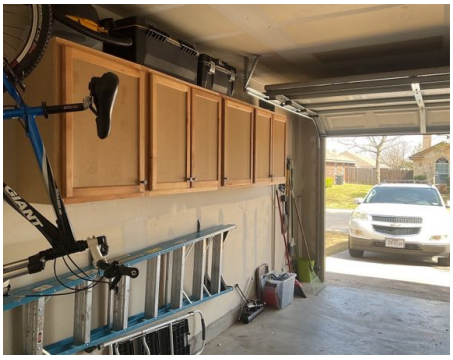






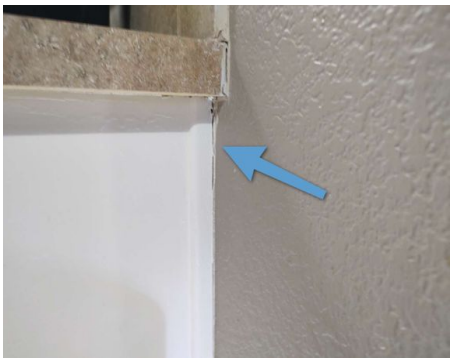




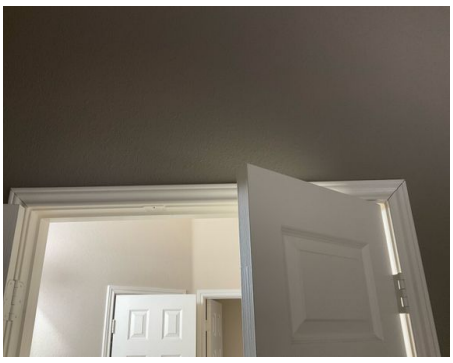

Doors Binding / Not Latching / Out of Square

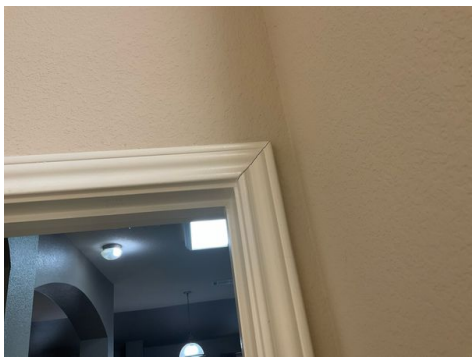
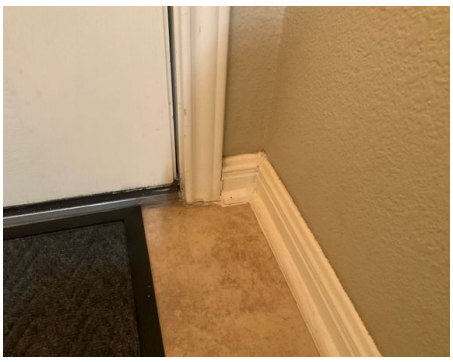
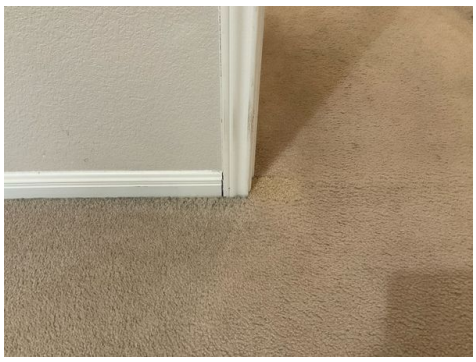

Cabinet Separation



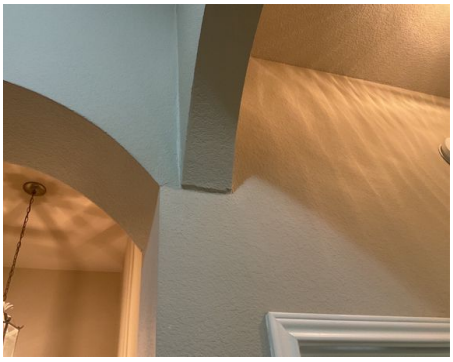
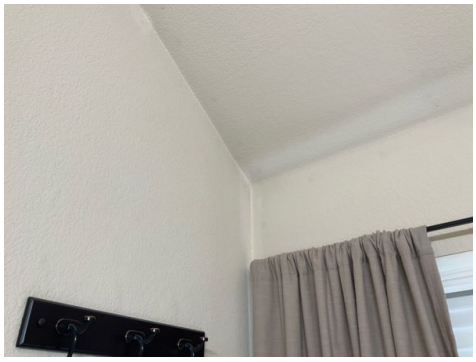

[redacted] [redacted]

Trim Separation

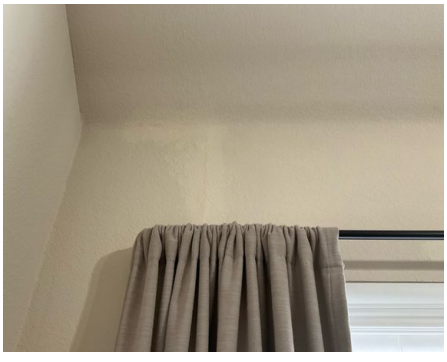


Repaired Cracks

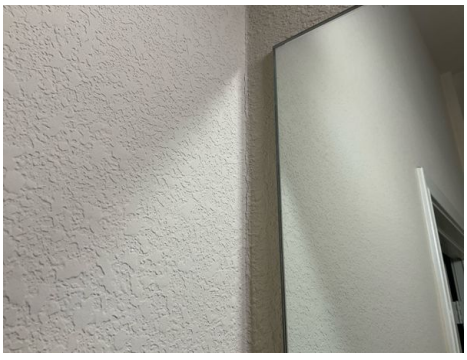



Wall Cracks Present



Corner Bead Separation

Separation of the drywall at interior corners



[redacted] [redacted]

Tape Separation

Separation of the drywall tape from the drywall

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 Cracking

Isolation membranes that meet ANSI A118.12 may be installed under flooring to help resist cracking associated with foundation movement, though this method requires removal and replacement of the flooring in the desired areas. We recommend contacting a flooring professional to determine which isolation membrane solution is best suited if desired.

6: OBSERVATIONS - EXTERIOR

Information

General Pictures














[redacted] [redacted]

Slope of Grade

Positive, Negative, Flat


Downspout Terminations

N/A

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.

Trees Within 10ft

No

Bushes/Foliage Within 5ft

No

Foundation Wall Cracking

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


Parge Coat Cracking

Cracks in the parge covering the foundation

[redacted] [redacted]

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.

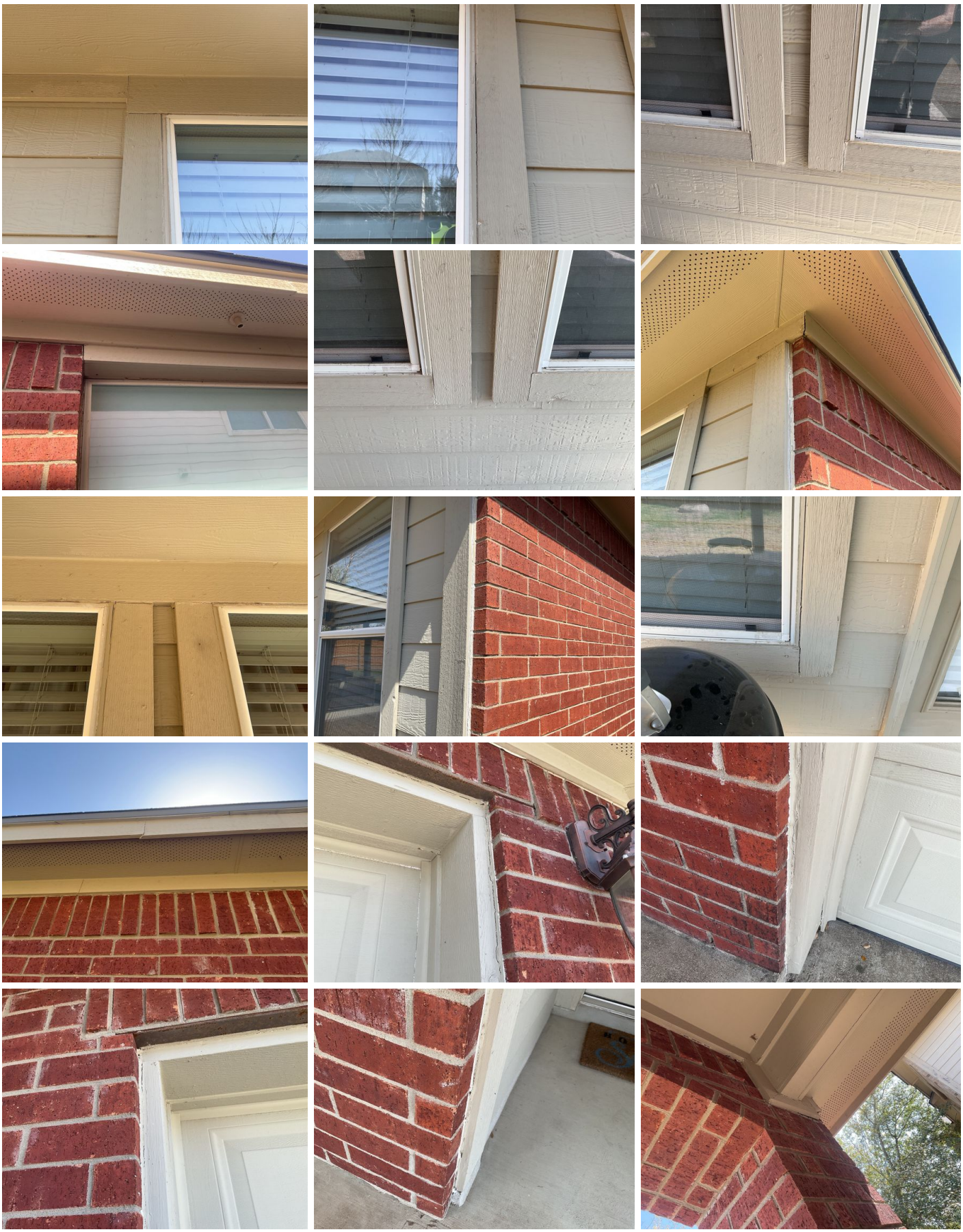
Veneer Cracks

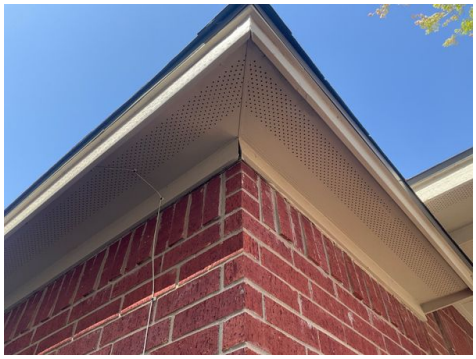
Brick/stone veneer cracks can be filled with mortar. Note, expansion joints in veneer should be filled with an elastic silicone caulk, not mortar.

Mortar Separation

[redacted] [redacted]

Trim Separation



Expansion Joint Separation

Siding-Trim Separation

Separation of the lap siding from the trim boards



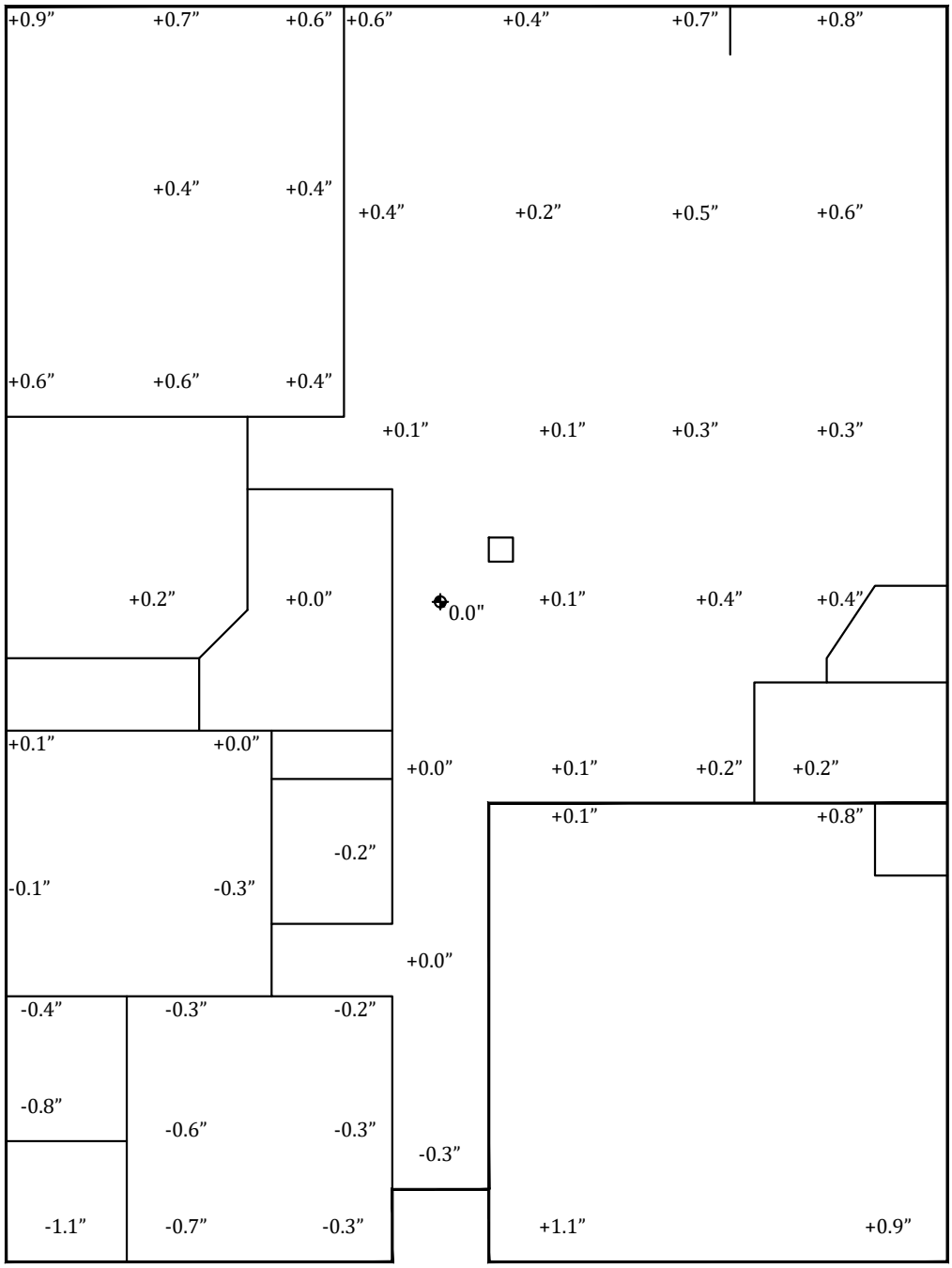


Over Exposure - Foundation Wall


Flatwork Separation/Settlement

Flatwork can be re-leveled with mud-jacking or poly-jacking if desired.


Soil Separation



LEGEND

◆	Bench Mark Elevation, 0.0"
0.0"	Top of Floor Elevation

FIGURE 1

NOT TO SCALE

GREENWORKS®
INSPECTIONS | ENGINEERING | ENVIRONMENTAL CONCIERGE AT YOUR SERVICE

Texas Eng. Firm : 20170

3626 N. Hall Street, Suite 610-G91
Dallas, Texas 75219
(855) 349-6757

ELEVATION SURVEY

[redacted]

Project No: [redacted]

Figure No: 1 of 1

Date: 03/24/2025

Revision Date: ---