



**AccuTech
Consultants, LLC**

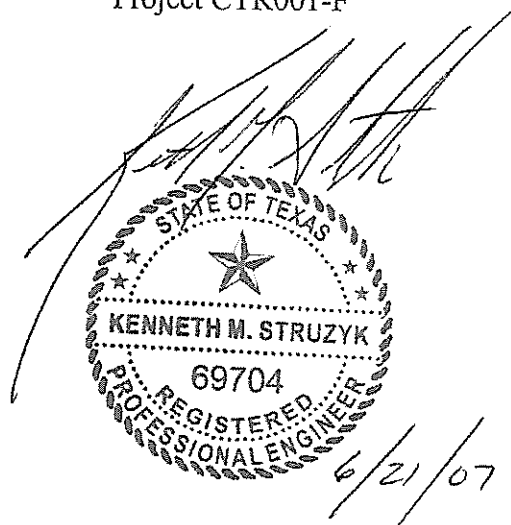
Structural Report

**San Antonio Housing Authority
Single Family Housing Design/Build Project
San Antonio, Texas**

prepared for:

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Project CTR001-F



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1 of 3 Originals

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Introduction

At the request of the Mr. Anthony Fetter, with Coats|Rose, AccuTech Consultants, LLC conducted an investigation of the San Antonio Housing Authority (SAHA) Single Family Housing Design/Build Project located in San Antonio, Texas. This project consisted of the investigation of the twenty-eight (28) homes. For the purpose of this report, we have identified each house by number as follows:

- | | | |
|-------------------------------------------|-----------------------|-----------------------|
| 1. 1603 Northwest 26 th Street | 11. 102 Villa Grande | 21. 1511 Villa Flores |
| 2. 1006 Northwest 27 th Street | 12. 115 Villa Grande | 22. 1710 Villa Placer |
| 3. 1110 Northwest 27 th Street | 13. 119 Villa Grande | 23. 406 Precious |
| 4. 1114 Northwest 27 th Street | 14. 142 Villa Grande | 24. 431 Precious |
| 5. 106 Villa Arboles | 15. 602 Villa Linda | 25. 459 Precious |
| 6. 107 Villa Arboles | 16. 607 Villa Linda | 26. 466 Precious |
| 7. 111 Villa Arboles | 17. 2607 Villa Norte | 27. 511 Precious |
| 8. 114 Villa Arboles | 18. 2615 Villa Norte | 28. 519 Precious |
| 9. 126 Villa Arboles | 19. 1502 Villa Flores | |
| 10. 130 Villa Arboles | 20. 1506 Villa Flores | |

The investigation was made by qualified personnel from AccuTech Consultants during the weeks of May 14 and May 21, 2007. A “Level A” investigation (as defined by the ASCE Guidelines for the Evaluation and Repair of Residential Foundations) of each of these homes was conducted. This type of investigation generally consists of visual walk-through observations of the interior and exterior of each structure. The purpose of this investigation was to evaluate the

structural condition of these homes. Additionally, we were asked to provide foundation elevation data for each of the houses as part of the investigation.

Background

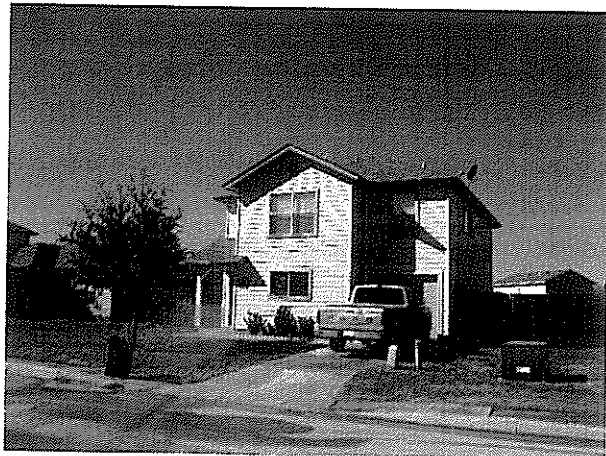
The SAHA began a Single Family Housing Design/Build Project in 1999. The purpose of the project was to construct several affordable homes for low to moderate-income families. These homes would provide low to moderate-income families the opportunity to purchase homes. It is our understanding that these homes are now being considered for purchase by several individuals.

General

These houses were one-story or two-story, wood-framed structures and were located in residential neighborhoods (See Photographs No. 1 and No. 2). Each of these homes was constructed



Photograph No. 1



Photograph No. 2

with one (1) of the seven (7) typical floor plans, which have been identified by letters “A” through “G” (Reference Appendix A). The floor plan of each home investigated was as follows:

- Plan “A” – Houses #1, #2, #6, #14, #16, #18, #22, #23, and #28
- Plan “B” – Houses #3, #5, #8, #11, #13, #19, #25, and #26
- Plan “C” – Houses #9, #10, #12, #15, and #24
- Plan “D” – House #20
- Plan “E” – House #17 and #21
- Plan “F” – House #27
- Plan “G” – Houses #4 and #7

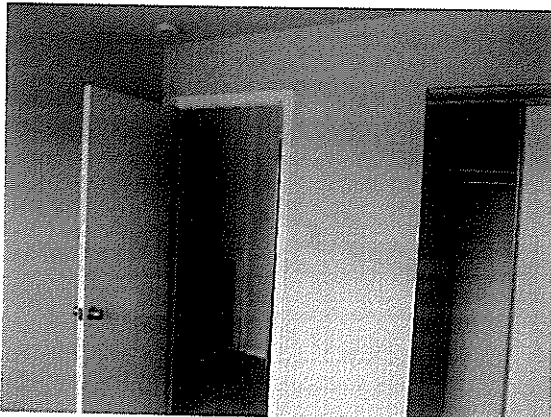
Our investigation of the houses indicated:

- They were constructed with brick veneer and/or siding (Hardi-Plank, etc.).
- The roofs were a combination of gabled and hip construction with composition shingles.
- The roof framing consisted of prefabricated trusses.
- The foundations were monolithic concrete slabs-on-grade. We understand that the slabs were conventionally reinforced.
- Porch slabs were typically located along the front of the structures. These slabs were a concrete slabs-on-grade that were monolithic with the main foundation slabs.
- “Stoop slabs” were typically located at the side or rear of the structures at an exterior door. These slabs were concrete slabs-on-grade that were separate from the main foundation slabs.
- Remedial foundation work, installation of steel piers, was conducted at four of the houses (houses #15, #16, #20, and #25).

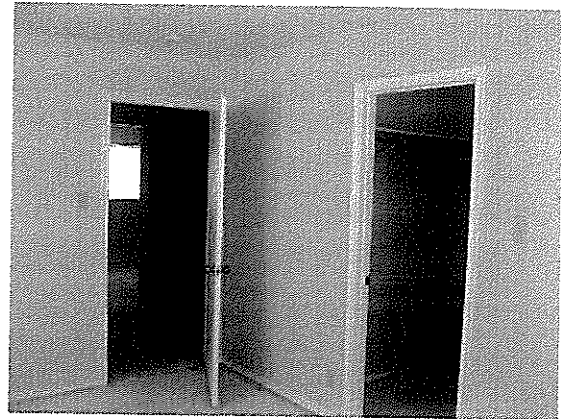
Observations

Observations were made by walking through and around each of the structures, with special attention to indicators of structural problems or distress. It was not the intent of this report to document all conditions that were noted, but to show typical conditions that affect the conclusions of this report. In general, we noted the following:

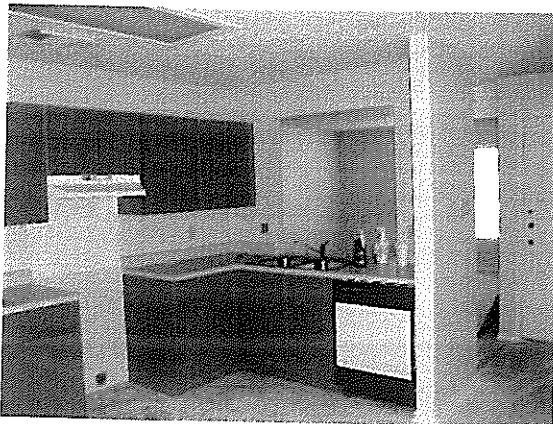
- The interior of most of the homes had been recently patched and painted. Therefore, little to no distress was found in the interior finishes of most of the homes (See Photographs No. 1 through No. 4).



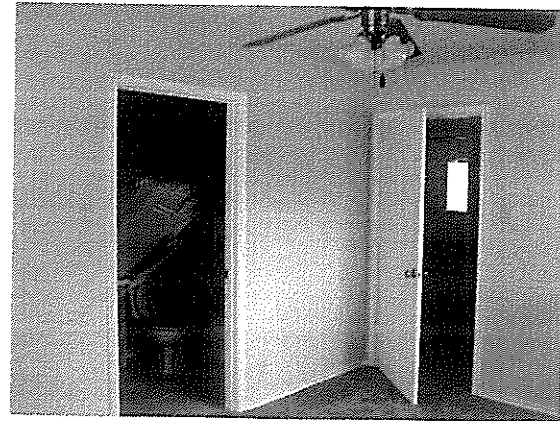
Photograph No. 1



Photograph No. 2



Photograph No. 3

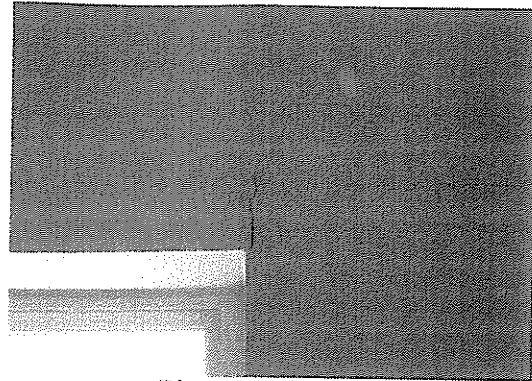


Photograph No. 4

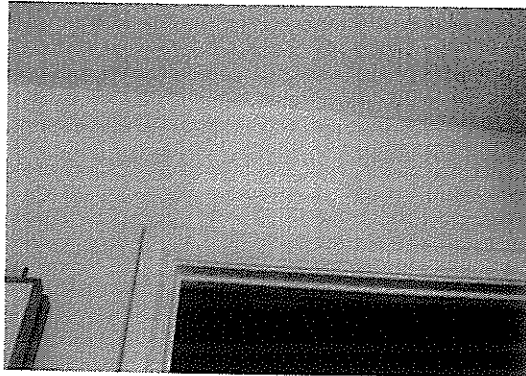
- There were some houses (houses #2, #6, #11, #13, #16, #19, #20, #24, and #26) where some minor cosmetic distress and/or patching was noted (Reference Photographs No. 5 through No. 8).



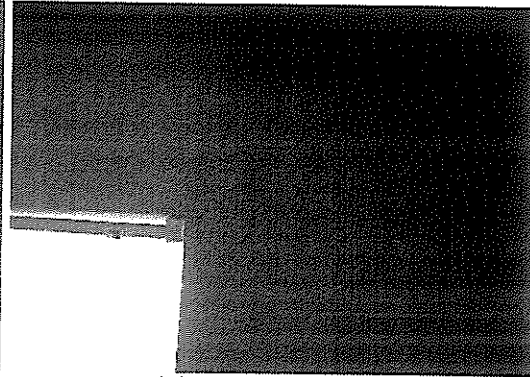
Photograph No. 5



Photograph No.6

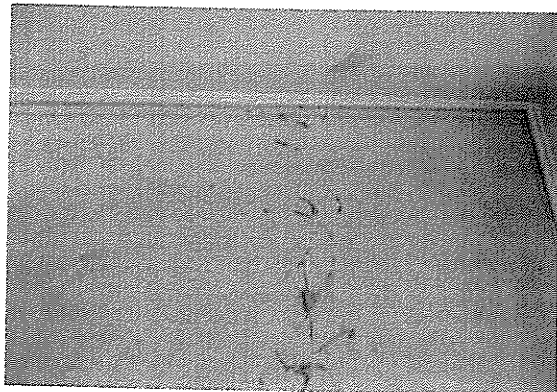


Photograph No. 7

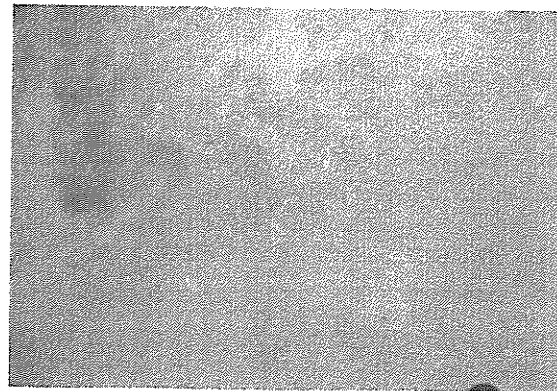


Photograph No. 8

- Cracking of the floor slabs was noted in a few of the houses (houses #2, #10, #12, #13, #15, #16, #20, #24, and #26) (See Photographs No. 9 and No. 10). Some of these

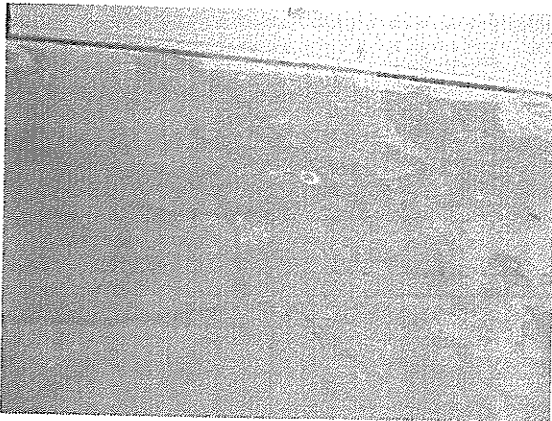


Photograph No. 9

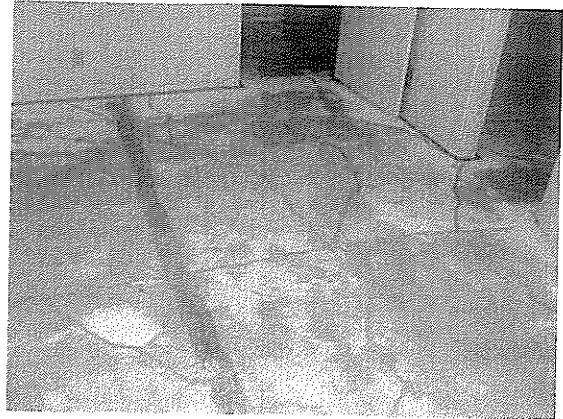


Photograph No10

cracks had been patched (houses #15, #16, #20, and #24) (See Photographs No. 11 and No. 12). An unusually large amount of patched slab cracks were noted in house #24 (See Photograph No. 12).



Photograph No. 11

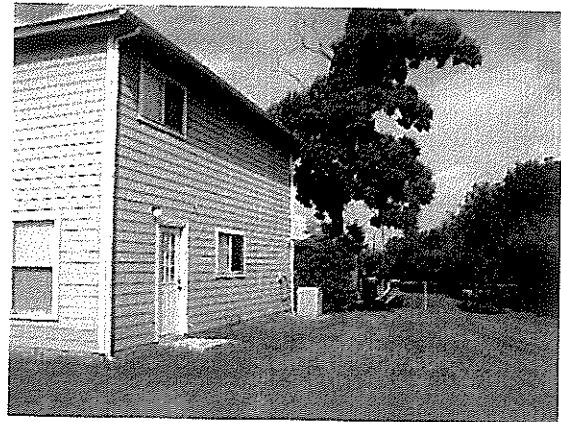


Photograph No. 12

- There was generally little to no distress to the exterior veneer at most of the houses (See Photographs No. 13 and No. 14).

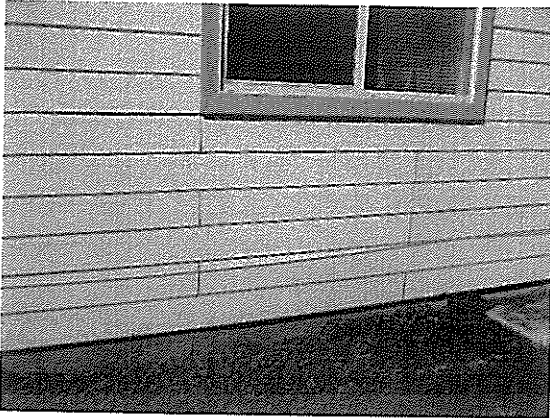


Photograph No. 13

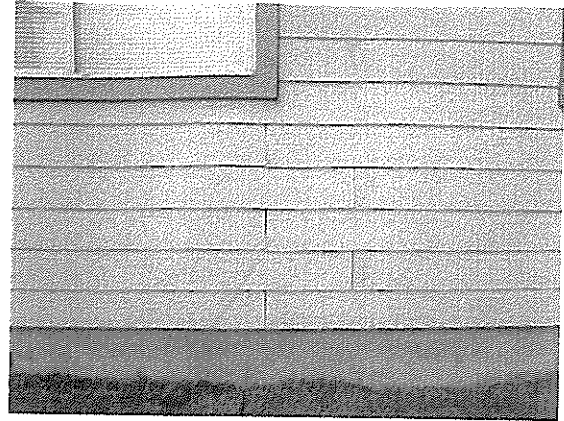


Photograph No. 14

- There were separations of the siding joints at some of the houses (houses #3, #5, #8, #9, #10, #11, #14, #26, #27, and #28) (See Photographs No. 15 and No. 16). Some of these separations had been sealed.

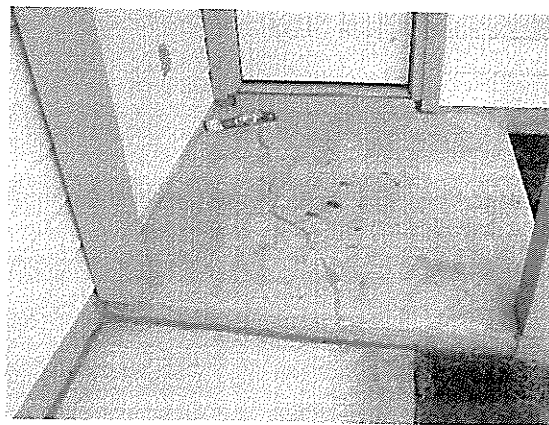


Photograph No. 15



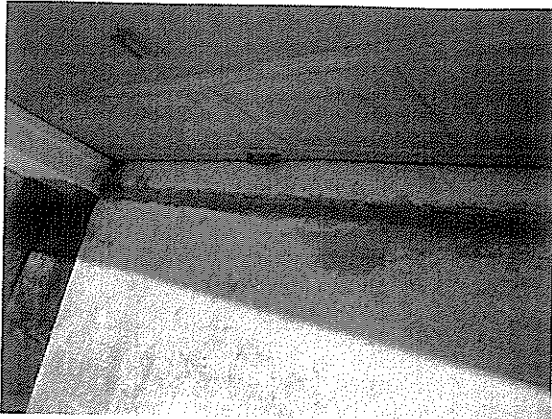
Photograph No. 16

- At one of the houses (house #16), the wall base plate extended out past the edge of the foundation.
- There was a crack in the brick veneer at one of the houses (house #16).
- Cracks or patched cracks were noted in the porch slabs of some of the homes (house #3, #7, #9, #16, and #25) (See Photograph No. 17).

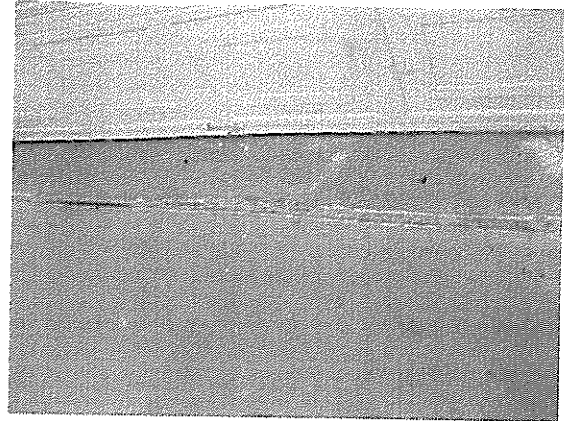


Photograph No. 17

- Sealant had been added to the control joints between the foundation and the adjacent flatwork at some of the structures (houses #6, #14, #18, and #26) (See Photographs No. 18 and No. 19).

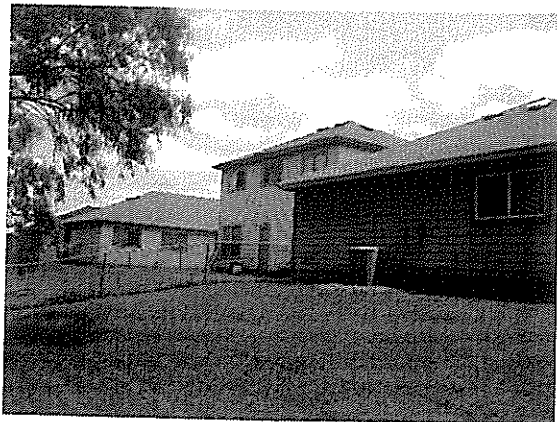


Photograph No. 18

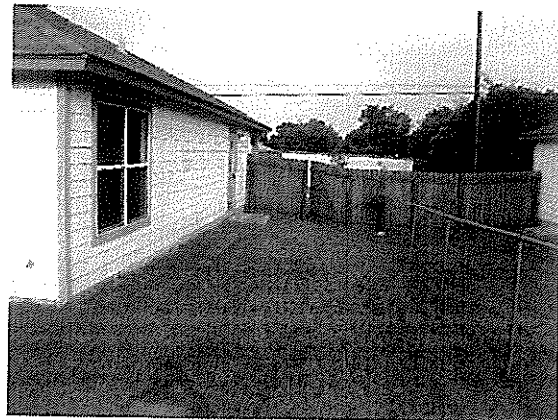


Photograph No. 19

- Some of the structures may have been constructed on fill sites (houses #2, #3, #8, #9, #10, #11, #14, #15, #16, #19, #20, #23, #24, #25, #26, #27, and #28) (See Photographs No. 20 and No. 21).



Photograph No. 20



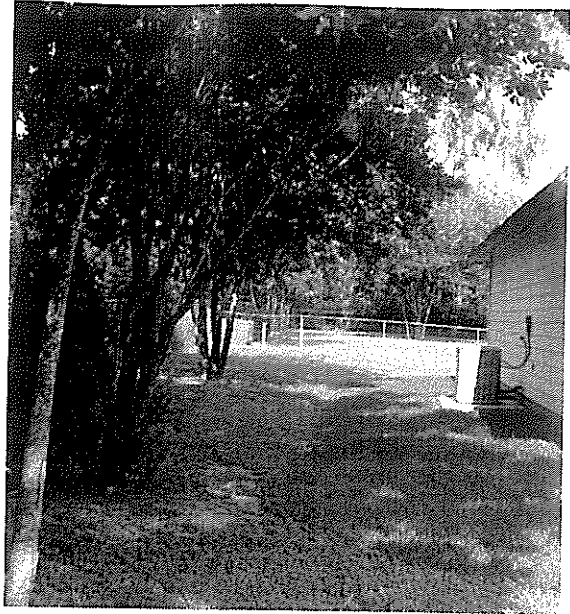
Photograph No. 21

- The site grading at several of the homes (houses #2, #3, #8, #9, #10, #11, #14, #15, #16, #19, #20, #23, #24, #25, #26, #27, and #28) appeared to provide inadequate drainage.
- The landscaping at the houses consisted of grass and other various types of vegetation (weeds).

- There were large trees in close proximity to some of the houses (house #10, #12, #15, #17, #19, #20, #21, and #25) (See Photographs No. 22 and No. 23).



Photograph No. 22



Photograph No. 23

- There were no signs of structural damage or distress at any of the structures.

Additionally, some of the items noted were non-structural in nature (such as broken windows, damaged doors, missing/removed cabinets, removed drywall, no flooring, etc.). The scope of our investigation was limited to structural issues.

Survey Information

As part of our investigation, the interior floor of each structure was surveyed (Reference Appendix B). Shots were adjusted uniformly throughout individual rooms to account for

differences in floor covering thicknesses and floor drops. The following is a summary of the survey data:

- The overall difference in elevation of the main foundation was 1.5 inches or less in thirteen of the homes (houses #1, #2, #4, #6, #7, #10, #16, #18, #19, #20, #24, #25, and #26) investigated.
- In eight of the homes (houses #5, #8, #11, #15, #21, #22, #27, and #28) investigated, the overall difference in elevation of the main foundation ranged between 1.6 and 2.0 inches.
- In six of the homes (houses #3, #9, #12, #13, #17, and #23) investigated, the overall difference in elevation of the main foundation ranged between 2.1 and 2.3 inches.
- One of the homes investigated (home # 14) had an overall difference in elevation of approximately 5.9 inches.
- The overall difference in elevation of the piered homes was approximately one inch. However, one of the piered homes (home #15) had an overall difference in elevation of 1.6 inches.
- The slope of some of the foundations (houses #3, #5, #8, #9, #10, #11, #14, #15, #23, #26, #27) generally followed the site.
- Relatively higher foundation elevations were noted along the perimeter of the structure at some of the houses (houses #1, #2, #5, #11, #13, #18, #19, #22).
- Some of the foundations (houses #12, #17, #21, #25) were found to have relatively lower foundation elevations in the vicinity of a large tree or trees.

Soil Information

As part of our investigation, the characteristics of the near surface soils were determined by reviewing the SOIL SURVEY of Bexar County, Texas as published by the United States Department of Agriculture – Natural Resources Conservation Service. Based on this publication, the naturally existing soils at the sites were determined to be highly expansive.

Discussion/Conclusions

Based on our investigation, we conclude the following:

1. Based on our observations, there were no signs of structural damage or distress to any of the structures.
2. Our elevation survey revealed that the foundations had an overall difference in elevation that ranged from 0.8 to 5.9 inches. It has been our experience that newly constructed foundations are never constructed perfectly level. Therefore, it is our opinion that some of the overall differences in elevation of these structures may possibly be as-built conditions.
3. The soils information indicated that the homes overlie expansive clay soils. Therefore, when moisture increases along the building perimeter, it can cause the underlying soils to swell and raise the perimeter (edges) of the foundation (See Figure 1). On the other hand, as the moisture contained in the soil around the foundation's perimeter decreases (dries

out), the perimeter of the foundation can move in a downward direction (See Figure 2). The drying out effect can be caused by the natural loss of moisture through evaporation, or this drying may be significantly increased by the effect of vegetation located near the foundation. These movements can cause walls and ceilings to crack, and doors to stick throughout the structure.

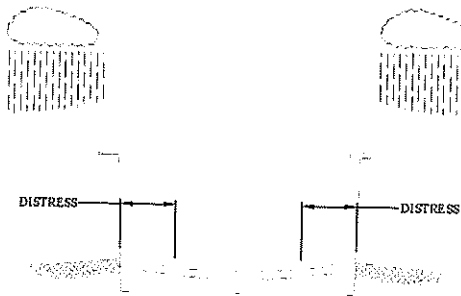


FIGURE 1

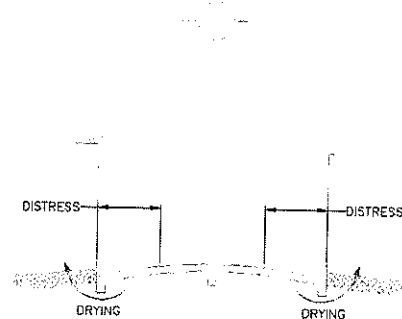


FIGURE 2

4. Due to the expansive nature of the underlying clay soils, water maintenance of the soil along the perimeter of the foundation can affect foundation performance. Therefore, the possibility exists that some of the differential foundation movement and resulting distress may be a result of inadequate water maintenance.
5. At a few of the homes (houses #12, #17, #21, #25), the affects of seasonal moisture changes have been compounded by trees and other vegetation near the foundation (See Figure 3), which tend to decrease the moisture of the underlying soils at the perimeter of the foundation at a faster rate. In these instances, our elevation survey revealed generally lower foundation elevations in the vicinity of trees that were located in close proximity to the foundation.

6. At several of the homes (houses #3, #5, #8, #9, #10, #11, #14, #15, #23, #26, #27), higher foundation elevations were found along the perimeter of the structure where the drainage appeared to be inadequate. In these cases, the affects of seasonal moisture changes have been compounded due to poor drainage (See Figure 4).



FIGURE 3

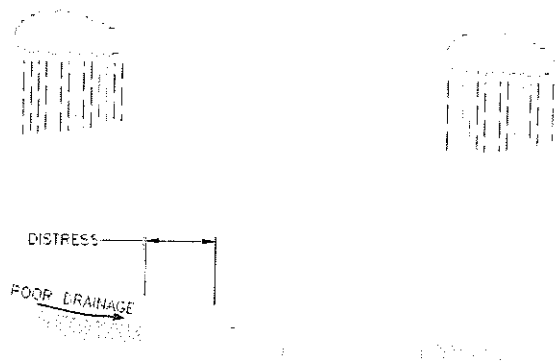


FIGURE 4

7. Based on our observations and our elevation surveys, some of the slopes of the foundations (houses #3, #5, #8, #9, #10, #11, #14, #15, #23, #26, #27) generally followed the slope of the site. In these instances, some of the foundation slope may have been an "as-built" condition or possibly the result of the foundation being constructed on a fill site. This movement is a result of initial settlement of the foundation and typical for foundation constructed on fill sites. (See Figure 5)

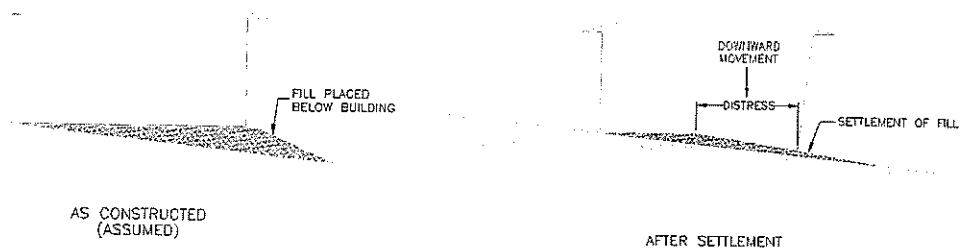


FIGURE 5

8. Our elevation survey also revealed that the foundations of fourteen of the structures (houses #3, #5, #8, #9, #11, #12, #13, #15, #17, #21, #22, #23, #27, and #28) had an overall difference in elevation that ranged between 1.6 to 2.3 inches. We would recommend that this data be brought to the builders and/or designers attention to verify that these elevation differences comply with their original design criteria.
9. Our elevation surveys revealed that the foundation of the structure located at 142 Villa Grande (house #14) had an overall difference in elevation of approximately 5.9 inches. However, we found little to no distress in the interior or exterior finishes. It is therefore our opinion that the foundation has undergone a uniform tilt (See Figure 6). This occurs when the foundation moves uniformly as a unit. Due to the floor slope, we would recommend that this condition be brought to the builders attention for the purpose of addressing the possible need for leveling.

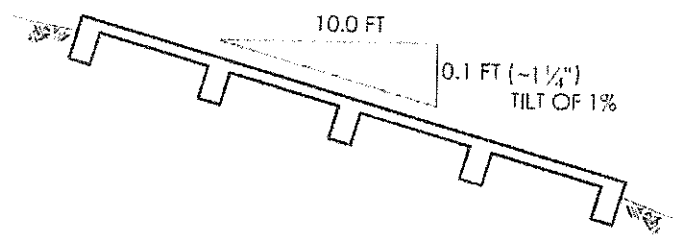


FIGURE 6 – Tilt Schematic

10. Our observations revealed that some of the homes (houses #2, #3, #7, #9, #10, #12, #13, #15, #16, #20, #24, #25, and #26) had cracks and/or patched cracks in the slabs (in both the interior floors and exterior porches). Our observations also revealed that these cracks

were typical shrinkage cracks and were not structural cracks. Shrinkage cracks occur due to normal volumetric changes associated with the drying of the concrete. These cracks develop as the concrete cures and are random hairline cracks (typically less than 1/16 of an inch) that often extend to the perimeter of the slab. However, these cracks often widen due to the vehicular and pedestrian traffic, particularly in the garage areas. These cracks can also widen due to flexural movement of the foundation due to seasonal moisture changes. Shrinkage cracks are not unusual in concrete construction and are considered cosmetic in nature.

11. We noted that the some of the shrinkage cracks were patched. In some cases, the patching that was conducted appears to have negatively magnified the appearance of the cracks. It is our opinion that this condition was the result of the quality of workmanship used in the repair of these cracks.

However, the structure located at 431 Precious (house #24) had an unusually large amount of patched shrinkage cracks. This condition indicates that there may have been a large amount of water used in the concrete mix. Although these cracks have been patched, we have no background information related to these repairs. Therefore, we recommend that the contractor and/or designer be contacted to confirm that these cracks are cosmetic in nature.

12. Our observations revealed that the edge plate of one of the homes (house #16) extended out beyond the edge of the foundation. This condition is a workmanship issue and is not uncommon in residential construction. However, we would recommend that it be verified that the base of the wall has been properly sealed to prevent insect and moisture intrusion.

13. Sealing of the siding joints was noted at several of the houses (houses #6, #14, #18, and #26). It was also noted that the sealant had been liberally applied and has “discolored” in most applications. Based on our observations, it is our opinion that this joint sealing was of poor workmanship and has negatively magnified the appearance of the siding. This condition is cosmetic in nature.

In summary, we found no problems with structural damage or distress. However, house #14 may require leveling due to the foundation tilt.

This report is subject to the Assumptions and Limiting Conditions included in Appendix C.