HERNANDO COUNTY

BUILDING PERMIT APPLICATION

RECEIVED
DEC 2 8 2009
~~HERNANDO COUNTY~~
DEVELOPMENT DEPT.

Want a Deficiency Report Faxed to you?
Please Provide Your FAX#:
Permitting Service FAX #:

1240343-

Key #: 00289814
Date: 12-28-9

Describe work to be done: COMPACTION GROUTING & Polyurethane Grouting

Valuation of work to be done: $ 85,192.00

Type of construction: ________ Frame: ________ CBS: ________ Other: X

Legal description: Lot: 11 Block: 628 Subdivision: SPRING HILL Unit: 10

Address of job site: No.: 2258 Street: Claremont Lane City: SPRING HILL, Hernando County

Directions to job site: T/L on 50, T/R on 41, T/R on Spring Hill Dr, T/R on Stoneville Ct, T/L on Claremont Ln, To Home

Property owner: Margaret Burnham Phone:
Address: 2258 Claremont Lane City: SPRING HILL State: FL Zip: 34609
Interest in property: owner

Name of fee simple titleholder (If Other Than Owner): N/A
Address: City: State: Zip:

Permitting Service Name: N/A Phone: Contact Name:

FILE COPY

Contractor: Frank Vitale - LRE Ground Services, Inc Phone: 352-796-0229
Address: P.O. Box 10263 City: Brooksville, State: FL Zip: 34604
License Number: CBC1256398 (State Certification or Hernando County # Only)

Sub-Contractor List (Complete as Necessary)

Electrical: N/A Phone:
License Number: (State Certification or Hernando County # Only)

Plumbing: N/A Phone:
License Number: (State Certification or Hernando County # Only)

1240343

Roofing: N/A Phone:
License Number: (State Certification or Hernando County # Only)

Aluminum: N/A Phone
License Number: (State Certification or Hernando County # Only)

Bonding Company Name: N/A
Address:
City: State: Zip:

Architect/Engineer's name: Geohazards, Inc.
Address: P.O. Box 14566
City: Gainesville State: FL Zip 32604

Mortgage lender's name: N/A
Address:
City: State: Zip:

Application is hereby made to obtain a permit to do the work and installations as indicated. *I certify that no work or installation has commenced prior to the issuance of a permit and* that all work will be performed to meet the standards of all laws regulating construction in this jurisdiction. I understand that a permit must be secured for ELECTRICAL WORK, PLUMBING, SIGNS, WELLS, POOLS, FURNACES, BOILERS, HEATERS, TANKS, and AIR CONDITIONERS, ETC.

OWNER'S AFFIDAVIT: I certify that all of the foregoing information is accurate and that all work will be done in compliance with all applicable laws regulating construction and zoning.

WARNING TO OWNER: YOUR FAILURE TO RECORD A NOTICE OF COMMENCEMENT MAY RESULT IN YOUR PAYING TWICE FOR IMPROVEMENTS TO YOUR PROPERTY.

IF YOU INTEND TO OBTAIN FINANCING, CONSULT WITH YOUR LENDER OR AN ATTORNEY BEFORE RECORDING YOUR NOTICE OF COMMENCEMENT.

Terry K. Edwards
Owner/Contractor or Authorized Agent

State of: FL County of: Hernando
The foregoing instrument was acknowledged before me this 28 day of Dec, 2009 by Terry Edwards,
who is (✓) personally known to me or who ( ) has produced ______ as identification.

Signature of Notary Public

Application Approved By: ______ Permit Representative

Notary Public - State of Florida
My Commission Expires May 28, 2011
Commission # DD 668602
Bonded Through National Notary Assn.

1240948-

Hernando County Development Department

Brooksville Office:
789 Providence Boulevard
Brooksville, FL 34601-2893
Phone: (352)754-4050
FAX: (352)754-4416

Spring Hill Office
7431 Forest Oaks Boulevard
Spring Hill, FL 34606
Phone: (352)[illegible]
FAX: (352)[illegible]

www.co.hernando.fl.us

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E:\wpdata\permits\bldg2.app Rev. 06/13/02

AUTHORIZED AGENT AFFIDAVIT

I Frank V. Vitale hereby grant authorization to Terry Edwards
(Contractor) (Authorized Agent)
to act in my behalf with the Hernando County Development Department while conducting activities related to obtaining permits. These activities specifically include signing all documents requiring signature of "contractor".

Terry Edwards is to be considered an agent of my business and
(Authorized Agent)
therefore the signature of said agent is binding and causes me to assume all responsibilities connected to or associated with the signature as they may relate to my contracting business.

I Frank V. Vitale relieve the Hernando County Development of,
(Contractor)
and agree to hold the Hernando County Development Department harmless from, any and all responsibility, claims or other actions arising from or related to the Department's acceptance of the above agent's signature for permit-related activities. I further understand that it is my sole responsibility to grant and terminate any such authorization and to ensure that the Department receives timely notice of any such grant or termination.

Signature of Contractor

Terry K Edwards
Signature of Agent

CBC1256398
State Certification or Registration Number

1240843

County Certification Number (if applicable)

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PLEASE NOTE: BOTH SIGNATURES MUST BE NOTARIZED

Notary for Contractor's Signature:

State of Florida County of Hernando

The foregoing was acknowledged before me this 29 day of May, 2009, by Frank V. Vitale, who is personally known to me, or who produced ______ as identification.

Jennifer L. Harris
Notary Public Signature

JENNIFER L. HARRIS
Notary Public - State of Florida
My Comm. Expires Nov 11, 2012
Commission # DD 836804
Bonded Through National Notary Assn

Print, Type or Stamp Name of Notary

Notary for Agent's Signature:

State of Florida County of Hernando

The foregoing was acknowledged before me this 29 day of May, 2009, by Terry K. Edwards who is personally known to me, or who produced ______ as Identification.

Jennifer L. Harris
Notary Public Signature

JENNIFER L. HARRIS
Notary Public - State of Florida
My Comm. Expires Nov 11, 2012
Commission # DD 836804
Bonded Through National Notary Assn

Print, Type or Stamp Name of Notary

* The original of this affidavit should be kept in the possession of the above designated Authorized Agent. This affidavit need only be produced to Hernando County when signing documents in the presence of a permit representative. When you sign a permit application be prepared to produce this affidavit, it will be copied and placed in the appropriate permit application.*

Revised 11/08/99 contauth..sop

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Permit No.
Key No. 00289814
Tax Folio/Parcel ID: R32 323 17 5100 0628 0110

2010007825
LORINDA 2719/1244

NOTICE OF COMMENCEMENT

State of Florida County of Hernando

THE UNDERSIGNED *hereby gives notice that improvement will be made to certain, and in accordance with Chapter 713, Florida State Statues, the* following information is provided in this Notice of Commencement:

OFFICIAL RECORDS
BK: 2719 PG: 1244

LT1-2-2010007825-1

1. Description of Property: Parcel No. SPRING HILL UNIT 10 BLK 628 LOT 11 ORB 312 PG 121
(Legal description of the property and street address if available)

2. General Description of Improvement: COMPACTION GROUTING & Polyurethane Grouting

3. Owner Information: Name: Margaret Burnham or Gary Burnham
Address: 2258 Claremont Lane City SPRING HILL State FL 34609
Interest in Property: Owner
Name and Address of Fee Simple Titleholder (if other than owner) :

4. Contractor: Name: Frank Vitale - LRE Ground Services, Inc.
Address: P.O. Box 10263 City Brooksville, State FL ~~33584~~ 34603
Phone No. 352-796-0229 Fax No. 352-754-4558

5. Surety: Name Amount of Bond: $
Address: City State
Phone No. Fax No.

LT2-2719-1244-1

02/11/2010 4:18PM # Pages 1
Filed & Recorded in Official Records of
HERNANDO COUNTY CLERK OF COURT
KAREN NICOLAI

6. Lender: Name:
Address: City State
Phone No. Fax No.

7. Persons within the State of Florida designated by Owner upon whom notices or other documents may be served as provided by Section 713.13(1)(a)(7), Florida Statutes. Name:
Address: City State
Phone No. Fax No.

8. In addition to himself or herself, Owner designates of ,
To receive a copy of the Leinor's Notice as provided in Section 713.13(1)(b), Florida Statutes.

9. Expiration date of Notice of Commencement (the expiration date is 1 year of recording unless a different date is specified.)

WARNING TO OWNER: ANY PAYMENTS MADE BY THE OWNER AFTER THE EXPIRATION OF THE NOTICE OF COMMENCEMENT ARE CONSIDERED IMPROPER PAYMENTS UNDER CHAPTER 713, PART 1, SEC 713.13, FLORIDA STATUTES, AND CAN RESULT IN YOUR PAYING TWICE FOR IMPROVEMENTS TO YOUR PROPERTY. A NOTICE OF COMMENCEMENT MUST BE RECORDED AND POSTED ON THE JOB SITE BEFORE THE FIRST INSPECTION. IF YOU INTEND TO OBTAIN FINANCING, CONSULT WITH YOUR LENDER OR AN ATTORNEY BEFORE COMMENCING WORK OR RECORDING YOUR NOTICE OF COMMENCEMENT.

Signature of Owner or Owner's Authorized Officer/Director/Partner/Manager

Signatory's Title/Office

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CLERK OF CIRCUIT COURT HERNANDO COUNTY FLORIDA

STATE OF FLORIDA
COUNTY OF HERNANDO
This is to certify that the forgoing is a true and correct copy of the original on file in my office. 02-11-10
Witness my hand and official seal this 02-11 20 10
Karen Nicolai, Clerk Circuit Ct.
By Deputy Clerk

State of Florida
County of ~~Citrus~~ Hernando

The forgoing instrument was acknowledged before me this 10 day of February 20 10 by Gary Burnham, as
(Name of Person)

for .
(Type of authority e.g., office, trustee, attorney in fact) (Name of party on behalf of who instrument was executed)

Signature of Notary

Print, Type or Stamp Name of Notary

Personally known ____ OR Produced Identification ✓
Type of Identification Produced: DL

JAMES J. BON
MY COMMISSION # DD 632411
EXPIRES: May 22, 2011
Bonded Thru Notary Public Underwriters

Verification pursuant to Section 92.525, Florida Statutes: under *Penalties of perjury, I declare that I have read the foregoing and* that the facts stated in it are true to the best of my knowledge and belief.

Signature of Natural Person Signing Above

F:/SHARED/DDS/BUILDING/forms/NOC 2007

SDII Global Corporation
4509 George Road
Tampa, Florida 33634
813.496.9634
Fax 813.496.9664

NOTICE

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SUBSIDENCE INVESTIGATION

BURNHAM RESIDENCE
2258 CLAREMONT LANE

SPRING HILL, FLORIDA

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GEOHAZARDS, INC.

Professional Geological, Geophysical and Geotechnical Engineering Sciences

P.O. BOX 14566
Gainesville, Florida 32604

Anthony F. Randazzo, Ph.D.
Geologist
Florida PG# 0003
Georgia PG# 1136

David Bloomquist, Ph.D.
Geotechnical Engineer
Florida PE# 37235

Attila A. Bodo, M.E.
Structural Engineer
Florida PE#15834

Douglas L. Smith, Ph.D.
Geophysicist
Florida PG# 0018
Georgia PG# 1140

ZONING PERMIT zoned PDRSF
to be used as Grouting
Checked By B Date 12/29/09

The work being done under this permit does not require a change in setback or create any encroachments. Any additional work will require other permits.

August 17, 2009

Geohazards, Inc., Project No. 2009647

Greg Schneidmiller
HomeWise Insurance
PMB 306
19046 Bruce B. Downs Blvd.
Tampa, Florida 33647

RECEIVED
DEC 10 2009
BY:

Re: Burnham Property, Claim No. HP16708

Dear Mr. Schneidmiller:

Pursuant to your request, we have reviewed the report by SDII Global Corporation (SDII) dated July 30, 2009, of the investigation of the Burnham property at 2258 Claremont Avenue, Spring Hill, Florida. We offer the following comments and opinions:

1. The SDII investigation consisted of ground penetrating radar (GPR) survey, 3 standard penetration test (SPT) borings, 5 hand auger borings, 2 test pit excavations, hand cone penetrometer tests, a floor elevation survey and a structural evaluation. The array of tests conducted is consistent with our understanding of the expectations for FS 627.707.

2. A "slight" depression was observed in the front yard, approximately 15 feet west of the west corner of the garage. The depression measured 5 feet by 3 feet and was approximately 1 inch deep. SPT boring B-1 was conducted between the depression and residence.

3. The SDII hand auger borings penetrated sand and slightly silty sand to 10 feet depth. The surficial water table was not encountered in the borings. Penetrometer probes within the hand auger borings encountered generally very loose to loose near-surface soils.

4. SDII detected two anomalous GPR features at the Burnham property. GPR anomaly A was located near the south corner of the residence and was further explored with SPT boring B-2. GPR anomaly B was located along the southwest side of the residence and was further tested with SPT boring B-3.

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5. Test pit TP-1 revealed the foundation for the main structure to be embedded 10 inches below ground surface. Current construction codes require house foundations to be embedded a minimum of 12 inches below ground surface.

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6. The results of the floor elevation survey recognized an elevation difference of approximately 0.8 inches within the main living area, which is within construction tolerance limits.

7. The SPT borings penetrated similar sequences of sands and clayey sands, overlying limestone at depths ranging from 47 to 88.5 feet. The variability in the depth to limestone is indicative of a possible paleosink environment underlying the Burnham property. In SPT boring B-1, a 2-foot weight-of-rod condition, loss of drilling fluid circulation and very soft limestone was experienced near the clayey sand-limestone contact. A series of declining N-values was also recorded in B-1 from 70 to 90 feet depth, above the deepest detected limestone. This boring was located near the shallow surface depression located near the west corner of the garage. Complete loss of drilling fluid circulation was experienced all three borings. Very soft limestone was penetrated in borings B-1 and B-2.

8. SDII concluded that sinkhole activity does not exist at the Burnham residence, and attributed the distress to "concrete shrinkage, expansion/contraction of building materials due to changes in ambient temperature and humidity levels, and post-construction structural settlement."

9. Geohazards, Inc. agrees that causes of distress noted by SDII appear plausible. However, the subsurface conditions encountered at the Burnham residence are interpreted as indicative of raveling. Raveling is the vertical or lateral migration of sediments to deeper, more distant places in limestone. It is a mechanism for sinkhole formation. Sinkhole activity can not be eliminated as a contributing source of the observed distress, in our opinion.

As requested, we have prepared a remediation program estimate to address the subsurface conditions at the site. If you have questions about our opinions, please do not hesitate to contact us. We appreciate the opportunity to be of service. Our invoice is attached.

Gerald O. Black, P.G.
Geologist

Scott E. Purcifull, P.G.
Geologist

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July 30, 2009

Mr. Greg Schneidmiller
HomeWise Insurance Company
PMB 306
19046 Bruce B Downs Blvd.
Tampa, FL 33647

Subject: Final Report – Subsidence Investigation
Burnham Residence - Spring Hill, Florida
Claim Number HP16708
SDII Project No. 3020158

Dear Mr. Schneidmiller:

SDII Global Corporation (SDII) is pleased to submit this final report of our subsidence evaluation for the above referenced project. When conducting a subsidence investigation, SDII follows the general sinkhole-investigation protocols included in Chapter 627.707 Florida Statutes and described in "Geological and Geotechnical Investigation Procedures for Evaluation of the Causes of Subsidence Damage in Florida" (Florida Geological Survey, Special Publication No. 57, 2005).

Presented herein are the findings and conclusions of our investigation including geologic, geotechnical, and structural evaluations of the cause(s) of damage to the Burnham residence. These evaluations are based on an extensive data collection and interpretation effort by our technical staff who have been trained in Florida subsidence investigation techniques and data interpretation, and supervision and review by the senior professionals who have signed and sealed the report. As the person responsible for training and assuring the quality of our investigations, I monitor all investigations and reports.

SDII appreciates the opportunity to have assisted HomeWise Insurance Company on this project. The senior professionals who developed the opinions herein and signed the report and I are always available to help. If you have any questions or comments concerning this report, please contact us.

Sincerely,

SDII GLOBAL CORPORATION

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Sam B. Upchurch, Ph.D., P.G.
Vice President and Principal Geologist

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1.0 INTRODUCTION

1.1 Background

SDII Global Corporation (SDII) was retained by HomeWise Insurance Company to conduct a subsidence investigation in accordance with §627.707 Florida Statutes at the Burnham residence in Spring Hill, Florida. The purpose of the investigation was to determine the existence of sinkhole activity and a sinkhole loss as defined by §627.706 Florida Statutes at the residence. This report provides the results of the subsidence investigation.

1.2 Scope of Work

The following methods were used during the investigation to determine the existence of sinkhole activity at the residence.

- The residence was inspected to determine the nature and extent of reported damage and to observe existing conditions across the property.
- The homeowner representative was interviewed to obtain the timeline for the damage, chronology of construction, ownership of the structure, and background information relative to potential causes of damage to the structure.
- Available published data were reviewed regarding general geologic and hydrogeologic conditions in the area of the residence.
- A ground penetrating radar (GPR) survey was conducted inside and outside of the residence to determine the presence of anomalous soil conditions that might be indicative of karst activity, buried debris, or otherwise disturbed or unusual subsurface conditions.
- Hand auger borings and push penetrometer soundings were advanced to determine the composition and strength of subsurface materials near the foundation.
- Standard penetration test (SPT) borings were advanced to determine the relative strengths of soils and to characterize deep geologic conditions.
- Representative soil and geologic material collected from the SPT borings were analyzed in the laboratory to confirm visual interpretations and further characterize the properties of the materials.
- Two test pits were excavated to observe foundation construction and geometry directly.
- Relative floor elevation contour mapping was completed to identify anomalous floor elevation trends and establish a baseline contour map of the existing floor elevation.
- A structural assessment was completed to identify construction methods and structural deficiencies related to the potential causes of observed conditions.

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The property was predominantly flat. The observed damage to the house consisted of cracks in the walls, flooring and ceiling of the residence. According to the homeowner, the damage was first noticed January 2009.

There was a slight depression in the front yard, on the west side of the driveway. The area was approximately 5 feet by 3 feet by 1 inch deep. The grass at the center of the area appeared to be distressed.

A more detailed description of the observed damage is discussed in "Section 3.0 Structural Evaluation". Photographs showing representative examples of the observed damage to the structure are provided on Figure 2. A complete set of photographs taken at the property has been archived and is available upon request.

1.5 Review of Published Soils Data

The Soil Conservation Service (SCS) Soil Survey for Hernando County[1] lists the soils underlying the residence as Candler fine sand, 0 to 5 percent slopes. This is a nearly level to gently sloping, excessively drained soil.

Typically, the surface layer is dark grayish brown fine sand about 4 inches thick. The subsurface layer is fine sand to a depth of about 48 inches. The upper 5 inches is brown, the next 11 inches is light yellowish brown, and the next 28 inches is brownish yellow. Below a depth of 48 inches is very pale brown fine sand containing lamellae of brown loamy fine sand about 1/16 to 1/8 inch thick and 1 to 4 inches long.

The water table is below a depth of 80 inches. Permeability is very rapid in the upper 48 inches of the profile and rapid below. This soil has very low available water capacity in the upper 48 inches, and low available water capacity below that depth.

1.6 Review of Published Topographic Data and Aerial Photographs

The U.S. Geological Survey topographic map of the area[2] indicated that the estimated ground surface elevation for the site is approximately 40 to 50 feet NGVD.

Closed depressions that might indicate ancient sinkhole activity were shown on the topographic map within a mile of the house. Closed depressions do not necessarily indicate current sinkhole activity and may represent other origins of the landform.

1.7 Review of Published Hydrologic Data

The potentiometric surface of the Floridan aquifer in the area of the residence had an estimated range from 10 to 20 feet above mean sea level [3]. This elevation range is below land surface and the apparent elevation of the water table, so there is a downward vertical hydraulic gradient.

[1] Soil Conservation Service, 1977. Soil Survey of Hernando County. U.S. Department of Agriculture
[2] U.S. Geological Survey, 1988. Port Richey NE Quadrangle. Washington, D.C., 1:24,000 topographic map.
[3] Duerr, A.D., 2001. Potentiometric Map of the Floridan Aquifer, May, 2001. U.S. Geological Survey

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epikarst surface. Examples of weathering features found on the epikarst surface include solution-enlarged fractures, solution holes, and limestone pinnacles.

During periods of high sea level, sand and clayey sediments were deposited over the Suwannee Limestone. When sea level fell, these sediments were eroded away. For example, during the Miocene Epoch, sand and clay were deposited on the ancient, epikarst surface of the Suwannee Limestone. This Miocene cover was later removed by erosion as sea level retreated, leaving the rough, irregular surface of the limestone filled with isolated remnants of Miocene clay and sand. Generally, these Miocene sediments can be differentiated from the overlying Pleistocene-Holocene terrace deposits by their phosphatic mineralogy and tendency to contain silt and clay.

In this region, low-resistance materials and losses of drilling fluid circulation during standard penetration tests are often related to shallow weathering or erosional features at or near the epikarst, or with ancient erosional features near strata contacts. Sinkhole activity in this geologic setting is controlled largely by the thickness of the sedimentary cover that overlies the limestone. This cover ranges from approximately 30 to 200 feet thick. When sinkholes do occur in this geologic setting, they may be numerous, vary in size, and open abruptly.[8]

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[8] Sinclair, W. C. and J.W. Stewart. 1980. Sinkhole Type, Development and Distribution in Florida. Florida Bureau of Geology Map Series No. 110.

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2.5 Geologic and Geotechnical Evaluation Summary

The hand auger boring and SPT boring data indicate that sinkhole activity, as defined by §627.706 Florida Statutes, was not encountered at the site.

Hand auger boring HA-5 encountered a slightly thicker layer of gray sand with silt.

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3.0 STRUCTURAL EVALUATION

3.1 Scope of Structural Evaluation and Overview of Site Conditions

The purpose of the visual, structural assessment of the Burnham residence was to help determine the probable causes that have contributed to the damage of the residence. The homeowner's son, Mr. Gary Burnham, and public adjuster, Mrs. Vicki Delgado, were present during the field portion of the assessment.

According to information provided by the Hernando County Property Appraiser's website, the single-story structure was built in 1986. There were no reported or observed additions. The structure faces generally northwest and is constructed of masonry-block, exterior load-bearing walls. The floor of the residence consists of a soil-supported, concrete slab-on-grade. The main roof structure was hip in design and was covered with asphalt shingles.

There is an in-ground pool located adjacent to the rear of the residence. The pool deck appeared to be an unreinforced concrete slab-on-grade. The pool had a screened enclosure. The pool deck was finished with cool deck coating.

Two test pit (TP) excavations were performed along the perimeter of the main structure and pool deck to directly observe the foundation construction and geometry. For the approximate locations of the test pit excavations see Figure 4.

The results of TP-1 indicate that the foundation of the main structure consists of a concrete slab-on-grade with a thickened edge monolithic footing. The footing was embedded 10 inches. The top of the slab was 5 inches above the existing ground surface for a total footing thickness of 15 inches.

The results of TP-2 indicate that the foundation of the pool deck consists of a 4 inches thick concrete slab-on-grade. The slab was embedded 4 inches.

3.2 Summary of Structural Damage

The following paragraphs summarize the damage noted during the investigation. Approximate locations and photographs representative of the damage are illustrated in Figure 2. All of the photographs and other information obtained by SDII will be retained in the project file and can be provided upon request.

On the interior of the residence, SDII observed cracks that ranged from hairline to 1/16-inch in separation in the walls of the garage, kitchen, and master bathroom. SDII observed cracks that ranged from hairline to 1/16-inch in separation in the ceiling of the hallway, southwest bedroom, garage, guest bathroom, master bedroom, master bathroom, and family room. There were cracks that ranged from hairline to 1/16-inch in separation in the floor tile of the foyer, guest bathroom, and master bathroom. There were cracks that ranged from hairline to 1/16-inch in separation in the floor slab of the garage.

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Installation of Ceramic Tile, proper installation of ceramic tile involves using an isolation membrane between the floor tile and the concrete slab over any existing cracks. It also involves establishing a minimum of 80 percent contact area between the tile and the thin-set while ensuring proper bond between the thin-set and a debris-free concrete surface.

The separation between the aluminum window frame and the window return is consistent with deteriorated and/or improper weatherproofing around the window. The magnitude of this separation is further aggravated by changes in temperature and ambient humidity levels. This separation is unrelated to differential movement of the foundation. This type of damage is normally mitigated by a regular maintenance program in which caulk is applied at the interface between the window and the window return.

The remaining interior cracking observed on the residence is consistent with post-construction structural settlement that is within an expected range for the type and age of construction and the soil types and conditions encountered at the site. Post-construction structural settlement occurs when the self-weight of a structure is transferred to the design bearing locations. There is a minor degree of deflection associated with this load transfer, which is typically accounted for in the initial design. This structural settlement does not affect structural integrity. However, minor stress will be redistributed through the structure resulting in hairline cracking of the drywall in the ceilings and interior walls. Locations that are particularly susceptible are above windows, doorways and openings, at or near changes in geometry of the framing, and at or near abrupt changes or corners of a drywall panel. This type of cracking has no bearing on the structural integrity of the residence and is unrelated to differential movement of the foundation.

3.5 Summary of Structural Evaluation

It is the professional opinion of SDII that the damage to the residence is the result of concrete shrinkage, expansion/contraction of building materials due to changes in ambient temperature and humidity levels, and post-construction structural settlement.

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5.0 LIMITATIONS

5.1 Ground Penetrating Radar

According to ASTM D6429, GPR is the preferred method for investigating "voids and sinkholes". This is because the method provides high-resolution data with a minimum of interferences. GPR has been used in similar investigations to help identify shallow subsurface conditions that are frequently associated with karst features. In many cases, a GPR investigation has resulted in the identification and mapping of the boundaries of karst features and has helped characterize their size and geometry. However, this method is limited to the ability of the GPR unit to collect interpretable data at the project site. There is a possibility that karst features may exist at the project site and not be detected by the GPR technique due to small size, subsurface soil conditions, or the occurrence of such karst features below the depth of penetration of the GPR signal. Note that many GPR anomalies are not sinkhole or karst features. The presence of an anomaly should not be construed to reflect sinkhole activity simply because of its existence.

5.2 Standard Penetration Test and Hand Auger Borings

The determination of soil type and conditions was only done from the ground surface to the maximum depth of the borings. Any changes in subsurface conditions that occur between or below the borings would not have been detected or reflected in this report.

The maximum depth of hand auger borings is 10 feet bls unless otherwise noted.

Soil classifications are based upon identifiable textural changes, color changes, changes in composition, or changes in resistance to penetration at the intervals from which such samples were collected. Abrupt changes in soil type, as reflected in boring logs and/or cross sections, may actually represent gradual transitions.

Depth to the water table is based upon observations made while advancing hand augers and SPT borings. This depth is an estimate and does not reflect the annual or extreme variations that occur in this area due to fluctuations in rainfall, pumpage, and rates of evapotranspiration. Low permeability soils or sediments may not allow water to freely enter the borehole and, therefore, the water table may not be evident or it may only represent a transient condition. The depths are estimated from the immediate land surface, which is not surveyed or tied to a known reference elevation.

5.3 Site Figures

The measurements used for the preparation of the figures in this report were made with a fiberglass measuring tape or measuring wheel. Such measurements are usually accurate to within ±5 percent. Right angles were estimated from existing exterior walls at the house; such angles are usually accurate to within 5 degrees. Figures in this report were not prepared by a licensed land surveyor and should not be interpreted as such.

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6.0 ENDORSEMENTS

6.1 Compliance with Florida Statute Title XXXVII Chapter 627.7073

This report followed the Statutory requirements that it be prepared by an individual qualified to determine the existence of sinkhole activity and that the tests performed be of sufficient scope to eliminate sinkhole activity as the cause of damage. SDII certifies that this investigation was of sufficient scope to determine the cause(s) of damage within a reasonable probability as specified in §627.7073 Florida Statutes.

In accordance with Florida Statutes, the following individuals, who are licensed to practice in the State of Florida and are Principals of SDII, have supervised this investigation and report.

SDII GLOBAL CORPORATION

Monica L. Fowler, P.G.
Senior Geologist
Florida Registration Number 1388

Thomas H. Fisher, P.E.
Professional Engineer (Structural)
Florida Registration Number 58027
FBPE CA Number 8778

12408343-
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Table 1

Chronology of Field Testing

Type of Field Test	Details	Date of Data Collection
Ground Penetrating Radar	Appendix A	July 9, 2009
Test Pit Excavation	Appendix A	July 9, 2009
Hand Auger Borings	Appendix A & B	July 9, 2009
Standard Penetration Testing	Appendix A & C	July 20 & 21, 2009
Relative Floor Elevation Contour Map	Appendix A & Figure 5	July 9, 2009

Table 2

GPR Instrument Settings

GPR Transects	Antenna Frequency (megahertz)	Time Range (nanoseconds)
Outside of Structure	200	180
Inside of Structure	500	60

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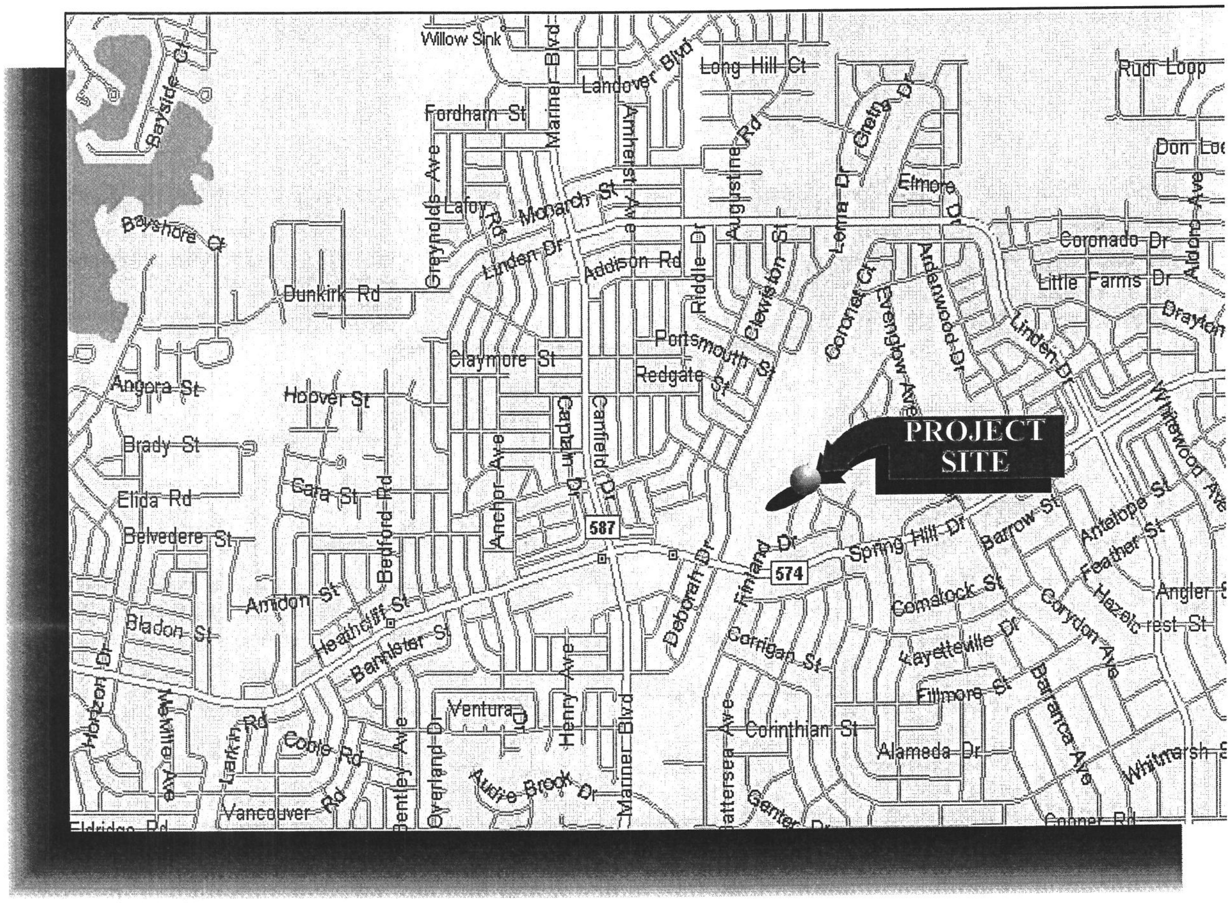

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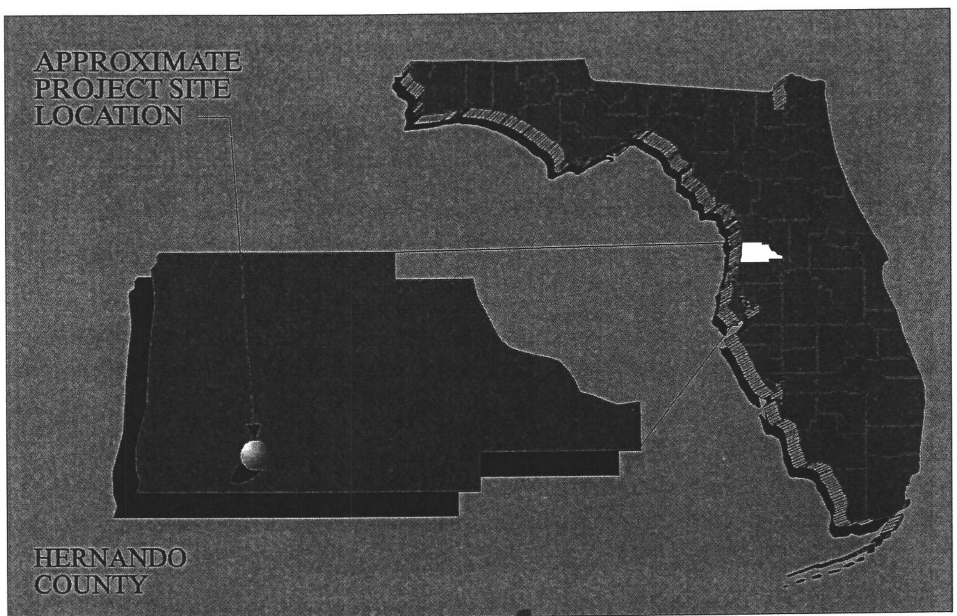
NOT TO SCALE



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HOMEWISE INSURANCE COMPANY TAMPA, FLORIDA	SDII GLOBAL	**PROJECT SITE LOCATION MAP**	
		BURNHAM RESIDENCE SPRING HILL, FLORIDA	
		DESIGNED BY: MZ / CHECKED BY: SU / DRAWN BY: SAS	PROJECT NO.: 3020158 / DRAWING NO.: 0158-1 / DATE: 07/27/09	FIGURE 1

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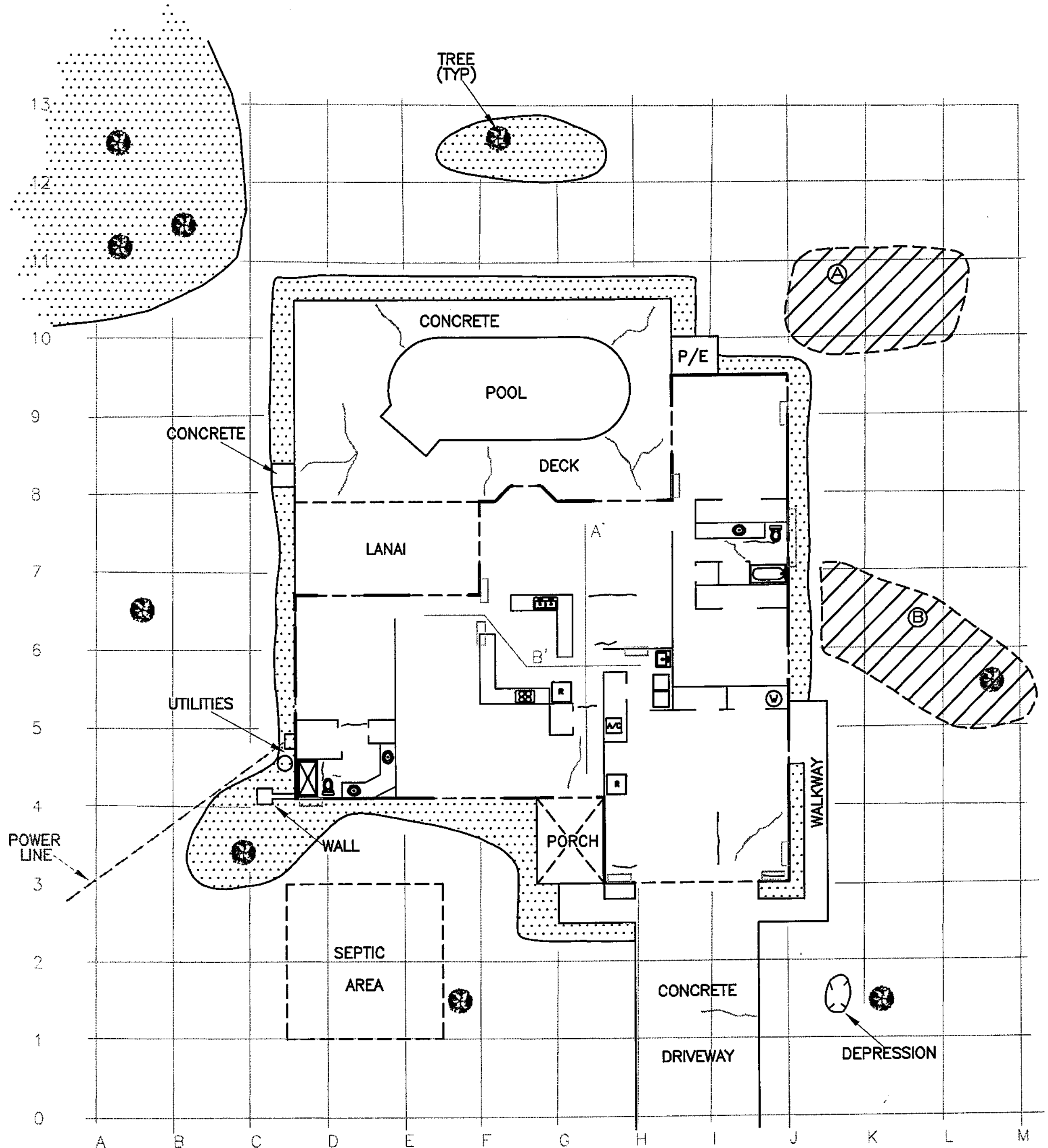

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APPROXIMATE LOCATION OF GPR TRANSECT LINE
APPROXIMATE LOCATION OF SUBSURFACE ANOMALY WITH DESIGNATION
APPROXIMATE LOCATION OF AREA PARTIALLY OR TOTALLY INACCESSIBLE TO GPR SURVEY
APPROXIMATE LOCATION OF CRACKING/SEPARATION ON WALLS
APPROXIMATE LOCATION OF CRACKING/SEPARATION IN CONCRETE SLAB
APPROXIMATE LOCATION OF CRACKING IN CEILING

0 20'
SCALE

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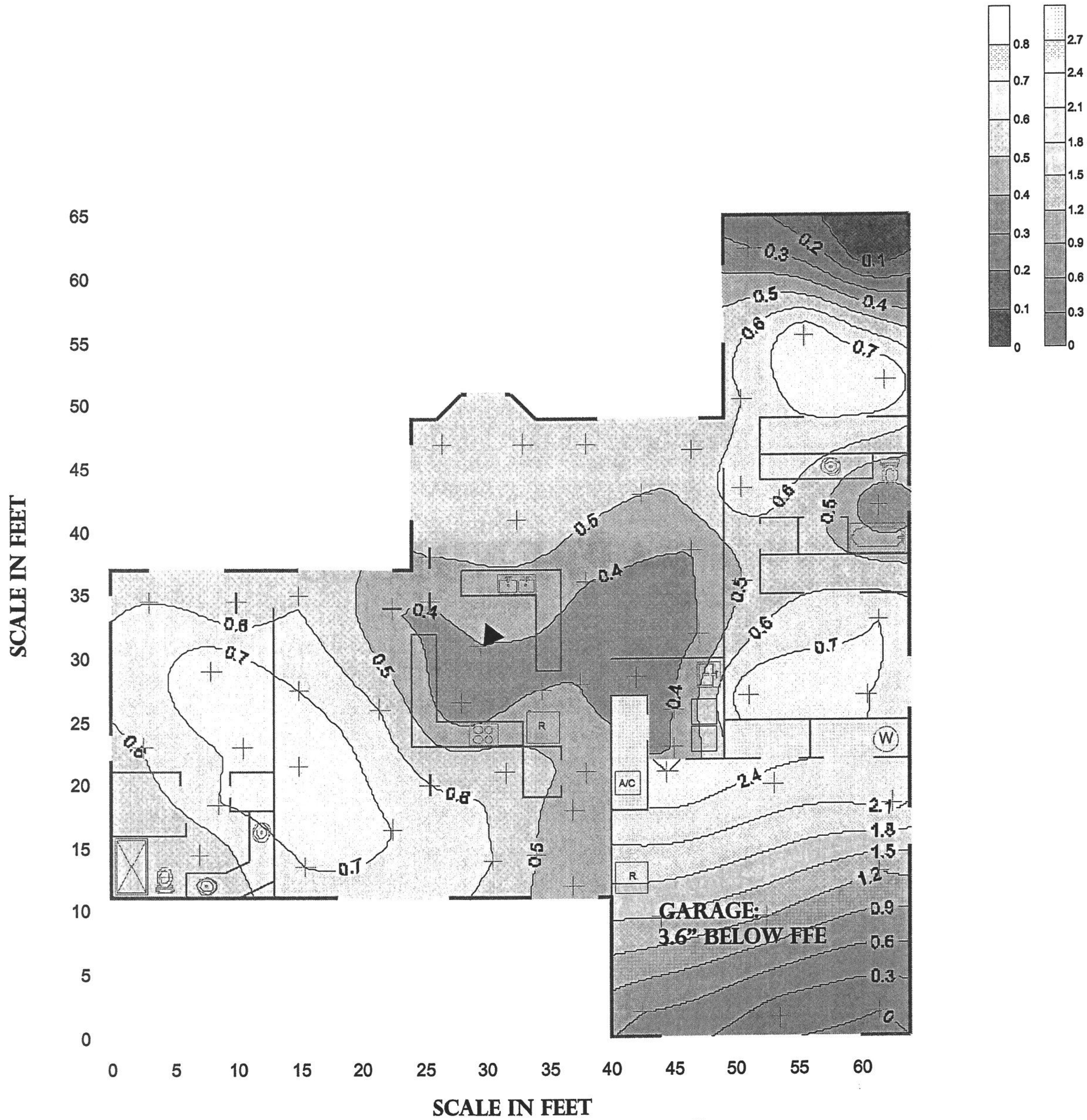
HOMEWISE INSURANCE COMPANY TAMPA, FLORIDA	SDII GLOBAL	SITE PLAN SHOWING APPROXIMATE LOCATION OF GPR SURVEY AND RESULTS BURNHAM RESIDENCE SPRING HILL, FLORIDA	
		DESIGNED BY: MDZ	PROJECT NO.: 3020158	FIGURE
		CHECKED BY: SU	DRAWING NO.: 0158-3	3
		CREATED BY: SMS	DATE: 07/27/09	

NOTE: COLOR SCALES DENOTE
RELATIVE ELEVATION IN INCHES



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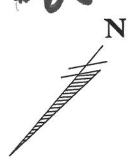

\+ INDICATES POINT OF MANOMETER DATA COLLECTION

▼ APPROXIMATE LOCATION OF MANOMETER

FFE FINISHED FLOOR ELEVATION OF MAIN LIVING AREA

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HOMEWISE INSURANCE COMPANY TAMPA, FLORIDA	SDII GLOBAL	RELATIVE FLOOR ELEVATION CONTOUR MAP BURNHAM RESIDENCE SPRING HILL, FLORIDA	
		SURVEYED BY: ED CHECKED BY: THF DRAWN BY: SMS	PROJECT NO.: 3020158 DRAWING NO.: 0158-5 DATE: 07/24/09
			FIGURE 5

APPENDIX A

EXPLANATION OF METHODS

Ground Penetrating Radar

Ground penetrating radar (GPR) is a geophysical exploration tool that is used to detect shallow conditions in the soils adjacent to, and with appropriate conditions, underlying a structure. The method involves towing an antenna that generates a signal in the radar frequency range. This signal penetrates the soil and, upon encountering changes in soil conditions, a portion of the signal is reflected back to the antenna. By measuring the two-way travel time of this signal as it returns from a reflector, the general configuration of soil horizons can be mapped. The depth of penetration and quality of the data depend on the subsurface materials.

GPR methods are used to detect unusual soil conditions (anomalies) in the shallow subsurface. These anomalies *may* reflect sinkhole conditions, underground utilities, changes in soil composition, water content, or orientation; and many other conditions. SDII tests these anomalies directly by standard penetration testing, cone penetrometer, or we place a boring between the anomaly and structure in order to determine if conditions represented by the anomaly extend to the structure.

GPR methods are described in ASTM (American Society for Testing and Materials) Method D6432.

Hand Auger Borings

Hand auger borings are utilized to collect soils near the foundation of the structure and in areas where sampling of the soils in the shallow subsurface is prudent. The hand auger consists of bucket-type sampler and an extendable handle. The bucket sampler has sharpened tines designed to cut into the soil. The soil passes through the tines and into a 3 inch cylindrical container from which the sample is removed. Soil samples are collected in increments of 6 inches. Soil samples are placed into containers and labeled for classification in the laboratory.

Hand auger borings are collected according to ASTM Method D1452.

Test Pit Excavations

Test pits are excavated at the foundation of investigated structures. If additions have been added to the house, or if the investigator has reason to expect that the foundation vary around the structure, more test pits will be excavated. The investigator excavates to the bottom of the foundation, notes the manner of foundation and slab construction, and takes measurements where possible.

There are no published standards for test pit excavation.

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SDII utilizes a unique method to track and document circulation of drilling fluid. The Glossary defines the terms used to note the condition of circulation, and the SPT boring logs (Appendix C) present the relevant data for each borehole. We track two conditions: fluid return to the surface from the borehole and loss of fluid from the borehole into surrounding strata.

If the drill bit becomes clogged or if the clay content of the drilling fluid is high enough to increase the fluid viscosity and prevent the pumps from circulating the liquid, circulation may be reduced or eliminated. Loss of drilling fluid movement for these reasons does not suggest the presence of cavities or other sinkhole-related phenomena because the volume of drilling fluid in the system does not change. SDII's boring logs state the initial flow of drilling fluid through the system and then track any reductions in flow in order to separate loss of return of the mud to the surface from within the borehole from loss of the fluid from the borehole into the surrounding strata.

If the drilling fluid flows out of the borehole into the surrounding strata, drilling fluid is lost. This is known as a loss of drilling fluid circulation and the rate at which the fluid flows out of the borehole into the surrounding strata can be used to understand the nature of the permeable zone into which the liquid flows. If the permeable zone is a cavity or contains large pores, loss of fluid circulation is rapid. If the fluid is lost from the borehole slowly, it is probably moving into sand or other materials that are permeable but not characterized by pore spaces large enough to take rapid movement of a viscous fluid. The terms used to document losses of circulation are defined in the Glossary, and the data are presented on the boring logs Appendix C).

At the beginning of each use of the split spoon, the drill string will be placed in the borehole and allowed to rest on the bottom of the hole for a few seconds. If the drill string sinks or drops under its own weight, a "weight-of-rod" (WOR) event occurs, and WOR-strength materials have been encountered. After sufficient time is provided with the spoon resting in the hole, the weight of the hammer is added to the static load. Again, the rod, spoon, and hammer may sink or drop to cause a "weight-of-hammer" (WOH) event. WOR and WOH events may reflect voids, disturbed material, or soft soils. The longer the drill string the more weight is placed on the soils and the less meaningful is the WOR or WOH event as a diagnostic tool.

The rapidity of the decline during a WOR or WOH event assists in understanding the nature of the material through which the drill string passes. As a result, SDII utilizes a unique method for describing WOR or WOH events. For example, a rapid WOR or WOH event is more likely to reflect penetration of a void (or extremely weak strata) than is a slow downward movement of the drill string. The terms used to denote the rapidity of movement of the drill string during a WOR or WOH event are defined in the Glossary, and the borehole-specific data are presented in the right hand column of each SPT boring log (Appendix C).

ASTM Method D1586 governs the SPT process.

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Dynamic Cone Penetrometer Test

The dynamic cone penetrometer (DCPT) is a hand-held penetrometer that operates in a fashion similar to the SPT. The cone point is seated 2 inches into the undisturbed bottom of the auger

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Normally accepted construction tolerance for the "levelness" of concrete floor slabs is 1 inch in 20 feet. This translates to approximately 1/4 inch in 5 feet. SDII recommends that a floor slab elevation map be created if initial site data indicates a slope in excess of 1/4 inch in 5 feet.

The resulting map is not prepared by a licensed surveyor and is not to be considered as a survey as regulated by §472 Florida Statutes. There is no standard method for floor elevation map preparation.

Soil Classification

All formal descriptions of soil types, colors, compositions, textures, and other properties are completed in SDII's soils laboratory. The classification process follows ASTM methods and utilizes Unified Soil Classification System (USCS) notation. SDII includes both geologic and USCS descriptions in its soil characterization in order to assist in determination of the origin of each soil type and geologic material and determine the engineering properties of the soil.

For visually classified soils, ASTM Method D2488 is utilized. Method D2487 is utilized for soils that have been subject to Atterberg Limits and gradation (grain size) analysis.

Particle Size Analysis (Gradation Analysis)

Particle size analyses are performed in SDII's soils laboratory. The simplest method used is wash gradation using the 200-mesh U.S. Standard Sieve. This separates the particles coarser than 0.075 mm from the finer materials. The proportion of the soil fraction finer than the 200-mesh screen (-200 fraction) is utilized in the USCS soil classification system. For a full grain size or gradation curve of sand-sized materials, the dried sandy soil is passed through a nest of sieves. If grain size data are needed on fine sand, silt, and clay fractions, the hydrometer method is utilized.

Appropriate grain size or gradation data are obtained by use of ASTM Method D422. The -200 fraction is determined according to ASTM Method D140.

Moisture Content, Organic, and Ash Content

For determination of the moisture content of a soil, the soil sample is oven dried, and the weight loss is attributed to the mass of moisture lost from the sample. The moisture content is calculated by dividing the weight of water in the sample by the dry weight of the soil and then multiplying by 100 to obtain a percentage. The organic and ash contents are determined by loss of weight upon destruction of the organic material in a furnace. The organic content is the percentage of mass of the dried sample lost upon destruction, and the percent ash is the weight of dry solids after organic destruction divided by the dry weight of the sample with organics included. This measurement is also expressed as a percentage.

The percentages of moisture, organics, and ash are determined according to ASTM Method D2974. ASTM Method 2216 also governs moisture content measurements.

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graph (Swelling Potential Diagram) developed by Seed et al.[11]. The approximate swelling potential is determined by the position of the point on this graph.

There is no ASTM method for calculation and use of activity, but most geotechnical engineering textbooks and Seed et al. present the method.

[11] Seed, H.B., R.J. Woodward, Jr., and R. Lundgrin, 1962. Prediction of swelling potential for compacted clays. Journal of Soil Mechanics, Vol. 88 (SM3), pp. 53-87.

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DEPTH (ft) BLS

HA-1

Depth (ft)	Push value	Description
0–3	7, 18	POORLY GRADED SAND WITH SILT (SP-SM) Gray (10YR 5/1) fine to medium quartz sand with silt, and small roots
		POORLY GRADED SAND (SP) Grayish-brown (10YR 5/2) fine to medium quartz sand
3–10	28, 40	POORLY GRADED SAND (SP) Very-pale-brown (10YR 8/4) fine to medium quartz sand
		Water table not encountered
10		TOB @ 10.0 ft. bls.

HA-2

Depth (ft)	Push value	Description
0–4	7, 7, 20	POORLY GRADED SAND WITH SILT (SP-SM) Gray (10YR 5/1) fine to medium quartz sand with silt
		POORLY GRADED SAND (SP) Grayish-brown (10YR 5/2) fine to medium quartz sand
4–10	40	POORLY GRADED SAND (SP) Very-pale-brown (10YR 8/4) fine to medium quartz sand
		Water table not encountered
10		TOB @ 10.0 ft. bls.

HA-3

Depth (ft)	Push value	Description
0–3	8, 8	POORLY GRADED SAND (SP) Gray (10YR 5/1) fine to medium quartz sand with silt
		POORLY GRADED SAND (SP) Pale-brown (10YR 6/3) fine to medium quartz sand
3–10	30, 40	POORLY GRADED SAND (SP) Very-pale-brown (10YR 8/4) fine to medium quartz sand
		Water table not encountered
10		TOB @ 10.0 ft. bls.

HA-4

Depth (ft)	Push value	Description
0–3	7, 12	POORLY GRADED SAND WITH SILT (SP-SM) Gray (10YR 5/1) fine to medium quartz sand with silt
		POORLY GRADED SAND (SP) Pale-brown (10YR 6/3) fine to medium quartz sand
3–10	30, 30	POORLY GRADED SAND (SP) Very-pale-brown (10YR 8/4) fine to medium quartz sand
		Water table not encountered
10		TOB @ 10.0 ft. bls.

APPROX WATER TABLE | APPROX SEASONAL HIGH WATER TABLE | APPROX ANALYZED SOIL HORIZON | TOB TERMINATION OF BORING

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NOTE:
SECOND COLUMN FROM LEFT INDICATES APPROXIMATE PUSH PENETRATION VALUES IN Kg/cm2 (WHERE APPLICABLE)

HOMEWISE
INSURANCE COMPANY
TAMPA, FLORIDA

HAND AUGER BORING LOGS

SITE NAME: BURNHAM RESIDENCE
SITE LOCATION: SPRING HILL, FLORIDA

DESIGNED BY:	LAR	PROJECT NO.:	3020158	HAND AUGER
CHECKED BY:	MLF	BORING DATE:	07/09/09	
DRAWN BY:	AWC	PAGE NO.:	1 OF 2	1 thru 5

APPENDIX C

SPT BORING LOGS

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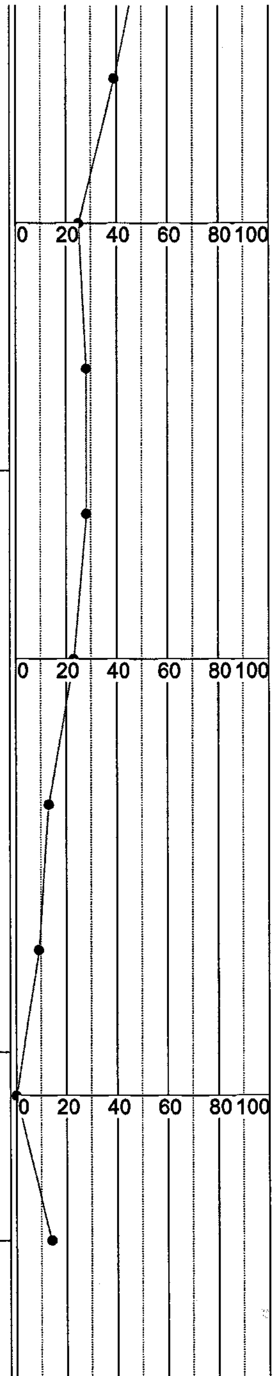
DEPTH (ft) BLS	SYMBOL	DESCRIPTION	PENETRATION blows per foot	BLOW COUNTS	N VALUE	COMMENTS Water Table Drilling Fluid Losses ft. = ft. bls (typical)
55				23/19/20	39	
60			0 20 40 60 80 100	11/13/12	25	
65				12/12/16	28	
70		CLAYEY SAND (SC): Loose to medium dense Light-gray (10YR 7/2) clayey fine to medium quartz sand		10/13/15	28	
75			0 20 40 60 80 100	11/10/13	23	
80				5/6/7	13	
85				6/5/4	9	
90		LIMESTONE: Weak to moderately strong Pale-yellow (2.5Y 8/2) limestone gravel and granules, with calcareous clay	0 20 40 60 80 100	WOR/WOR/WOR	WOR	MOD/WOR from 88.5-90.5 ft., then 3/4/7 RLOC @ 90 ft. DB from 90 ft. to end of boring NoEV from 93.5 ft. to end of boring
95				9/8/6	14	TOB @ 95 ft. bls. Grouted borehole
100						



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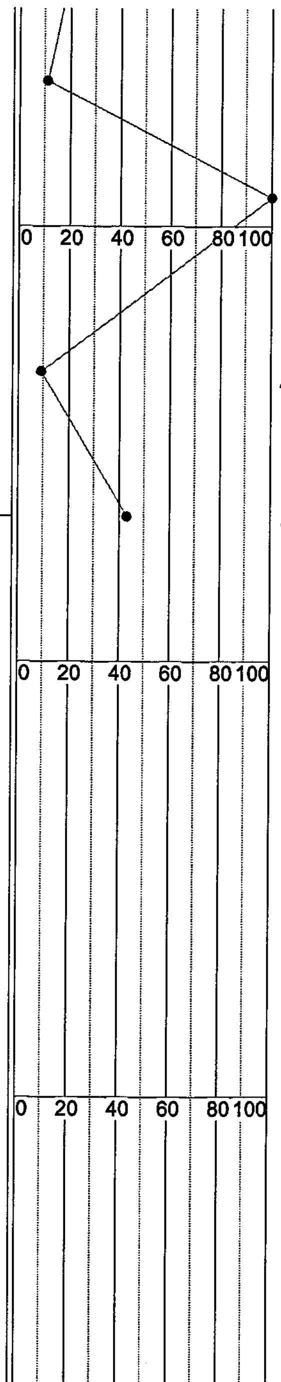
HOMEWISE INSURANCE COMPANY TAMPA, FLORIDA	SPT BORING LOG SITE NAME: BURNHAM RESIDENCE SITE LOCATION: SPRING HILL, FLORIDA
DESIGNED BY: LAR	PROJECT NO: 3020158
CHECKED BY: MLF	BORING DATE: 07/20/09
DRAWN BY: PRN	PAGE NO.: 2 OF 2
BORING	B-1

DEPTH (ft) BLS	SYMBOL	DESCRIPTION	PENETRATION blows per foot	BLOW COUNTS	N VALUE	COMMENTS Water Table Drilling Fluid Losses ft. = ft. bls (typical)
						DB from 53 ft. to end of boring
55				5/5/6	11	
60				50	100	
65				4/1/8	9	
70				15/15/28	43	TOB @ 70 ft. bls.
						Grouted borehole
75						
80						
85						
90						
95						
100						



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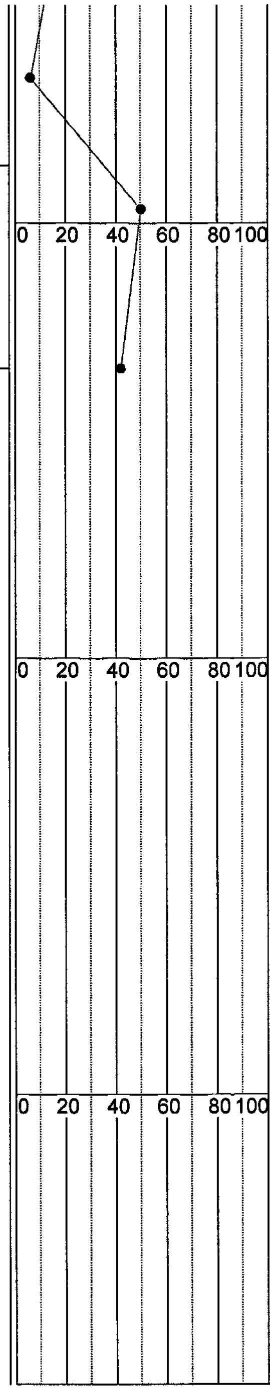
HOMEWISE INSURANCE COMPANY TAMPA, FLORIDA	SDII GLOBAL	SPT BORING LOG SITE NAME: BURNHAM RESIDENCE SITE LOCATION: SPRING HILL, FLORIDA

DESIGNED BY: LAR	PROJECT NO:	3020158	BORING	
CHECKED BY: MLF	BORING DATE:	07/20/09	B-2	
DRAWN BY: PRN	PAGE NO.:	2 OF 2		

DEPTH (ft) BLS	SYMBOL	DESCRIPTION	PENETRATION blows per foot	BLOW COUNTS	N VALUE	COMMENTS Water Table Drilling Fluid Losses ft. = ft. bls (typical)
55				3/3/3	6	
						RLOC @ 58.5 ft. DB from 58.5 ft. to end of boring
60		LIMESTONE: Very strong to extremely strong Pale-yellow (2.5Y 8/2) limestone gravel and granules, with calcareous clay		42/50	50	50 blows for 5 inches of penetration @ 59 ft. Drilled soft from 61 ft. to end of boring
65				12/26/16	42	TOB @ 65 ft. bls. Grouted borehole
70						
75						
80						
85						
90						
95						
100						



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HOMEWISE INSURANCE COMPANY TAMPA, FLORIDA	SDII GLOBAL	SPT BORING LOG SITE NAME: BURNHAM RESIDENCE SITE LOCATION: SPRING HILL, FLORIDA		
		DESIGNED BY: LAR CHECKED BY: MLF DRAWN BY: PRN	PROJECT NO: 3020158 BORING DATE: 07/20/09 PAGE NO.: 2 OF 2	BORING B-3

GRAIN SIZE ANALYSIS

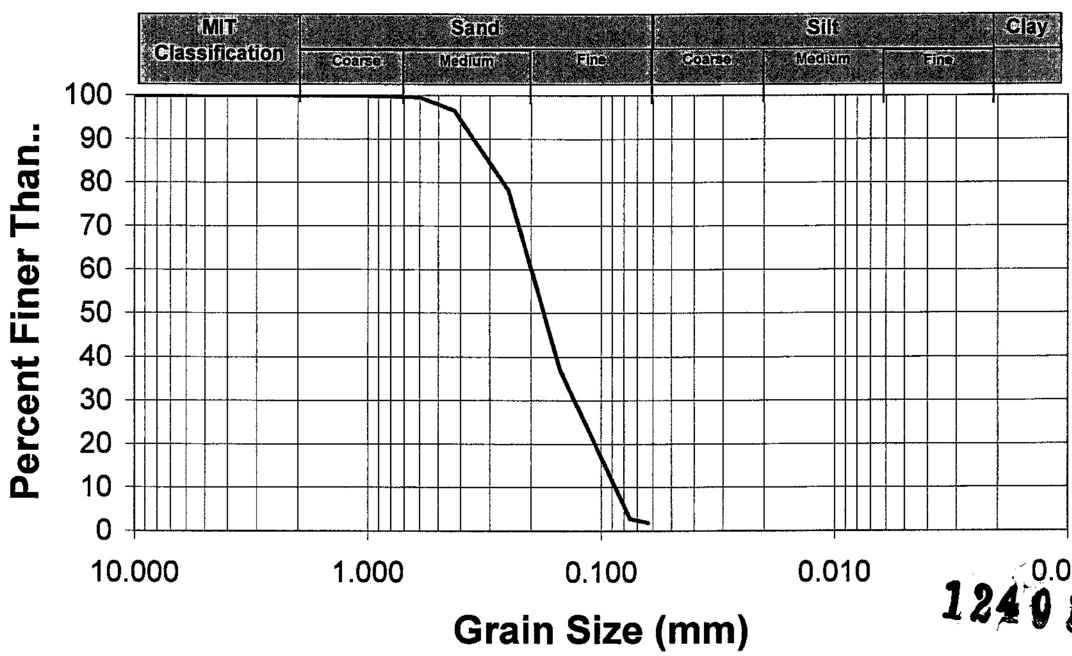
SDII Global Corporation

Date: July 24, 2009
Project Number: 3020158
Project Name: BURNHAM RESIDENCE

Sample	Type	Number	Depth (ft)
	B	2	4-6

Lab Sample No. 397
Tested By: LAR

Sieve No.	Diameter (mm)	Cumulative Weight Retained	Cumulative Percent Retained on Sieve	Cumulative Percent Passing Sieve
1/2"	12.500	0.0	0.0	100.0
3/8"	9.500	0.0	0.0	100.0
4	4.750	0.0	0.0	100.0
10	2.000	0.0	0.0	100.0
16	1.180	0.0	0.0	100.0
30	0.600	0.4	0.4	99.6
40	0.425	3.5	3.5	96.5
60	0.250	21.9	21.7	78.3
100	0.150	63.5	63.0	37.0
200	0.075	98.0	97.2	2.8
230	0.063	98.9	98.1	1.9
Pan	0.000	100.8		



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Sam Upchurch, P.G.
Florida Registration Number

GLOSSARY

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Carbonate rock – Carbonate is a principal component of calcite ($CaCO_3$), the primary mineral of limestone, and dolomite ($Ca,Mg(CO_3)_2$) the primary mineral of dolostone. The term is used as a substitute term for either limestone or dolostone, both of which are considered carbonate rocks.

Carbonate fluorapatite – The predominant phosphate mineral in phosphorite. Carbonate fluorapatite is also locally termed collophane, francolite, or "phosphate".

Cavern – A cave or large conduit system created by the dissolution of limestone or other soluble rock.

Charlton Member – The uppermost geologic unit within the Miocene Coosawhatchie Formation. The formation is composed of interbedded dolostone and clay, and is found in northeastern Florida and southeastern Georgia. The Charlton Member is generally too thin to create conditions that are conducive to sinkhole formation.

Chert – A type of rock formed by ground water depositing amorphous or crystalline silica (SiO_2) in the voids of previously existing rocks or by replacement of carbonate sediment or rock. Chert is common in the Hawthorn Group and at unconformities (ancient erosional surfaces) that separate some geological formations. Flint is a fine-grained, black to dark-gray variety of chert. Because chert is brittle and often highly fractured, drilling fluid circulation is often lost in cherty zones. The rock is extremely hard and difficult to drill.

Chimney flashing – A sheet metal flashing that provides a tight joint between chimney and roof.

"Chimney" sink – If the limestone bedrock is near the land surface, cover collapse sinkholes result in a near vertical shaft that has been termed a "chimney" sink. These features are common in north-central Florida.

Chord - Individual segment of a roof or floor truss. Truss chords span between truss joints and are designed for tension and compression.

Citronelle Formation – The Citronelle Formation is Pliocene in age. While it is primarily composed of fine to very coarse-grained sand and clayey sand, the Citronelle Formation also contains a significant amount of clay and, in some areas, gravel. The Citronelle Formation is found primarily in upland areas of the Florida panhandle.

Clast – A sedimentary particle, such as a sand grain, that has been transported by the action of water, wind, or gravity.

Clastic – An adjective that describes sediments and rocks composed of transported particles. Sand and clay are examples of clastic sediments.

Clay – A grain-size term used to describe the fine-grained particles in soils, sediments, and sedimentary rocks. Clay-sized particles are smaller than 0.004 millimeters (mm) in diameter according to the Wentworth scale used by geologists. Soil scientists and geotechnical engineers use a slightly different size range, where clay is less than 0.002 mm in diameter.

Clay mineral – Clay minerals comprise a family of mineral types that are typically clay-sized. Common clay minerals in Florida include montmorillonite and kaolinite. Montmorillonite is especially important because it has the capability of shrinking and swelling when moisture content or ground-water quality changes.

Claystone – Claystone is rock term applied to indurated or lithified (turned into rock) clay. The clay may be lithified by cementation or simply by drying and consolidation.

Closed depression - A depression in the land surface characterized by internal drainage. That is, all rainfall within the depression is trapped and has no way to flow out over the land surface. Topographic depressions that result from sinkhole activity are usually closed depressions.

Cohesive – Cohesive soils are soils (or sediments) that contain sufficient clay or other fine-grained material that they can be molded and exhibit plastic behavior when moist.

Collapse sinkhole – A sinkhole formed by collapse of the cover materials (soil, sediment, or rock) into an underground void created by the dissolution of limestone or dolostone. See rock collapse sinkhole and cover collapse sinkhole.

Collar beam – A tie that prevents the roof from spreading. It connects similar rafters on opposite sides of the roof.

Common - Used to indicate that the property being described is estimated to be from 5 to 10 percent in abundance.

Conduit – In karst terminology, a conduit is an opening or passage in soil or rock that is interconnected with a cavern or fracture system and through which water and clasts can move. Soils ravel into conduits in the underlying rock in order to form sinkholes.

Cone penetrometer – Cone penetrometers are mechanical or electronic devices designed to measure the resistance of a soil or sediment to penetration. SDII utilizes three forms of penetrometer: hand penetrometer, dynamic cone penetrometer, and "Dutch" cone penetrometer.

Confining bed or unit – A body of soil, sediment, or rock material of low hydraulic conductivity (permeability) that retards the flow of ground water into or out of an aquifer.

Consolidation – Consolidation is the increase in density (mass per unit volume) of a soil or sediment through compressive stress (loading). Typically, soils and sediments undergo a gradual reduction in volume (compaction) and porosity slowly declines with time and loading. Upon construction of a house, there may be an initial consolidation phase, during which the underlying materials (especially fill) adjust to the new load. The majority of consolidation occurs during the initial consolidation phase. After this initial settlement has occurred, there may be long-term, continued consolidation that may result in settlement cracks long after construction is complete.

Contour map – A map in which lines (contour lines) are drawn to represent the distributions of equal values of some parameter. For example, contour maps are prepared to depict variations in floor elevation within a structure.

Coosawhatchie Formation – The Coosawhatchie is one of four formal geologic formations within the Miocene Hawthorn Group in north Florida. It is predominantly composed of interbedded sand, clay, and dolostone. The Coosawhatchie Formation is equivalent to the Peace River Formation of central and southern Florida.

Corner bead – A wood or metal strip protecting the outside corners of plastered walls.

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Drill string – The drilling rod, and bit or split spoon constitute the drill string of a typical drilling rig.

"Dutch" cone penetrometer – The "Dutch" cone was developed in Holland. It consists of an electronic cone that monitors the tip resistance and sleeve friction as the cone is forced through the soil column. While the "Dutch" cone is unable to retrieve soil samples, it provides superior, continuous information about soil strengths.

Dynamic cone penetrometer – A hand cone penetrometer based on dropping a known weight on a anvil connected to a standard penetration tip. Because of the similarities with standard penetration tests, the dynamic cone penetrometer has been calibrated to provide N-values related to the standard penetration test.

Eave – The lower edge of a sloping roof projecting beyond the wall.

EFR - Established fluid return. This term is used on boring logs to indicate the amount of drilling fluid passing a weir. It is used to establish the effectiveness of the drilling fluid circulation system and to quantify drilling fluid losses.

Electrical conductivity – The ability of a material to conduct electrical current.

Electrical resistivity – Resistivity is the reciprocal of electrical conductivity. Electrical resistivity is the ability of a material to resist the flow of an electrical current.

Electronic cone penetrometer – See Dutch cone penetrometer.

Eocene – The Eocene is the geologic epoch that extended from approximately 57,800,000 to 36,600,000 years ago.

Eolian – See aeolian.

Epikarst – Epikarst is the zone of weathering at the upper surface of a limestone stratum. Weathering of limestone results in development of rubble, fine-grained carbonate-rich silt and clay, karren (including pinnacles and valleys in the limestone rock surface), and other features. Epikarst is frequently associated with losses of drilling fluid circulation, low blow counts, weight of rod or hammer events, and recovery of gravel-sized particles of rock.

Equivalent N value – The equivalent N value is calculated from the tip-stress data and soil behavior type as determined with the "Dutch", or electronic, cone penetrometer. It represents penetration-resistance value that is roughly equivalent to the N value recorded in an SPT log. While the equivalent N value isn't a true N value, it has been shown to be an accurate and reliable method of comparing CPT and SPT data in certain soil types.

ER – See electrical resistivity.

Evapotranspiration – Moisture passes from the land surface into the atmosphere by two processes. Evaporation is the movement of moisture from water bodies and the soil to the atmosphere and transpiration is the movement from plants. Combined, this movement is termed evapotranspiration.

Expansion joint – The structural separation between two building elements designed to minimize the effect of the stresses and movements of a building's components.

Expansive clay – A clay-rich deposit that can undergo shrinkage or swelling as moisture content or water quality change.

Fast weight of rod or hammer - See FAS.

Fat clay - Highly plastic clay as defined by ASTM criteria. Fat clay is designated by the USCS symbol CH. Fat clay in Florida is typically montmorillonitic and expansive.

Facies - Geological term referring to the general appearance of a soil, sediment, or rock. Used to differentiate portions of a stratum that have different properties or origins, such as sandy facies as opposed to clayey facies or eolian (wind deposited) facies as compared to fluvial (stream deposited) facies.

FAS - This symbol on the boring logs indicates that there was a fast decline of the drill string under weight of hammer or weight of rod. Fast declines are defined as a 2.5 to 5 foot downward movement of the drill string in 0 to 10 seconds. Fast WOR or WOH events are likely to reflect open voids or very poorly consolidated soils.

Feldspar – A common mineral group found in sandy deposits.

Ferric oxyhydroxides – A chemically complex group of particles composed of iron in combination with oxygen and water. Ferric oxyhydroxide particles constitute the reddish to yellowish stains on many soils.

Few - Used to indicate that the property being described is estimated to be from 5 to 10 percent in abundance.

Fill -Fill consists of soils placed on an original or prepared land surface in order to change the elevation of the land surface, alter the contours of a property, elevate the structure, or support a slab.

Flashing – The pieces of metal or roofing used to prevent seepage of water into a building around any intersection or projection in a roof, such as vent pipes, chimneys, adjoining walls, dormers and valleys.

Flint – See chert.

Floating slab – A concrete reinforced slab poured inside foundation walls or footings and separated from them by an expansion joint. The process of pouring the slab separately allows the slab to rise or fall without causing cracks at the edges of the footing.

Floridan Aquifer – The Floridan aquifer consists of a thick sequence of highly permeable, Eocene to Miocene limestone and dolostone strata that occur throughout Florida and the southern parts of Georgia, Alabama, and South Carolina. Carbonate rock units in the Floridan aquifer are frequently implicated in sinkhole investigations in central and north Florida.

Fluvial – Fluvial is a term that pertains to streams or rivers. Stream-deposited sediments can be said to be fluvial in origin.

Footing – The portion of the foundation (a concrete base) that transfers the structural load to the ground.

Fort Thompson Formation – The Fort Thompson Formation is Pleistocene in age. It is composed of interbedded sand, shell, and freshwater and marine limestone, and is found throughout south Florida where it comprises part of the Biscayne aquifer.

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Ksf – Abbreviation for 1,000 pounds per square foot.

Leached zone – The leached zone is a paleosol (an ancient soil system produced by weathering at the land surface) that has developed on the top of the Hawthorn Group in portions of Polk and Hillsborough Counties. As used by SDII in subsidence investigations, the leached zone is only the upper few feet of the Hawthorn Group sediment that can be characterized by weathering and depletion of soluble materials. The result is a low-density paleosol that has not completely consolidated and includes zones with low standard penetration test blow counts. Losses of drilling fluid circulation are uncommon in the leached zone because the voids and low soil strength zones are rarely interconnected.

Lean clay - Clay with relatively low plasticity as defined by ASTM criteria. Lean clay is designated by the USCS symbol CL. Lean clay in Florida is typically composed of clay-sized particles that are not highly expansive.

Limestone – A sedimentary rock primarily composed of calcite ($CaCO_3$). Limestone is soluble and often develops karst features when weathered.

Lintel – A horizontal structural member that spans a door, a window or another opening to carry the weight of walls above.

Liquid limit – The liquid limit is the Atterberg limit that represents the moisture content of a cohesive soil at which it ceases to be plastic and flows as a viscous (thick) liquid.

Little - Used to indicate that the property being described is estimated to be from 15 to 25 percent in abundance.

Live load – The load superimposed by the use and occupancy of a building, not including the wind load or dead load.

Lithified – A term used to describe soils or sediments that have been transformed into rock through compaction, cementation, or other processes.

Load - The weight that bears on a structure or foundation. See static load and dynamic load.

LOC – See loss of circulation.

LOR - Loss of return. This term is used on boring logs to indicate that the drilling fluid is not actively circulating to the mud pit but is visible in the borehole. The mud is at a steady-state condition where it neither enters the strata in the borehole nor circulates back to the drilling rig. The term is used to quantify that circulation is being inhibited. This does not imply that fluid is being lost to the formation. The circulation system may have lost efficiency as a result of clogging or excess mud.

Loss of circulation – Loss of circulation occurs when drilling fluid, which is used to stabilize the borehole and remove cuttings as the borehole is drilled, is lost. Losses of circulation may reflect movement of fluid into unconnected porosity or conduits. When investigating subsidence causes, losses of circulation are considered an important, but not unique, piece of evidence for karst activity or fracturing.

Loss of return - See LOR.

Lost circulation zone – A lost circulation zone is the horizon or position within a borehole where drilling fluid circulation is lost.

Major crack - A crack with an opening in excess of 1/16 inch in width.

Manometer – An instrument, usually a u-shaped tube, used for measuring the pressure of gasses or vapors. When filled with water, a manometer can be used to measure relative elevations.

Mansard roof – A type of roof containing two sloping planes of different pitch on each of four sides; contains no gables. The lower plane has a much steeper pitch than the upper.

Masonry – Stone, brick, concrete, hollow tile or building units or materials, bonded together with mortar to form a wall, pier or similar mass.

Miami Limestone – The Pleistocene Miami Limestone is composed of highly permeable, limestone with interbedded quartz sand. The Miami Limestone is found in Miami-Dade, Broward and Palm Beach counties. It forms the uppermost permeable unit of the Biscayne aquifer.

Miccosukee Formation – The Pliocene Miccosukee Formation is composed of interbedded sand, clay, and in some areas, gravel. The Miccosukee Formation occurs in upland areas in north Florida.

Minicone penetrometer – The minicone penetrometer is a special adaptation of the electronic cone penetrometer that is designed for use in confined spaces.

Minor - Used to indicate that the property being described is estimated to range from 1 to 5 percent in abundance.

Minor crack - A crack with an opening 1/16 inch or less in width.

Miocene Epoch – The time interval that began approximately 23,700,000 years ago and ended approximately 5,300,000 years ago.

MOD - This symbol on the boring logs indicates that there was a moderate decline of the drill string under weight of hammer or weight of rod. Moderate declines are defined as a 2.5 to 5 foot downward movement of the drill string in 10 to 30 seconds. Moderate WOR or WOH events are likely to reflect poorly consolidated soils, not open voids.

Moderate weight of rod or hammer - See MOD.

Moisture barrier – The treated paper, plastic or metal membrane that prevents water from passing into floors and walls.

Moisture content – The moisture content of a soil is determined by dividing the weight of water in a soil sample by its dry weight. Expressed as a percentage, the moisture content can exceed 100 percent because of the method of calculation.

Monitoring well – A non-pumping well, generally of small diameter, which is used to measure the elevation of ground water and to sample for water quality.

Monolithic concrete – Poured (solid) concrete.

Monolithic slab – A concrete foundation wall and floor slab poured as one piece.

Montmorillonite – Montmorillonite is a clay mineral that is capable of absorbing or desorbing large amounts of water, upon which it swells or shrinks. Montmorillonitic clay beds are common in the Hawthorn Group, where they form characteristic medium to light green beds. Sandy soils with as little as 20% montmorillonite may exhibit expansive behavior because of the ability of the clay mineral to swell and shrink.

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Plastic limit – The plastic limit is the Atterberg limit that describes the moisture content of a cohesive soil at which it ceases to be brittle and becomes plastic, or capable of being molded.

Plasticity index – The plasticity index is the range of moisture contents, expressed as percentages, over which a cohesive soil is plastic. It is calculated by subtracting the plastic limit from the liquid limit.

Pleistocene Epoch– The time interval that began approximately 1,600,000 years ago and ended 10,0000 years ago.

Plinthite – A plinthite is a low humus (organic) content, iron-oxide-rich, soil zone that hardens irreversibly upon repeated wetting and drying. Plinthites form iron-oxide-rich hardpans.

Pliocene Epoch – The geologic time interval that began approximately 5,300,000 years ago and ended approximately 1,600,000 years ago.

Plio-Pleistocene – The time interval that includes both the Pliocene and Pleistocene Epochs.

Polje - A large, flat-bottomed depression that formed when the sides of several sinkholes merged and the resulting basin was filled with sediment. Some Florida poljes approach a square mile in area. Paynes Prairie in Alachua County is an example.

Porcelainite – Porcelainite is a common rock in Hawthorn Group strata. It consists of clay that has been cemented by silica. It has a luster similar to porcelain.

Porosity – Porosity refers to the amount of void space in a soil, sediment, or rock. Quantitatively, porosity is the ratio of the volume of void spaces in a rock or sediment to the total volume of the rock or sediment.

Potentiometric surface – An areally distributed surface that represents the level to which ground water rises in tightly cased wells that tap an aquifer.

Push penetrometer – The push penetrometer (PPT) is a hand-held device that consists of a pointed rod attached to a calibrated scale that measures the resistance of the soil to penetration by the rod.

Quartz – Quartz is the most abundant mineral in Florida sand. It consists of silica.

Quartzipsamment – A quartz sand-rich soil deposited in fill situations, such as in mined areas and dredge-and-fill development. The soils may be faintly zoned.

Rapid loss of circulation - See RLOC.

Rare - Used to indicate that the property being described is estimated to be less than 5 percent in abundance.

Raveling – Raveling is the process by which water transports soil particles downward into cavities in the underlying strata. Because Florida sand is typically damp and the grains are angular, they do not easily ravel without moving water. Because of their cohesiveness, clay-rich strata are more difficult to ravel than sandy soils.

Rebar – See reinforcing bar.

Recent – In the context of geologic time, Recent refers to the Holocene Epoch, the geologic time interval that is currently underway.

Refusal – Refusal refers to ability of a soil boring to penetrate the soil. With hand auger borings, push penetrometer soundings, and CPT soundings, the technician is unable to advance the auger or probe through the soil.

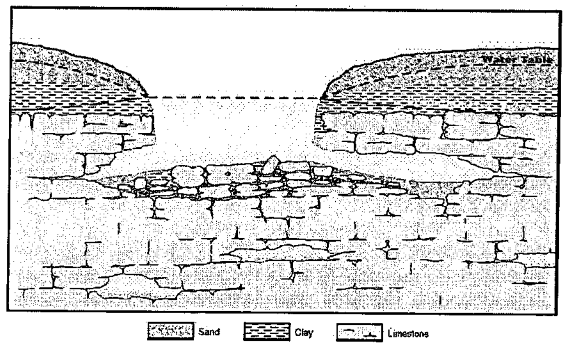
Reinforced concrete – Concrete containing prestressed or nonprestressed reinforcement (metal bars or wire mesh) and designed on the assumption that the two materials act together in resisting forces.

Reinforcing bar (rebar) – The steel bar used to reinforce concrete slabs, foundations, footings, piers, etc. The size of reinforcing bar is indicated by a number that represents 1/8" diameter increments.

Relic sinkhole – A relic (or relict) sinkhole is an ancient sinkhole that is no longer active. It may be expressed as a sinkhole lake, depression in the land surface, or loose soils in the subsurface. See paleosinkhole and alluvial sinkhole.

Ridge board – The board at the top intersection that aligns and receives the top ends of the rafters.

RLOC - Rapid loss of circulation. This term is used on boring logs to indicate that the volume of drilling fluid is being reduced by losses to the formation. RLOC implies that the level of fluid declined in the borehole at a rate greater than 5 feet per minute. A rapid loss of circulation suggests that the pore space into which the drilling fluid passed was sufficient for the fluid to freely flow into the formation.



Rock collapse sinkhole

Rock collapse sinkhole (above) – A rock collapse sinkhole forms when the limestone (or other soluble rock) ceiling of a cavern fails and collapses into a void.

Roof rafters – The structural members that support the roof.

Rubble – In the contest of karst, rubble describes the gravel-like debris that forms as limestone is weathered. Rubble consists of irregularly broken rock fragments of diverse sizes.

Sag depression – A sag depression is often the surficial manifestation of a solution or cover subsidence sinkhole. As the underlying bedrock is dissolved away, the cover materials slowly sag, creating a depression. Owing to the shallow water table, sags often become small, circular wetlands.

Sand – A grain size-related term used to describe particles in soils, sediments, and sedimentary rocks. Sand-sized particles range from 0.0625 to 2 millimeters (mm) in diameter according to the Wentworth scale used by geologists. Soil scientists use a slightly different size range: 0.005 to 2 mm.

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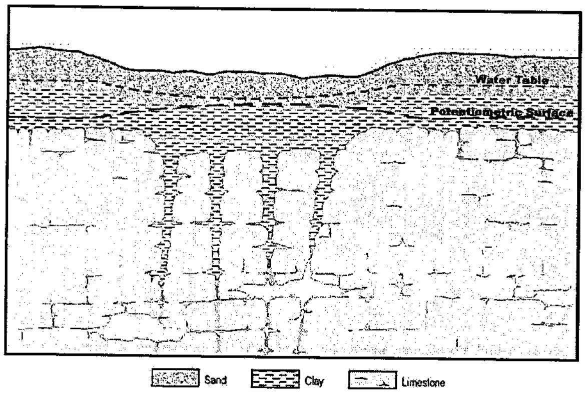
B zone and consists of relatively unweathered host materials from which the soils form.

Solution sinkhole (below) – Sinkhole formed by the slow subsidence of soil or sediment as the upper surface of the underlying, water-soluble sediment or rock is removed by dissolution. See cover subsidence sinkhole.



Solution Sinkhole

Some - Used to indicate that the property being described is estimated to be from 30 to 45 percent in abundance.

Sorted - Term used by geologists to indicate the range of grain sizes in soil, sediment, or rock. Well sorted indicates that the material consists of mostly one size of particles and poorly sorted indicates that the material contains a wide range of grain sizes. See graded.

Span – The distance between supports of a beam, girder, arch or truss. In roofing, the horizontal distance from eaves to eaves.

Split spoon sampler – The split spoon sampler is placed at the terminus of the drill string for standard penetration testing. It consists of an 18- or 24-inch metal tube that is split longitudinally. After the penetration testing, the spoon is retrieved, broken open, and soils samples are recovered.

Spoil – Spoil is a term that refers to fill materials. For example, when finger canals are dredged, the dredged materials may be placed along side of the canal as a spoil bank.

Spread footing – The rectangular base placed beneath the foundation to distribute the building load over a greater area.

SPT – See standard penetration test.

SRR - Some reduced return. This term is used on boring logs to indicate that 50 to 75 percent of the drilling fluid is actively circulating. It is used to quantify that circulation is being inhibited. This does not imply that fluid is being lost to the formation. The circulation system may have lost efficiency as a result of clogging or excess mud.

Stair-step crack - A crack that follows the pattern of cement block or brick mortar joints.

Standard penetration test – A widely used geotechnical investigation technique in which a split-spoon sampler is driven into a soil or sediment by a 140-pound hammer dropping 30 inches. The number of blows required to drive the sampler one foot is termed the blow count (N).

Steady state - The term steady state indicates that conditions under observation are balanced and not changing during the period of observation. For example, steady state exists when the established fluid return (EFR) is constant.

Subflooring – The boards or sheet material laid over joists or plywood, over which a finished floor is laid.

Surficial aquifer system – Where it occurs, the surficial aquifer system is the uppermost hydrologic unit that is contiguous with the land surface and contains the water table. The surficial aquifer system may be composed of one or more rock or sediment types including sand, clay, limestone, and dolostone. Pliocene to Holocene sediments typically comprise the surficial aquifer system.

Surficial sands – A term applied to the sandy, marine terrace sediments found throughout Florida.

Suwannee Limestone – The Oligocene Suwannee Limestone crops out in many areas of west-central Florida. Where it is near the land surface the Suwannee commonly develops karst features.

Tamiami Formation – The Plio-Pleistocene Tamiami Formation is composed of a complex mixture of interbedded sand, shelly sand, clay, and limestone. It is found throughout south Florida. The Tamiami Formation may form part of the surficial or intermediate aquifer system.

Tampa Member – The Tampa Member (formally the Tampa Limestone) is a sandy limestone with interbedded clay and sand that occurs near the base of the Arcadia Formation of which it is a member.

Terrace sands – Sandy sedimentary deposits formed in shallow marine and coastal environments. As the sea level fluctuated during the Pleistocene Epoch, multiple terraces formed, each characterized in Florida by a range in elevations above sea level. These sea-level fluctuations buried many ancient sinkholes, thus masking their existence.

Terrazzo – Highly polished flooring made of cement and marble chips.

Tip stress – The tip stress (or tip resistance) is the amount of stress experienced by the tip of the CPT as it is advanced into the subsurface. The tip stress measures the relative density of the soil and its ability to be penetrated.

Topography – The distribution of elevations of the land surface.

Torreya Formation – The Miocene Torreya Formation is informally divided into an upper siliciclastic unit and lower limestone unit. It occurs in upland areas of north Florida and southern Georgia.

Trace - Used to indicate that the property being described is estimated to be less than 5 percent in abundance.

Transect – A line or profile along which geophysical data are acquired.

Truss – A rigid, open web structural member designed and engineered to carry roof or floor loads.

Truss joint - Intersection of truss chords.

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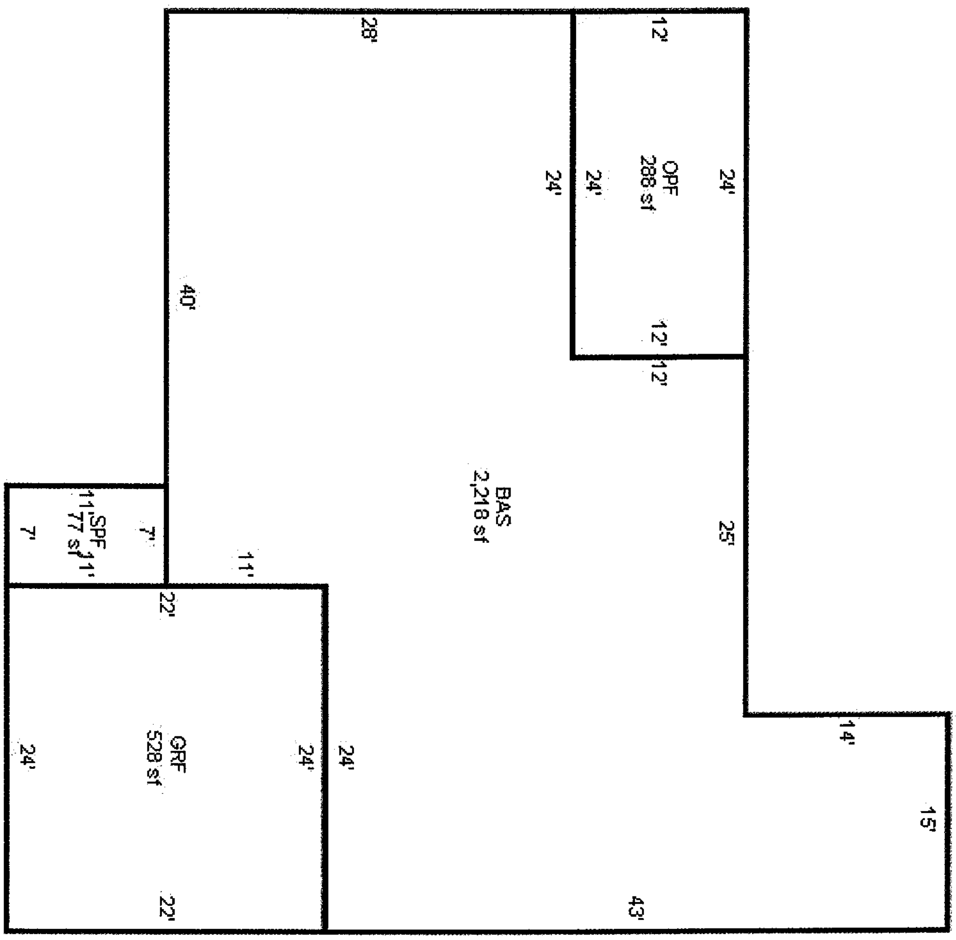

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Georgia PG# 1136			Georgia PG# 1140

August 5, 2009

Geohazards, Inc., Project No. 2009647 DRAFT

Greg Schneidmiller
HomeWise Insurance
PMB 306
19046 Bruce B. Downs Blvd.
Tampa, Florida 33647

Re: Burnham Property, Claim No. HP16708

DRAFT

Dear Mr. Schneidmiller:

Pursuant to your request, we have reviewed the report by SDII Global Corporation (SDII) dated July 30, 2009, of the investigation of the Burnham property at 2237 Arrow Avenue, Spring Hill, Florida. We offer the following comments and opinions: Wrong

1. The SDII investigation consisted of ground penetrating radar (GPR) survey, 3 standard penetration test (SPT) borings, 5 hand auger borings, 2 test pit excavations, hand cone penetrometer tests, a floor elevation survey and a structural evaluation. The array of tests conducted is consistent with our understanding of the expectations for FS 627.707.

2. A "slight" depression was observed in the front yard, approximately 15 feet west of the west corner of the garage. The depression measured 5 feet by 3 feet and was approximately 1 inch deep. SPT boring B-1 was conducted between the depression and residence.

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3. The SDII hand auger borings penetrated sand with silt and sand to 10 feet depth. The surficial water table was not encountered in the borings. Penetrometer probes within the hand auger borings encountered generally very loose to loose near-surface soils.

4. SDII detected two anomalous GPR features at the Burnham property. GPR anomaly A was located near the south corner of the residence and was further explored with SPT boring B-2. GPR anomaly B was located along the southwest side of the residence and was further tested with SPT boring B-3.

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5. Test pit TP-1 revealed the foundation for the main structure to be embedded 10 inches below ground surface. Current construction codes require house foundations to be embedded a minimum of 12 inches below ground surface.

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6. The results of the floor elevation survey recognized an elevation difference of approximately 0.8 inches within the main living area, which is considered to be within construction tolerance limits.

7. The SPT borings penetrated similar sequences of sands and clayey sands, overlying limestone at depths ranging from 47 to 88.5 feet. The variability in the depth to limestone is indicative of a possible paleosink environment underlying the Burnham property. In SPT boring B-1, a 2-foot weight-of-rod condition, loss of drilling fluid circulation and very soft limestone was experienced near the clayey sand-limestone contact. A series of declining N-values was also recorded in B-1 from 70 to 90 feet depth, above the deepest detected limestone. This boring was located near the shallow surface depression located near the west corner of the garage. Complete loss of drilling fluid circulation was experienced all three borings. Very soft limestone was penetrated in borings B-1 and B-2.

8. SDII concluded that sinkhole activity does not exist at the Burnham residence, and attributed the distress to "concrete shrinkage, expansion/contraction of building materials due to charges in ambient temperature and humidity levels, and post-construction structural settlement."

9. Geohazards, Inc. agrees that causes of distress noted by SDII appear plausible. However, the subsurface conditions encountered at the Burnham residence are indicative of possible raveling. Raveling is the vertical or lateral migration of sediments to deeper, more distant places in limestone. It is a mechanism for sinkhole formation. Sinkhole activity can not be eliminated as a contributing source of the observed distress.

As requested, we have prepared a remediation program estimate to address the subsurface conditions at the site. If you have questions about our opinions, please do not hesitate to contact us. We appreciate the opportunity to be of service. Our invoice is attached.

Gerald O. Black, P.G.
Geologist

Scott E. Purcifull, P.G.
Geologist

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TECHNICAL SPECIFICATIONS FOR SUBSURFACE STABILIZATION PRESSURE GROUTING AT THE

Burnham Property
2258 Claremont Avenue, Spring Hill, Florida
HomeWise Insurance Claim No. HP16708 --- Geohazards, Inc. Project No. 2009647
August 14, 2009

1.0 DESCRIPTION

The following specifications are for stabilization and remediation of subsoil conditions. The work consists of furnishing all labor, equipment and materials required to inject cementitious grout to an estimated average depth of 68 feet. Do not drill beyond 83 feet unless prior permission is obtained by the Engineer of Record. The stabilization program is intended to stabilize possible unstable subsurface soils by compacting any loose soils via densification, where present, sealing the limestone surface, voids and any partially in-filled cavities, and to minimize the potential for future ground subsidence due to raveling activity.

2.0 SCOPE

The scope of the stabilization program includes vertical and/or angled grout injections. The total estimated grout quantity, injection pipe footage and grout point locations are attached. However, the grouting program may be modified by the Contractor and Geotechnical Engineer (or his or her representative) as dictated by the actual field conditions. In these specifications, "Geotechnical Engineer" refers to Geohazards, Inc.'s geotechnical engineer.

If directed by the Geotechnical Engineer or his or her representative, additional grout locations may be required based on the site conditions encountered. Proposed injection point locations are planned with an approximate spacing of 8 - 10 feet on center (see location map). Alternative grout locations may be required. However, the Contractor or Geotechnical Engineer (or his or her representative) will establish the final grout injection locations in the field.

3.0 CONTRACTOR

The pressure grouting Contractor shall submit his or her qualifications to the Geotechnical Engineer. The Contractor shall have at least three years of experience in cement pressure grouting jobs, and shall submit references of his or her activities if requested.

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4.0 EQUIPMENT

Grout Injection Equipment

A continuous flow, positive displacement model capable of pumping cement grout with a slump (ASTM C-143) of 3 to 6 inches maximum and pressures up to 600 psi (i.e., Schwing Model BPA 750D-15R or equivalent) shall be used. A pressure gauge shall be located in-line at the top of the casing or immediately before the top of the casing. The gauge shall be capable of reading pressures up to 600 psi in increments of 25 psi or smaller. Alternate equipment may be used at the discretion of the Geotechnical Engineer or his or her representative. Approval of any and all onsite equipment does not infer final acceptance.

Injection Pipes

Minimum inside diameter: 2 inches, Maximum inside diameter: 3 inches. Use of reducing nipples is not allowed.

5.0 GROUT MIXTURE

General

The materials used in this work shall conform to standard grouting practices as follows:

- Portland cement will conform to ASTM C-150. Aggregate will be natural sand material with percent passing the No. 200 sieve not greater than 30 percent. No maximum grain size is specified, however, it must not create sand blocking at the nozzle at the specified operating pressures.
- Lime will be hydrated if utilized.
- Mix water shall be potable.
- Once mixed, the cement/sand grout (including approved additives) shall obtain a minimum 48-hour compressive strength of 200 psi.

Grout Mix

The mixture used for grouting shall be a creamy consistency which will permit the grout to flow. If requested, when samples of the grout mixture are set aside for at least 12 hours in a standard concrete test mold, the resulting free surface water height shall be less than one percent of the initial sample height. Slump shall not exceed 6 inches. However, the slump may be varied throughout the grouting operation at the discretion of the Geotechnical Engineer or his or her representative. The grout mix shall not contain more than 0.6% by weight (22 lbs/cy) of bentonite. If bentonite is to be used, it must be hydrated prior to the addition of cement to minimize bleeding and segregation. The use of bentonite in compaction grouting can cause a loss of compressive strength of the grout mixture.

6.0 GROUT MIXING & PLACING

If on site mixing is used, facilities shall be provided for accurately measuring the ingredients in each batch of grout. The ingredients shall be thoroughly mixed and immediately pumped to the grout pipes through a flexible hose not more than 250 feet long.

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7.0 PRESSURE GROUTING PROCEDURE

Pipe Installation

Grout pipes shall be installed to a depth sufficient to encounter bearing limestone or other bearing material (e.g., dense sand), approximately 68 feet on average below the ground surface. If this estimated average depth is exceeded by more than 15 feet, the drilling procedure shall cease and the Geotechnical Engineer notified. Drilling may continue at the Geotechnical Engineer's discretion. The Contractor may rotary drill or drive the injection pipes to the refusal depth. However, the method of installation shall ensure a good seal between the pipe and the surrounding soil. The installation method may be modified subject to the Geotechnical Engineer or his or her representative's approval if grout seeps up around the outside of the pipe during injection.

Grout Injection

Following satisfactory installation of an injection pipe, grouting operations may begin. During the grouting operation the injection pipes shall be incrementally raised to inject the entire zone between depths of approximately 68 feet and 10 feet below the ground surface. If feasible, the sequence of grouting should be performed at alternating locations to allow sufficient time for the mix to set prior to drilling and grouting adjacent points. The rate of pumping shall not exceed twelve cubic feet per minute. The pumping pressure at the top of the casing is planned to be in the range of 200 to 300 psi or as required by the Geotechnical Engineer or his or her representative.

Unless otherwise directed by the Geotechnical Engineer or his or her representative, pumping shall cease for at least a 24-hour period if a 1-foot zone takes 20 or more cubic yards of grout at a slump of 4 inches. If this excessive pumping occurs, the grout pipe shall be raised and flushed to prevent the pipe from being cemented in place. Pumping can then proceed at another grout pipe location. Pumping may resume at the excessive grout pipe location and depth after a period of 24 hours has passed. The slump maybe reduced further to 2 inches if a grout point fails to produce resistant pressure during the pumping operation. Once a resistance pressure of 250 – 300 psi is reached, the slump may be increased to not more than 6 inches to improve migration of the grout into the soil in order to compact loose zones adjacent to the pipe.

Grouting procedures should be terminated once the grout point is filled to within 6 – 10 feet of the surface in order to minimize collateral damage to the structure.

Contractor Submittals

Methods of the work:
a. Grout pipe installation procedures
b. Proposed grout pipe locations, depths, and intervals
c. Increments of depth for installation of grout
d. Maximum grout quantities at each increment of depth
e. Grout pressures at depths
f. Equipment to be used in the work
g. List of vendors and suppliers
h. Daily records
i. Grout mix design, design slump and tolerances

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8.0 MONITORING BY THE GEOTECHNICAL ENGINEER OR HIS OR HER REPRESENTATIVE

General
The Geotechnical Engineer or his or her representative will monitor the pressure grouting operations to document compliance with the specifications outlined above and the duties discussed below. All injection pipe installations and grouting operations shall be performed in the presence of the Geotechnical Engineer's representative. The Geotechnical Engineer or his or her representative shall assume responsibility for verifying the quantity of grout pumped, intervals of grouting and deciding if additional or less grout is necessary.

Compliance
The Geotechnical Engineer or his or her representative may stop the grouting operation at any time if, in his or her judgment, the operation does not comply with these specifications or the work is unsuitable.

Daily Records
The Geotechnical Engineer or his or her representative will make all measurements of ground heave or settlement, installed pipe lengths and grout quantities pumped. Records of each day's grouting operation will be maintained for the benefit of the insurance company and Contractor. The grout and pipe quantities recorded by the Geotechnical Engineer's representative shall be considered the final amounts for pay purposes.

Ground/House Movement
During grouting, the Contractor and Geotechnical Engineer or his or her representative shall observe any vertical movement of the ground and house using a transit/level. If a downward movement of the ground surface is observed, the grouting operation shall cease and observations shall continue for 30 minutes. Likewise if there is any upward movement of the house, grouting should be temporarily suspended. If the ground does not return to its original grade, pumping shall be resumed at a lower rate of injection. If upward movement is observed, the grouting operation shall cease.

Existing Utilities/Structures
The Contractor shall exercise care when grouting beneath and adjacent to any underground utilities. The Contractor is responsible for ensuring the grouting operation does not damage existing utilities, wells, septic tanks, etc.

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Florida PG# 0018
Georgia PG# 1140

TECHNICAL SPECIFICATIONS FOR POLYURETHANE INJECTION AT THE

Burnham Property
2258 Claremont Avenue, Spring Hill, Florida
HomeWise Insurance Claim No. HP16708 --- Geohazards, Inc. Project No. 2009647
August 14, 2009

1.0 DESCRIPTION

The following specifications are for stabilization and densification of the loose base and sub-base soils beneath the pool deck. The work consists of furnishing all labor, equipment and materials required to inject polyurethane material to depths no greater than 4 feet below the base of the foundation or slab on grade. The procedure is intended to stabilize the near surface soils (loose sands/silts) by densification and/or infilling.

2.0 SCOPE

The scope of the stabilization program includes vertical injection points. The total estimated quantities, injection pipe length and proposed injection locations are attached. However, the remediation program may be modified by the Contractor and Geohazards, Inc. Structural/Geotechnical Engineer (or his or her representative) as dictated by the actual field conditions. Proposed injection point locations are planned with an approximate spacing of 4 feet on center (see location map). Alternative injection points may be required if dictated by the field conditions. The Contractor and the Structural/Geotechnical Engineer (or his or her representative) will establish the final injection locations.

3.0 CONTRACTOR

The injection Contractor shall submit his or her qualifications to the Structural/Geotechnical Engineer for review. The Contractor shall have at least three years of experience in polyurethane injection projects, and shall submit references of his or her activities if requested.

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4.0 EQUIPMENT

Drilling Equipment

The contractor is to use equipment capable of drilling 5/8 inch to 3/4 inch diameter holes through the concrete slab to reach a depth of 4 feet below the slab on grade. This equipment should be capable of drilling holes without damaging the structural integrity of the existing slab.

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admin@sinkholes.com

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Injection Equipment
The contractor shall use pumping equipment capable of injecting the polyurethane material up to 4 feet below the foundation or slab. The contractor must use a manufacturer's certified flow meter to measure the amount of polyurethane material injected at each location. An inline pressure gage must be used to monitor the pumping pressure during injection. The pumping unit shall be capable of controlling the rate of flow of material.

During the injection process the concrete slab must be monitored for any movement. Survey transits, laser levels, or dial indicator devices should be used for monitoring.

Injection Holes
Minimum diameter: 5/8 inches, maximum diameter: 3/4 inches.

5.0 POLYURETHANE MIXTURE
The materials used in this work shall conform to standard practices as follows:

- The material shall consist of a closed cell, hydro-insensitive, high density polyurethane-forming mixture, having water insoluble diluents, that permits the formation of polyurethanes in excess water. This formula and these characteristics must be certified by the manufacturer.
- The polyurethane injection material shall conform to ASTM D1622. The density must fall within the range of 3.0 lbs/ft^3 and 3.2 lbs/ft^3.
- The polyurethane shall conform to ASTM D1621. The compressive strength shall equal or exceed 38.0 psi.
- Maximum volume shrinkage for 10 years is 5.0%.
- The material shall reach 90% of compressive strength within 30 minutes of injection.

6.0 INJECTION
The temperature of the injection material must be maintained according to the manufacturer's recommendations. Pressure and temperature control devices capable of maintaining proper temperature and proportionate mixing of the polyurethane component materials shall be used. Continuous readings shall be taken to determine the amount of movement of the slab.

7.0 POLYURETHANE INJECTION PROCEDURE
Initial Void Filling
The contractor shall drill 5/8 inch to 3/4 inch holes through the concrete slab at the approximate locations specified by the Structural/Geotechnical Engineer.

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Polyurethane Injection

The polyurethane shall be injected at a rate and amount specified by the manufacturer. Continuous monitoring of pressure, volume, and slab movement shall be recorded. The injection process should be stopped if any of the following actions take place:

- Polyurethane overflow from any of the injection holes.
- Excessive pumping pressures that exceed allowable values specified by the Structural/Geotechnical Engineer.
- Concrete slab movement greater than required for re-leveling.

Contractor Submittals

Submit the following for review and record-keeping:
a. Injection pipe installation procedures
b. Proposed pipe locations, depths, and intervals
c. Increments of depth for installation of polyurethane material
d. Maximum quantities at each increment of depth
e. Injection pressures at depths
f. Equipment to be used in the work
g. List of vendors and suppliers
h. Daily records
i. Polyurethane mix properties

8.0 MONITORING BY THE STRUCTURAL/GEOTECHNICAL ENGINEER OR HIS OR HER REPRESENTATIVE

General

The Structural/Geotechnical Engineer or his or her representative will monitor the polyurethane injection operations to document compliance with the specifications outlined above and the duties discussed below. All operations shall be performed in the presence of the Structural/Geotechnical Engineer's representative. The Structural/Geotechnical Engineer or his or her representative shall assume responsibility for verifying the quantity of polyurethane pumped, intervals of pumping and deciding if additional or less polyurethane material is necessary.

Compliance

The Structural/Geotechnical Engineer or his or her representative may recommend that the injection operation be stopped if, in his or her judgment, the operation does not comply with these specifications or the site conditions change.

Daily Records

The Structural/Geotechnical Engineer or his or her representative will verify all measurements of slab movement, settlement, and polyurethane quantities pumped. Records of each day's injection operation will be maintained by the Contractor and the Structural/Geotechnical Engineer. The quantities recorded by the Structural/Geotechnical Engineer shall be considered the final amounts for pay purposes.

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Slab Movement
During grouting, the Contractor and Structural/Geotechnical Engineer or his or her representative shall observe any vertical movement of the slab. A laser level must be used to monitor movements. Visual observation is not permissible. If a downward movement or tilting of the slab is observed, the injection operation shall cease and observations shall continue for 30 minutes.

Existing Utilities/Structures
The Contractor shall exercise care when injecting the polyurethane beneath the slab. The Contractor is responsible for ensuring the polyurethane grouting operation does not damage existing utilities, cables, etc. beneath the slab.

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GEOHAZARDS, INC.

Professional Geological, Geophysical and Geotechnical Engineering Services

P.O. Box 14566
Gainesville, Florida 32604

Anthony F. Randazzo, Ph.D.
Geologist
Florida PG# 0003
Georgia PG#1136

David Bloomquist, Ph.D.
Geotechnical Engineer
Florida PE# 37235

Attila A. Bodo, P.E.
Structural Engineer
Florida PE# 15834

Douglas L. Smith, Ph.D.
Geophysicist
Florida PG# 0018
Georgia PG# 1140

PROPOSED REMEDIATION PROGRAM

Burnham Property
2258 Claremont Avenue, Spring Hill, Florida
HomeWise Insurance Claim No. HP16708 --- Geohazards, Inc. Project No. 2009647
August 14, 2009

Geohazards, Inc. has reviewed a July 30, 2009, report of a subsidence investigation performed by SDII Global Corporation, at the above site. Based on the WOR/LOC zones, and observed surface depressions, sinkhole activity cannot be eliminated as a contributing source of distress. Subsurface compaction grouting, a common ground modification technique, is indicated to mitigate raveling and fill void spaces adjacent to and below the structure.

Additionally, observed distress suggests that chemical grouting be used beneath the pool deck to increase the cohesive strength and density of these soils.

The following plan has been developed to remediate the adverse subsurface conditions at the site.

Task	Description	Estimated Quantity	Unit Cost	Extended Cost
1	Mobilization/Demobilization/Permits	1 ea.	L.S.	$2,000
2	Site Preparation	1 ea.	L.S.	$2,200
3	Injection Pipe Installation; 32 grout points, to competent limestone estimated at an average depth of 68 ft. below the ground surface	2,176 ft.	$16/ft.	$34,816
4	Grout Injection	200 - 300 cy.	$160/cy.	$32,000 - $48,000
5	Injection Pipe Installation; 47 chemical grout points, 4 ft. maximum depth, approximately 4 feet on center	188 lf.	$8/lf. 1240848-	$1,504
6	Chemical Grout Injection	1,100 lbs.	$9/lb.	$9,000
7	On-site Monitoring	7 - 10 days	$60/hour	$3,360 - $4,800
8	Certification Reports	2	$450/report	$900
	Total Estimated Cost Range			$85,780 - $103,220

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GEOHAZARDS, INC.

Sinkholes • Expansive Clays • Land Subsidence
P.O. Box 14566
Gainesville, FL 32604
(352) 371-7243 1-800-770-9990
Fax: (352) 371-4410

PROPOSED GROUT INJECTION LOCATIONS

Burnham Property
2258 Claremont Ave.
Spring Hill, Florida

FOR: HomeWise Insurance DATE: 8-14-09 BY: David Bloomquist, PhD, PE
Investigation#2009647

32 Injection Point Locations

Approximately 8′ - 10′ between points

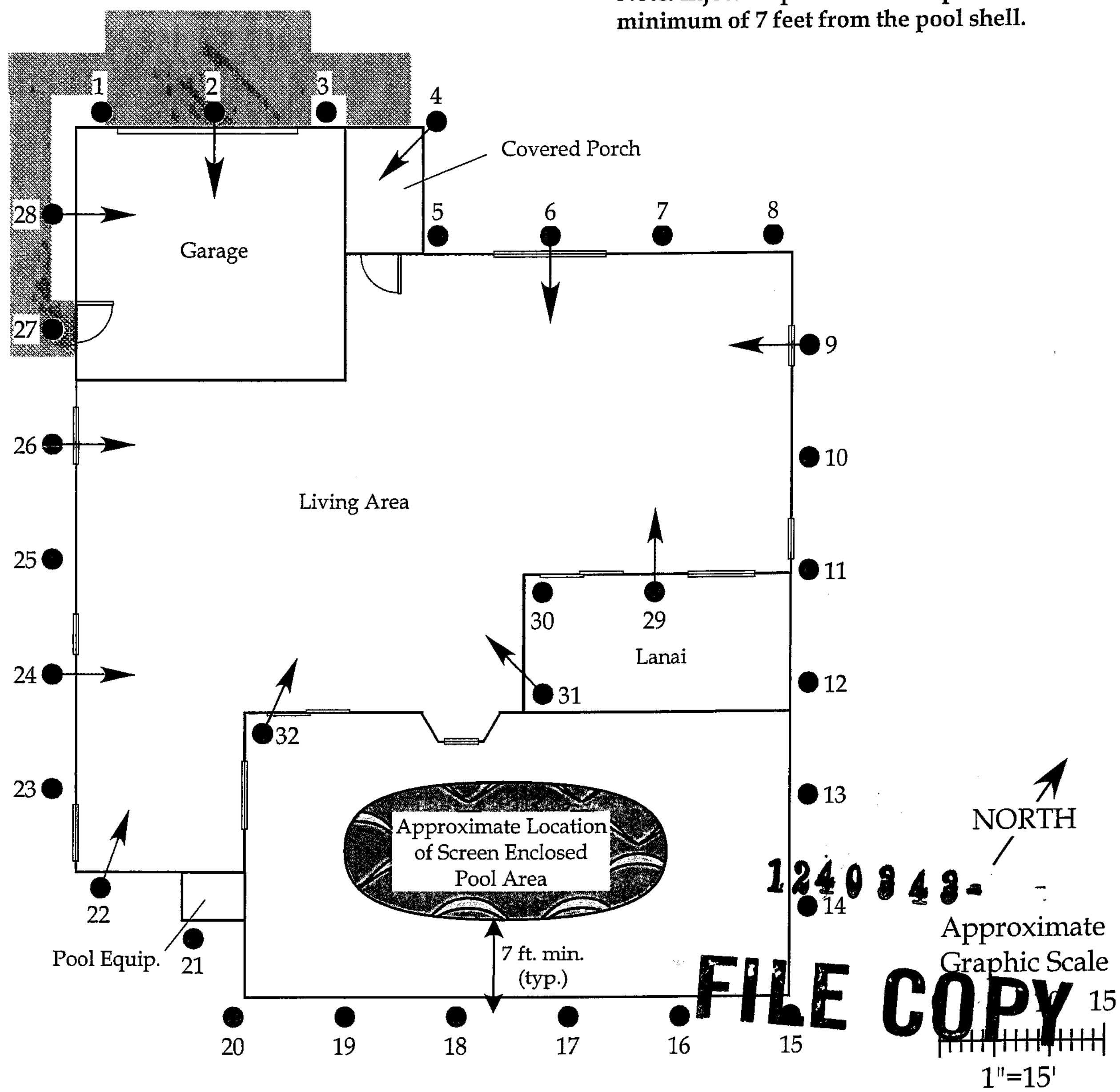
Estimated average insertion depth: 68 feet

Injection Point ●

Angled Injection Point ●⟶

Depression

Note: Injection points shall be placed a minimum of 7 feet from the pool shell.



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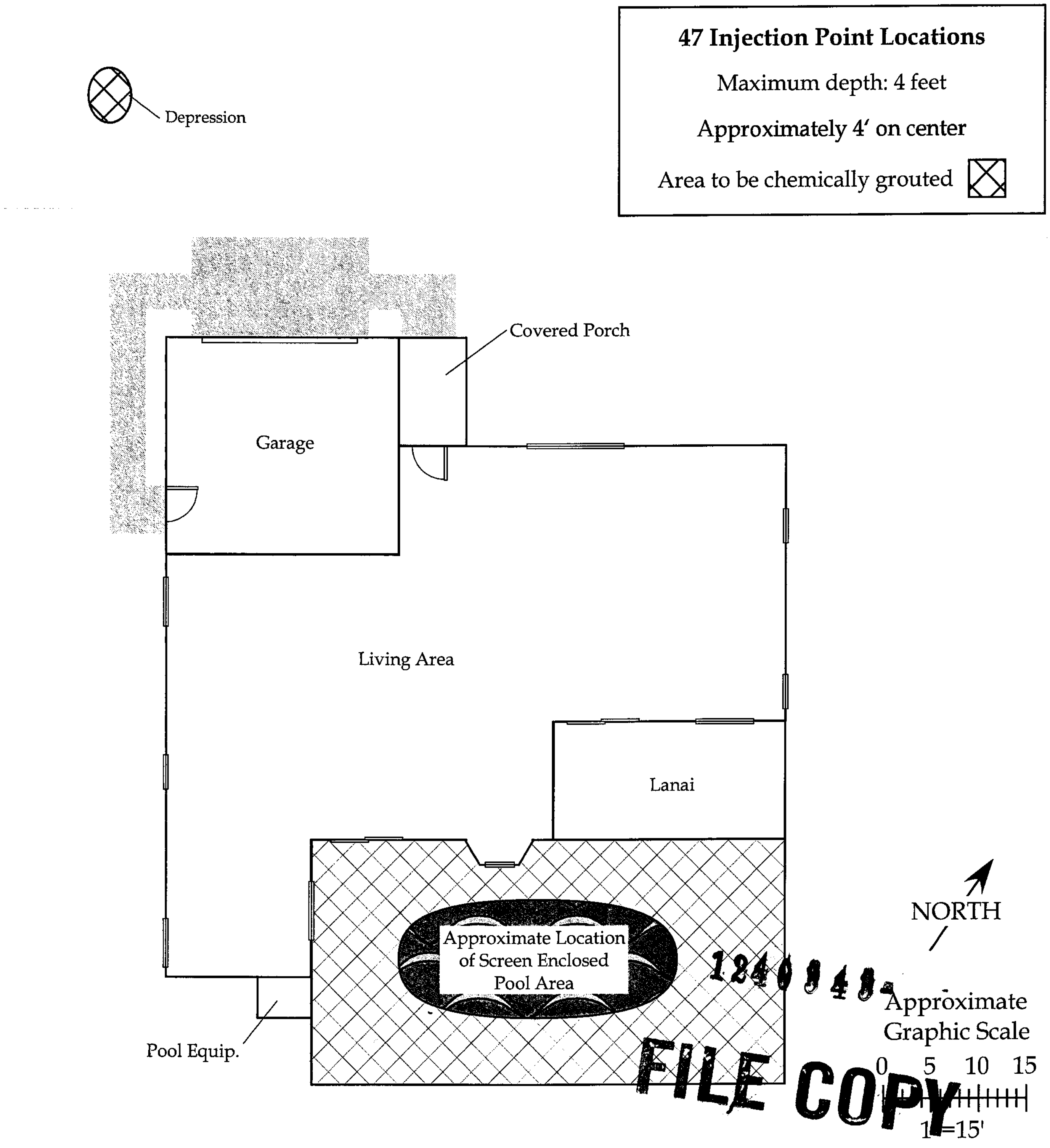
PROPOSED CHEMICAL GROUT INJECTION LOCATIONS

Burnham Property
2258 Claremont Ave.
Spring Hill, Florida

FOR: HomeWise Insurance DATE: 8-14-09 BY: David Bloomquist, PhD, PE
Investigation#2009647



The observed distress does not indicate the need for underpinning at this time.

The above plan does not include any remedial repair of the dwelling interior or exterior, slabs on grade, nor vegetation removal/replacement. Any cracks in the slab on grade should be repaired as part of the cosmetic repair program.

Chemical grouting should begin no sooner than 45 days after the completion of compaction grouting. Cosmetic repairs should begin no sooner than 15 days after the completion of chemical grouting.

It is important to note that none of the three SPT borings terminated in competent limestone.

The suggested plan provided by Geohazards, Inc. should be used by the contractor as a basis for bidding, since site conditions may require the relocation, addition or deletion of insertion points (e.g., septic tanks, drain fields, underground sprinkler pipes, utilities, etc.).

12-3-09

David Bloomquist, PhD, PE
Geotechnical Engineer
Florida License No. 37235

HERNANDO CO. DEVELOPMENT SERVICES DEPARTMENT

Building Plans Review	
Approved for Use ☐	Not Approved ☐
Approved as Noted ☐	Comments Attached ☐

This review does not relieve the Contractor from errors or omissions in this submittal or from the Contractor's responsibility for code compliance. These plans have been reviewed for code compliance in accordance with the Florida Building Code. The issuance of this permit shall not be held to permit or approve the violation of any law, code regulation or ordinance.

By: WE 256 Date: DEC 29 2009

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PERMIT CARD INSTRUCTIONS

- ( ) TKE The permit card must be displayed on street side of lot facing the street in a permanent, substantial shelter accessible to the inspector.
- ( ) TKE The permit card must remain displayed until all Final Inspections are completed.
- ( ) TKE No inspections will be made unless an approved set of plans is available at jobsite for the inspections.
- ( ) TKE Your first inspection must be made <u>within 180 days of permit issuance date</u>.
- ( ) TKE It is the contractor's (owner/builder's) responsibility to ensure that required inspections are made prior to proceeding with each stage of the project. Please refer to the list of required inspections given to you with your permit.
- ( ) TKE It is the contractor or owner/builder's responsibility to ensure corrections are made to items that have been red tagged, the red tags paid, and re-inspections performed and approved prior to proceeding with work. Failure of the contractor or owner/builder to request and receive re-inspections before proceeding with additional work may result in disciplinary action or a fine against the contractor or owner/builder.
- ( ) TKE Final Inspections must be requested within ten (10) days of completion of your project.
- ( ) TKE Final Inspections that have been red tagged must be reinspected within seven (7) days. All red tag fees must be paid prior to final inspection.
- ( ) TKE You must have <u>a completed inspection within every 180 days</u> for your permit to remain active. If a completed inspection is not obtained your permit may become inactive and require you to pay additional fees to reactivate the permit.
- ( ) TKE The life of the permit is 2 years from date of issuance.

I have read and understand the permit card instructions as listed above.

( ) Terry K. Edwards
Owner/Contractor Signature

Date

Permit Representative Initials

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Note This applies to the two-page application forms. For a checklist of docume... application processing, please refer to the appropriate checklist in the application packets.

✓ Application has been stamped received
✓ FBC 2007 stamp
✓ Fax number for deficiencies
✓ Key number
✓ Date
✓ Complete description of work to be done/description matches contract, if applicable
✓ Valuation of work to be done
✓ Type of construction marked
✓ Legal description
✓ Address, if applicable
✓ Directions to jobsite
✓ Property owner's name, address and interest in property
NA Name of fee simple titleholder (if other than owner) and address
NA Permitting service name, if applicable
✓ Contractor, address and license number
NA Electrical subcontractor, if applicable, phone and license number
NA Plumbing subcontractor, if applicable, phone and license number
NA Mechanical subcontractor, if applicable, phone and license number
NA Roofing subcontractor, if applicable, phone and license number
NA Aluminum subcontractor, if applicable, phone and license number
NA Bonding company name and address, if applicable
NA Architect/Engineer's name and address, if applicable
NA Mortgage Lender's name and address, if applicable
✓ Application signed:
- ___ By Owner (Owner/Builder permit)
- ✓ By Contractor (Contractor permit)
- ___ By Authorized Agent
  - ___ Original Agent Authorization submitted

✓ Application Notarized
✓ Application approved/initialed by Permit Representative
✓ Applicant has been advised of any documents which are required and have not been submitted
✓ Permit fee or advanced payment has been verified as being correct, in accordance with fee schedule
✓ Notice of commencement received (signed by owner, certified, recorded copy)

Permit Representative: ____________ Date: 1240343-

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