DATE 02/25/2009

Columbia County Building Permit

This Permit Must Be Prominently Posted on Premises During Construction

PERMIT
000027660

APPLICANT RICHARD PLAGE PHONE 863 559-8317

ADDRESS 13 BANANA RD FL 33810

OWNER WILLIAM & KIMBERLY ALLISON PHONE 752-7083

ADDRESS 166 SW RANDALL TERR LAKE CITY FL 32024

CONTRACTOR LEWIS COLLIER PHONE 863 859-3889

LOCATION OF PROPERTY 47S,TR ON CR 245, TR ON RANDALL TERR, 2ND LOT ON LEFT

TYPE DEVELOPMENT FOUNDATION STAB. ESTIMATED COST OF CONSTRUCTION 124875.00

HEATED FLOOR AREA _____ TOTAL AREA _____ HEIGHT ____ STORIES ____

FOUNDATION _____ WALLS _____ ROOF PITCH _____ FLOOR _____

LAND USE & ZONING RSF-2 MAX. HEIGHT _____

Minimum Set Back Requirments: STREET-FRONT 25.00 REAR 15.00 SIDE 10.00

NO. EX.D.U. 1 FLOOD ZONE X DEVELOPMENT PERMIT NO. _____

PARCEL ID 25-4S-16-03153-029 SUBDIVISION PICCADILLY PARK

LOT 2 BLOCK ____ PHASE ____ UNIT ____ TOTAL ACRES 0.67

		CGC1504067	Richard B Plage	
Culvert Permit No.	Culvert Waiver	Contractor's License Number	Applicant/Owner/Contractor	
EXISTING	X09-053	BK	RJ	N
Driveway Connection	Septic Tank Number	LU & Zoning checked by	Approved for Issuance	New Resident

COMMENTS: IMPACT FEE EXEMPT-EXISTING DWELLING

Check # or Cash 14530

FOR BUILDING & ZONING DEPARTMENT ONLY

(footer/Slab)

Temporary Power _____ date/app. by Foundation _____ date/app. by Monolithic _____ date/app. by

Under slab rough-in plumbing _____ date/app. by Slab _____ date/app. by Sheathing/Nailing _____ date/app. by

Framing _____ date/app. by Rough-in plumbing above slab and below wood floor _____ date/app. by

Electrical rough-in _____ date/app. by Heat & Air Duct _____ date/app. by Peri. beam (Lintel) _____ date/app. by

Permanent power _____ date/app. by C.O. Final _____ date/app. by Culvert _____ date/app. by

M/H tie downs, blocking, electricity and plumbing _____ date/app. by Pool _____ date/app. by

Reconnection _____ date/app. by Pump pole _____ date/app. by Utility Pole _____ date/app. by

M/H Pole _____ date/app. by Travel Trailer _____ date/app. by Re-roof _____ date/app. by

BUILDING PERMIT FEE $ 625.00 CERTIFICATION FEE $ 0.00 SURCHARGE FEE $ 0.00

MISC. FEES $ 0.00 ZONING CERT. FEE $ 50.00 FIRE FEE $ 0.00 WASTE FEE $ _____

FLOOD DEVELOPMENT FEE $ _____ FLOOD ZONE FEE $ 25.00 CULVERT FEE $ _____ **TOTAL FEE** 700.00

INSPECTORS OFFICE Hale Eddins CLERKS OFFICE CH

NOTICE: IN ADDITION TO THE REQUIREMENTS OF THIS PERMIT, THERE MAY BE ADDITIONAL RESTRICTIONS APPLICABLE TO THIS PROPERTY THAT MAY BE FOUND IN THE PUBLIC RECORDS OF THIS COUNTY. AND THERE MAY BE ADDITIONAL PERMITS REQUIRED FROM OTHER GOVERNMENTAL ENTITIES SUCH AS WATER MANAGEMENT DISTRICTS, STATE AGENCIES, OR FEDERAL AGENCIES.

"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."

EVERY PERMIT ISSUED SHALL BECOME INVALID UNLESS THE WORK AUTHORIZED BY SUCH PERMIT IS COMMENCED WITHIN 180 DAYS AFTER ITS ISSUANCE, OR IF THE WORK AUTHORIZED BY SUCH PERMIT IS SUSPENDED OR ABANDONED FOR A PERIOD OF 180 DAYS AFTER THE TIME THE WORK IS COMMENCED. A VALID PERMIT RECIEVES AN APPROVED INSPECTION EVERY 180 DAYS. WORK SHALL BE CONSIDERED NOT SUSPENDED, ABANDONED OR INVALID WHEN THE PERMIT HAS RECIEVED AN APPROVED INSPECTION WITHIN 180 DAYS OT THE PREVIOUS INSPECTION.

The Issuance of this Permit Does Not Waive Compliance by Permittee with Deed Restrictions.

Columbia County, Florida
Building & Zoning Department

Number of pages including cover sheet 2

Date 7/27/09

To: Rick

Phone:

Fax: 863 853-8593

From: Gale

Per Randy Jones

Phone: 386-758-1008

Fax: 386-758-2160

Remarks: ☐ Urgent ☐ For review ☐ ASAP ☐ Please comment

Previously faxed on 7/9/09 to fax number 877-859-8593 as per noted.

GP

FAX JOURNAL REPORT

TIME : 07/27/2009 14:04
NAME : BUILDING AND ZONING
FAX : 3867582160
SER.# : BROA8F779906

NO.	DATE	TIME	FAX NO./NAME	DURATION	PAGE(S)	RESULT	COMMENT
#107	07/23	11:42	97545431	20	01	OK	TX ECM
#108	07/23	11:42	97557156	29	01	OK	TX ECM
	07/23	12:14	386 555 5555	17	01	OK	RX ECM
	07/23	12:33		01:10	01	OK	RX
	07/23	12:57	386 555 5555	17	01	OK	RX ECM
#109	07/23	13:15	CODE ENFORCEMENT	54	01	OK	TX ECM
	07/23	13:21	3867545431	20	01	OK	RX ECM
#110	07/23	13:50	CLAY	31	02	OK	TX ECM
#110	07/23	13:51	LISA AT CLAY	48	02	OK	TX ECM
#111	07/23	13:58	SVE	22	01	OK	TX ECM
	07/23	14:57	3523320266	13	01	OK	RX ECM
	07/23	16:09	3523320266	30	03	OK	RX ECM
	07/23	16:40	3867522102	25	01	OK	RX ECM
	07/24	04:00		50	01	OK	RX
	07/24	08:03	3864974866	01:11	04	OK	RX ECM
#112	07/24	08:16	CLAY	26	02	OK	TX ECM
#112	07/24	08:17	LISA AT CLAY	44	02	OK	TX ECM
	07/24	08:32	3864974866	45	01	OK	RX ECM
#113	07/24	09:09	819047795733	39	01	OK	TX ECM
#114	07/24	09:28	813864974866	33	02	OK	TX ECM
	07/24	09:45	386 758 8920	01:11	03	OK	RX ECM
	07/24	11:42	3864974946	25	01	OK	RX ECM
#115	07/24	11:56	97558188	41	01	OK	TX
	07/24	12:46		16	02	OK	RX ECM
#116	07/24	13:02	CLAY	17	01	OK	TX ECM
#116	07/24	13:03	LISA AT CLAY	27	01	OK	TX ECM
#117	07/24	13:04	A B SEPTIC	47	01	OK	TX ECM
#118	07/24	16:07	97197498	21	01	OK	TX ECM
#119	07/24	16:08	97197498	21	01	OK	TX ECM
#120	07/24	16:25	97521024	01:29	07	OK	TX ECM
	07/27	02:55		51	01	OK	RX
	07/27	09:40		50	01	OK	RX
	07/27	10:11		18	01	OK	RX ECM
#122	07/27	10:24	CLAY	18	01	OK	TX ECM
#122	07/27	10:25	LISA AT CLAY	27	01	OK	TX ECM
#123	07/27	10:27	A B SEPTIC	47	01	OK	TX ECM
#124	07/27	10:43	CLAY	17	01	OK	TX ECM
#124	07/27	10:44	LISA AT CLAY	27	01	OK	TX ECM
#125	07/27	10:45	A B SEPTIC	47	01	OK	TX ECM
#126	07/27	10:47	97588920	26	01	OK	TX ECM
#127	07/27	10:51	819544476946	20	01	OK	TX ECM
#128	07/27	10:52	CODE ENFORCEMENT	38	01	OK	TX ECM
#129	07/27	11:21	PROGRESS	26	01	OK	TX ECM
	07/27	11:26	3863643768	32	01	OK	RX ECM
	07/27	13:17	3863626118	32	01	OK	RX ECM
	07/27	13:22	3863643768	33	01	OK	RX ECM
	07/27	13:49	352 472 0104	40	02	OK	RX ECM
#130	07/27	14:01	818638538593	34	02	OK	TX ECM
#131	07/27	14:03	818638538593	34	02	OK	TX ECM
#132	07/27	14:04	CLAY	27	02	OK	TX ECM

BUSY: BUSY/NO RESPONSE
NG : POOR LINE CONDITION / OUT OF MEMORY
POL : POLLING
RET : RETRIEVAL
PC : PC-FAX

MEMO

To: Rick Plage

Fr: Randy Jones, Asst. Building & Zoning Coor.

Dt: July 9, 2009

Re: Permit # 27660 (Allison Residence)

Our office has received the engineering report from GSE Engineering & Consulting Inc. for the above job.
The reports indicate that all work was performed to their satisfaction, and our office will consider this permit closed.

PERMIT 000027660

GSE Engineering & Consulting, Inc.

May 15, 2009

Ms. Lori Robinson
State Farm Florida Insurance Company
P.O. Box 44036
Jacksonville, Florida 32231

Subject: Grout Injection Remediation Completion Report
Claim No. 59-D210-403
Allison Residence
166 SW Randall Terrace
Lake City, Columbia County, Florida
GSE Project No. 10299A

Dear Ms. Robinson:

GSE is pleased to submit this report summarizing the grout injection remediation performed at the Allison residence located at 166 SW Randall Terrace in Lake City, Columbia County, Florida. Figure 1 illustrates the project location.

BACKGROUND INFORMATION

GSE Engineering & Consulting, Inc. (GSE) was retained by State Farm Florida Insurance Company to perform a subsidence exploration at the Allison residence. The purpose of the subsidence exploration was to explore the subsurface conditions at the site, identify and evaluate damage to the home, and determine the existence of sinkhole activity and sinkhole loss as defined by §627.707 Florida Statutes. Within the report, GSE recommended the soils beneath the home be stabilized using a grout injection program.

GSE was later retained by State Farm Florida Insurance Company to monitor and confirm that the grout injection was completed in substantial compliance with the recommendations presented in GSE's document entitled *Summary Report of a Subsidence Exploration* dated September 23, 2008 (GSE Project No. 10299). Please refer to this report for additional background information.

The purpose of the grout injection program was to treat the suspected sinkhole conditions beneath the foundation of the home by filling subsurface voids and compacting loose subsurface soils. GSE monitored the contractor's operations during the grouting to confirm general compliance with the intent of our recommendations.

SUMMARY OF MONITORING SERVICES

The following summarizes the activities GSE observed and documented at the site:

- GSE and Certified Foundations, Inc. (CFI) representatives met at the site to establish the grout point locations. The actual number and locations of grout points were established and field adjusted considering on site access and providing appropriate lateral coverage across the residence.

- CFI installed and grouted 15 injection points around the perimeter of the residence between March 26 and April 2, 2009. Pipe depths ranged from approximately 41 to 74 feet for a total of 879 linear feet.

- A representative from GSE monitored the grout quantities and pumping pressures. Structural movement was monitored with a surveyor's level provided by CFI. Grout placement into each injection point was terminated due to structural uplift or high pumping pressure.

- CFI ordered 130 cubic yards of grout of which approximately 127 cubic yards was injected into the subsurface. The remaining 3 yards of grout was returned to the plant.

Based on the above information, it is our opinion that the deep injection grouting program has been completed in substantial compliance with GSE's engineering recommendations and local grouting practices. This grouting procedure was implemented to stabilize the subsurface conditions related to sinkhole activity in the immediate vicinity of the foundation of the residence. This procedure may not prelude development of new sinkhole activity in the future.

Table 1 in the Appendix summarized the grout injection, including estimated grout volume injected and initial depth of each point. Figure 2 illustrates the approximate location and numbering of the grout points.

GSE understands that cosmetic repairs will be performed following the underpinning operations that will be performed at a later date. Accordingly, any existing damage and/or collateral damage associated with the grouting operations should be repaired at that time by a qualified restoration contractor.

CLOSING

GSE appreciates the opportunity to have assisted you on this project. If you have any questions or comments concerning this report or if we may be of further assistance, please contact us.

Sincerely,

GSE Engineering & Consulting, Inc.

Joakim (Jay) B. Nordqvist, P.E.
Principal Engineer
Florida Registration Number 42681

Kenneth L. Hill, P.E. 5/18/09
Principal Engineer
Florida Registration Number 40146

JBN/KLH:rb
Z:General\Projects\10299A Allison Residence\10299A Grout Injection.doc

Appendix:
- Figure 1 - Project Site Location Map
- Figure 2 - Site Plan Showing Approximate Locations of Installed Grout Injection Points
- Table 1 - Summary Table of Grout Injection Remediation

Distribution:
- Addressee (2)
- Certified Foundations, Inc. (2)
- File (1)

APPENDIX

NORTH

NOT TO SCALE

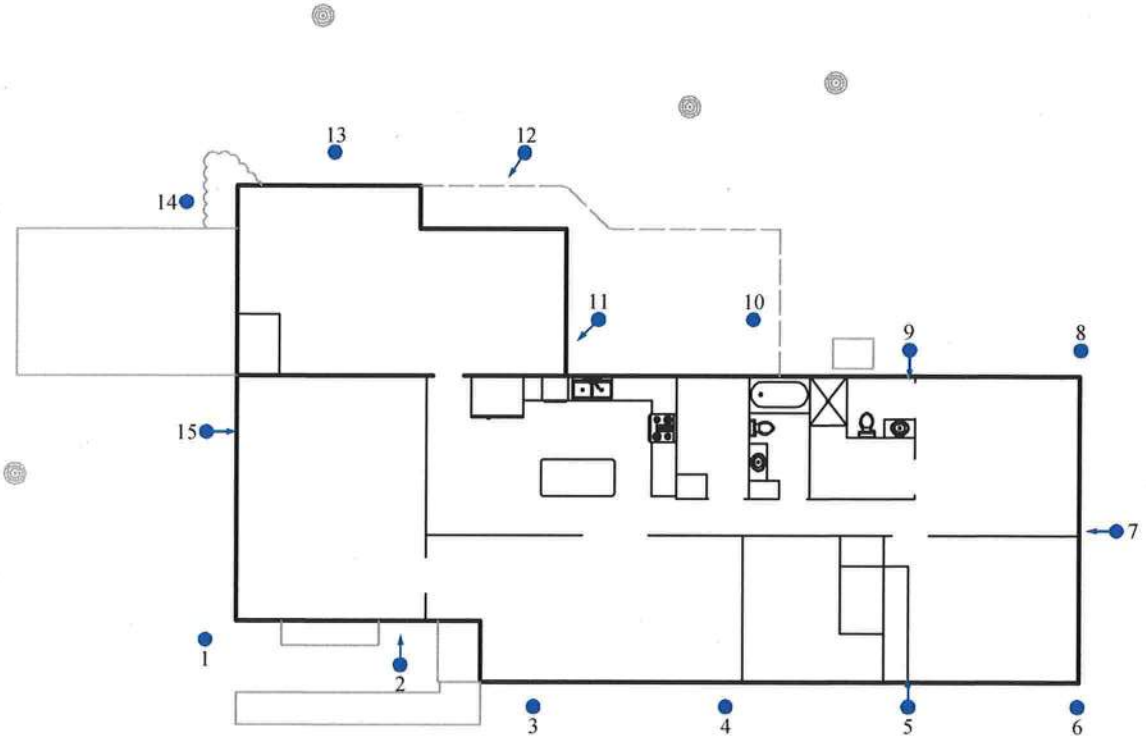
CLAIM No. 59-D210-403
ALLISON RESIDENCE
LAKE CITY, COLUMBIA COUNTY, FLORIDA
GSE PROJECT No. 10299A

PROJECT SITE LOCATION MAP

DESIGNED BY : KLH
CHECKED BY : KLH
DRAWN BY : JJJ

GSE Engineering & Consulting, Inc.

FIGURE 1



LEGEND :

- GROUT INJECTION POINT
- ANGLED GROUT INJECTION POINT

NORTH

0 15'

SCALE: 1" = 15' APRROX.

CLAIM No. 59-D210-403
ALLISON RESIDENCE
LAKE CITY, COLUMBIA COUNTY, FLORIDA
GSE PROJECT No. 10299A

SITE PLAN SHOWING APPROXIMATE LOCATION OF INSTALLED GROUT POINTS

DESIGNED BY : KLH
CHECKED BY : KLH
DRAWN BY : JJJ

GSE Engineering & Consulting, Inc.

FIGURE 2

Table 1. Summary Table of Grout Injection Remediations

Grout Point Number	Initial Pipe Depth (Feet)	Approximate Volume of Grout (Cubic Yards)	Date Drilled	Date Grouted
1	51	7.3	3/26/09	4/1/09
2	74	14	3/26/09	4/2/09
3	67	13.4	3/26/09	4/1/09
4	64	15	3/26/09	4/2/09
5	64	6.9	3/26/09	4/2/09
6	43	6.6	3/26/09	4/2/09
7	74	7.3	3/27/09	3/31/09
8	51	7.8	3/27/09	3/31/09
9	46	5.9	3/27/09	3/31/09
10	41	3.1	3/27/09	3/31/09
11	56	12.4	3/27/09	3/31/09
12	59	4.9	3/27/09	3/31/09
13	63	7	3/27/09	4/1/09
14	67	11.1	3/27/09	4/1/09
15	59	4.3	3/27/09	4/1/09
TOTAL	879	127		

PERMIT 000027660

GSE Engineering & Consulting, Inc.

May 15, 2009

Ms. Lori Robinson
State Farm Florida Insurance Company
P.O. Box 44036
Jacksonville, Florida 32231

Subject: Completion Report of Underpinning Pile Operations
Claim No. 59-D210-403
Allison Residence
166 SW Randall Terrace
Lake City, Columbia County, Florida
GSE Project No. 10299A

Dear Ms. Robinson:

GSE is pleased to submit this report summarizing the underpinning pile operations at the subject residence.

BACKGROUND INFORMATION

GSE Engineering & Consulting, Inc. (GSE) was retained by State Farm Florida Insurance Company to perform a subsidence exploration at the Allison residence located at 166 SW Randall Terrace in Lake City, Columbia County, Florida (Figure 1).

The purpose of the subsidence exploration was to explore the subsurface conditions at the site, identify and evaluate damage to the home, and determine the existence of sinkhole activity and sinkhole loss as defined by §627.707 Florida Statutes. Our findings, conclusions, and recommendations were presented in a document entitled *Summary Report of a Subsidence Exploration* dated September 23, 2008 (GSE Project No. 10299). Please refer to this report for additional background information.

Within the report, GSE recommended underpinning piles be installed to stabilize the foundation upon completion of a grout injection program. The grout injection program was previously completed as documented in our report entitled *Grout Injection Remediation Completion Report* dated May 15, 2009 (GSE Project No. 10299A). Please refer to that document for additional information.

GSE was retained by State Farm Florida Insurance Company to monitor and confirm that the underpinning pile installation was completed in substantial compliance with GSE recommendations. This report summarizes and documents our observations.

GSE Engineering & Consulting, Inc.
5627 SW 64th Street, Suite B
Gainesville, Florida 32608
352-377-3233 Phone
352-377-0335 Fax
www.gseengineering.com
Certificate of Authorization No. 27430

The piles were installed into the subsurface that bear on competent materials, and a steel bracket attached the piles to the foundation. A hydraulic ram was used to jack the foundation against the piles to transfer the foundation load to the piles. The piles were then permanently attached to the foundation through a bracket and the hydraulic rams were removed.

SUMMARY OF MONITORING SERVICES

The following summarizes the activities GSE observed and documented at the site:

- GSE met with Certified Foundations, Inc. (CFI) representatives at the site and assisted in locating the planned underpinning pile installation locations. The locations considered and were adjusted for accessibility and proper spacing between individual piles.

- CFI installed 41 steel underpinning piles along the perimeter and an interior bearing wall of the residence between April 14 through 28, 2009.

- The piles consisted of steel pipes that were hydraulically advanced to bear on competent material. The hydraulic seating pressures for the piles ranged between 900 and 3500 psi. Several of the piles were pre-jetted with water to assist in the pile advancement. Pile advancement was terminated when appreciable lift began with potential to cause collateral damage to the structure. Foundation lift was monitored during pile installations and final lift by CFI.

- Spreader beams were installed at all pile locations except piles 5, 10, 11 and 13 to reduce the potential for collateral damage to the structure during pile installation. The short distance from the bottom of the windows to the foundation necessitated the installation of the spreader beams.

- Pile depths ranged from 14 to 56 feet with a total of approximately 1393 linear feet of steel pipe installed into the subsurface.

- The hydraulic final lift pressures ranged from approximately 900 to2500 psi. The amount of associated measured foundation lift at the pile locations ranged from less than 1/16 inch to 1/8 inch.

Based on our observations, the underpinning pile installation was documented as substantially complying with GSE's recommendations. Table 1 in the Appendix summarizes the approximate underpinning pile installation. Figure 2 illustrates the location and numbering of the underpinning piles.

It is GSE understands that cosmetic repairs will be performed following the underpinning operations. Accordingly, any existing damage and/or collateral damage associated with underpinning operations should be repaired at that time by a qualified restoration contractor.

CLOSING

GSE appreciates the opportunity to have assisted you on this project. If you have any questions or comments concerning this report or if we may be of further assistance, please contact us.

Sincerely,

GSE Engineering & Consulting, Inc.

Joakim (Jay) B. Nordqvist, P.E.
Principal Engineer
Florida Registration Number 42681

Kenneth L. Hill, P.E. 5/18/09
Principal Engineer
Florida Registration Number 40146

KLH/JBN:rb
Z:General\Projects\10299A Allison Residence\10299A Underpinning Pile Operations.doc

Attachments:
- Figure 1 – Project Site Location Map
- Figure 2 – Site Plan Showing Approximate Locations of Installed Underpinning Piles
- Table 1 – Underpinning Pile Installation Summary

Distribution:
- Addressee (2)
- Certified Foundations, Inc. (2)
- File (1)

ATTACHMENTS

NORTH

NOT TO SCALE

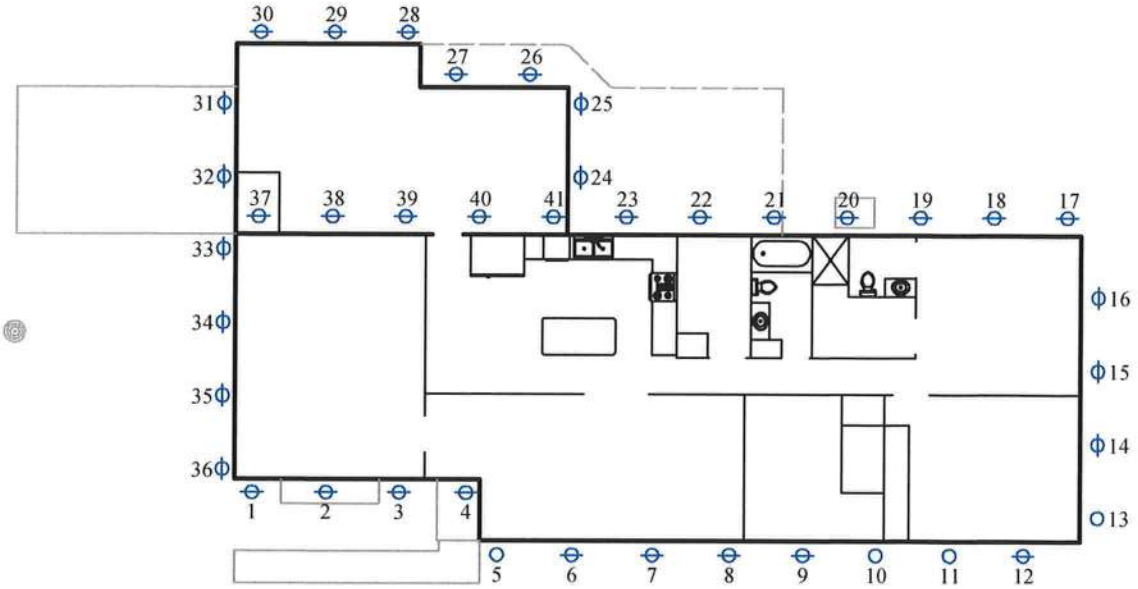
CLAIM No. 59-D210-403
ALLISON RESIDENCE
LAKE CITY, COLUMBIA COUNTY, FLORIDA
GSE PROJECT No. 10299A

PROJECT SITE LOCATION MAP

DESIGNED BY : KLH
CHECKED BY : KLH
DRAWN BY : JJJ

GSE Engineering & Consulting, Inc.

FIGURE 1



LEGEND :

- UNDERPINNING PILE (4)
- UNDERPINNING PILE WITH SPREADER BEAM (37)

NORTH

0 15'

SCALE: 1" = 15' APRROX.

CLAIM No. 59-D210-403
ALLISON RESIDENCE
LAKE CITY, COLUMBIA COUNTY, FLORIDA
GSE PROJECT No. 10299A

SITE PLAN SHOWING APPROXIMATE LOCATION OF INSTALLED UNDERPINNING PILES

DESIGNED BY : KLH
CHECKED BY : KLH
DRAWN BY : JJJ

GSE Engineering & Consulting, Inc.

FIGURE 2

GSE Engineering & Consulting, Inc.

UNDERPINNING PILE INSTALLATION SUMMARY
ALLISON RESIDENCE 59-D210-403
LAKE CITY, COLUMBIA COUNTY, FLORIDA
GSE Project No. 10299A

Table 1

	Underpinning Pile	1	2	3	4	5	6	7	8	9	10
	Date	4/23/09	4/27/09	4/27/09	4/24/09	4/14/09	4/14/09	4/15/09	4/15/09	4/15/09	4/15/09
		Installation Pressure (psi)									
Depth (ft)	3.5	900	900	900	900	800	800	1100	900	900	800
	7	1200	1200	1200	1100	2900	1700	1700	2200	1800	1500
	10.5	1300	1400	1600	1000	3000	2800	2100	2700	2400	2100
	14	1100	1200	1200	900	2400	2300	1200	2500	2700	2000
	17.5	1400	1500	1600		1100	1200	1400	2700	1800	2300
	21	1300	1300	1400		1400	1400	1700	2800	2700	1800
	24.5	1500	1200	1200		1300	1900	1800	2700	2100	2000
	28	2000	2000	1300		1900	2000	2100	2800	2300	1800
	31.5			2000		1400	2200	2200	3000	2500	2000
	35					1800	3000	1900		2200	18000
	38.5					1400		3000		2000	3000
	42					3000				3000	
	45.5										
	49										
	52.5										
	56										

Seating Pressure (psi)	2000	2000	2000	900	3000	3000	3000	3000	3000	18000
Final Lift Pressure (psi)	1500	1500	1500	900	1500	1500	1500	1500	1500	1500
Foundation Lift (in)	1/8	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16
Bearing Tip Depth (ft)	28	28	31.5	14	42	35	42	31.5	42	38.5

GSE Engineering & Consulting, Inc.

UNDERPINNING PILE INSTALLATION SUMMARY
ALLISON RESIDENCE 59-D210-403
GAINESVILLE, ALACHUA COUNTY, FLORIDA
GSE Project No. 10288A

Table 1

	Underpinning Pile	11	12	13	14	15	16	17	18	19	20
	Date	4/15/09	4/15/09	4/16/09	4/16/09	4/16/09	4/16/09	4/17/09	4/17/09	4/20/09	4/20/09
		Installation Pressure (psi)									
Depth (ft)	3.5	900	1100	900	1100	900	1000	1000	900	1100	1100
	7	1400	1600	1300	1400	1700	1200	1600	1300	1800	1700
	10.5	1500	1300	1400	1300	2100	1600	1800	2100	1900	2100
	14	1800	2100	1600	1700	2200	1800	1500	1800	2000	1800
	17.5	2100	2300	1400	1200	1600	1600	1800	1600	1700	1900
	21	1800	2100	1700	1100	1900	1600	1900	1700	1900	2100
	24.5	1500	2400	1400	1800	2000	2500	2100	1700	1200	2300
	28	1400	2100	1900	1600	2100		1800	2500	1800	1300
	31.5	1800	2200	2000	1800	2800		1600		2100	1400
	35	1600	2500	1400	1600	3000		1800		1900	1700
	38.5	3000		1500	1300			2400		3000	2200
	42			2800	1400			3000			1500
	45.5				3000						3000
	49										
	52.5										
	56										

Seating Pressure (psi)	3000	2500	2800	3000	3000	2500	3000	2500	3000	3000
Final Lift Pressure (psi)	1500	1500	1500	1500	1500	1500	2500	1500	1500	1500
Foundation Lift (in)	1/16	1/16	1/16	1/16	1/16	1/8	1/16	1/16	1/16	1/16
Bearing Tip Depth (ft)	38.5	35	42	45.5	35	24.5	42	28	38.5	45.5

GSE Engineering & Consulting, Inc.

UNDERPINNING PILE INSTALLATION SUMMARY
ALLISON RESIDENCE 59-D210-403
GAINESVILLE, ALACHUA COUNTY, FLORIDA
GSE Project No. 10288A

Table 1

	Underpinning Pile	21	22	23	24	25	26	27	28	29	30
	Date	4/20/09	4/20/09	4/21/09	4/21/09	4/21/09	4/21/09	4/21/09	4/21/09	4/21/09	4/21/09
		Installation Pressure (psi)									
Depth (ft)	3.5	1000	1000	1200	900	1100	100	1100	6/18/1902	900	900
	7	1500	1900	1100	1200	1500	1400	1300	1100	1200	1300
	10.5	2200	2100	1700	1500	1300	1700	1200	1700	1900	1700
	14	1900	1700	1800	1700	1500	1400	1600	1800	1700	1800
	17.5	1800	1600	1600	1500	1800	1600	1700	1600	1800	1900
	21	2000	1300	1400	1600		1800	1900	1200	1700	1600
	24.5	2200	1600	2400	2000			2000	1800	1500	1800
	28	1600	2200	2700					2000	2000	2000
	31.5	1700	2100	1800							
	35	2000	1800	1700							
	38.5	3000	1200	2100							
	42		3000	3000							
	45.5										
	49										
	52.5										
	56										

Seating Pressure (psi)	3000	3000	3000	2000	1800	1800	2000	2000	2000	2000
Final Lift Pressure (psi)	1500	1500	1500	1500	1800	1500	1500	1500	1500	1500
Foundation Lift (in)	1/16	1/16	1/16	1/16	1/16	1/8	1/16	1/16	1/8	1/8
Bearing Tip Depth (ft)	38.5	42	42	24.5	17.5	21	24.5	28	28	28

GSE Engineering & Consulting, Inc.

UNDERPINNING PILE INSTALLATION SUMMARY
ALLISON RESIDENCE 59-D210-403
GAINESVILLE, ALACHUA COUNTY, FLORIDA
GSE Project No. 10288A

Table 1

	Underpinning Pile	31	32	33	34	35	36	37	38	39	40
	Date	4/22/09	4/22/09	4/23/09	4/23/09	4/23/09	4/23/09	4/23/09	4/28/09	4/28/09	4/28/09
		Installation Pressure (psi)									
Depth (ft)	3.5	900	1000	1100	1100	1000	800	1100	1100	1000	1100
	7	1300	1300	1400	1000	1100	1500	1300	1200	1200	1300
	10.5	1500	1600	1500	1100	1200	1400	1200	1100	1300	1500
	14	1700	1400	1000	1200	1300	1100	1000	1300	1500	1200
	17.5	1900	1800	1100	1400	1600	1300	1100	1100	1100	1500
	21	1500	1000	900	1100	1100	1400	1300	1400	1400	1600
	24.5	1700	1400	1000	1200	1400	1500	1000	1400	1200	1100
	28	2000	1000	1300	1000	1300		1100	1200	1600	1300
	31.5		2100	1500	1200	1500		1000	1300	1100	1500
	35		1800		2000	2000		1500	2000	2000	2000
	38.5		1800					2000			
	42		2100								
	45.5		1800								
	49		1700								
	52.5		2500								
	56		2500								

Seating Pressure (psi)	2000	2500	1500	2000	2000	1500	2000	2000	2000	2000
Final Lift Pressure (psi)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Foundation Lift (in)	1/16	1/16	1/8	1/16	1/16	1/8	1/16	1/16	1/16	1/16
Bearing Tip Depth (ft)	28	56	31.5	35	35	24.5	38.5	35	35	35

GSE Engineering & Consulting, Inc.

UNDERPINNING PILE INSTALLATION SUMMARY
ALLISON RESIDENCE 59-D210-403
LAKE CITY, COLUMBIA COUNTY, FLORIDA
GSE Project No. 10299A

Table 1

	Underpinning Pile	41									
	Date	4/28/09									
		Installation Pressure (psi)									
Depth (ft)	3.5	1000									
	7	1200									
	10.5	1400									
	14	1600									
	17.5	1800									
	21	1500									
	24.5	1300									
	28	1400									
	31.5	1600									
	35	2000									
	38.5	3000									
	42										
	45.5										
	49										
	52.5										
	56										

Seating Pressure (psi)	3000									
Final Lift Pressure (psi)	1500									
Foundation Lift (in)	1/16									
Bearing Tip Depth (ft)	38.5									

- FED EX REQ'D - 2.23.09 (INCOMPLETE) CK#14530

Columbia County Building Permit Application

For Office Use Only Application # 0902-32 Date Received 2/24 By JOE Permit # 27660

Zoning Official BLK Date 25.02.09 Flood Zone X FEMA Map # N/A Zoning RSF-2

Land Use RES. 1a Dw Elevation N/A MFE N/A River N/A Plans Examiner 2/25/09 Date 2/25/09

Comments Impact Fee Exempt - Existing Dwelling

☐ NOC ☑ EH ☑ Deed or PA ☑ Site Plan ☐ State Road Info ☐ Parent Parcel #

☐ Dev Permit # ☐ In Floodway ☑ Letter of Authorization from Contractor

☐ Unincorporated area ☐ Incorporated area ☐ Town of Fort White ☐ Town of Fort White Compliance letter

Septic Permit No. 2-09-053 IN FILE 2 Fax

Name Authorized Person Signing Permit Richard A Plage Phone 863-559-8317

Address 166 SW Randall Terrace, Lake City, FL 32024

Owners Name William and Kimberly Allison Phone 386-752-7083

911 Address 166 SW Randall Terrace, Lake City, FL 32024

Contractors Name Lewis G Collier Phone 863-859-3889

Address 1306 Banana Rd, Lakeland, FL 33810-2001

Fee Simple Owner Name & Address

Bonding Co. Name & Address

~~Architect~~/Engineer Name & Address Kenneth L. Hill, 4949 SW 41st Blvd, Unit 70, Lake City, FL 32608

Mortgage Lenders Name & Address

Circle the correct power company – FL Power & Light – (Clay Elec.) – Suwannee Valley Elec. – Progress Energy

Property ID Number 25-4S-16-03153-029 Estimated Cost of Construction $124,875.00

Subdivision Name Piccadilly Park Lot 2 Block D Unit Phase

Driving Directions W on US 90; S on US 41; S on CR 47; W on CR 242; N on SW Randall Terrace.

47-S to C-242, TR TO ~~BAY HEADQUARTERS~~ TO RANDALL TERRACE, TR

.12 MILE ON THE L. 2nd lot on left

Number of Existing Dwellings on Property 1

Construction of FOUNDATION STABILIZATION Total Acreage .67 Lot Size

Do you need a - Culvert Permit or Culvert Waiver or Have an Existing Drive Total Building Height

*SITE PLAN ENCLOSED

Actual Distance of Structure from Property Lines - Front 70 per site plan Side 55 Side 55 Rear 100

Number of Stories Heated Floor Area Total Floor Area Roof Pitch

Application is hereby made to obtain a permit to do 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 be performed to meet the standards of all laws regulating construction in this jurisdiction.

$100

WARNING TO OWNER: YOUR FAILURE TO RECORD A NOTICE OF COMMENCMENT MAY RESULT IN YOU 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 ATTORNEY BEFORE RECORDING YOUR NOTICE OF COMMENCEMENT.

FLORIDA'S CONSTRUCTION LIEN LAW: Protect Yourself and Your Investment
According to Florida Law, those who work on your property or provide materials, and are not paid-in-full, have a right to enforce their claim for payment against your property. This claim is known as a construction lien. If your contractor fails to pay subcontractors or material suppliers or neglects to make other legally required payments, the people who are owed money may look to your property for payment, even if you have paid your contractor in full. This means if a lien is filed against your property, it could be sold against your will to pay for labor, materials or other services which your contractor may have failed to pay.

NOTICE OF RESPONSIBILITY TO BUILDING PERMITEE:
YOU ARE HEREBY NOTIFIED as the recipient of a building permit from Columbia County, Florida, you will be held responsible to the County for any damage to sidewalks and/or road curbs and gutters, concrete features and structures, together with damage to drainage facilities, removal of sod, major changes to lot grades that result in ponding of water, or other damage to roadway and other public infrastructure facilities caused by you or your contractor, subcontractors, agents or representatives in the construction and/or improvement of the building and lot for which this permit is issued. No certificate of occupancy will be issued until all corrective work to these public infrastructures and facilities has been corrected.

OWNERS CERTIFICATION: I hereby certify that all the foregoing information is accurate and all work will be done in compliance with all applicable laws and regulating construction and zoning. I further understand the above written responsibilities in Columbia County for obtaining this Building Permit.

William B Allison Jr
Owners Signature

CONTRACTORS AFFIDAVIT: By my signature I understand and agree that I have informed and provided this written statement to the owner of all the above written responsibilities in Columbia County for obtaining this Building Permit.

Richard G. Pharr
Contractor's Signature (Permitee)

Contractor's License Number CGC1504067
Columbia County
Competency Card Number_____

Affirmed under penalty of perjury to by the Contractor and subscribed before me this 20th **day of** Feb **20**09

Personally known ✓ **or Produced Identification**_____

Yolanda Young
State of Florida Notary Signature (For the Contractor)

SEAL:

NOTARY PUBLIC STATE OF FLORIDA
Notary Public State of Florida
Yolanda Y Young
My Commission DD492590
Expires 11/20/2009

Revised 11-30-07

Columbia County Property Appraiser

DB Last Updated: 1/12/2009

2008 Tax Year

Parcel: 25-4S-16-03153-029 HX

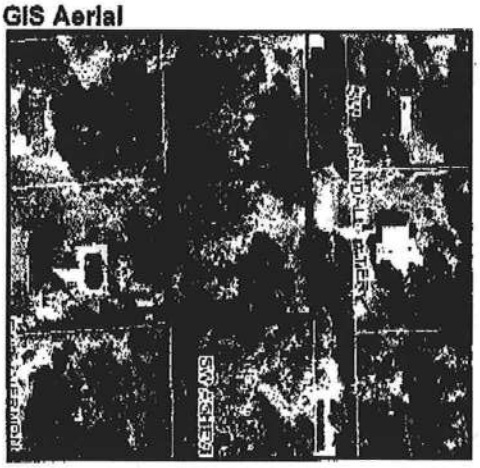
Tax Record | Property Card | Interactive GIS Map | Print

Search Result: 1 of 1

Owner & Property Info

Owner's Name	ALLISON WILLIAM B & KIMBERLY H		
Site Address	RANDALL		
Mailing Address	166 SW RANDALL TER LAKE CITY, FL 32024		
Use Desc. (code)	SINGLE FAM (000100)		
Neighborhood	25416.04	**Tax District**	2
UD Codes	MKTA06	**Market Area**	06
Total Land Area	0.675 ACRES		
Description	COMM NW COR OF SEC RUN E 1188.09 FT, S 732.94 FT FOR POB, CONT S 172.50 FT, E 170 FT, N 172.50 FT, W 170 FT TO POB. (AKA LOT 2 BLOCK D PICCADILLY PARK S/D UNREC) ORB 416-107, 604-560, 733-664, 810-2063, 813-1885		

GIS Aerial



Property & Assessment Values

Mkt Land Value	cnt: (1)	$18,450.00
Ag Land Value	cnt: (0)	$0.00
Building Value	cnt: (1)	$72,851.00
XFOB Value	cnt: (3)	$3,420.00
Total Appraised Value		$94,721.00

Just Value		$94,721.00
Class Value		$0.00
Assessed Value		$68,689.00
Exempt Value	(code: HX)	$43,689.00
Total Taxable Value		$25,000.00

Sales History

Sale Date	Book/Page	Inst. Type	Sale Vimp	Sale Qual	Sale RCode	Sale Price
10/13/1995	810/2063	WD	I	Q		$63,000.00
9/28/1990	733/664	WD	I	Q		$58,000.00
10/1/1986	604/560	WD	I	Q		$57,000.00

Building Characteristics

Bldg Item	Bldg Desc	Year Blt	Ext. Walls	Heated S.F.	Actual S.F.	Bldg Value
1	SINGLE FAM (000100)	1978	Common BRK (19)	1864	2009	$72,851.00
	Note: All S.F. calculations are based on exterior building dimensions.					

Extra Features & Out Buildings

Code	Desc	Year Blt	Value	Units	Dims	Condition (% Good)
0180	FPLC 1STRY	1978	$2,300.00	1.000	0 x 0 x 0	(.00)
0294	SHED WOOD/	1993	$840.00	160.000	10 x 16 x 0	AP (30.00)
0296	SHED METAL	1993	$280.00	80.000	8 x 10 x 0	AP (30.00)

Land Breakdown

Lnd Code	Desc	Units	Adjustments	Eff Rate	Lnd Value
000100	SFR (MKT)	1.000 LT - (.675AC)	1.00/1.00/1.00/1.00	$18,450.00	$18,450.00

Columbia County Property Appraiser. DB Last Updated: 1/12/2009

IMPERIAL POLK COUNTY LOCAL BUSINESS TAX RECEIPT

RECEIPT / ACCT # 2110000811

LOCATION: 1306 BANANA RD
12 - LAKELAND - NOT IN CITY

OWNER: COLLIER, LEWIS GENE

EXPIRES: 9/30/2009

CLASS **B**

230150 CONTRACTOR GENERAL

CERTIFIED FOUNDATIONS INC
LEWIS GENE COLLIER
1306 BANANA RD
LAKELAND, FL 33810

BUS TAX TYPE: RENEWAL
BASE TAX: 55.00

ADDL FEE:

TOTAL: 55.00

JOE G. TEDDER, TAX COLLECTOR 430 E MAIN ST • PO BOX 2016 • BARTOW, FL 33831-2016 TEL (863) 534-4731 • www.PolkTaxes.com

THIS POLK COUNTY LOCAL BUSINESS TAX RECEIPT MUST BE CONSPICUOUSLY DISPLAYED AT THE BUSINESS LOCATION

PAID-1203135.0001-0001 12 08/18/2008 55.00

STATE OF FLORIDA

DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION

CONSTRUCTION INDUSTRY LICENSING BOARD
1940 NORTH MONROE STREET
TALLAHASSEE FL 32399-0783

(850) 487-1395

COLLIER, LEWIS GENE
CERTIFIED FOUNDATIONS INC
1306 BANANA ROAD
LAKELAND FL 33810

Congratulations! With this license you become one of the nearly one million Floridians licensed by the Department of Business and Professional Regulation. Our professionals and businesses range from architects to yacht brokers, from boxers to barbeque restaurants, and they keep Florida's economy strong.

Every day we work to improve the way we do business in order to serve you better. For information about our services, please log onto **www.myfloridalicense.com**. There you can find more information about our divisions and the regulations that impact you, subscribe to department newsletters and learn more about the Department's initiatives.

Our mission at the Department is: License Efficiently, Regulate Fairly. We constantly strive to serve you better so that you can serve your customers. Thank you for doing business in Florida, and congratulations on your new license!

STATE OF FLORIDA AC# 3856132
DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION

CGC1504067 07/15/08 078167606

CERTIFIED GENERAL CONTRACTOR
COLLIER, LEWIS GENE
CERTIFIED FOUNDATIONS INC

IS CERTIFIED under the provisions of Ch.489 FS
Expiration date: AUG 31, 2010 L08071500984

DETACH HERE

AC# 3856132

STATE OF FLORIDA

DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION
CONSTRUCTION INDUSTRY LICENSING BOARD

SEQ# L08071500984

DATE	BATCH NUMBER	LICENSE NBR
07/15/2008	078167606	CGC1504067

The GENERAL CONTRACTOR
Named below IS CERTIFIED
Under the provisions of Chapter 489 FS.
Expiration date: AUG 31, 2010

COLLIER, LEWIS GENE
CERTIFIED FOUNDATIONS INC
1306 BANANA ROAD
LAKELAND FL 33810

CHARLIE CRIST
GOVERNOR

CHUCK DRAGO
INTERIM SECRETARY

DISPLAY AS REQUIRED BY LAW

ACORD CERTIFICATE OF LIABILITY INSURANCE

OP ID CB
CERTI-1

DATE (MM/DD/YYYY)
02/12/09

PRODUCER

Heacock Insurance - Lakeland
P.O. Box 328
Lakeland FL 33802
Phone: 863-683-2228 Fax: 863-683-3309

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURED

CFI Certified Foundations Inc.
Lewis G & JoAnn Collier,ATIMA
1306 Banana Road
Lakeland FL 33810-2001

INSURERS AFFORDING COVERAGE		NAIC #
INSURER A:	American Empire Surplus	
INSURER B:	Bridgefield Employers Ins Co	
INSURER C:	Hanover Insurance	22292
INSURER D:		
INSURER E:		

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	ADD'L INSRD	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
A		GENERAL LIABILITY [X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS MADE [X] OCCUR [X] Per Project Aggre GEN'L AGGREGATE LIMIT APPLIES PER: [ ] POLICY [X] PRO-JECT [ ] LOC	8EP08813	03/08/08	03/08/09	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 2000000 $ 100000 $ Excl $ 2000000 $ 2000000 $ 2000000
C		AUTOMOBILE LIABILITY [X] ANY AUTO [ ] ALL OWNED AUTOS [ ] SCHEDULED AUTOS [ ] HIRED AUTOS [ ] NON-OWNED AUTOS	AZJ6338304	01/01/09	01/01/10	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 1,000,000 $ $ $
		GARAGE LIABILITY [ ] ANY AUTO				AUTO ONLY - EA ACCIDENT OTHER THAN AUTO ONLY: EA ACC AGG	$ $ $
		EXCESS/UMBRELLA LIABILITY [ ] OCCUR [ ] CLAIMS MADE [ ] DEDUCTIBLE [ ] RETENTION $				EACH OCCURRENCE AGGREGATE	$ $
B		WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? If yes, describe under SPECIAL PROVISIONS below	83026377	01/01/09	01/01/10	[X] WC STATU-TORY LIMITS [ ] OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $ 500000 $ 500000 $ 500000
		OTHER					

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS

CERTIFICATE HOLDER

COLUMCO

Columbia County
Building & Zoning Dept
P O Box 1529
Lake City FL 32056-1529

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 10 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE

CFI

CERTIFIED FOUNDATIONS, INC.

July 24, 2008

Letter of Authorization

Attn: Building Department

I, Lewis G. Collier, President of Certified Foundations, Inc., authorize my employee, Richard Plage to act as my agent in securing permits. I understand I am responsible for any and all work performed by my agent.

CONTRACTOR'S SIGNATURE
License #CGC1504067

State of Florida
County of Polk

Sworn to and subscribed before me this 24th day of July, 2008.

Kathleen S Morissette
Notary Public

KATHLEEN S. MORISSETTE
Commission # DD584480
My Commission Expires 08-14-2010
Bonded Through Atlantic Bonding Co., Inc.

Richard G Plage
AGENT/EMPLOYEE'S SIGNATURE

State of Florida
County of Polk

Sworn to and subscribed before me this 24th day of July, 2008.

Kathleen S Morissette
Notary Public

KATHLEEN S. MORISSETTE
Commission # DD584480
My Commission Expires 08-14-2010
Bonded Through Atlantic Bonding Co., Inc.

GSE Engineering & Consulting, Inc.

SUMMARY REPORT OF A SUBSIDENCE EXPLORATION

CLAIM No. 59-D210-403
ALLISON RESIDENCE
166 SW RANDALL TERRACE
LAKE CITY, FLORIDA

GSE PROJECT No. 10299

Prepared For:

STATE FARM FLORIDA INSURANCE COMPANY

SEPTEMBER 2008

GSE Engineering & Consulting, Inc.

September 23, 2008

Ms. Lori Robinson
State Farm Florida Insurance Company
P.O. Box 44036
Jacksonville, Florida 32231

Subject: Summary Report of a Subsidence Exploration
Claim No. 59-D210-403
Allison Residence
166 SW Randall Terrace
Lake City, Florida
GSE Project No. 10299

Dear Ms. Robinson:

GSE Engineering & Consulting, Inc. is pleased to submit this report of a subsidence exploration for the Allison residence in Lake City, Florida. GSE follows the sinkhole investigation protocols in Chapter 627.707 Florida Statutes and the "Geological and Geotechnical Investigation Procedures for Evaluation of the Causes of Subsidence Damage in Florida", Florida Geological Survey Special Publication No. 57, 2007 when conducting subsidence explorations.

GSE certifies that this exploration was of sufficient scope to determine the cause(s) of damage within a reasonable professional probability, and that the individuals signing this report are qualified to determine the existence of sinkhole activity in accordance with §627.707 Florida Statutes.

GSE appreciates the opportunity to have assisted you on this project. If you have any questions or comments concerning this report, please contact us.

Sincerely,

GSE Engineering & Consulting, Inc.

Joakim (Jay) B. Nordqvist, P.E.
Principal Engineer
Florida Registration Number 42681

Kenneth L. Hill, P.E. 1/20/09
Principal Engineer
Florida Registration Number 40146

KLH/JBN:rb
Z:General\Projects\10299 Allison\10299.doc

Distribution: Addressee (5)
File (1)

GSE Engineering & Consulting, Inc.
4949 SW 41st Boulevard, Unit 70
Lake City, Florida 32608
352-377-3233 Phone
352-377-0335 Fax
www.gseengineering.com

EXECUTIVE SUMMARY

GSE Engineering & Consulting, Inc. (GSE) was retained by State Farm Florida Insurance Company to conduct a subsidence exploration at the Allison residence located at 166 SW Randall Terrace in Lake City, Florida.

The purpose of this subsidence exploration was to explore the subsurface conditions at the site and determine the existence of sinkhole activity and sinkhole loss as defined by §627.706 Florida Statutes. This exploration has been performed in accordance with the requirements of §627.707 Florida Statutes.

It is GSE's professional opinion the overall pattern of decreasing soil strength with depth and drilling fluid circulation losses in the unconsolidated portion of the boring profile encountered by SPT borings B-1 and B-2 is indicative of sinkhole activity as defined by §627.706 Florida Statutes.

The damage at the residence is attributed to thermal expansion and contraction and differential settlement. Contributing causes of the differential settlement that cannot be excluded as contributing causes, within a reasonable professional probability, include long-term post construction foundation settlement, effects of clay-rich soils, erosion, and sinkhole activity.

GSE recommends the subsurface soils beneath the area of the home be improved to minimize further subsidence damage. Soil improvement should be accomplished through grout injection to compact and improve the density of sandy soils beneath the home and swimming pool. Grout injection is also intended to seal the top of the limestone surface to reduce the potential for future raveling. Upon completion of the grouting program, GSE recommends the foundation along the perimeter of the home be stabilized using underpinning piles.

The remainder of this report summarizes the services conducted as part of this subsidence exploration and presents our evaluation, conclusions, and recommendations.

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APPENDIX

1.0 INTRODUCTION

1.1 General

GSE Engineering & Consulting, Inc. (GSE) was retained by State Farm Florida Insurance Company to conduct a subsidence exploration at the Allison residence located at 166 SW Randall Terrace in Lake City, Florida.

According to the Columbia County Property Appraiser's web site[1], the legal description of the property is:

COMM NW COR OF SEC RUN E 1188.09 FT, S 732.94 FT FOR POB, CONT S 172.50 FT, E 170 FT, N 172.50 FT, W 170 FT TO POB. (AKA LOT 2 BLOCK D PICCADILLY PARK S/D UNREC) ORB 416-107, 604-560, 733-664, 810-2063, 813-1885

The current property owner is listed by the Columbia County Property Appraiser's web site as:

ALLISON WILLIAM B & KIMBERLY H.

1.2 Project Description

The Allison residence is a single-story, brick and wood frame residence constructed in 1978[1]. The Columbia County Property Appraiser's web site indicates the Allison family purchased the home in September 1995. Construction documents (plans) for the home were not readily available from the Columbia County or City of Lake City building departments.

Mr. William Allison was present during our on-site reconnaissance. Mr. Allison was concerned about a crack in the rear patio slab and a crack in the adjacent west wall of the home that developed within the past 1 to 1.5 years and has become more pronounced. Mr. Allison was concerned the damage may be related to sinkhole activity.

1.3 Purpose

The purpose of this subsidence exploration was to explore the subsurface conditions at the site, and determine the existence of sinkhole activity and sinkhole loss as defined by §627.706 Florida Statutes. This exploration has been performed in accordance with the requirements of §627.707 Florida Statutes.

---

[1]Columbia County, Florida Property Appraiser's web site.

2.0 SITE RECONNAISSANCE

Mr. Kenneth L. Hill, P.E. visited the site on August 25, 2008 to observe site conditions, document damage to the home, and interview the homeowner. Mr. William Allison was present during this site visit.

The home is single-story, brick and wood frame construction built in 1978[1]. The home faces east and is sited on a lot that slopes gently down from the west to the east (rear to front). The home has a combination gable-end and relatively flat roof. The majority of the home has no gutters on the roof. Gutters are located on the rear roof line above the rear patio, but no downspouts are connected to the gutters. The front yard is open and covered in grass. The rear yard contains a few large oak trees. Landscaping is present around portions of the home.

The home appears to have two additions. The first addition consists of the family room at the south end of the home. Mr. Allison indicated this room was present at the time they purchased the home. This room has a different foundation and different windows than the main portion of the home, and the floor is at a lower elevation than the main portion of the home. The second addition is located at the rear of the home, and consists of a storage room. Mr. Allison constructed this addition approximately 5 years ago. The room was previously a carport that was enclosed.

The interior of the home is wood-framed finished with drywall and plaster. The floors are covered in carpet, tile and wood. A fireplace is located in the family room.

Damage is present on the exterior and in the interior of the home. The majority of the damage is located on the west wall and in the rear patio slab.

The interior damage consists of a hairline width crack coming off a corner of the window in the pantry. A hairline width crack is present in the peak of the vaulted ceiling of the family room. Cracks are present in the ceiling of the addition, and Mr. Allison indicated these resulted from previous roof leaks.

Exterior damage consists of vertical cracks in the brick facing on the west, north and east walls of the home. The width of these cracks range from hairline to about 1/16 inch. These cracks are generally located above or below the corners of windows. A crack is present in the rear patio slab. This crack is approximately ¼ inch in width, and has about 1 inch of vertical displacement.

Several small depressions were observed in the front yard. These depressions were generally on the order of 2 to 3 feet in diameter and 6 to 8 inches deep. We excavated into two of these depressions and found the remains of decayed stumps.

3.0 HISTORICAL DATA REVIEW

This section presents a review of readily available published information related to topography, hydrological data, soil survey information and regional geology.

3.1 Review of Published Topographic Data

The Columbia City USGS Topographic Map indicates the ground surface elevation in the area of the home is approximately 85 to 95 feet[2] NGVD. The regional topography has a gentle slope down to the south. Closed depressions were identified on the topographic map approximately within half a mile of the home. Closed depressions are not necessarily an indicator of sinkholes, and could represent other landforms.

3.2 Review of Published Hydrological Data

The Floridan Aquifer in the vicinity of the site has an elevation on the order of 30 to 40 feet[3]. This elevation is well below land surface, indicating a downward hydraulic gradient occurs at the site.

3.3 Review of Published Soil Information

The Columbia County Soil Survey[4] maps one soil type in the vicinity of the site, consisting of Bonneau fine sand. The following soil description is from the County soil survey.

Bonneau fine sand, 2 to 5 percent slopes - This is a moderately well drained, gently sloping soil on uplands and on knolls in the uplands. The areas of this soil range from 3 to 200 acres and are circular.

Typically, the surface layer is grayish brown fine sand about 7 inches thick. The subsurface layer is fine sand about 20 inches thick. In the upper 8 inches, it is yellowish brown, and below that, it is brownish yellow with very pale brown splotches. The subsoil extends to a depth of 80 inches. In the upper 9 inches, it is yellowish brown fine sandy loam; in the next 22 inches it is very pale brown, yellowish red, and grayish brown sandy clay loam; in the next 16 inches, it is very pale brown, yellowish red, and grayish brown sandy clay loam with pockets of fine sandy loam; and in the lower part it is gray and pink sandy clay loam.

Included with this soil in mapping are small areas of Lucy, Ocilla, Blanton, Goldsboro, and Ichetucknee soils. These soils make up less than 20 percent of the map unit.

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[2] DeLorme Topo USA® 6.0.

[3] Potentiometric Surface of the Upper Floridan Aquifer in the St. Johns River Water Management District and Vicinity, Florida, May 2007, U.S. Geological Survey.

[4] United States Department of Agriculture, Natural Resources Conservation Service, Web Soil Survey.

This Bonneau soil has a water table at a depth of 48 to 72 inches for 1 to 2 months during rainy periods in most years. Otherwise, the water table is below a depth of 72 inches. The available water capacity is low in the surface and subsurface layers and upper part of the subsoil and medium in the lower part of the subsoil. Permeability is rapid in the surface and subsurface layers and moderate in the subsoil. Natural fertility is moderate. The organic matter content is very low.

3.4 Review of Published Regional Geology

The Allison residence is located in central Columbia County. This area of Columbia County maps as the Undifferentiated Sediments[5] geological region (Qu).

Much of Florida's surface is covered by a varying thickness of undifferentiated sediments consisting of siliciclastics, organics and freshwater carbonates. Where these sediments exceed 20 feet (6.1 meters) thick, they were mapped as discrete units. In an effort to subdivide the undifferentiated sediments, those sediments occurring in flood plains were mapped as alluvial and flood plain deposits (Qal). Sediments showing surficial expression of beach ridges and dunes were mapped separately (Qbd) as were the sediments composing Trail Ridge (Qtr). Terrace sands were not mapped (refer to Healy [1975] for a discussion of the terraces in Florida). The subdivisions of the Undifferentiated Quaternary Sediments (Qu) are not lithostratigraphic units but are utilized in order to facilitate a better understanding of the State's geology.

The siliciclastics are light gray, tan, brown to black, unconsolidated to poorly consolidated, clean to clayey, silty, unfossiliferous, variably organic-bearing sands to blue green to olive green, poorly to moderately consolidated, sandy, silty clays. Gravel is occasionally present in the panhandle. Organics occur as plant debris, roots, disseminated organic matrix and beds of peat. Freshwater carbonates, often referred to as marls in the literature, are scattered over much of the State. In southern Florida, freshwater carbonates are nearly ubiquitous in the Everglades. These sediments are buff colored to tan, unconsolidated to poorly consolidated, fossiliferous carbonate muds. Sand, silt and clay may be present in limited quantities. These carbonates often contain organics. The dominant fossils in the freshwater carbonates are mollusks.

[5] Open-File Report 80, Thomas M. Scott, P.G. No. 99, Text to Accompany the Geological Map of Florida, Florida Geological Survey, 2001.

4.0 FIELD AND LABORATORY TESTS

4.1 General Description

The procedures used for field sampling and testing are in general accordance with industry standards of care and established geotechnical engineering and geological investigation practices for this geographic region. Our field exploration consisted of performing geophysical services consisting of ground penetrating radar (GPR) and electrical resistivity (ER), hand auger borings, test pits, Standard Penetration Test borings, laboratory tests on samples recovered from the site and a relative floor elevation survey. The following sections describe our field testing program in more detail.

4.2 Ground Penetrating Radar and Electrical Resistivity Imaging Surveys

Ground Penetrating Radar (GPR) and Electrical Resistivity Imaging (ERI) surveys were performed at the site by GeoView, Inc. (GeoView) as a subconsultant to GSE.

A GPR survey was conducted both inside and outside of the residence. The GPR survey outside of the residence was conducted along a series of perpendicular transects spaced 10 ft apart. The GPR survey was performed in the inside areas of the home that were accessible. The GPR data was collected with a Mala radar system.

The ERI survey was conducted using the Advanced Geosciences, Inc. Sting R8 automatic electrode resistivity system. A total of four ERI transects were performed using up to 23 electrodes on each line with an "a spacing" of 5 ft. A dipole-dipole combined with an inverse Schlumberger electrode configuration was used with a maximum "n value" of six. The ERI data was analyzed using EarthImager 2D, a computer inversion program, which provides two-dimensional vertical cross-sectional resistivity model (pseudo-section) of the subsurface.

A more detailed description of the GPR and ERI methods is included in the GeoView report attached in the Appendix (GeoView Project No. 5628).

4.3 Auger Borings

The auger borings were performed in accordance with ASTM Specification D-1452. The borings were performed with hand auger equipment that was rotated into the ground in a manner that reduces soil disturbance. After penetrating to the required depth, the auger was retracted and the soils collected in the auger bucket were field classified and placed in sealed containers. Representative samples of each stratum were retained from the auger boring. The boring locations were selected to provide a general representation of the near surface soil conditions at the site.

Static cone penetrometer soundings were performed at the hand auger locations to depths of four feet below land surface (bls). The penetrometer probes provide an indicator of soil strength, and can be generally correlated to the N-value of the SPT test in sandy, clayey and silty soils.

Results from the hand auger borings and static cone penetrometer soundings are provided in Section 8.1. The auger boring locations are indicated on Figure 3.

4.4 Standard Penetration Test Borings

The boring locations were selected considering the findings of the geophysical survey, relative floor elevation survey and damage to the home. The soil borings were performed with a drill rig employing mud rotary drilling techniques and Standard Penetration Testing (SPT) in accordance with ASTM Specifications D-1586. The SPTs were performed continuously to ten feet and at five-foot intervals thereafter. Soil samples were obtained at the depths where the SPTs were performed. The soil samples were classified in the field, placed in sealed containers, and returned to our laboratory for further evaluation.

After drilling to the sampling depth and flushing the borehole, the standard two-inch O.D. split-barrel sampler was seated by driving it six inches into the undisturbed soil. Then the sampler was driven an additional 12 inches by blows of a 140-pound hammer falling 30 inches. The number of blows required to produce the 12 inches of penetration were recorded as the penetration resistance ("N" value). These values and the complete SPT boring logs are provided in Section 8.2.

Upon completion of the sampling, the boreholes were abandoned in accordance with Water Management District guidelines.

The SPT boring locations are indicated on Figure 3.

4.5 Test Pits

Test pits were manually excavated at the residence in order to observe the foundation type and measure its dimensions and confirm the embedment depth. The location of the test pits are indicated on Figure 3.

4.6 Relative Floor Elevation Survey

A relative floor elevation survey of the interior floor of the residence was performed using a Zip Level Pro®. Data for the floor elevation survey was collected at random points in the rooms that were readily accessible. GSE does not move furniture to obtain the floor elevation data. Data points were limited due to inaccessibility within the interior of the home. The data is accurate to approximately 0.1 inch. The data is used in a computer model that plots contours of the relative elevation of the floor slab. The floor elevation survey map is not prepared by a licensed surveyor, and is not to be considered a survey as regulated by §472 Florida Statutes. The results of the relative floor elevation survey are provided on Figure 4.

4.7 Soil Laboratory Tests

The soil samples recovered from the soil borings were returned to our laboratory, and examined to confirm the field descriptions. Representative samples were then selected for laboratory testing. The laboratory tests consisted of the percent passing the No. 200 sieve determinations

with natural moisture contents and the Atterberg Limits. These tests were performed in order to aid in classifying the soils and to further evaluate their engineering properties. The laboratory tests are provided in Section 8.4.

5.0 FINDINGS

This section summarizes the findings of the field and laboratory services.

5.1 Geophysical Testing (GPR & ERI)

A complete discussion of the GPR and ERI methods and findings are presented in the GeoView report attached in the Appendix. The following discussion was taken from the GeoView report.

Results of the GPR survey indicated the presence of a well-defined, relatively continuous set of GPR reflectors at an approximate depth range of 3 to 7 ft bls. The GPR reflector set correlates to the lithological contact between the sand and underlying sandy clay stratum identified at 4 ft bls by the hand auger boring.

The GPR reflector set associated with the sand/sandy-clay lithological contact was continuous across the surveyed areas of the project site. No observed areas of significant downwarping or other indicators of possible sinkhole activity were observed.

Analysis of the ERI Transects indicate the presence of high to moderate resistivity near-surface soil materials (represented in red to green on the ERI transects) across the majority the project site to the maximum depth range of the ERI transects ranging from 13 to 25 ft bls. However, low resistivity soils (represented in blue) were encountered at 1 to 6 ft in the northern portions of the survey area and below 6 to 12 ft east of the residence. The high resistivity layer likely corresponds to the sand stratum identified to a depth of 4 ft bls in the hand auger boring. The moderate to low resistivity materials likely correspond to variations in the sand content of the sandy clay stratum that was encountered in the hand auger boring.

One ERI anomaly was identified at the project site (Figure 3). The ERI anomaly was characterized by the localized occurrence of relatively less resistive soil materials at depth. These relatively less resistive sediments occurred at an estimated depth range of 10 to 25 ft bls. It is noted that no geological structures suggesting a possible downward raveling of sediments was observed within this area on either the GPR or ERI data. Accordingly, this ERI anomaly is likely associated with relic depositional or erosion activity, rather than possible karst activity.

5.2 Hand Auger Boring Results

The locations of the hand auger and SPT borings are provided on Figure 3. The complete logs for the borings are provided in Sections 8.1 and 8.2. Descriptions for the soils encountered are based on visual observation of the recovered soil samples and the laboratory testing performed. Stratification boundaries between the soil types should be considered approximate, as the actual transition between soil types may be gradual.

The four hand auger borings conducted indicate the near surface soil conditions across the site are relatively similar. The borings typically encountered 2.5 to 4 feet of tan sand with silt to silty sand (SP-SM, SM) overlying orange, tan, light gray and red clayey sand (SC) and some sandy clay (CH) to the explored depths of 5 to 7 feet. Boring A-1 encountered 1.5 feet of tan clayey

sand (SC) that appeared to be fill material. The borings were terminated at depths of 5 to 7 feet due to difficult drilling conditions (hard soils).

The water table was encountered in the hand auger borings at depths of 2 to 6.5 feet bls at the time of our exploration.

The findings of the hand auger borings are generally consistent with the Bonneau soil survey mapping.

Manual excavations performed in two of the depressions in the front yard found the remains of decayed tree stumps. The size and depths of the small depressions are consistent with ground settlement resulting from decayed stumps.

The static cone penetrometer soundings performed at the auger boring locations found soil penetration resistance values of 10 to 70 kg/cm^2. The test results indicate very loose to medium dense soil conditions.

5.3 SPT Boring Results

The two SPT borings encountered near surface soil conditions similar to the auger boring findings, consisting of sand with silt (SP-SM) to depths of 2 to 3.5 feet bls overlying clayey sand (SC) with interbedded layers of sandy clay (CH) to depths of 40 and 46 feet bls. The borings next encountered limestone which extended to the boring termination depths of 55 and 65 feet bls. The limestone was very weathered and contained zones infilled with clay in boring B-1 from 40 to 57 feet bls.

The N-value profiles of the borings were generally similar. The N-values indicate medium dense to dense conditions through the sand and clayey sand to approximately 15 to 20 feet bls, followed by a steady decline in N-values with depth to the top of the limestone formation. Weight-of-rod and weight-of-hammer strength materials occurred in both borings in the soils overlying the limestone or in the infilled zones within the limestone. Losses of drilling fluid circulation occurred in both borings in the soils overlying the limestone or at the limestone surface.

Due to the mud rotary method of advancing the borehole below 10 feet, the depth of the water table could not be determined.

The steady decline in soil strength with depth accompanied by the loss of circulation of the drilling fluid in both SPT borings indicate sinkhole activity is occurring at the home.

5.4 Test Pit Results

Two test pits were excavated at the site to determine the foundation type and embedment depth. Figure 3 indicates the test pit locations.

TP-1 indicates the foundation of the home consists of a stem wall placed on a continuous shallow foundation. The top of the foundation was encountered 9 inches bls. The foundation extended out from the stem wall 3.5 inches with a thickness of 8 inches. The test pit indicates the foundation consists of an 8 inch thick continuous foundation embedded about 17 inches, with an overall width of about 14 to 16 inches.

TP-2 indicates the foundation of the family room addition consists of a slab-on-grade. The foundation was approximately 8 inches thick and embedded approximately 5 inches.

A test pit was not performed at the storage room addition due to access constraints. Mr. Allison indicated the storage room foundation consists of a concrete slab that was poured over the existing carport slab.

5.5 Relative Floor Elevation Survey Results

The relative floor elevation survey indicates approximately 0.8 inches of elevation change occurs across the floor of the main living area of the home. The lowest elevation was encountered at the front of the residence in the bedroom on the east side of the house. Higher elevations were encountered at the northwest corner of the home in a bedroom. The majority of the relative floor elevation contours indicate differential foundation movement has not occurred. However, the crack in the rear wall of the home is consistent with differential foundation movement.

The relative floor elevation survey results are provided on Figure 4.

5.6 Laboratory Soil Analysis

Selected soil samples recovered from the soil borings were analyzed in order to aid in classifying the soils and to further evaluate their engineering properties. The laboratory tests consisted of three percent passing the No. 200 sieve determinations with natural moisture contents tests and two Atterberg Limits tests. Locations of the soil borings are shown on Figure 3. Selected soil samples for laboratory testing were collected from depths ranging from near land surface to 5 feet bls. The complete laboratory report is provided in Section 8.4.

The laboratory tests indicate the tested soils consist of sand with silt, clayey sand and sandy clay. The surficial sand (SP-SM) has 8 percent soil fines passing the No. 200 sieve. The underlying clayey sand (SC) has 36 percent soil fines passing the No. 200 sieve. The tested sandy clay (CH) has 60 percent soil fines passing the No. 200 sieve.

The Atterberg Limits tests indicate the tested clayey sand (SC) had a Liquid Limit (LL) value of 34, Plastic Limit (PL) value of 21, and Plasticity Index (PI) value of 13. This corresponds to a material with low (LL < 50 and PI < 25) potential for expansive behavior[6]. The tested sandy clay (CH) had a LL value of 61, PL value of 25, and PI value of 36. This corresponds to a material with high (LL> 60, PI > 35) potential for expansive behavior.

[6] U.S. Department of the Army USA, 1983, Foundations in Expansive Soils, TM 5-818-7, p. 4-1.

6.0 EVALUATION AND CONCLUSIONS

GSE Engineering & Consulting, Inc. has performed a comprehensive exploration of the subsurface conditions at the Allison residence to evaluate the presence of sinkhole activity and likely cause(s) of damage to the home. It is GSE's professional opinion that the overall pattern of decreasing soil strength with depth and drilling fluid circulation losses in the unconsolidated portion of the boring profile encountered by SPT borings B-1 and B-2 is indicative of sinkhole activity as defined by §627.706 Florida Statutes.

The damage at the residence is attributed to thermal expansion and contraction and differential foundation movement. Contributing causes of the differential foundation movement that cannot be excluded, within a reasonable professional probability, include normal foundation settlement, effects of highly expansive clay-rich soils, erosion of surface soils, and sinkhole activity. The damage to the rear patio slab is generally attributed to erosion of the surficial soils due to runoff from the patio. However, surficial erosion is not considered a contributing cause of the cracking in the adjacent west wall of the home. The small depressions identified in the yard are attributed to decaying stumps.

Some of the noted differential settlement is consistent with foundation settlement that is within an expected range for the type and age of construction, considering identified site and the subsurface conditions encountered at the residence. Various factors influence actual manifestation of post construction differential settlement including lack of adequate compaction, disturbance of the foundation supporting soils during construction, surface water diversion, foundation embedment, and erosion.

The cracking in the porch slab is consistent with concrete drying shrinkage aggravated by differential movement. Concrete slabs are susceptible to long-term post construction settlement resulting from surface runoff erosion around the perimeter and through shrinkage cracks due to their typically shallow embedment depth and sandy nature of supporting soils.

Effects of expansive clay-rich soils identified at the site are also a potential contributing factor to differential foundation movement. The depth variation and variability in the expansive characteristics of the clay-rich soils and availability of water can cause differential movement of the foundation consistent with that identified at this residence.

Sinkhole activity is related to raveling of overlying soils into the limestone formation, which can result in subsidence or collapse of near surface soils supporting foundations. This loss of support of the near surface soils can cause differential movement of the foundation such as that observed at this residence.

7.0 RECOMMENDATIONS

GSE recommends the subsurface soils beneath the home be improved to minimize further subsidence damage. Soil improvement should be accomplished through grout injection to compact and improve the density of sandy soils beneath the home. Grout injection is also intended to seal the top of the limestone surface to reduce the potential for future raveling.

The grouting program should incorporate up to 15 injection points spaced approximately 15 feet on center around the perimeter of the structure. The grout points should be vertical and inclined as shown in Figure 5. The actual locations and number of grout points should be confirmed in the field and adjusted as necessary to accommodate site specific conditions.

The depth of grouting, based on the field boring logs is likely to vary from approximately 50 to 60 feet. An average grout pipe depth of 55 feet can be considered for budgeting purposes. Typical compaction grout mix with a slump between 4 and 6 inches should be used, pumped at slow enough rates such that the grout will densify and not hydro-fracture the soil.

The total quantity of grout required can vary based on site conditions, but is likely to be between 150 and 250 cubic yards (cy). Continuous monitoring of the structure elevation should be undertaken during the grouting process to identify and prevent unnecessary upward movement of the structure.

Upon completion of the grouting program, GSE recommends the foundation along the perimeter of the home be stabilized using underpinning piles. These piles are installed into the subsurface that bear on competent materials, and a steel bracket attaches the piles to the foundation. A hydraulic ram is typically used to jack the foundation against the piles, which in some cases can lift the foundation back to near the original elevation and also transfer the foundation load to the piles. The piles are then permanently attached to the bracket, and the rams are removed.

Underpinning should be installed at an approximate 6 feet on center spacing along the exterior walls of the home. GSE estimates 41 underpinning piles will be necessary to support the perimeter of the structure. Figure 6 illustrates the approximate locations of the recommended underpinning piles. The actual locations should be confirmed in the field and adjusted as necessary. Piles that fall under windows or lightly loaded areas of the structure should consider spreader beams to limit collateral damage during pile installation.

GSE anticipates the depth of the underpinning piles will range from about 50 to 60 feet in depth. An average depth of 55 feet should be assumed for cost evaluation purposes. Due to the anticipated variability in the depth to limestone, deeper and shallower piles could occur and should be anticipated. The underpinning piles and bracket assembly should have an ultimate capacity of at least 30 kips. These piles should be driven, hydraulically advanced or drilled to bear on competent material at depth. In some areas, pre-drilling of the piles may be necessary to advance the desired depth. Alternate pile installation methods must be submitted to the geotechnical engineer for approval.

The optimum level to which the structure can be lifted as a result of the underpinning process is a function of the structural configuration as well as the amount of long-term and irreversible stresses that have accumulated. In many cases, it may not be practical to attempt to completely level the structure, as excessive collateral damage may result. The structure should be carefully monitored during the lifting process. The contractor is responsible for the means and methods of construction.

GSE recommends all grouting and underpinning operations be performed under the observation of the geotechnical engineer. The contractor should submit the proposed grouting and pin pile systems and proposed installation methods to the geotechnical engineer for approval.

Cosmetic repairs to the home should be postponed for at least 60 days after the underpinning repairs are completed to allow re-distribution of stresses through the structure resulting from the underpinning program.

8.0 FIELD DATA

8.1 Auger Boring Logs

GSE Engineering & Consulting, Inc.
4949 SW 41st Blvd., Unit 70
Gainesville, Florida 32608
Telephone: 352-377-3233

CLIENT State Farm Florida Insurance Company
PROJECT NAME Claim No. 50-D210-403 Allison Residence
PROJECT NUMBER 10299
PROJECT LOCATION Lake City, Columbia County, Florida

DATE PERFORMED 8/25/2008 **BORING NUMBER A-1**
DRILLING CONTRACTOR
GROUND WATER LEVELS: LOGGED BY CM
▼ AT TIME OF DRILLING 3.5 ft. CHECKED BY KLH
▽ ESTIMATED SEASONAL HIGH NA
NOTES

DATE PERFORMED 8/25/2008 **BORING NUMBER A-2**
DRILLING CONTRACTOR
GROUND WATER LEVELS: LOGGED BY CM
▼ AT TIME OF DRILLING 2.5 ft. CHECKED BY KLH
▽ ESTIMATED SEASONAL HIGH NA
NOTES

DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE NUMBER	MATERIAL DESCRIPTION
0.0		AU 1	(SC) Tan slightly clayey SAND (Fill)
1.5			(SM) Tan and gray slightly silty SAND
2.5		AU 2	
3.0		AU 3	(SM) Tan silty SAND ▼
4.0			(SC) Orange and tan clayey SAND
5.0		AU 4	
7.0			Bottom of borehole at 7.0 feet.

DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE NUMBER	MATERIAL DESCRIPTION
0.0		AU 1	(SM) Tan slightly silty SAND
2.5			▼
4.0			(SC) Orange and tan clayey SAND
4.5		AU 2	
5.0		AU 3	(SC) Orange and tan very clayey SAND
5.0			Bottom of borehole at 5.0 feet.

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GSE Engineering & Consulting, Inc.
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Telephone: 352-377-3233

CLIENT State Farm Florida Insurance Company
PROJECT NAME Claim No. 50-D210-403 Allison Residence
PROJECT NUMBER 10299
PROJECT LOCATION Lake City, Columbia County, Florida

DATE PERFORMED 8/25/2008 **BORING NUMBER A-3**
DRILLING CONTRACTOR
GROUND WATER LEVELS: LOGGED BY CM
▼ AT TIME OF DRILLING 2.0 ft. CHECKED BY KLH
▽ ESTIMATED SEASONAL HIGH NA
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	MATERIAL DESCRIPTION
0.0	AU 1	(SP-SM) Tan SAND with silt
2.5	AU 2	(SC) Orange and tan clayey SAND
3.5	AU 3	(CH) Orange, light gray and red sandy CLAY
5.0	AU 4	(SC) Light red, orange and gray clayey SAND
6.0		Bottom of borehole at 6.0 feet.

DATE PERFORMED 8/25/2008 **BORING NUMBER A-4**
DRILLING CONTRACTOR
GROUND WATER LEVELS: LOGGED BY CM
▼ AT TIME OF DRILLING 6.5 ft. CHECKED BY KLH
▽ ESTIMATED SEASONAL HIGH NA
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	MATERIAL DESCRIPTION
0.0	AU 1	(SP-SM) Tan SAND with silt
3.0		(SC) Orange, red and tan clayey SAND
6.5		Bottom of borehole at 6.5 feet.

8.2 Standard Penetration Test Boring Logs

GSE Engineering & Consulting, Inc.
4949 SW 41st Blvd., Unit 70
Gainesville, Florida 32608
Telephone: 352-377-3233

BORING NUMBER B-1

CLIENT State Farm Florida Insurance Company
PROJECT NAME Claim No. 50-D210-403 Allison Residence
PROJECT NUMBER 10299
PROJECT LOCATION Lake City, Columbia County, Florida
DATE STARTED 9/12/08 **COMPLETED** 9/12/08
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR Independent Drilling
GROUND WATER LEVELS:
DRILLING METHOD Mud Rotary
▼ **AT TIME OF DRILLING** NA
LOGGED BY CC **CHECKED BY** KLH
▽ **ESTIMATED SEASONAL HIGH** NA
NOTES _____

DEPTH (ft)	MATERIAL DESCRIPTION	CONTACT DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)
0	(SP-SM) Light brown SAND with silt	3.5	AU 1	
5	(SC) Medium dense light brown, light gray and orange clayey SAND	5	AU 2	
			SPT 3	1-5-12-20 (17)
	(SC) Medium dense light gray and orange clayey SAND		SPT 4	14-13-16-20 (29)
10			SPT 5	7-10-12-13 (22)
15			SPT 6	10-13-17 (30)
20			SPT 7	10-7-8 (15)
		22		
	(CL) Stiff orange and light gray CLAY		SPT 8	3-4-5 (9)
25		28		
30	(SC) Medium dense light gray and orange clayey SAND		SPT 9	4-5-7 (12)
		33		
35	(SC) Loose light gray and orange clayey SAND		SPT 10	6-4-4 (8)

LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX	PERCENT PASS NO. 200 SIEVE	MOISTURE CONTENT, %

▲ SPT N VALUE ▲
20 40 60 80

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GSE Engineering & Consulting, Inc.
4949 SW 41st Blvd., Unit 70
Gainesville, Florida 32608
Telephone: 352-377-3233

BORING NUMBER B-1

CLIENT State Farm Florida Insurance Company
PROJECT NAME Claim No. 50-D210-403 Allison Residence
PROJECT NUMBER 10299
PROJECT LOCATION Lake City, Columbia County, Florida

DEPTH (ft)	MATERIAL DESCRIPTION	CONTACT DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)
35	(SC) Loose light gray and orange clayey SAND *(continued)*	38		
	(SC) Very loose to loose gray and orange clayey SAND *Loss of circulation at 40'*	40	SPT 11	0-2-2 (4)
40	LIMESTONE with clay	43		
	(CL) Orange CLAY with limestone *Hammered 1 blow for first 30" and then 1 more blow for 12"*		SPT 12	1-0-0-0 (0)
45			SPT	0-1-0 (1)
	LIMESTONE *Hammered 1 blow for 12" in second interval.*	49	SPT 13	2-1-0 (1)
50		53		
	(SC) Very loose orange and gray clayey SAND with layers of dark gray silty clay		SPT 14	2-1-2 (3)
55		57		
	LIMESTONE		SPT 15	16-20-24 (44)
60				
	Hammered 100/5"	65	SPT 16	18-40-50/5" 90/11"
65	Bottom of borehole at 65.0 feet.			

LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX	PERCENT PASS NO. 200 SIEVE	MOISTURE CONTENT, %

▲ SPT N VALUE ▲
20 40 60 80
>>

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GSE Engineering & Consulting, Inc.
4949 SW 41st Blvd., Unit 70
Gainesville, Florida 32608
Telephone: 352-377-3233

BORING NUMBER B-2

CLIENT State Farm Florida Insurance Company
PROJECT NAME Claim No. 50-D210-403 Allison Residence
PROJECT NUMBER 10299
PROJECT LOCATION Lake City, Columbia County, Florida
DATE STARTED 9/12/08 **COMPLETED** 9/12/08
GROUND ELEVATION _____ **HOLE SIZE** _____
DRILLING CONTRACTOR Independent Drilling
GROUND WATER LEVELS:
DRILLING METHOD Mud Rotary
▼ **AT TIME OF DRILLING** NA
LOGGED BY CC **CHECKED BY** KLH
▽ **ESTIMATED SEASONAL HIGH** NA
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	CONTACT DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX	PERCENT PASS NO. 200 SIEVE	MOISTURE CONTENT, %	▲ SPT N VALUE ▲
0		(SP-SM) Light brown SAND with silt	2	AU 1							20 40 60 80
		(SC) Orange clayey SAND	4	AU 2							
5		(SC) Medium dense light brown and orange clayey SAND	6	SPT 3	4-6-7-10 (13)						
		(SC) Dense light gray and orange clayey SAND	8	SPT 4	12-17-20-24 (37)						
10		(SC) Medium dense light gray very clayey SAND	13.5	SPT 5	6-8-15 (23)						
15		(CL) Very stiff light gray silty sandy CLAY	18.5	SPT 6	9-9-13 (22)						
20		(SC) Medium dense light gray and orange silty clayey SAND	21	SPT 7	9-8-13 (21)						
		(CL) Stiff orange and light gray CLAY		SPT 8	3-5-8 (13)						
25											
30				SPT 9	5-5-5 (10)						
			33.5								
35		(SC) Very loose to loose orange clayey SAND *Loss of circulation at 35'*	35	SPT 10	3-2-2 (4)						

(Continued Next Page)

GSE Engineering & Consulting, Inc.
4949 SW 41st Blvd., Unit 70
Gainesville, Florida 32608
Telephone: 352-377-3233

BORING NUMBER B-2

CLIENT State Farm Florida Insurance Company
PROJECT NAME Claim No. 50-D210-403 Allison Residence
PROJECT NUMBER 10299
PROJECT LOCATION Lake City, Columbia County, Florida

DEPTH (ft)	MATERIAL DESCRIPTION	CONTACT DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)
35	(SC) Very loose orange clayey SAND with limestone and flintrock			
40	*Hammered 1 blow for first 12" then 1 more blow for 6"*		SPT 11	1-0-1 (1)
45	*Weight of hammer for 12" then 2 blows*		SPT 12	0-0-2 (2)
	White LIMESTONE	46		
50			SPT 13	24-50-20/1" 70/7"
55		55	SPT 14	50
	Bottom of borehole at 55.0 feet.			

LIQUID LIMIT, % | PLASTIC LIMIT, % | PLASTICITY INDEX | PERCENT PASS NO. 200 SIEVE | MOISTURE CONTENT, %

▲ SPT N VALUE ▲
20 40 60 80
>>

8.3 Key to Soil Classifications

KEY TO SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
	HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

CORRELATION OF PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY

	NO. OF BLOW, N	RELATIVE DENSITY
	0 - 4	Very Loose
	5 - 10	Loose
SANDS:	11 - 30	Medium dense
	31 - 50	Dense
	OVER 50	Very Dense

	NO. OF BLOWS, N	CONSISTENCY
	0 - 2	Very Soft
	3 - 4	Soft
SILTS	5 - 8	Firm
&	9 - 15	Stiff
CLAYS:	16 - 30	Very Stiff
	31 - 50	Hard
	OVER 50	Very Hard

PARTICLE SIZE IDENTIFICATION

BOULDERS:		Greater than 300 mm
COBBLES:		75 mm to 300 mm
GRAVEL:	Coarse -	19.0 mm to 75 mm
	Fine -	4.75 mm to 19.0 mm
SANDS:	Coarse -	2.00 mm to 4.75 mm
	Medium -	0.425 mm to 2.00 mm
	Fine -	0.075 mm to 0.425 mm
SILTS & CLAYS:		Less than 0.075 mm

SAMPLE LEGEND

Location of SPT sample

Location of Auger sample

8.4 Laboratory Test Results

GSE Engineering & Consulting, Inc.

SUMMARY REPORT OF LABORATORY TEST RESULTS

Project Number: 10299

Project Name: Allison Residence 59-D210-403

Boring Number	Depth (ft)	Soil Description	Natural Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	Percent Passing No. 200 Sieve	Organic Content (%)	Unified Soil Classification
A-2	4.5-5	Orange and Tan Clayey SAND	18	34	21	13	36		SC
A-3	0-1	Tan SAND with silt	17				8		SP-SM
A-3	4-5	Orange, Light Gray and Red Sandy CLAY	27	61	25	36	60		CH

9.0 LIMITATIONS

9.1 Warranty

GSE Engineering & Consulting, Inc. has prepared this report for our client for his exclusive use, in accordance with generally accepted soil and foundation engineering and geological investigation practices, and makes no other warranty either expressed or implied as to the professional opinions provided in the report.

9.2 Standard Penetration Test and Auger Borings

The determination of soil type and conditions was performed 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.

Soil classifications that were made in the field are based upon identifiable textural changes, color changes, changes in composition or changes in resistance to penetration in the intervals from which the samples were collected. Abrupt changes in soil type, as reflected in boring logs and/or cross sections may not actually occur, but instead, be transitional.

Depth to the water table is based upon observations made during the performance of the borings. This depth is an estimate and does not reflect the annual variations that would be expected in this area due to fluctuations in rainfall and rates of evapotranspiration.

9.3 Site Figures

The measurements used for the preparation of the figures in this report were made using measuring devices and/or by estimating distances from existing structures and site features. The illustrated test locations should be considered approximate. Figures in this report were not prepared by a licensed land surveyor and should not be interpreted as such.

FIGURES

CLAIM No. 59-D210-403
ALLISON RESIDENCE
LAKE CITY, COLUMBIA COUNTY, FLORIDA
GSE PROJECT No. 10299

PROJECT SITE LOCATION MAP

DESIGNED BY: KLH
CHECKED BY : KLH
DRAWN BY : KMD

GSE Engineering & Consulting, Inc.

FIGURE 1

LEGEND :

- SLAB/FLOOR DAMAGE
- CEILING DAMAGE
- WALL DAMAGE

NORTH

0 15'

SCALE: 1" = 15' APRROX.

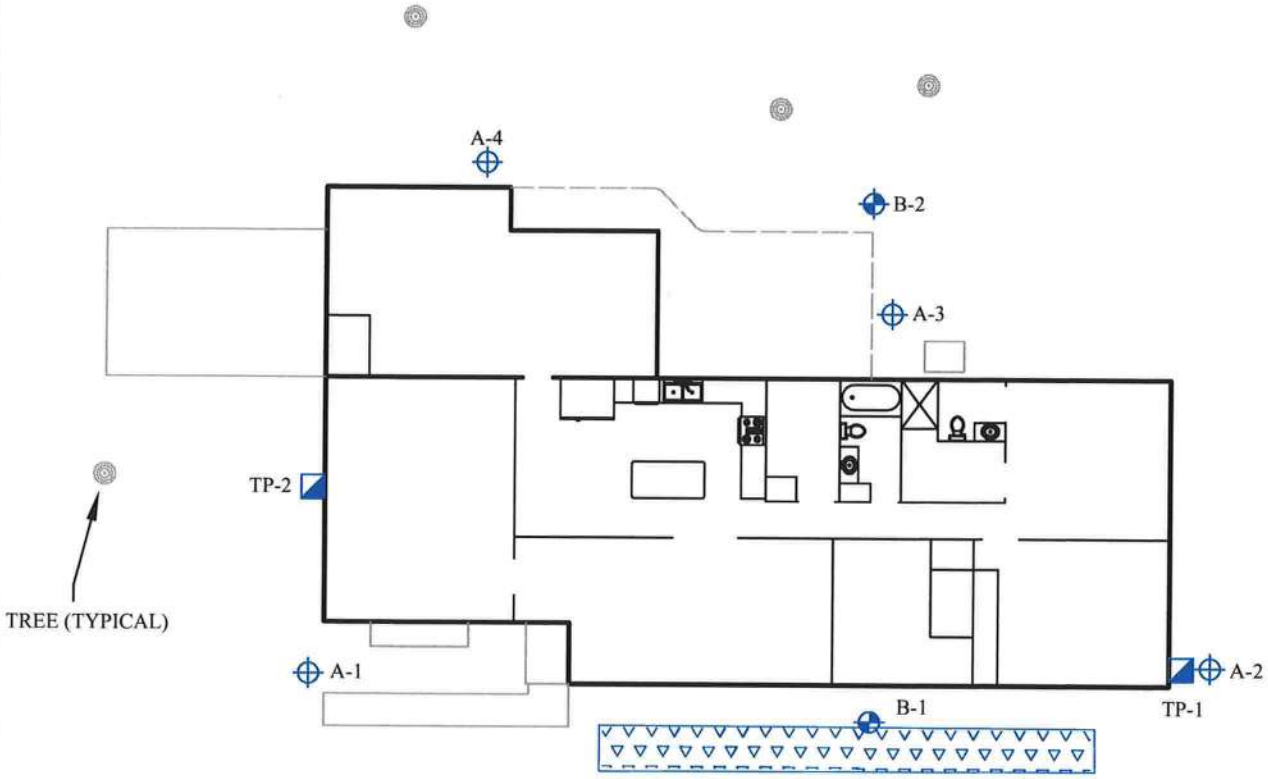
CLAIM No. 59-D210-403
ALLISON RESIDENCE
LAKE CITY, COLUMBIA COUNTY, FLORIDA
GSE PROJECT No. 10299

SITE PLAN SHOWING LOCATIONS AND REPRESENTATIVE PHOTOGRAPHS OF DAMAGE

DESIGNED BY: KLH
CHECKED BY : KLH
DRAWN BY : KMD

GSE Engineering & Consulting, Inc.

FIGURE 2



LEGEND :

- SPT BORING
- AUGER BORING
- TEST PIT
- APPROX. LOCATION OF ERI ANOMALY

NORTH

0 15'

SCALE: 1" = 15' APRROX.

CLAIM No. 59-D210-403
ALLISON RESIDENCE
LAKE CITY, COLUMBIA COUNTY, FLORIDA
GSE PROJECT No. 10299

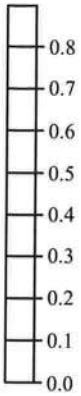
SITE PLAN SHOWING APPROXIMATE LOCATION OF FIELD TESTS

DESIGNED BY: KLH
CHECKED BY : KLH
DRAWN BY : KMD

GSE Engineering & Consulting, Inc.

FIGURE 3

LEGEND :



SCALE: 1" = 15' APRROX.

CLAIM No. 59-D210-403
ALLISON RESIDENCE
LAKE CITY, COLUMBIA COUNTY, FLORIDA
GSE PROJECT No. 10299

RELATIVE FLOOR ELEVATION SURVEY

DESIGNED BY: KLH
CHECKED BY : KLH
DRAWN BY : KMD

GSE Engineering & Consulting, Inc.

FIGURE 4

LEGEND :

- GROUT INJECTION POINT
- ANGLED GROUT INJECTION POINT

NORTH

0 15'

SCALE: 1" = 15' APRROX.

CLAIM No. 59-D210-403
ALLISON RESIDENCE
LAKE CITY, COLUMBIA COUNTY, FLORIDA
GSE PROJECT No. 10299

SITE PLAN SHOWING APPROXIMATE LOCATION OF GROUT INJECTION POINTS

DESIGNED BY: KLH
CHECKED BY : KLH
DRAWN BY : KMD

GSE Engineering & Consulting, Inc.

FIGURE 5

LEGEND :

- UNDERPINNING PILE (32)
- UNDERPINNING PILE WITH SPREADER BEAM (9)

NORTH

0 15'

SCALE: 1" = 15' APRROX.

CLAIM No. 59-D210-403
ALLISON RESIDENCE
LAKE CITY, COLUMBIA COUNTY, FLORIDA
GSE PROJECT No. 10299

SITE PLAN SHOWING APPROXIMATE LOCATION OF UNDERPINNING PILES

DESIGNED BY: KLH
CHECKED BY : KLH
DRAWN BY : KMD

GSE Engineering & Consulting, Inc.

FIGURE 6

APPENDIX

FINAL REPORT
GEOPHYSICAL INVESTIGATION
ALLISON RESIDENCE
LAKE CITY, FL

Prepared for GSE Engineering & Consulting, Inc.
Gainesville, FL

Prepared by GeoView, Inc.
St. Petersburg, FL

September 12, 2008

Mr. Ken Hill, P.E.
GSE Engineering & Consulting, Inc.
4949 SW 41st Boulevard, Unit 70
Gainesville, FL 32608

Subject: Transmittal of Final Report for Geophysical Investigation
Allison Residence - Lake City, FL
GeoView Project Number 5628

Dear Mr. Hill,

GeoView, Inc. (GeoView) is pleased to submit the final report that summarizes and presents the results of the geophysical investigation conducted at the Allison Residence. Ground penetrating radar and electrical resistivity were used to evaluate near-surface geological conditions. GeoView appreciates the opportunity to have assisted you on this project. If you have any questions or comments about the report, please contact us.

GEOVIEW, INC.

Michael J. Wightman, P.G.
President
Florida Professional Geologist
Number 1423

Steve Scruggs, P.G.
Geophysicist
Florida Professional Geologist
Number 2470

TABLE OF CONTENTS

1.0 Introduction

A geophysical investigation was conducted at the Allison Residence located at 166 SW Randall Terrace in Lake City, Florida. The investigation was conducted on August 25th, 2008. At the time of this investigation there were two small surface depressions located southeast of the residence.

The purpose of the geophysical investigation was to help characterize near-surface geological conditions in the area of the residence and to identify subsurface features that may be associated with sinkhole activity. The location of the geophysical survey area is provided on Figure 1. A discussion of the field methods used to generate the report figures is provided in Appendix A2.1.

2.0 Description of Geophysical Investigation

2.1 Ground Penetrating Radar Survey

A GPR survey was conducted both inside and outside of the residence. The GPR survey outside of the residence was conducted along a series of perpendicular transects spaced 10 ft apart. The GPR survey was performed in the inside areas of the home that were accessible (Figure 1). The GPR data was collected with a Mala radar system. The GPR settings used for the survey are presented in Table 1.

Table 1
GPR Equipment Settings Used for Exterior and Interior GPR Surveys

Location	Antenna Frequency	Time Range (nano-seconds)	Estimated Depth of GPR Signal Penetration
Exterior	250 MHz 1/	179	17 to 23 ft bls
Interior	500 MHz	70	6 to 9 ft bls

1/ MHz means mega-Hertz and is the mid-range operating frequency of the GPR antenna.

A description of the GPR technique and the methods employed for geological characterization studies is provided in Appendix A2.2.

2.2 Electrical Resistivity Imaging Survey

The ERI survey was conducted using the Advanced Geosciences, Inc. Sting R8 automatic electrode resistivity system. A total of four ERI transects were performed using up to 23 electrodes on each line with an "a spacing" of 5 ft. A dipole-dipole combined with an inverse Schlumberger electrode configuration was used with a maximum "n value" of six. The ERI data was analyzed using EarthImager 2D, a computer inversion program, which provides two-dimensional vertical cross-sectional resistivity model (pseudo-section) of the subsurface. A

description of the ERI method and the methods employed for geotechnical characterization studies is provided in Appendix A2.2. A discussion of the modeling process used to create the ERI results is provided in Appendix A2.2.1.

2.3 Hand Auger Boring

A hand auger boring was performed at the project site (Figure 1). The purpose of the hand auger boring was to obtain information regarding near-surface soil conditions. This information was used to assist in the interpretation of the GPR data. A discussion of the methods used for the hand auger boring is provided in Appendix 2. The location of the boring (HA-1) is provided on Figure 1 and the results are presented in Table 2.

Table 2
Hand Auger Results

Hand Auger Designation	Depth Interval	Soils Description
HA-1	0 to 4 ft bls	Sand
	4 to 6 ft bls	Sandy Clay

3.0 Identification of Possible Sinkhole Features Using GPR and ERI Methods

3.1 Identification of Possible Sinkhole Features Using GPR

The features observed on GPR data that are most commonly associated with sinkhole activity are:

- A downwarping of GPR reflector sets, that are associated with suspected lithological contacts, toward a common center. Such features typically have with a bowl or funnel shaped configuration and can be associated with a deflection of overlying sediment horizons caused by the migration of sediments into voids in the underlying limestone. If the GPR reflector sets are sharply downwarping and intersect, they can create "bow-tie" shaped GPR reflection feature, which often designates the apparent center of the GPR anomaly.
- A localized significant increase in the depth of the penetration and/or amplitude of the GPR signal response. The increase in GPR signal penetration depth or amplitude is often associated with either a localized increase in sand content at depth or decrease in soil density.
- An apparent discontinuity in GPR reflector sets, that are associated with suspected lithological contacts. The apparent discontinuities

and/or disruption of the GPR reflector sets may be associated with the downward migration sediments.

The greater the severity of these features or a combination of these features the greater the likelihood that the identified feature is a sinkhole. It is not possible based on the GPR data alone to determine if an identified feature is a sinkhole or, more importantly, whether that feature is an active sinkhole.

3.2 Identification of Possible Sinkhole Features Using ERI

Karst features are typically characterized by one of the following conditions on the ERI profile:

1. The occurrence of highly resistivity material that extends to depth in a columnar fashion toward the top of the limestone. Such a feature may indicate the presence of a sand-filled depression or raveling zone.
2. The localized presence of low-resistivity material extending below the interpreted depth to the top of limestone. Such a feature may indicate the presence of a clay-filled void or fracture with the limestone or the presence of highly weathered limestone rock.
3. Any significant localized increase in the depth to limestone. Such a feature may indicate the presence of an in-filled depression (paleo-sink).

When comparing the results of the ERI method, the following considerations should be given. The ERI method, for example, describes the transition from clay to limestone as a transition, rather than a discrete depth. This transition is due to several factors including; a) The vertical density of the resistivity data decreasing with depth and b) The possibility that the upper portion of the limestone is weathered which would create a physical transition zone in terms of resistivity between the clay and competent (non-weathered) limestone and 3) The limitations in the modeling process.

4.0 Survey Results

4.1 Discussion of GPR Survey Results

Results of the GPR survey indicated the presence of a well-defined, relatively continuous set of GPR reflectors at an approximate depth range of 3 to 7 ft bls. The GPR reflector set correlates to the lithological contact between the sand and underlying sandy clay stratum identified at 4 ft bls by the hand auger boring.

The GPR reflector set associated with the sand/sandy-clay lithological contact was continuous across the surveyed areas of the project site. No observed areas of significant downwarping or other indicators of possible sinkhole activity were observed. Accordingly, based on the results of the GPR survey the following is concluded:

1) No indication of sinkhole activity was observed in the GPR data collected across the project site.
2) The sandy clay stratum identified at 4 ft bls in the hand auger boring appears to be continuous across the project site.
3) Soils from the top of the previously discussed GPR reflector set to the maximum depth of penetration of the GPR signal (17 to 23 ft bls) appear to be relatively homogeneous (similar).
4) The depressions in the ground surface located southeast of the home are not related to sinkhole activity.

A discussion of the limitations of the GPR technique in geological characterization studies is provided in Appendix 2.

4.2 Discussion of ERI Survey Results

Results from the four ERI surveys are presented in Appendix 1. The ERI transects are of acceptable quality (a discussion of the criteria used to determine the quality of an ERI inversion model is provided in Appendix A2.3.1).

Analysis of the ERI Transects indicate the presence of high to moderate resistivity near-surface soil materials (represented in red to green on the ERI transects) across the majority the project site to the maximum depth range of the ERI transects ranging from 13 to 25 ft bls. However, low resistivity soils (represented in blue) were encountered at 1 to 6 ft in the northern portions of the survey area and below 6 to 12 ft east of the residence. The high resistivity layer likely corresponds to the sand stratum identified to a depth of 4 ft bls in the hand auger boring. The moderate to low resistivity materials likely correspond to variations in the sand content of the sandy clay stratum that was encountered in the hand auger boring.

Discussion of ERI Anomaly

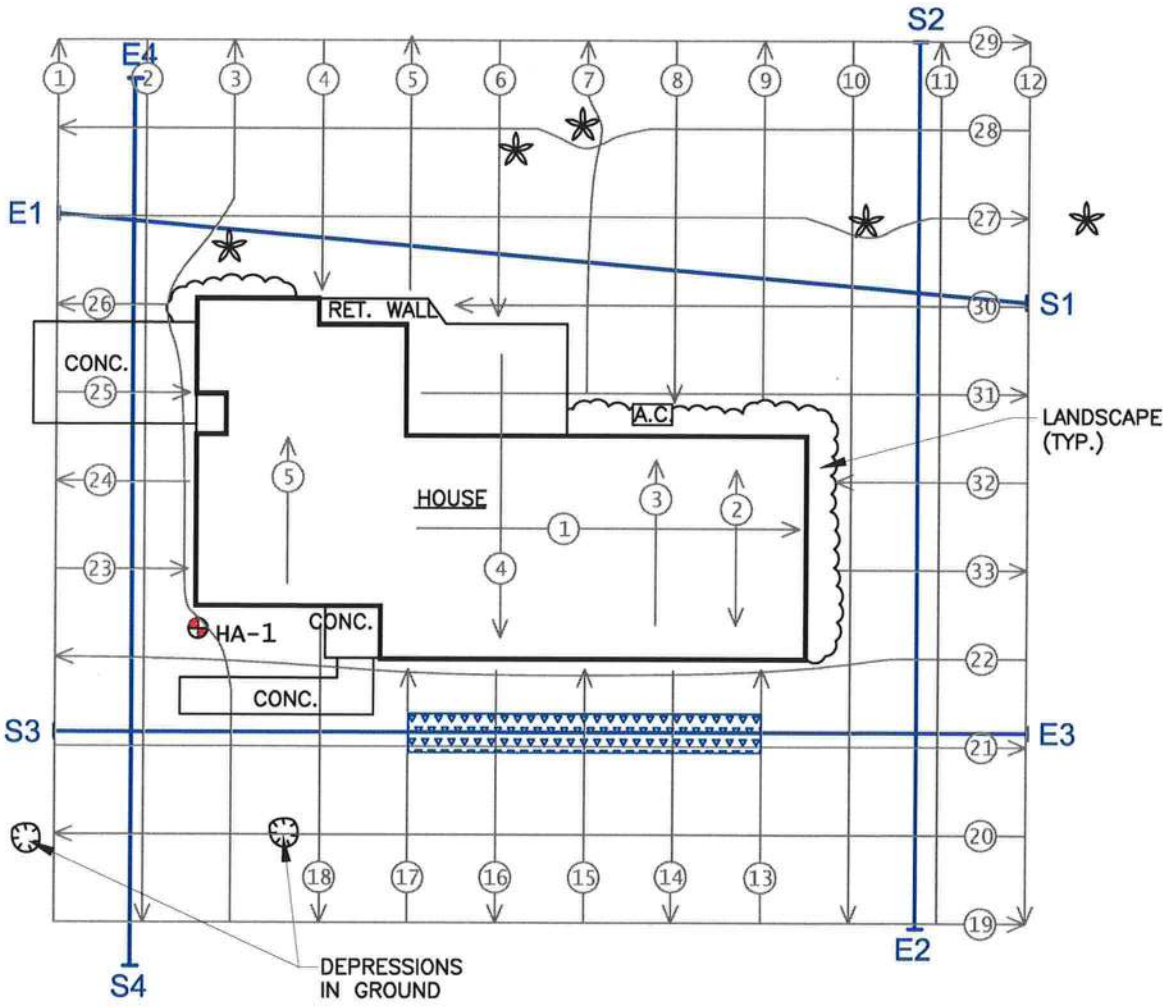
One ERI anomaly was identified at the project site (Figure 1). The ERI anomaly was characterized by the localized occurrence of relatively less resistive soil materials at depth. These relatively less resistive sediments occurred at an estimated depth range of 10 to 25 ft bls. It is noted that no geological structures suggesting a possible downward raveling of sediments was observed within this

area on either the GPR or ERI data. Accordingly, this ERI anomaly is likely associated with relic depositional or erosion activity, rather than possible karst activity.

4.3 Correlation of Geophysical Results

There was a very poor correlation between the GPR and ERI results in terms of identifying layers at similar ranges in depth. This lack of correlation is likely due to the inability of the ERI to resolve the near surface transition between the sandy and sandy clay as observed on the GPR data. The ERI method did identify an anomaly east of the residence. This anomaly is characterized by low resistivity sediments observed at depth. The lack of any soil disturbances observed on the GPR data supports the interpretation that the ERI anomaly is associated with relic depositional or erosion activity, rather than possible karst activity.

APPENDIX 1
FIGURE AND ERI TRANSECTS



EXPLANATION

S1 — E1 APPROX. OF ERI TRANSECT LINES WITH START AND END POINTS

17 PATH OF GPR TRANSECT LINES WITH DESIGNATION NUMBER

HA-1 LOCATION OF HAND AUGER BORING WITH DESIGNATION

LOCATION OF ERI ANOMALY

TREE

0 20'

SCALE: 1"=20' APPROX.

Geo View

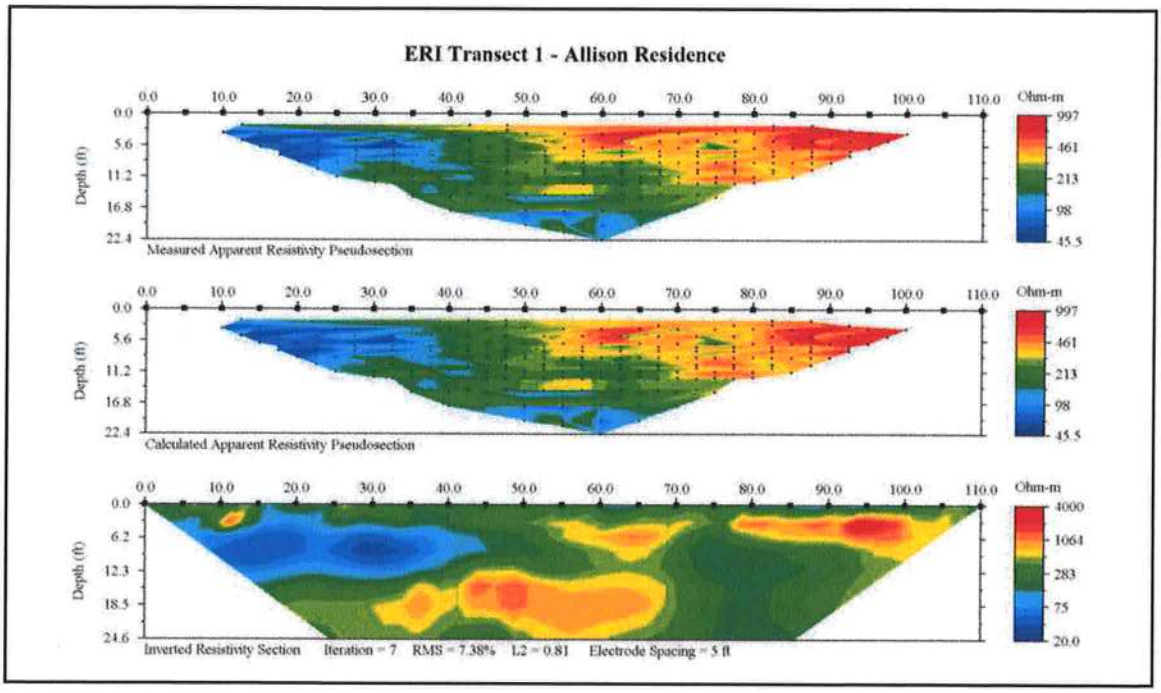
FIGURE 1

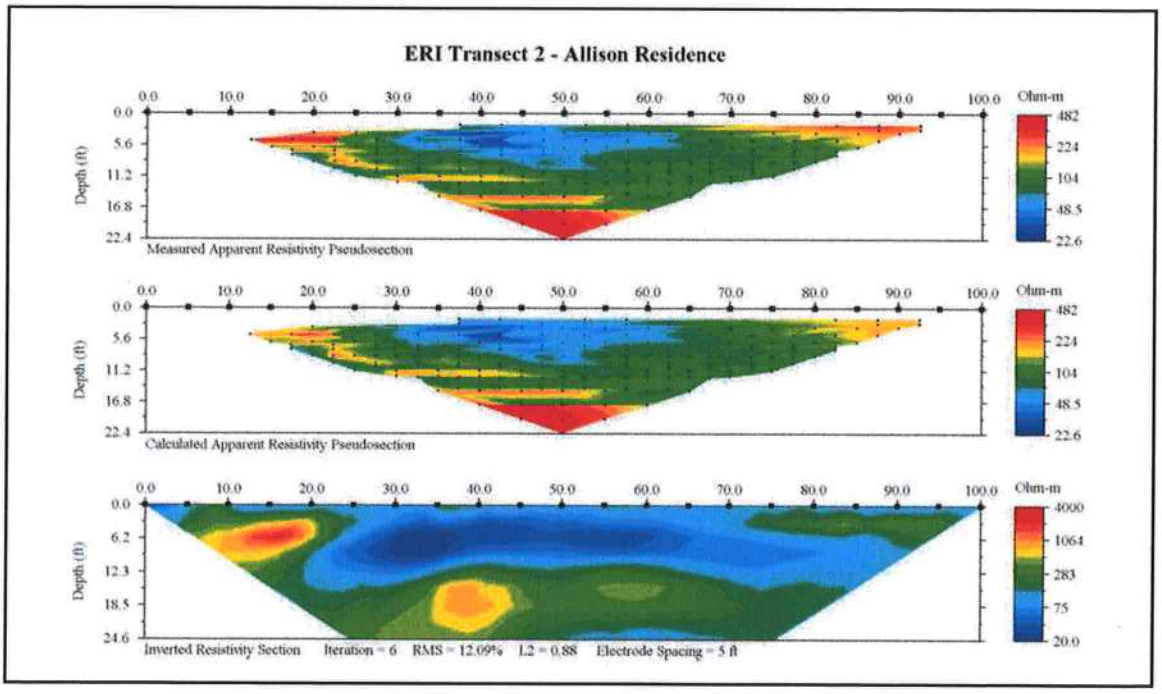
SITE MAP SHOWING RESULTS OF GEOPHYSICAL INVESTIGATION

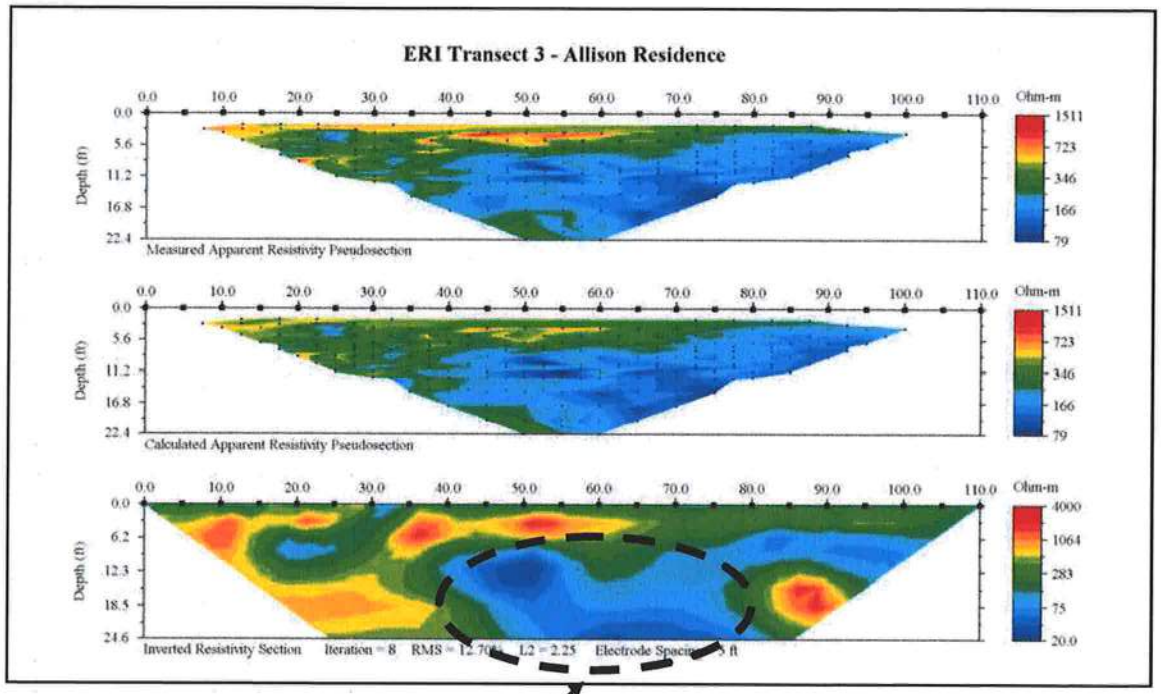
ALLISON RESIDENCE
166 SW RANDALL TERRACE
LAKE CITY, FLORIDA

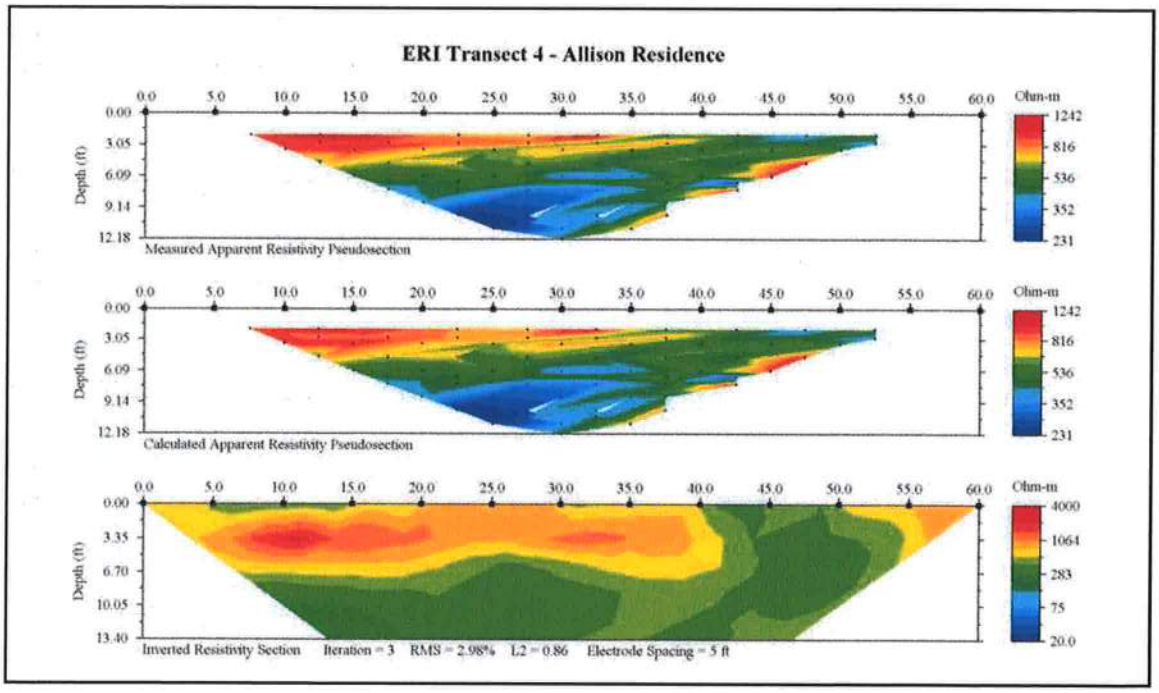
GSE ENGINEERING & CONSULTING, INC.
GAINESVILLE, FLORIDA

PROJECT: 5628
DATE: 09/12/08


ERI Transect 1 - Allison Residence
0.0 10.0 20.0 30.0 40.0 50.0 60.0 70.0 80.0 90.0 100.0 110.0
Depth (ft)
0.0 5.6 11.2 16.8 22.4
Ohm-m
997 461 213 98 45.5
Measured Apparent Resistivity Pseudosection
Calculated Apparent Resistivity Pseudosection
0.0 6.2 12.3 18.5 24.6
4000 1064 283 75 20.0
Inverted Resistivity Section Iteration = 7 RMS = 7.38% L2 = 0.81 Electrode Spacing = 5 ft


ERI Transect 2 - Allison Residence
0.0 10.0 20.0 30.0 40.0 50.0 60.0 70.0 80.0 90.0 100.0
Depth (ft)
0.0 5.6 11.2 16.8 22.4
Ohm-m
482 224 104 48.5 22.6
Measured Apparent Resistivity Pseudosection
Calculated Apparent Resistivity Pseudosection
0.0 6.2 12.3 18.5 24.6
4000 1064 283 75 20.0
Inverted Resistivity Section Iteration = 6 RMS = 12.09% L2 = 0.88 Electrode Spacing = 5 ft


ERI Transect 3 - Allison Residence
Depth (ft)
Ohm-m
Measured Apparent Resistivity Pseudosection
Calculated Apparent Resistivity Pseudosection
Inverted Resistivity Section
Iteration = 8
L2 = 2.25
ERI Anomaly


ERI Transect 4 - Allison Residence
Depth (ft)
Ohm-m
Measured Apparent Resistivity Pseudosection
Calculated Apparent Resistivity Pseudosection
Inverted Resistivity Section
Iteration = 3
RMS = 2.98%
L2 = 0.86
Electrode Spacing = 5 ft

APPENDIX 2
DESCRIPTION OF GEOPHYSICAL METHODS, SURVEY METHODOLOGIES AND LIMITATIONS

A2.1 On Site Measurements

The measurements that were collected and used to create the site map were made using a fiberglass measuring tape. Right angles were estimated using the exterior walls of the residence. The degree of accuracy of such an approach is typically +/- 5% for lengths and +/- 2.5 degrees for angles.

A2.2 Ground Penetrating Radar

Ground Penetrating Radar (GPR) consists of a set of integrated electronic components that transmits high frequency (200 to 1500 megahertz [MHz]) electromagnetic waves into the ground and records the energy reflected back to the ground surface. The GPR system consists of an antenna, which serves as both a transmitter and receiver, and a profiling recorder that both processes the incoming signal and provides a graphic display of the data. The GPR data can be reviewed as both printed hard copy output or recorded on the profiling recorder's hard drive for later review. GeoView uses a Mala GPR system. Geological characterization studies are typically conducted using a 250 MHz antenna.

A GPR survey provides a graphic cross-sectional view of subsurface conditions. This cross-sectional view is created from the reflections of repetitive short-duration electromagnetic (EM) waves that are generated as the antenna is pulled across the ground surface. The reflections occur at the subsurface contacts between materials with differing electrical properties. The electrical property contrast that causes the reflections is the dielectric permittivity that is directly related to conductivity of a material. The GPR method is commonly used to identify such targets as underground utilities, underground storage tanks or drums, buried debris, voids or geological features.

The greater the electrical contrast between the surrounding earth materials and target of interest, the greater the amplitude of the reflected return signal. Unless the buried object is metal, only part of the signal energy will be reflected back to the antenna with the remaining portion of the signal continuing to propagate downward to be reflected by deeper features. If there is little or no electrical contrast between the target interest and surrounding earth materials it will be very difficult if not impossible to identify the object using GPR.

The depth of penetration of the GPR signal is very site specific and is controlled by two primary factors: subsurface soil conditions and selected antenna

frequency. The GPR signal is attenuated (absorbed) as is passes through earth materials. As the energy of the GPR signal is diminished due to attenuation, the energy of the reflected waves is reduced, eventually to the level that the reflections can no longer be detected. As the conductivity of the earth materials increases, the attenuation of the GPR signal increases thereby reducing the signal penetration depth. In Florida, the typical soil conditions that severely limit GPR signal penetration are near-surface clays and/or organic materials.

The depth of penetration of the GPR signal is also reduced as the antenna frequency is increased. However, as antenna frequency is increased the resolution of the GPR data is improved. Therefore, when designing a GPR survey a tradeoff is made between the required depth of penetration and desired resolution of the data. As a rule, the highest frequency antenna that will still provide the desired maximum depth of penetration should be used. For areas outside of the home, a low-frequency (250 MHz) antenna is used. This allows for maximum signal penetration and thereby maximum depth from which information will be obtained. For GPR surveys conducted inside of a home a 500 MHz antenna is often used. The 500 MHz antenna sometimes provides higher quality data on concrete surfaces.

A GPR survey is conducted along survey lines (transects) that are measured paths along which the GPR antenna is moved. Electronic marks are placed in the data by the operator at designated points along the GPR transects. These marks allow for a correlation between the GPR data and the position of the GPR antenna on the ground.

For geological characterization surveys, the GPR survey is conducted along a set of perpendicularly orientated transects. The survey is conducted in two directions because subsurface features such as sinkholes are often asymmetric. Spacing between the transects typically ranges from 10 to 50 feet. Closely spaced grids are used when the objective of the GPR survey is to identify all sinkhole features within a project site. Coarser grids are used when the objective is to provide a general overview of site conditions. After completion of a survey using a given grid spacing, additional more-closely spaced GPR transects are often performed to better characterize sinkhole features identified by the initial survey. This information can be used to provide recommended locations for geotechnical borings.

Depth estimates to the top of lithological contacts or sinkhole features are determined by dividing the time of travel of the GPR signal from the ground surface to the top of the feature by the velocity of the GPR signal. The velocity of the GPR signal is usually obtained from published tables of velocities for the type

and condition (saturated vs. unsaturated) of soils underlying the site. The accuracy of GPR-derived depths typically ranges from 20 to 40 percent of the total depth.

Interpretation and Limitations of GPR data

The analysis and collection of GPR data is both a technical and interpretative skill. The technical aspects of the work are learned from both training and experience. Having the opportunity to compare GPR data collected in numerous settings to the results from geotechnical studies performed at the same locations develops interpretative skills for geological characterization studies.

The ability of GPR to collect interpretable information at a project site is limited by the attenuation (absorption) of the GPR signal by underlying soils. Once the GPR signal has been attenuated at a particular depth, information regarding deeper geological conditions will not be obtained. GPR data can only resolve subsurface features that have a sufficient electrical contrast between the feature in question and surrounding earth materials. If an insufficient contrast is present, the subsurface feature will not be identified.

GeoView can make no warranties or representations of geological conditions that may be present beyond the depth of investigation or resolving capability of the GPR equipment or in areas that were not accessible to the geophysical investigation.

A2.3 Electrical Resistivity

Electrical resistivity surveying is a geophysical method in which an electrical current is injected into the earth; the subsequent response (potential) is measured at the ground surface to determine the resistance of the underlying earth materials. The resistivity survey is conducted by applying electrical current into the earth from two implanted electrodes (current electrodes C_1 and C_2) and measuring the associated potential between a second set of implanted electrodes (potential electrodes P_1 and P_2). Field readings are in volts. Field readings are then converted to resistivity values using Ohm's Law and a geometric correction factor for the spacing and configuration of the electrodes. The calculated resistivity values are known as "apparent" resistivity values. The values are referred to as "apparent" because the calculations for the values assume that the volume of earth material being measured is electrically homogeneous. Such field conditions are rarely present.

Resistivity of earth materials is controlled by several properties including composition, water content, pore fluid resistivity and effective permeability. For this study the properties that had the primary control on measured resistivity values

are composition and effective permeability. The general geological setting of this project area is clay overlain by limestone.

For this study a dipole-dipole combined with an inverse Schlumberger resistivity array configuration was used. The dipole-dipole array is different that most other resistivity arrays in that the electrode and current electrodes are kept together using a constant spacing value referred to as an "a spacing". The current and potential electrode sets are moved away from each other using multiples of the "a spacing" value. The number of multiples is referred to as the "n value". For example, an array with an "a spacing" of 5 feet and a "n value" of 6 would have the current and potential electrode sets spaced 30 ft apart with a separation between the two electrodes in the set of 5 ft. By sampling at varying "n values", greater depth measurements can be achieved. Inverse Schlumberger data is collected with the current set of electrodes being kept with a fixed separation (L spacing) and the potential electrodes a minimum distance of 5L from the inner current electrodes. Dipole-dipole resistivity data is usually presented in a two-dimensional pseudo-section format. Inverse Schlumberger data is usually presented as a vertical profile of resistivity distribution below the center point between the two current electrodes. The dipole-dipole and inverse Schlumberger data is combined and presented as either a contour of the individual data points (using the calculated apparent resistivity values) or as a geological model using least squares analysis. Such least squares analysis was used for this study using the computer software program (EarthImager 2D) developed for the equipment manufacturer. Apparent resistivity values are calculated using the following formula for a dipole-dipole configuration: $\gamma_a=\pi(b^3/a^2-b)\nabla V/I$:

Where:

γ_a= apparent resistivity
π= 3.14
a= "a spacing"
b= "a spacing" x "n value"
∇V= voltage between the two potential electrodes
I= current (in amps)

For a Schlumberger configuration the apparent resistivity is calculated using: $\gamma_a=\pi([s^2-a^2]/4)\nabla V/aI$:

Where:

γ_a= apparent resistivity
π= 3.14

a= spacing between the inner set of electrodes"
s= distance between the outer electrode and nearest inner electrode
∇V= voltage between the two potential electrodes
I= current (in amps)

A2.3.1 Inversion Modeling of ERI Data

The objective for inversion modeling of resistivity data is to create a description of the actual distribution of earth material resistivity based on the subsurface geology that closely matches the resistivity values that are measured by the instrumentation. This modeling is done through the use of EarthImager™, a proprietary computer program developed by the equipment manufacturer. When evaluating the validity of the inversion model several factors need to be considered. The RMS, or root mean square error, expresses the quality of fit between the actual and modeled resistivity values for the given set of points in the model. The lower the RMS error the higher the quality of fit between the actual and modeled data sets. In general, inversion models with an RMS error of less than 5 to 10 percent are acceptable. The size of the RMS error is dependent upon the number of bad data points within a data set and the magnitude of how bad the data points are. As part of the modeling process bad data points are typically removed, which decreases the RMS error and improves (with limitations) the quality of the model. The quality of fit between the actual and modeled resistivity values is also expressed as the L-2 norm. When the modeled and actual data sets have converged, the L-2 norm reduces to unity (1.0 or smaller).

However, as the number of data points is reduced, the validity of the inversion model is diminished. Accordingly, when interpreting a particular area of an inversion model the number of data points used to create that portion of the model must be taken into consideration. If very few points are within a particular area of the model, then the modeled solution in that area should be considered suspect and possibly rejected.

The entire ERI transect should be considered suspect if a model has a high RMS error and a large number of removed data points. It is likely that sources of interference have affected the field readings and rendered the modeled solution invalid. Such sources of interference can include buried metallic underground utilities, reinforced concrete slabs, septic leach fields or electrical grounding systems. Accordingly, all efforts need to be made in the field to locate, to the degree possible, the ERI transect lines away from such features. The locations of such features also need to be mapped in the field so their potential effects can be considered when interpreting the modeled results.

A2.4 Hand Auger Boring

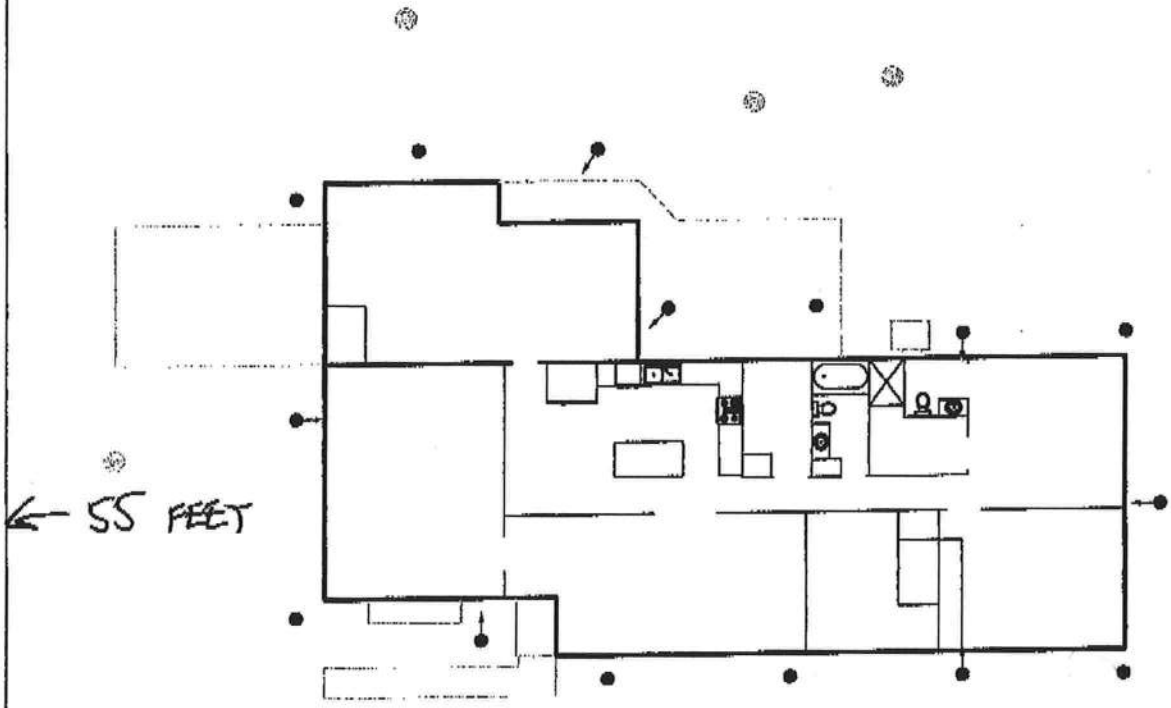
A hand auger boring was performed outside of the residence. The boring was performed in general accordance with ASTM standards D1452-90 (1995) titled "Standard Practice for Soil Investigation and Sampling by Auger Borings". The purpose of the hand auger boring was to obtain information regarding near-surface soil conditions to assist in the interpretation of the GPR data. The boring was performed by manually advancing the auger bucket into the ground in approximate increments of 6 inches. Soils were retrieved and placed on plastic sheet for identification. Classifications of soils were made in the field based upon observed textural, color and compositional characteristics. Hand auger borings are typically advanced to the depth of the first competent clay layer, the water table or to a maximum depth of 9 feet. Unless requested, soil samples are not saved.

ALLISON
SITE PLAN

↑
100 FEET

STRUCTURE DISTANCES FROM PROPERTY LINES

ATTN: BRIAN



← 55 FEET

55 FEET →

70 FEET
↓

LEGEND :
- GROUT INJECTION POINT
- ANGLED GROUT INJECTION POINT

NORTH

0 15'

SCALE: 1" = 15' APRROX.

CLAIM No. 59-D210-403
ALLISON RESIDENCE
LAKE CITY, COLUMBIA COUNTY, FLORIDA
GSE PROJECT No. 10299

SITE PLAN SHOWING APPROXIMATE LOCATION OF GROUT INJECTION POINTS

DESIGNED BY: KLH
CHECKED BY : KLH
DRAWN BY : KMD

GSE Engineering & Consulting, Inc.

FIGURE 5

CERTIFIED FOUNDATIONS, INC.

1306 Banana Rd., Lakeland, Fl. 33810 • 863-859-3889

800-329-3889 • Toll Free Fax 877-859-8593

February 24, 2009

Columbia County Building Department
Attn: Joe
Fax 386-758-2160

Re: Sinkhole Remediation Building Permit Application
Additional Information (166 SW Randall Terrace, Lake City, FL 32024)

Joe ::

The additional information that you requested follows.

I talked with Kelly in Environmental Health, and she should be walking over the X Number card.

Please process the application as soon as possible, so we can stabilize the owners home.
I will be in contact regarding picking up the permit on Thursday, 02-26-09.

Call me with any questions: 863-559-8317.

Thank you.

Sincerely,
Richard Plage

Columbia County, Florida
Building & Zoning Department

Number of pages including cover sheet 1

Date 23 FEB 2009

To:	From:
RICHARD HUSSEY	COLUMBIA COUNTY
	JOE.
	386. 758-1163
	LEAVE MESSAGE.
Phone:	Phone: 386-758-1008
Fax: 877. 859. 8593	Fax: 386-758-2160

Remarks: ☒ Urgent ☐ For review ☐ ASAP ☐ Please comment

INCOMPLETE APPLICATION
NEED PROOF OF OWNERSHIP.
BETTER DRIVING DIRECTIONS NEEDED
ENVIRONMENTAL HEALTH -
SITE PLAN NEEDED ON EXISTING STRUCTURE

NOTICE OF COMMENCEMENT

Permit No. _____
Parcel ID No. 25-4S-16-03153-029

Inst:200912003092 Date:2/26/2009 Time:11:38 AM
DC,P.DeWitt Cason,Columbia County Page 1 of 1 B:1168 P:323

THE UNDERSIGNED hereby gives notice that improvements will be made to certain real property, and in accordance with Section 713.13 of the Florida Statutes, the following information is provided in this **NOTICE OF COMMENCEMENT**.

1.Description of property (***legal description***): COMM NW COR OF SEC RUN E 1188.09 FT S 732.94 FT FOR POB
a) Street (***job***) Address: 166 SW RANDALL TERRACE LAKE CITY, FL 32024
2.General description of improvements: **Foundation Stabilization**

3.Owner Information
a) Name and address: WILLIAM B & KIMBERLY ALLISON 166 SW RANDALL TER, LAKE CITY, FL 32024
b) Name and address of fee simple titleholder (if other than owner) _____
c) Interest in property _____
4.Contractor Information
a) Name and address: **Certified Foundations, Inc., 1306 Banana Rd, Lakeland, FL 33810**
b) Telephone No.: 863 859-3849 Fax No. (Opt.) _____
5.Surety Information
a) Name and address: _____
b) Amount of Bond: _____
c) Telephone No.: _____ Fax No. (Opt.) _____
6.Lender
a) Name and address: _____
_____ Phone No. _____
7. Identity of person within the State of Florida designated by owner upon whom notices or other documents may be served:
a) Name and address: _____
b) Telephone No.: _____ Fax No. (Opt.) _____
8.In addition to himself, owner designates the following person to receive a copy of the Lienor's Notice as provided in Section 713.13(1)(b), Florida Statutes:
a) Name and address: _____
b) Telephone No.: _____ Fax No. (Opt.) _____
9.Expiration date of Notice of Commencement **(the expiration date is one year from the date 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 I, SECTION 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 YOUR LENDER OR AN ATTORNEY BEFORE COMMENCING WORK OR RECORDING YOUR NOTICE OF COMMENCEMENT.

STATE OF FLORIDA
COUNTY OF COLUMBIA

10. William B Allison
Signature of Owner or Owner's Authorized Officer/Director/Partner/Manager

DL# A425-922-56-343-0 WILLIAM B. ALLISON
Print Name

The foregoing instrument was acknowledged before me this 8 day of January, 20 09, by _____
William Allison as Owner **(type of authority, e.g. officer, trustee, attorney in fact) for** _____ **(name of party on behalf of whom instrument was executed).**

Personally Known ____ OR Produced Identification ✓ Notary Signature Kathleen S Morissette

Type of Identification Produced Driver's Lic Name (print) Kathleen S Morissette

--- AND ---

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.

William B Allison
Signature of Natural Person Signing (in line # 10.) Above

FORMS/NOC,rvsd200

KATHLEEN S. MORISSETTE
Commission # DD584480
My Commission Expires 08-14-2010
Bonded Through Atlantic