



Application # BRES1901-0143

Harnett County Central Permitting  
PO Box 65 Lillington, NC 27548  
910-893-7525 Fax 910-893-2793 www.hamett.org/permits

Received:  
01/22/19

\* Each section below to be filled out by whomever performing work. Must be owner or licensed contractor. Address, company name & phone must match information on license.

**Application for Residential Building and Trades Permit**

Owner's Name: Charles Butts Date: 1/10/2019

Site Address: 4325 Spring Hill Church Rd. Lillington, NC Phone: 910-893-5645

Subdivision: \_\_\_\_\_ Lot: \_\_\_\_\_

Description of Proposed Work: Install crawl space encapsulation system and smart jack supports to support the floor joist system.

**General Contractor Information**

Regional Waterproofing Inc.  
Building Contractor's Company Name  
721 E Gannon Ave. Zebulon, NC 27597  
Address

919-851-4500  
Telephone  
danny@regionalwaterproofing.com  
Email Address

License # \_\_\_\_\_

**Electrical Contractor Information**

Description of Work \_\_\_\_\_ Service Size: \_\_\_\_\_ Amps T-Pole:  Yes  No

Electrical Contractor's Company Name \_\_\_\_\_

Telephone \_\_\_\_\_

Address \_\_\_\_\_

Email Address \_\_\_\_\_

License # \_\_\_\_\_

**Mechanical/HVAC Contractor Information**

Description of Work \_\_\_\_\_

Mechanical Contractor's Company Name \_\_\_\_\_

Telephone \_\_\_\_\_

Address \_\_\_\_\_

Email Address \_\_\_\_\_

License # \_\_\_\_\_

**Plumbing Contractor Information**

Description of Work \_\_\_\_\_ # Baths \_\_\_\_\_

Plumbing Contractor's Company Name \_\_\_\_\_

Telephone \_\_\_\_\_

Address \_\_\_\_\_

Email Address \_\_\_\_\_

License # \_\_\_\_\_

**Insulation Contractor Information**

Insulation Contractor's Company Name & Address \_\_\_\_\_

Telephone \_\_\_\_\_

**\*NOTE: General Contractor / owner must fill out and sign the second page of this application.**



I hereby certify that I have the authority to make necessary application, that the application is correct and that the construction will conform to the regulations in the Building, Electrical, Plumbing and Mechanical codes, and the Harnett County Zoning Ordinance. I state the information on the above contractors is correct as known to me and that **by signing below I have obtained all subcontractors permission to obtain these permits** and if **any** changes occur including listed contractors, site plan, number of bedrooms, building and trade plans, Environmental Health permit changes or proposed use changes, I certify it is my responsibility to notify the Harnett County Central Permitting Department of any and all changes.

**EXPIRED PERMIT FEES** - 6 Months to 2 years permit re-issue fee is \$150.00. After 2 years re-issue fee is as per current fee schedule.

  
Signature of Owner/Contractor/Officer(s) of Corporation

1/10/19  
Date

**Affidavit for Worker's Compensation N.C.G.S. 87-14**


The undersigned applicant being the:

General Contractor     Owner     Officer/Agent of the Contractor or Owner

Do hereby confirm under penalties of perjury that the person(s), firm(s) or corporation(s) performing the work set forth in the permit:

- Has three (3) or more employees and has obtained workers' compensation insurance to cover them.
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- Has no more than two (2) employees and no subcontractors.

While working on the project for which this permit is sought it is understood that the Central Permitting Department issuing the permit may require certificates of coverage of worker's compensation insurance prior to issuance of the permit and at any time during the permitted work from any person, firm or corporation carrying out the work.

Sign w/Title:  GC Date: 1/10/19



**Prepared by:**  
 Ronnie Coutu  
 ronnie@regionalwaterproofing.com

Regional Foundations Solutions  
 www.regionalwaterproofing.com  
 TF (800) 536-6260  
 F (919) 269-6788

**Prepared on:**  
 10-8-18

**Prepared for:**  
 Charles & Carol Butts  
 W (910) 893-5645  
 P (910) 893-5645

**Job location:**  
 4325 Spring Hill Church Rd  
 Lillington, NC 27546-9260

**Proposal**

## Project Summary

My Crawl Space .....	\$11,680.00
Permanently Stabilize Floors .....	\$10,340.00
Total Investment .....	\$22,020.00
Same Day Savings .....	\$2,137.00
<b>Total Contract Price .....</b>	<b>\$19,883.00</b>
Deposit Required - 20% .....	\$3,976.60
Deposit Paid .....	\$3,244.00
<b>Amount Due Upon Installation .....</b>	<b>\$16,639.00</b>

## Customer Consent

Any alteration from the above specifications and corresponding price adjustment (if necessary) will be made only at the Customer's request or approval. Completing the work in this Proposal at the time scheduled is contingent upon accidents or delays beyond our control. This Proposal is based primarily on the Customer's description of the problem. Engineering services are used as required by companies such as Hayman Engineering and StoneWall Engineering. This Proposal may be withdrawn if not accepted by the Customer within 20 days.

**Authorized Signature** Signed electronically by Ronnie Coutu **Date** 10/8/2018 3:44PM

Acceptance of Contract— I am/we are aware of and agree to the contents of this Proposal, the attached Job Detail sheet(s), and the attached Limited Warranty, (together, the "Contract"). You are authorized to do the work as specified in the Contract. However, field adjustments may be made if deemed vital by project Foreman or Production Manager. I/we will make the payment set forth in this Contract at the time it is due. I/we will pay your service charge of 1-1/3% per month (16% per annum) if my/our account is 30 days or more past due, plus your attorney's fees and costs to collect and enforce this Contract.

**Customer Signature** Carol Butts **Date** 10/8/2018 3:44PM  
4325 Spring Hill Road Lillington, NC 27546 Signed Electronically

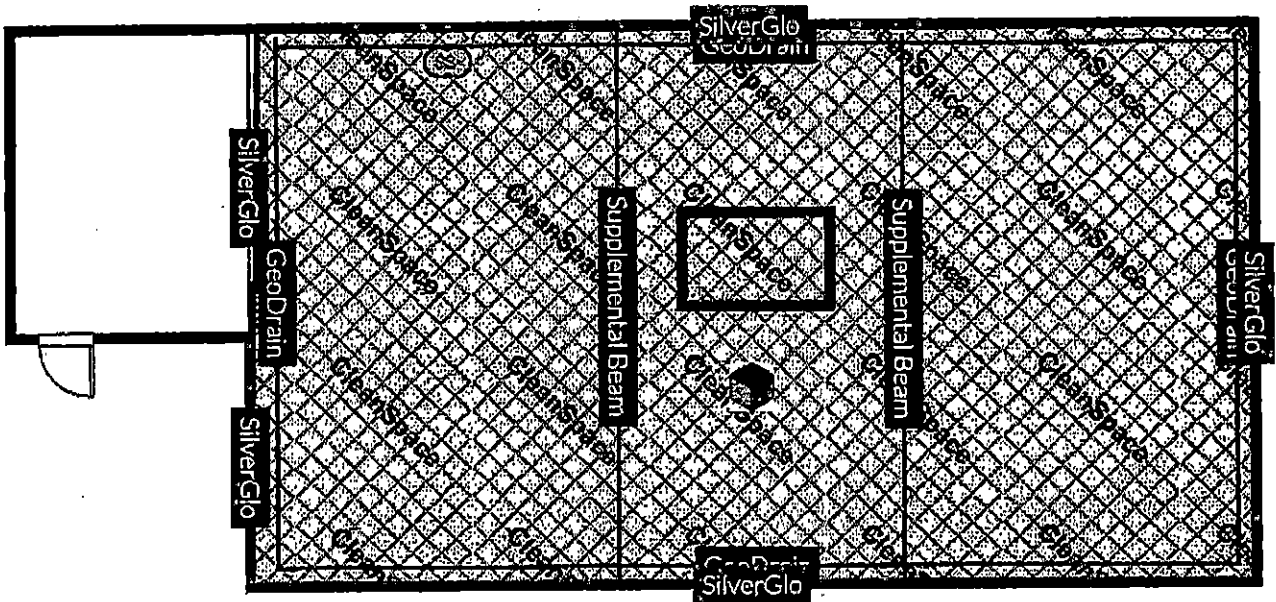
This is a new installation, and is exempt from sales tax.

**Initial** NCB

Customer understands after three days all deposits are final.

**Initial** NCB

# Job Details



# Job Details (Continued)

## Specifications

Install SmartJack supports as indicated on job drawing to support the floor joist system above. Install a supplemental beam as indicated on job drawing. Acquire appropriate permits and engineering per local building code. All Engineering requires a Letter of Completion. Install 1/3 hp cast Iron pump in TripleSafe liner with clean pump stand. Install GeoDrain to address groundwater seepage. Install CleanSpace crawl space encapsulation system in area shown on drawing. Remove Debris Install SaniDry Sedona to keep humidity low. Install SilverGlo as shown on drawing.

## Contractor Will

- 1.) Contact utility locator service

## Customer Will

- 1.) Repair any sprinkler lines that may be damaged during the installation.
- 2.) Mark any private lines that may be hidden underground, and assumes all liability if damage should occur to such lines.
- 3.) Make payment of remaining balance to foreman of crew the same day installation is complete.

## Additional Notes

All recommendations are based on customers descriptions of the problem. While inspection tools such as hygrometers and laser levels are used, no deconstruction or original house plans are available to review for the recommendation. Some unforeseen factors may impact project, despite best inspectors best efforts.

## Product List

SmartJack, 1-3' .....	10	Supplemental Beam .....	64 ft	Permits & Engineering .....	1
SuperSump Plus .....	1	GeoDrain, Drainage .....	120 ft	CleanSpace .....	1200 sqft
Debris Removal .....	1	SaniDry Sedona .....	1	SilverGlo .....	1200 sqft



**SFA Design Group, LLC**

STRUCTURAL | CIVIL | GEOTECHNICAL | LAND USE PLANNING  
9020 SW Washington Square Drive, Suite 505, Portland, Oregon 97223  
1813 Rutan Drive, Suite C, Livermore, California 94551  
1912 S 146th Street, Seattle, Washington 98168  
p: 503-841-0311 www.sfadg.com

# STRUCTURAL CALCULATIONS

## Butts Residence Underpinning

4325 Spring Hill Church Rd., Lillington, NC 27546

Regional Basement and Crawlspace Repair



### LIMITATIONS

ENGINEER WAS RETAINED IN A LIMITED CAPACITY FOR THIS PROJECT. DESIGN IS BASED UPON INFORMATION PROVIDED BY THE CLIENT WHO IS SOLELY RESPONSIBLE FOR ACCURACY OF SAME. NO RESPONSIBILITY AND/OR LIABILITY IS ASSUMED BY, OR IS TO BE ASSIGNED TO THE ENGINEER FOR ITEMS BEYOND THAT SHOWN ON THESE SHEETS.

Project No. RBC19-001

January 18, 2019



PROJECT NO. RBC19-001	SHEET NO.
--------------------------	-----------

PROJECT Butts Residence Underpinning	DATE 1/18/2019
SUBJECT Push Pier Design Requirements	BY CB

**Structural Notes**

The structural calculations in this set also reference to the design of the SmartJack addition. The SmartJacks will be taking vertical loads from the floor framing. The new SmartJack footings will be integrated into the existing structure. By inspection lateral calculations were not required because the weight of the area of work is under 10% of the weight of the total structure, in accordance with the 2015 IBC Section 3403.4. Lateral loads will be transferred into the foundation with existing footings.

**General**

Building Department City of Lillington  
 Building Code Conformance (Meets Or Exceeds Requirements)  
 2015 International Building Code (IBC)  
 2015 International Residential Code (IRC)  
 2015 North Carolina Building Code

**Dead Loads**

Floor Dead Load 15.0 psf

**Live Loads**

Floor Live Load (Residential) 40.0 psf



PROJECT NO. RBC19-001	SHEET NO.
--------------------------	-----------

PROJECT Butts Residence Underpinning	DATE 1/18/2019
SUBJECT Design Loads	BY CB

**Worst Case Vertical Design Loads**

Tributary Width To Anchor =		= 6.50 ft		
1st Floor L =	(15 psf)	(10.66 ft)	= 160 plf	Dead Load
1st Floor L =	(40 psf)	(10.66 ft)	= 426 plf	Floor Live Load
				Roof Snow Load
				Controlling ASD Load Combination:
				D+L
				1.039 kips
				2.772 kips
				0.000 kips

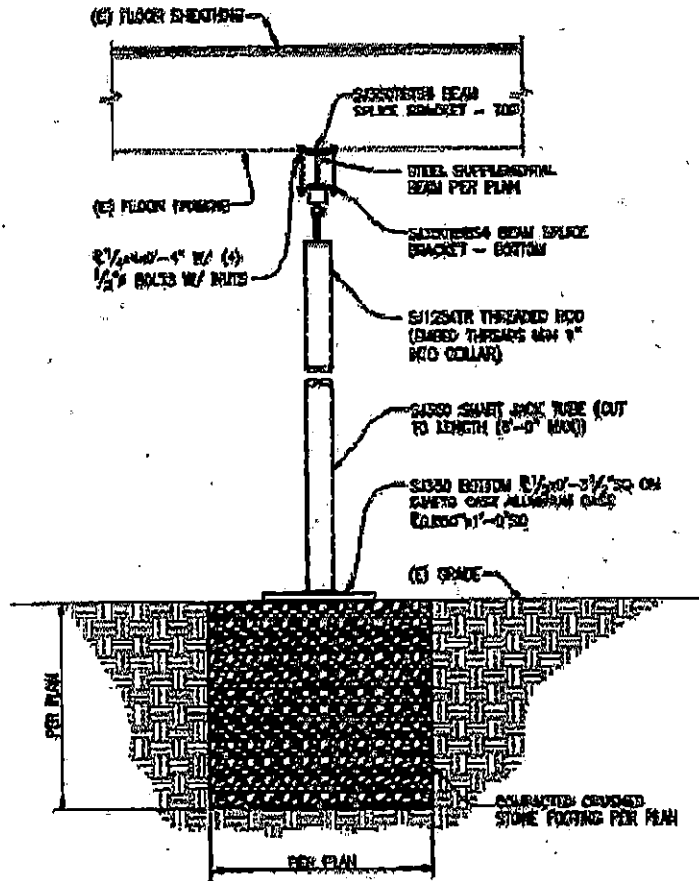
**Max Vertical Load to Worst Case Pier 3.811 kips**

**Horizontal Shear to Embedment**





PROJECT Butts	DATE 1/18/2019
SUBJECT Foundation Supportworks SJ350T Smart Jack System	BY CB



Note: Section above is a general representation of smartjack system, refer to plan for layout and project specific details.

Smart Jack System = SJ350T  
 $P_{max} = 3.811$  kips  
 Maximum Tube Unbraced Length,  $d_u = 6.000$  ft  
 Maximum Threaded Rod Unbraced Length,  $d_r = 3.000$  in  
 Eccentricity,  $e_{max} = 1.000$  in  
 Moment = 3.811 in-kips

**Tube Properties**

Design Tube OD = 3.500 in  
 Design Wall Thickness = 0.165 in  
 $k = 1.00$   
 $r = 1.181$  in  
 $A = 1.729$  in<sup>2</sup>  
 $c = 1.750$  in  
 $S = 1.377$  in<sup>3</sup>  
 $I = 2.409$  in<sup>4</sup>  
 $E = 29000$  ksi  
 $F_y = 50$  ksi

**Threaded Rod Properties**

$kl/r = 80.99$  Slenderness OK  
 $Cc = 107.00$   
 $F'e = 40.13$  ksi  
 $Fa = 22.55$  ksi  
 $fa = 2.20$  ksi  
 $Fb = 33.00$  ksi  
 $fb = 2.77$  ksi  
 $Cm = 1.00$   
 $fa/Fa = 0.10$  Eq H1-3 may be used  
  
Eq H1-1 NA  
Eq H1-2 NA  
Eq H1-3 0.18 Pler OK

**Threaded Rod Properties**

Threaded Rod Dia. = 1.250 in  
 $k = 1.00$   
 $r = 0.313$  in  
 $A = 1.227$  in<sup>2</sup>  
 $c = 0.625$  in  
 $S = 0.192$  in<sup>3</sup>  
 $I = 0.120$  in<sup>4</sup>  
 $E = 29000$  ksi  
 $Fy = 70$  ksi

**Threaded Rod Properties**

$kl/r = 9.60$  Slenderness OK  
 $Cc = 90.43$   
 $F'e = 1619.74$  ksi  
 $Fa = 40.79$  ksi  
 $fa = 3.11$  ksi  
 $Fb = 46.20$  ksi  
 $fb = 19.87$  ksi  
 $Cm = 1.00$   
 $fa/Fa = 0.08$  Eq H1-3 may be used  
  
Eq H1-1 NA  
Eq H1-2 NA  
Eq H1-3 0.51 Tube OK

**Soil Bearing Capacity of Structural Fill**

$b_c = 12.00$  in  
 $b_r = 24.00$  in  
 $l_{min} = 24.00$  in  
Soil Bearing Capacity = 1500.00 psf  
Capacity = 6.00 k OK

**MAX LOAD TO SMART JACK = 3811LB**  
**3.5 IN DIAMETER SMART JACK TUBE WITH 0.165 IN. THICK WALL AND MAX HEIGHT OF 6FT**  
**1-1/4 IN DIAMETER SOLID THREADED ROD WITH MAX HEIGHT OF 3 IN**  
**24 IN SQR X 24 IN DP STRUCTURAL FILL**  
**EMBED THREADED ROD A MINIMUM OF 3/4 IN INTO CONFINING RING AND THREADED INSERT**

**Steel Beam**  
 Lic. #: KW-06006923 Licensee: SFA ENGINEERING LLC

Description: Supplemental Beam

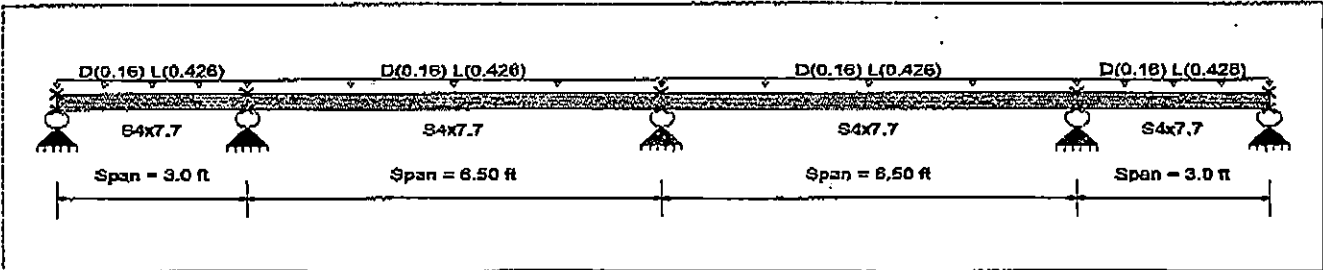
**CODE REFERENCES**

Calculations per AISC 360-10, IBC 2015, CBC 2016, ASCE 7-10  
 Load Combination Set: IBC 2015

**Material Properties**

Analysis Method: Allowable Strength Design.  
 Beam Bracing: Completely Unbraced  
 Bending Axis: Major Axis Bending

Fy: Steel Yield: 36.0 ksi  
 E: Modulus: 29,000.0 ksi



**Applied Loads**

Service loads entered. Load Factors will be applied for calculations.

- Beam self weight NOT internally calculated and added
- Load for Span Number 1  
 Uniform Load: D = 0.160, L = 0.4260 k/ft, Tributary Width = 1.0 ft
- Load for Span Number 2  
 Uniform Load: D = 0.160, L = 0.4260 k/ft, Tributary Width = 1.0 ft
- Load for Span Number 3  
 Uniform Load: D = 0.160, L = 0.4260 k/ft, Tributary Width = 1.0 ft
- Load for Span Number 4  
 Uniform Load: D = 0.160, L = 0.4260 k/ft, Tributary Width = 1.0 ft

**DESIGN SUMMARY**

**Design OK**

Maximum Bending Stress Ratio =	0.371 : 1	Maximum Shear Stress Ratio =	0.182 : 1
Section used for this span	S4x7.7	Section used for this span	S4x7.7
Ma : Applied	2.331 k-ft	Va : Applied	2.028 k
Mn / Omega : Allowable	6.287 k-ft	Vn/Omega : Allowable	11.117 k
Load Combination	+D+L+H	Load Combination	+D+L+H
Location of maximum on span	6.500ft	Location of maximum on span	6.500 ft
Span # where maximum occurs	Span # 2	Span # where maximum occurs	Span # 2
Maximum Deflection			
Max Downward Transient Deflection	0.025 in Ratio = 3,140 >=360		
Max Upward Transient Deflection	-0.002 in Ratio = 15,477 >=360		
Max Downward Total Deflection	0.034 in Ratio = 2283 >=180		
Max Upward Total Deflection	-0.003 in Ratio = 11252 >=180		

**Maximum Forces & Stresses for Load Combinations**

Load Combination	Segment Length	Span #	Max Stress Ratios		Summary of Moment Values						Summary of Shear Values			
			M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
<b>+D+H</b>														
Dsgn. L =	3.00 ft	1	0.066	0.044	0.03	-0.42	0.42	10.50	6.29	2.91	1.00	0.49	16.68	11.12
Dsgn. L =	6.50 ft	2	0.101	0.050	0.32	-0.64	0.64	10.50	6.29	2.29	1.00	0.55	16.68	11.12
Dsgn. L =	6.50 ft	3	0.101	0.050	0.32	-0.64	0.64	10.50	6.29	2.29	1.00	0.55	16.68	11.12
Dsgn. L =	3.00 ft	4	0.066	0.034	0.03	-0.42	0.42	10.50	6.29	2.91	1.00	0.30	16.68	11.12
<b>+D+L+H</b>														
Dsgn. L =	3.00 ft	1	0.243	0.160	0.12	-1.53	1.53	10.50	6.29	2.91	1.00	1.78	16.68	11.12
Dsgn. L =	6.50 ft	2	0.371	0.182	1.18	-2.33	2.33	10.50	6.29	2.29	1.00	2.03	16.68	11.12
Dsgn. L =	6.50 ft	3	0.371	0.182	1.18	-2.33	2.33	10.50	6.29	2.29	1.00	2.03	16.68	11.12
Dsgn. L =	3.00 ft	4	0.243	0.125	0.12	-1.53	1.53	10.50	6.29	2.91	1.00	1.39	16.68	11.12

Description: Supplemental Beam

**Overall Maximum Deflections**

Load Combination	Span	Max. "+-" Defl	Location in Span	Load Combination	Max. "+-" Defl	Location in Span
	1	0.0000	0.000	+D+L+H	-0.0031	2.140
+D+L+H	2	0.0342	3.077		0.0000	2.140
+D+L+H	3	0.0340	3.467		0.0000	2.140
	4	0.0000	3.467	+D+L+H	-0.0032	0.880

**Vertical Reactions**

Support notation: Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4	Support 5
Overall MAXimum	0.370	3.170	4.058	3.170	0.370
Overall MINimum	0.101	0.865	1.107	0.865	0.101
+D+H	0.101	0.865	1.107	0.865	0.101
+D+L+H	0.370	3.170	4.058	3.170	0.370
D Only	0.101	0.865	1.107	0.865	0.101
L Only	0.269	2.304	2.948	2.304	0.269



Carolina Building Code  
son.

standards into the  
not relieve the  
standard shall be used

these notes:

of supervision of a  
of North Carolina.

location or construction.

1

contained in these notes

character and extent of  
"typical" apply to

depth and stability of the

methods of construction  
depth and stability of the  
elements required to  
to be familiar with the  
property. The  
engineer for design of

standards and the governing  
be brought to the

site. Conflicts between  
contract/Engineer before

of the design loads as  
action.

inher for review.

## SOILS AND FOUNDATIONS

**REFERENCE STANDARDS:** Conform to IBC Chapter 18 "Soils & Foundations."

### DESIGN SOIL VALUES:

Allowable Foundation Pressure (Assumed)	1500 PSF
Passive Lateral Pressure	200 PSF/FT
Active Lateral Pressure (unrestrained)	40 PSF/FT
Active Lateral Pressure (restrained)	50 PSF/FT
Coefficient of Sliding Friction	0.35

**FOOTING DEPTH:** Exterior perimeter footings shall bear not less than 18 inches below finish grade, by the geotechnical engineer and the building official. Interior footings shall bear not less than 12 inches below finish floor.

## DESIGN REQUIREMENTS

### DESIGN CRITERIA:

**BUILDING CODE CONFORMANCE (MEETS OR EXCEEDS REQUIREMENTS):**

- 2015 INTERNATIONAL BUILDING CODE (IBC)
- 2015 INTERNATIONAL RESIDENTIAL CODE (IRC)
- 2015 NORTH CAROLINA BUILDING CODE (NCBC)

### DEAD LOADS:

FLOOR DEAD LOAD 15 PSF

### LIVE LOADS:

FLOOR LIVE LOAD (RESIDENTIAL) 40 PSF

**DEFLECTIONS:** Total Load Deflection Limit L/240  
Live Load Deflection Limit L/360

### STARTUP MATERIALS:

- TOP PLATE - ASTM A36  
(MIN YIELD STRESS,  $F_y = 36$  KSI / MIN TENSILE STRESS,  $F_u = 58$  KSI)
- THREADED INSERT - ASTM A193 GRADE 1018  
(MIN YIELD STRESS,  $F_y = 56$  KSI / MIN TENSILE STRESS,  $F_u = 90$  KSI)
- TUBE - ASTM A500 GRADE C  
(MIN YIELD STRESS,  $F_y = 50$  KSI / MIN TENSILE STRESS,  $F_u = 55$  KSI)
- BOTTOM PLATE - ASTM A36  
(MIN YIELD STRESS,  $F_y = 36$  KSI / MIN TENSILE STRESS,  $F_u = 58$  KSI)
- CONFORMING RING - ASTM A53 GRADE B  
(MIN YIELD STRESS,  $F_y = 35$  KSI / MIN TENSILE STRESS,  $F_u = 60$  KSI)



SFA Design Group, LLC  
11111...  
4325 SPRING HILL CHURCH RD.  
WILLINGTON, NC 27946

REGIONAL BASEMENT & CRAWL  
SPACE REPAIR  
4325 SPRING HILL CHURCH RD.  
WILLINGTON, NC 27946

GENERAL NOTES

REVISIONS

PROJECT NO:  
DESIGNED BY:  
DRAWN BY:  
CHECKED BY:  
DATE:  
03-15-2019

SHEET NO:

**S1.1**



Application # \_\_\_\_\_

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Building Contractor's Company Name Telephone  
721 E Gannon Ave. Zebulon, NC 27597 danny@regionalwaterproofing.com  
Address Email Address

License # \_\_\_\_\_

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Description of Work \_\_\_\_\_ Service Size: \_\_\_\_\_ Amps T-Pole:  Yes  No

Electrical Contractor's Company Name \_\_\_\_\_ Telephone \_\_\_\_\_

Address \_\_\_\_\_ Email Address \_\_\_\_\_

License # \_\_\_\_\_

**Mechanical/HVAC Contractor Information**

Description of Work \_\_\_\_\_

Mechanical Contractor's Company Name \_\_\_\_\_ Telephone \_\_\_\_\_

Address \_\_\_\_\_ Email Address \_\_\_\_\_

License # \_\_\_\_\_

**Plumbing Contractor Information**

Description of Work \_\_\_\_\_ # Baths \_\_\_\_\_

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Address \_\_\_\_\_ Email Address \_\_\_\_\_

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I hereby certify that I have the authority to make necessary application, that the application is correct and that the construction will conform to the regulations in the Building, Electrical, Plumbing and Mechanical codes, and the Harnett County Zoning Ordinance. I state the information on the above contractors is correct as known to me and that **by signing below I have obtained all subcontractors permission to obtain these permits** and if **any** changes occur including listed contractors, site plan, number of bedrooms, building and trade plans, Environmental Health permit changes or proposed use changes, I certify it is my responsibility to notify the Harnett County Central Permitting Department of any and all changes.

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Signature of Owner/Contractor/Officer(s) of Corporation

1/10/19  
Date

**Affidavit for Worker's Compensation N.C.G.S. 87-14**


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While working on the project for which this permit is sought it is understood that the Central Permitting Department issuing the permit may require certificates of coverage of worker's compensation insurance prior to issuance of the permit and at any time during the permitted work from any person, firm or corporation carrying out the work.

Sign w/Title:  GC Date: 1/10/19



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Ronnie Coutu  
ronnie@regionalwaterproofing.com

Regional Foundations Solutions  
www.regionalwaterproofing.com  
TF (800) 536-6260  
F (919) 269-6788

Prepared on:  
10-8-18

Prepared for:  
Charles & Carol Butts  
W (910) 893-5645  
P (910) 893-5645

Job location:  
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Lillington, NC 27546-9260

Proposal

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Any alteration from the above specifications and corresponding price adjustment (if necessary) will be made only at the Customer's request or approval. Completing the work in this Proposal at the time scheduled is contingent upon accidents or delays beyond our control. This Proposal is based primarily on the Customer's description of the problem. Engineering services are used as required by companies such as Hayman Engineering and StoneWall Engineering. This Proposal may be withdrawn if not accepted by the Customer within 20 days.

Authorized Signature Signed electronically by Ronnie Coutu Date 10/8/2018 3:44PM

Acceptance of Contract— I am/we are aware of and agree to the contents of this Proposal, the attached Job Detail sheet(s), and the attached Limited Warranty, (together, the "Contract"). You are authorized to do the work as specified in the Contract. However, field adjustments may be made if deemed vital by project Foreman or Production Manager. I/we will make the payment set forth in this Contract at the time it is due. I/we will pay your service charge of 1-1/3% per month (16% per annum) if my/our account is 30 days or more past due, plus your attorney's fees and costs to collect and enforce this Contract.

Customer Signature Carol Butts Date 10/8/2018 3:44PM  
4325 Spring Hill Road Lillington, NC 27546 Signed Electronically

This is a new installation, and is exempt from sales tax.

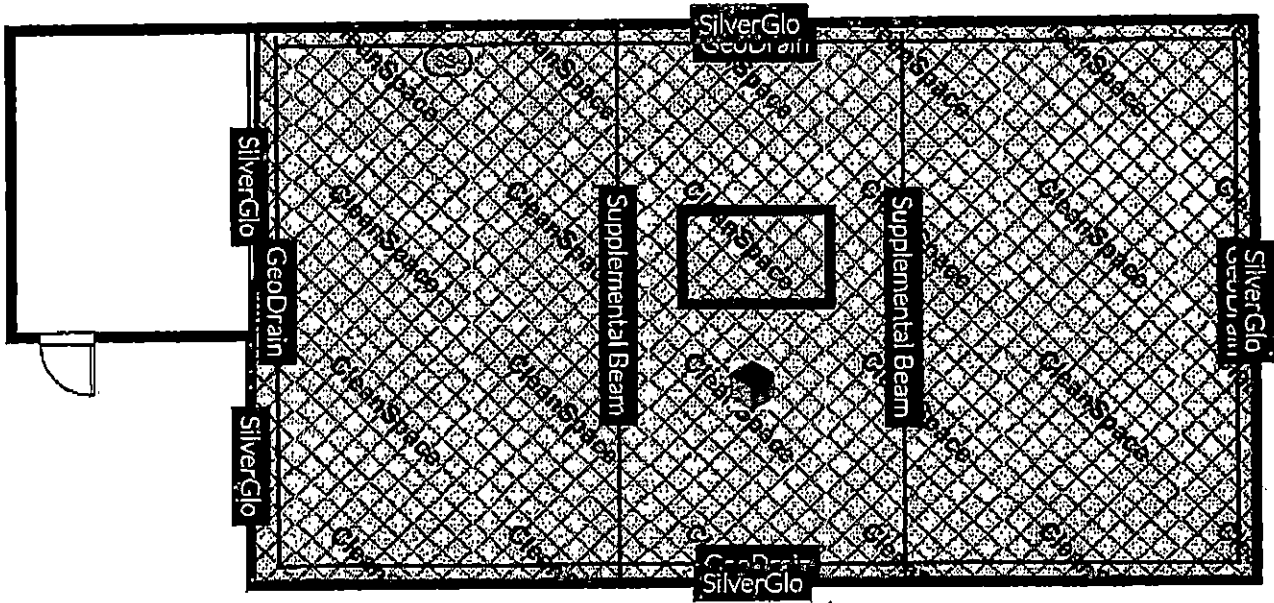
Initial NCB

Customer understands after three days all deposits are final.

Initial NCB



# Job Details



# Job Details (Continued)

## Specifications

Install SmartJack supports as indicated on job drawing to support the floor joist system above. Install a supplemental beam as indicated on job drawing. Acquire appropriate permits and engineering per local building code. All Engineering requires a Letter of Completion. Install 1/3 hp cast Iron pump in TripleSafe liner with clean pump stand. Install GeoDrain to address groundwater seepage. Install CleanSpace crawl space encapsulation system in area shown on drawing. Remove Debris Install SaniDry Sedona to keep humidity low. Install SilverGlo as shown on drawing.

## Contractor Will

- 1.) Contact utility locator service

## Customer Will

- 1.) Repair any sprinkler lines that may be damaged during the installation.
- 2.) Mark any private lines that may be hidden underground, and assumes all liability if damage should occur to such lines.
- 3.) Make payment of remaining balance to foreman of crew the same day installation is complete.

## Additional Notes

All recommendations are based on customers descriptions of the problem. While inspection tools such as hygrometers and laser levels are used, no deconstruction or original house plans are available to review for the recommendation. Some unforeseen factors may impact project, despite best inspectors best efforts.

## Product List

SmartJack, 1-3'	10	Supplemental Beam	64 ft	Permits & Engineering	1
SuperSump Plus	1	GeoDrain, Drainage	120 ft	CleanSpace	1200 sqft
Debris Removal	1	SaniDry Sedona	1	SilverGlo	1200 sqft



**SFA Design Group, LLC**

STRUCTURAL | CIVIL | GEOTECHNICAL | LAND USE PLANNING  
9020 SW Washington Square Drive, Suite 505, Portland, Oregon 97223  
1813 Rutan Drive, Suite C, Livermore, California 94551  
1912 S 146th Street, Seattle, Washington 98168  
p: 503-641-8311 www.sfadg.com

# STRUCTURAL CALCULATIONS

## Butts Residence Underpinning

4325 Spring Hill Church Rd., Lillington, NC 27546

Regional Basement and Crawlspace Repair



### LIMITATIONS

ENGINEER WAS RETAINED IN A LIMITED CAPACITY FOR THIS PROJECT. DESIGN IS BASED UPON INFORMATION PROVIDED BY THE CLIENT WHO IS SOLELY RESPONSIBLE FOR ACCURACY OF SAME. NO RESPONSIBILITY AND/OR LIABILITY IS ASSUMED BY, OR IS TO BE ASSIGNED TO THE ENGINEER FOR ITEMS BEYOND THAT SHOWN ON THESE SHEETS.

Project No. RBC19-001

January 18, 2019



PROJECT NO. RBC18-001	SHEET NO.
--------------------------	-----------

PROJECT Butts Residence Underpinning	DATE 1/18/2019
SUBJECT Push Pier Design Requirements	BY CB

**GENERAL NOTES**

The structural calculations in this set also reference to the design of the SmartJack addition. The SmartJacks will be taking vertical loads from the floor framing. The new SmartJack footings will be integrated into the existing structure. By inspection lateral calculations were not required because the weight of the area of work is under 10% of the weight of the total structure, in accordance with the 2015 IBC Section 3403.4. Lateral loads will be transferred into the foundation with existing footings.

**GENERAL**

Building Department City of Lillington  
 Building Code Conformance (Meets Or Exceeds Requirements)  
 2015 International Building Code (IBC)  
 2015 International Residential Code (IRC)  
 2015 North Carolina Building Code

**LOADS**

Floor Dead Load 15.0 psf

**LOADS**

Floor Live Load (Residential) 40.0 psf



PROJECT NO. RBC19-001	SHEET NO.
--------------------------	-----------

PROJECT Butts Residence Underpinning	DATE 1/18/2019
SUBJECT Design Loads	BY CB

**Worst Case Vertical Design Loads**

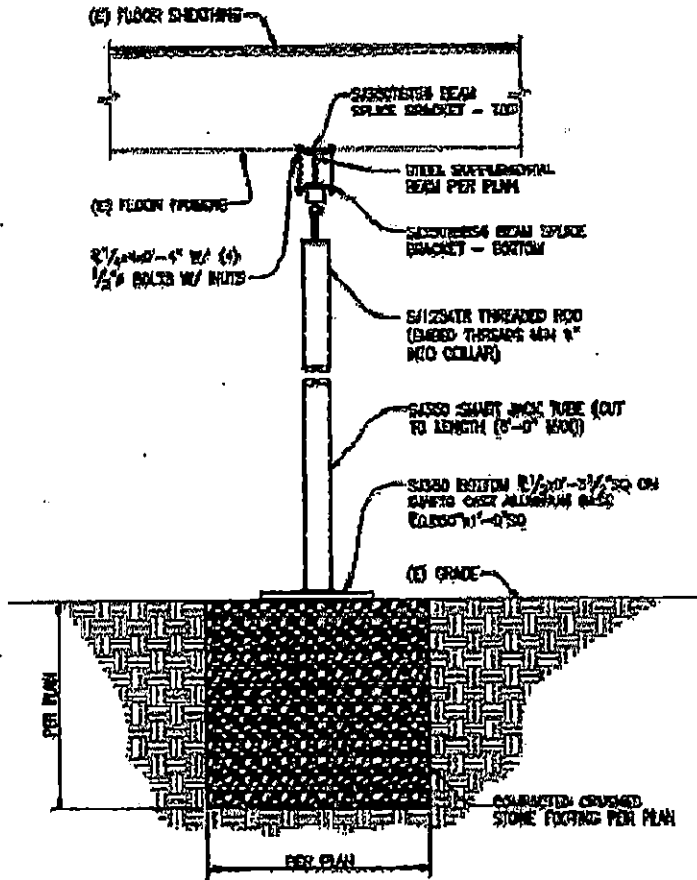
Tributary Width To Anchor =			= 6.50 ft		
1stFloorDL =	(15 psf)	(10.66 ft)	= 160 plf	Dead Load	1.039 kips
1stFloorLL =	(40 psf)	(10.66 ft)	= 426 plf	Floor Live Load	2.772 kips
				Roof Snow Load	0.000 kips
				Controlling ASD Load Combination:	
				D+L	

<b>Max Vertical Load to Worst Case Pier</b>	<b>3.811 kips</b>
---	-------------------

**Reinforcement (See S-2 for Enlargement Plan)**



PROJECT Butts	DATE 1/18/2019
SUBJECT Foundation Supportworks SJ350T Smart Jack System	BY CB



Note: Section above is a general representation of smartjack system, refer to plan for layout and project specific details.

Smart Jack System = SJ350T  
 $P_{max} = 3.811$  kips  
 Maximum Tube Unbraced Length,  $d_u = 6.000$  ft  
 Maximum Threaded Rod Unbraced Length,  $d_r = 3.000$  in  
 Eccentricity,  $e_{max} = 1.000$  in  
 Moment = 3.811 in-kips

**Tube Properties**

Design Tube OD = 3.500 in  
 Design Wall Thickness = 0.165 in  
 $k = 1.00$   
 $r = 1.181$  in  
 $A = 1.729$  in<sup>2</sup>  
 $c = 1.750$  in  
 $S = 1.377$  in<sup>3</sup>  
 $I = 2.408$  in<sup>4</sup>  
 $E = 29000$  ksi  
 $F_y = 50$  ksi

<b>Threaded Rod Properties</b>		
	$kl/r = 60.99$	Slenderness OK
	$Cc = 107.00$	
	$F'e = 40.13$ ksi	
	$Fa = 22.55$ ksi	
	$fa = 2.20$ ksi	
	$Fb = 33.00$ ksi	
	$fb = 2.77$ ksi	
	$Cm = 1.00$	
	$fa/Fa = 0.10$	Eq H1-3 may be used
	Eq H1-1 NA	
	Eq H1-2 NA	
	Eq H1-3 0.18	Pier OK

<b>Threaded Rod Properties</b>		
	Threaded Rod Dia. = 1.250 in	
	$k = 1.00$	
	$r = 0.313$ in	
	$A = 1.227$ in <sup>2</sup>	
	$c = 0.625$ in	
	$S = 0.192$ in <sup>3</sup>	
	$I = 0.120$ in <sup>4</sup>	
	$E = 29000$ ksi	
	$Fy = 70$ ksi	

<b>Threaded Rod Properties</b>		
	$kl/r = 9.60$	Slenderness OK
	$Cc = 90.43$	
	$F'e = 1619.74$ ksi	
	$Fa = 40.79$ ksi	
	$fa = 3.11$ ksi	
	$Fb = 46.20$ ksi	
	$fb = 19.87$ ksi	
	$Cm = 1.00$	
	$fa/Fa = 0.08$	Eq H1-3 may be used
	Eq H1-1 NA	
	Eq H1-2 NA	
	Eq H1-3 0.51	Tube OK

<b>Soil Bearing Capacity of Smart Jack Fill</b>		
	$b_c = 12.00$ in	
	$b_r = 24.00$ in	
	$l_{min} = 24.00$ in	
	Soil Bearing Capacity = 1500.00 psf	
	Capacity = 6.00 k	OK

**MAX LOAD TO SMART JACK = 3811LB**  
**3.5 IN DIAMETER SMART JACK TUBE WITH 0.165 IN. THICK WALL AND MAX HEIGHT OF 6FT**  
**1-1/4 IN DIAMETER SOLID THREADED ROD WITH MAX HEIGHT OF 3 IN**  
**24 IN SQR X 24 IN DP STRUCTURAL FILL**  
**EMBED THREADED ROD A MINIMUM OF 3/4 IN INTO CONFINING RING AND THREADED INSERT**

**Steel Beam**  
 Lic. #: KW-06005923 Licensee: SFA ENGINEERING LLC

Description: Supplemental Beam

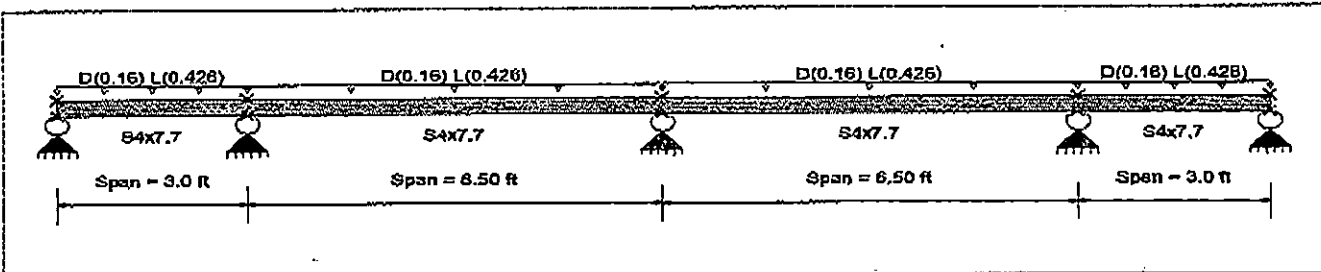
**CODE REFERENCES**

Calculations per AISC 360-10, IBC 2015, CBC 2016, ASCE 7-10  
 Load Combination Set: IBC 2015

**Material Properties**

Analysis Method: Allowable Strength Design  
 Beam Bracing: Completely Unbraced  
 Bending Axis: Major Axis Bending

Fy: Steel Yield: 36.0 ksi  
 E: Modulus: 29,000.0 ksi



**Applied Loads**

Service loads entered. Load Factors will be applied for calculations.

- Beam self weight NOT internally calculated and added
- Load for Span Number 1  
 Uniform Load: D = 0.160, L = 0.4260 k/ft, Tributary Width = 1.0 ft
- Load for Span Number 2  
 Uniform Load: D = 0.160, L = 0.4260 k/ft, Tributary Width = 1.0 ft
- Load for Span Number 3  
 Uniform Load: D = 0.160, L = 0.4260 k/ft, Tributary Width = 1.0 ft
- Load for Span Number 4  
 Uniform Load: D = 0.160, L = 0.4260 k/ft, Tributary Width = 1.0 ft

**DESIGN SUMMARY**

**Design OK**

Maximum Bending Stress Ratio =	0.371 : 1	Maximum Shear Stress Ratio =	0.182 : 1
Section used for this span	S4x7.7	Section used for this span	S4x7.7
Ma : Applied	2.331 k-ft	Va : Applied	2.028 k
Mn / Omega : Allowable	6.287 k-ft	Vn/Omega : Allowable	11.117 k
Load Combination	+D+L+H	Load Combination	+D+L+H
Location of maximum on span	6.500ft	Location of maximum on span	6.500 ft
Span # where maximum occurs	Span # 2	Span # where maximum occurs	Span # 2
Maximum Deflection			
Max Downward Transient Deflection	0.025 in Ratio = 3,140 >= 360		
Max Upward Transient Deflection	-0.002 in Ratio = 15,477 >= 360		
Max Downward Total Deflection	0.034 in Ratio = 2283 >= 180		
Max Upward Total Deflection	-0.003 in Ratio = 11252 >= 180		

**Maximum Forces & Stresses for Load Combinations**

Load Combination	Segment Length	Span #	Max Stress Ratios		Summary of Moment Values						Summary of Shear Values			
			M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+H	Dsgn. L = 3.00 ft	1	0.066	0.044	0.03	-0.42	0.42	10.50	6.29	2.91	1.00	0.49	16.68	11.12
	Dsgn. L = 6.50 ft	2	0.101	0.050	0.32	-0.64	0.64	10.50	6.29	2.29	1.00	0.55	16.68	11.12
	Dsgn. L = 6.50 ft	3	0.101	0.050	0.32	-0.64	0.64	10.50	6.29	2.29	1.00	0.55	16.68	11.12
	Dsgn. L = 3.00 ft	4	0.066	0.034	0.03	-0.42	0.42	10.50	6.29	2.91	1.00	0.38	16.68	11.12
+D+L+H	Dsgn. L = 3.00 ft	1	0.243	0.160	0.12	-1.53	1.53	10.50	6.29	2.91	1.00	1.78	16.68	11.12
	Dsgn. L = 6.50 ft	2	0.371	0.182	1.18	-2.33	2.33	10.50	6.29	2.29	1.00	2.03	16.68	11.12
	Dsgn. L = 6.50 ft	3	0.371	0.182	1.18	-2.33	2.33	10.50	6.29	2.29	1.00	2.03	16.68	11.12
	Dsgn. L = 3.00 ft	4	0.243	0.125	0.12	-1.53	1.53	10.50	6.29	2.91	1.00	1.39	16.68	11.12



**Steel Beam**  
 Lic. #: KW-05005923 Licensee: SFA ENGINEERING LLC

Description: Supplemental Beam

**Overall Maximum Deflections**

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+L+H	-0.0031	2.140
+D+L+H	2	0.0342	3.077		0.0000	2.140
+D+L+H	3	0.0340	3.467		0.0000	2.140
	4	0.0000	3.467	+D+L+H	-0.0032	0.880

**Vertical Reactions**

Support notation: Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4	Support 5
Overall MAXimum	0.370	3.170	4.056	3.170	0.370
Overall MINimum	0.101	0.865	1.107	0.865	0.101
+D+H	0.101	0.865	1.107	0.865	0.101
+D+L+H	0.370	3.170	4.056	3.170	0.370
D Only	0.101	0.865	1.107	0.865	0.101
L Only	0.269	2.304	2.948	2.304	0.269



**GENERAL REQUIREMENTS**

**GOVERNING CODE:** The "International Building Code", 2015 Edition, and 2015 North Carolina Building Code as adopted and modified by the City of Lillington shall govern design and construction.

**REFERENCE STANDARDS:** Reference to ASTM and other standards incorporate these standards into the contract as though included in their entirety. Reference to a specific Section does not relieve the contractor from compliance with the entire standard. The latest edition of the standard shall be used unless a specific date is indicated.

**DEFINITIONS:** The following definitions cover the meanings of certain terms used in these notes:

- "Architect / Engineer" - The Architect and the Engineer-of-Record.
- "Prepared by a Specialty Structural Engineer" - Prepared by or under the direct supervision of a Specialty Structural Engineer (SSE) with a structural license issued by the State of North Carolina. Submittals shall be stamped and signed by the SSE.
- "Submit for review" - Submit to the Architect/Engineer for review prior to fabrication or construction.

**NOTE PRIORITIES:** Notes on the individual drawings govern over notes on this sheet.

**SPECIFICATIONS:** Refer to the specifications for information in addition to that contained in these notes and the structural drawings.

**STRUCTURAL DETAILS:** The structural drawings are intended to show the general character and extent of the project. They are not intended to show all details of the work. Details noted "typical" apply to similar work throughout the project unless noted separately.

**STRUCTURAL RESPONSIBILITIES:** The structural engineer is responsible for the strength and stability of the primary structure in its completed form.

**CONTRACTOR RESPONSIBILITIES:** The contractor is responsible for the means and methods of construction and all job related safety standards (i.e. OSHA). He is responsible for the strength and stability of the structure during construction. He shall provide temporary shoring, bracing and other elements required to maintain stability until the structure is complete. It is the contractor's responsibility to be familiar with the work required in the construction documents and the requirements for executing it properly. The contractor shall at his discretion employ a North Carolina State registered structural engineer for design of temporary bracing and shoring.

**DISCREPANCIES:** In case of discrepancies between the specifications, reference standards and the governing code, the Architect/Engineer will determine which shall govern. Discrepancies shall be brought to the attention of the Architect/Engineer before proceeding with the work.

**SITE VERIFICATION:** The contractor shall verify all dimensions and conditions at the site. Conflicts between the drawings and actual site conditions shall be brought to the attention of the Architect/Engineer before proceeding with the work.

**CONSTRUCTION LOADS:** Loads on the structure during construction shall not exceed the design loads as noted in DESIGN REQUIREMENTS below or the capacity of partially completed construction.

**ALTERNATES:** Alternates for specified items may be submitted to the Architect/Engineer for review.

**SOILS AND FOUNDATIONS**

**REFERENCE STANDARDS:** Conform to IBC Chapter 18 "Soils & Foundations."

**DESIGN SOIL VALUES:**

Allowable Foundation Pressure (Assumed)	1500 PSF
Passive Lateral Pressure	200 PSF/FT
Active Lateral Pressure (unrestrained)	40 PSF/FT
Active Lateral Pressure (restrained)	50 PSF/FT
Coefficient of Sliding Friction	0.35

**FOOTING DEPTH:** Exterior perimeter footings shall bear not less than 18 inches below finish grade, by the geotechnical engineer and the building official. Interior footings shall bear not less than 12 inches below finish floor.

**DESIGN REQUIREMENTS**

**DESIGN CRITERIA:**

**BUILDING CODE CONFORMANCE (MEETS OR EXCEEDS REQUIREMENTS):**

- 2015 INTERNATIONAL BUILDING CODE (IBC)
- 2015 INTERNATIONAL RESIDENTIAL CODE (IRC)
- 2015 NORTH CAROLINA BUILDING CODE (NCBC)

**DEAD LOADS:**

FLOOR DEAD LOAD	15 PSF
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**LIVE LOADS:**

FLOOR LIVE LOAD (RESIDENTIAL)	40 PSF
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<b>DEFLECTIONS:</b>	Total Load Deflection Limit	L/240
	Live Load Deflection Limit	L/360

**SMARTTRACK MATERIALS:**

- TOP PLATE - ASTM A36
- (MIN YIELD STRESS, Fy = 36 KSI / MIN TENSILE STRESS, Fu = 58 KSI)
- THREADED INSERT - ASTM A108 GRADE 3018
- (MIN YIELD STRESS, Fy = 56 KSI / MIN TENSILE STRESS, Fu = 90 KSI)
- TUBE - ASTM A500 GRADE C
- (MIN YIELD STRESS, Fy = 50 KSI / MIN TENSILE STRESS, Fu = 65 KSI)
- BOTTOM PLATE - ASTM A36
- (MIN YIELD STRESS, Fy = 36 KSI / MIN TENSILE STRESS, Fu = 58 KSI)
- CONFORMING RING - ASTM A53 GRADE B
- (MIN YIELD STRESS, Fy = 35 KSI / MIN TENSILE STRESS, Fu = 60 KSI)



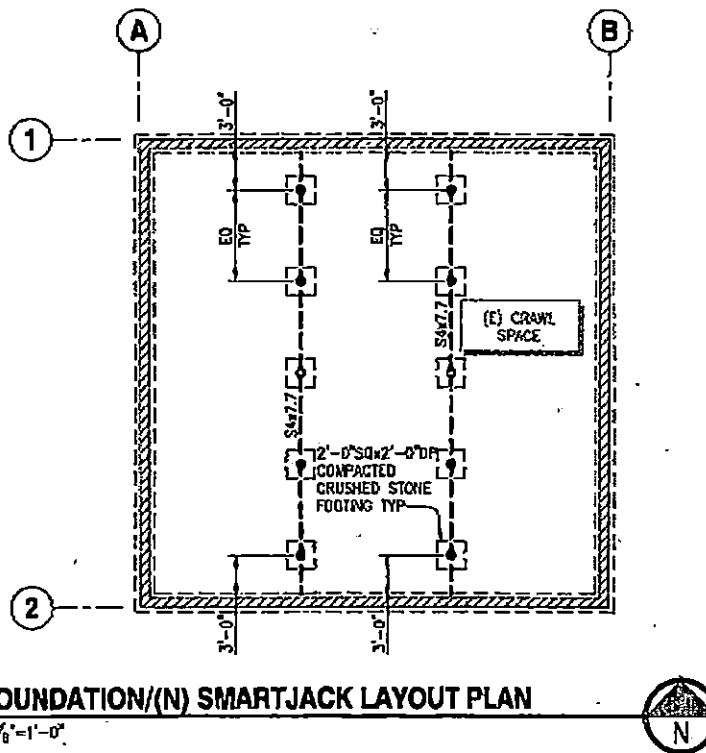
**REGIONAL BASEMENT & CRAWL SPACE REPAIR**  
 BUTTS RESIDENCE  
 4325 SPRING HILL CHURCH RD.  
 LILLINGTON, NC 27546

GENERAL NOTES

REVISIONS

PROJECT NO: R1819001  
 DESIGNED BY: CB  
 DRAWN BY: CS  
 CHECKED BY: DWR, JLD  
 DATE: 03-19-2018

SHEET NO:  
**S1.1**



**(E) FOUNDATION/(N) SMARTJACK LAYOUT PLAN**

SCALE:  $\frac{1}{8}'' = 1'-0''$

**(E) FOUNDATION/(N) SMARTJACK LAYOUT PLAN NOTES:**

1. REFERENCE S1.1 FOR GENERAL REQUIREMENTS

2. CONTRACTOR TO NOTIFY ENGINEER OF RECORD OF DISCREPANCIES BETWEEN FIELD CONDITIONS & THOSE SHOWN IN THESE DOCUMENTS PRIOR TO CONSTRUCTION/INSTALLATION OF SMARTJACKS TYP

3. INDICATES (E) CMU WALL OR (E) CONC FOOTING (CONTRACTOR TO VERIFY 8"x8"x3'-0" (E) CMU WALL AND 1'-6"x12" DP (E) CONC FOOTING MIN TYP (NOTIFY ENGINEER OF RECORD IF FIELD CONDITIONS DIFFER))

4. INDICATES LOCATION OF SMARTJACK ON COMPACTED CRUSH STONE ((10) TOTAL)

**SMARTJACK INSTALLATION NOTES:**

- MAX LOAD TO SMARTJACK = 3,811 LBS
- 3.50"Ø PIPE W/ 0.165" THICK WALL
- 2 1/2"x5x0'-6" ASTM A36 10# PLATE
- 1 1/4"x10" LONG THREADED ROD INSERT
- 2 1/2"x3 1/2"x0'-3 1/8" ASTM A36 PLATE W/ 3.13"x0.187" WALL & 3/4" LONG ASTM A53 CONFINING RING
- 20.850"x12x1'-0" MS/A 356.0-T6 CAST ALUMINUM BASE

5. SECTION CUT - DETAIL NUMBER/SHEET NUMBER

6. ALL CONSTRUCTION MATERIALS ON PLANS, ELEVATIONS & DETAILS ARE (U) UNO

7. CONTRACTOR SHALL NOT REMOVE ANY (E) POST OR PRE-CAST FOOTINGS SUPPORTING THE FLOOR FRAMING

8. SMARTJACK SPACING SHALL BE AS INDICATED ON PLAN (6'-6" MAX) UNO.



**REGIONAL BASEMENT & CRAWL SPACE REPAIR**  
 BUTTS RESIDENCE  
 4325 SPRING HILL CHURCH RD.  
 LILLINGTON, NC 27546

(E) FOUNDATION/(N) SMARTJACK LAYOUT PLAN

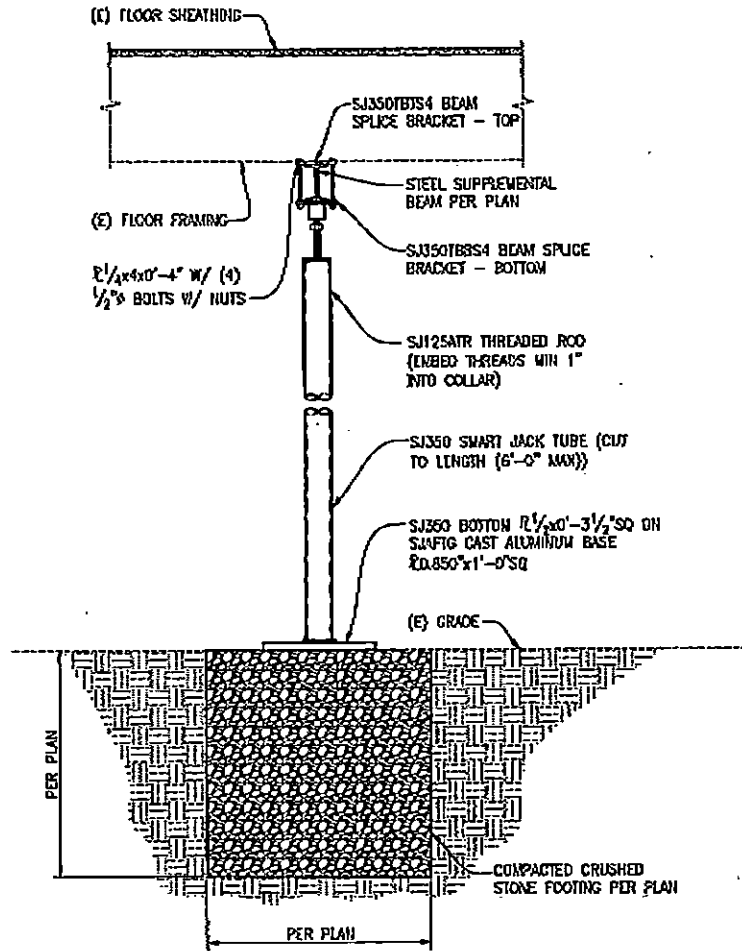
**REVISIONS**

NO.	DESCRIPTION

PROJECT NO:  
 DESIGN BY:  
 CB  
 DRAWN BY:  
 CB  
 CHECKED BY:  
 CDR, JLS  
 DATE:  
 01-15-2018

SHEET NO:

**S2.1**



**(N) MODEL 350 SMARTJACK AT (N) STEEL BEAM**

SCALE: 1"=1'-0"

1



**REGIONAL BASEMENT & CRAWL SPACE REPAIR**  
 BUTTS RESIDENCE  
 4325 SPRING HILL CHURCH RD.  
 LILLINGTON, NC 27546

SMARTJACK  
 DETAILS

REVISIONS

NO.	DESCRIPTION

PROJECT NO: REC219-001  
 DESIGNED BY: CB  
 DRAWN BY: CB  
 CHECKED BY: CVA, LD  
 DATE: 01-15-2019

SHEET NO:

**S4.1**