



3365 Skyway Drive
Auburn, AL 36830
P: 360.566.7343

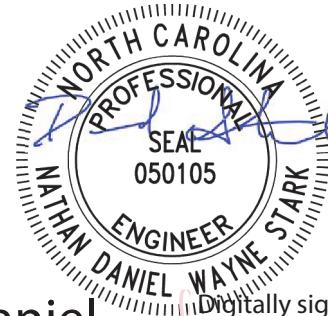
STRUCTURAL CALCULATIONS
PREPARED FOR
TARHEEL BASEMENT SYSTEMS
FOR
NIVAR RESIDENCE
FOUNDATION REPAIR
3327 MOUNT PISGAH CHURCH RD
BROADWAY, NORTH CAROLINA

PROJECT NUMBER: 23.082.TBS

DATE: April 26, 2023

PROJECT MANAGER: Daniel Stark, P.E.

COA: C-4876



**Daniel
Stark**

Digitally signed by
Daniel Stark
Date: 2023.04.26
17:29:36 -05'00'



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April 26, 2023

Project No.:23.082.TBS

Tarheel Basement Systems
2910 Griffith Road
Winston-Salem, North Carolina 27103

RE: Foundation Repair - 3327 Mount Pisgah Church Rd, Broadway, North Carolina

PROJECT BACKGROUND

We understand the structure is a single-family residence and has experienced settlement at the back interior wall of the structure. A recent floor level survey (attached) indicates as much as 0.5" of differential settlement may have occurred. It is our understanding (4) 2 7/8 inch diameter push piers have been proposed to provide additional foundation support.



Image 1: Front Elevation

GEOLOGIC SETTING

The existing structure is located in Broadway, North Carolina. The geologic structure in the area is comprised of sandy loam and the site is moderately sloping. It is our opinion the localized settlement is a result of improper foundation drainage and/or undersized footings. We believe suitable support can be achieved by installing push piers.

SUMMARY

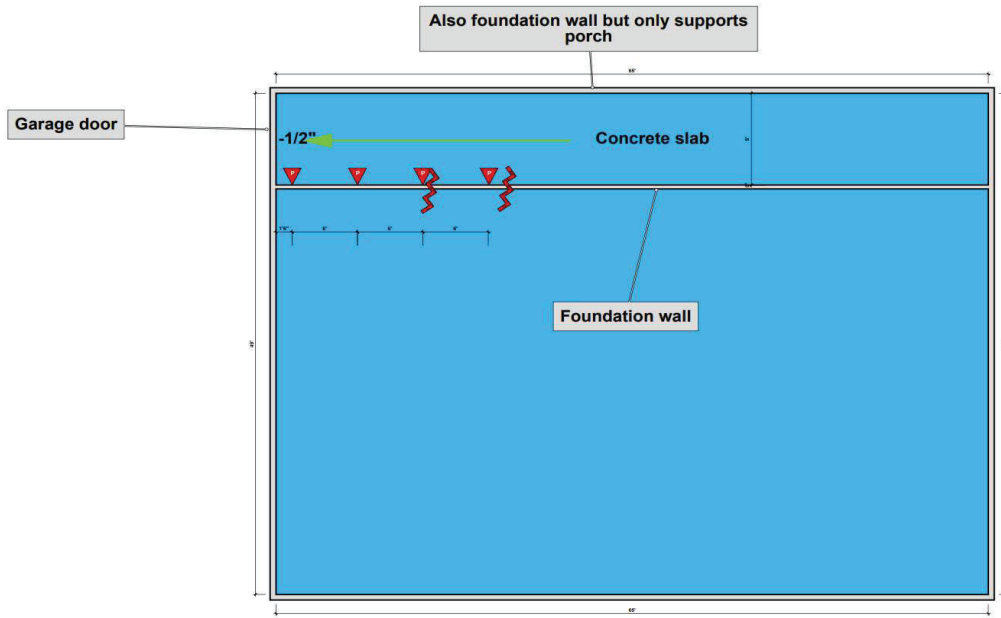
The ultimate load requirement for the push piers is 46000 lbs, and based on the geologic setting, we expect the piers to achieve adequate capacity at approximately 8 – 25 feet. We recommend the piers with a 2 7/8 inch shaft be installed to a minimum depth of 8 feet and a minimum installation pressure of 4800 psi, or refusal, using a 9.62 square inch hydraulic ram.

Regards,

A handwritten signature in blue ink, appearing to read "D Stark".

Daniel Stark, P.E.
Stark Foundations

FLOOR LEVEL SURVEY



Front



PROJECT

Foundation Repair
3327 Mount Pisgah Church Rd
Broadway, North Carolina

Date: 26-Apr-23
Designed by: JMR

Project No.: 23.082.TBS

Design Criteria

Code(s):

2018 North Carolina State Building Code
International Building Code (IBC) 2015
ASCE 7-10

Design Loads:

Dead:

Roof = 15 psf
Chimney = 45 psf
Third Floor = 15 psf
Second Floor = 15 psf
First Floor (4" Conc. Slab) = 50 psf
Walls = 8 psf
8" Foundation Wall = 100 psf
Soil = 110 psf

Soil:

Allow Lateral Bearing Pressure = 100 psf/ft
Active Pressure = 60 psf/ft

Live:

Roof (Snow) = 15 psf
Roof Live Load = 20 psf governs
Third Floor = 40 psf
Second Floor = 40 psf
First Floor (4" Conc. Slab) = 40 psf

Wind: (not applicable)

Exposure = C Risk Category = II
Wind Speed, V = 115 mph $K_{zt} = 1$
Gust Factor, G = 0.85 $K_d = 0.85$
Int. Pressure Coefficient, $GC_{pi} = -0.18$ $K_z = 1$
Ext. Pressure Coefficient, $C_p = 0.8$ Height, $h_z = 30$ ft

Design Wind Pressure:

Design Load Combo = D + 0.6W

where: $p_w = q_z (GC_p - GC_{pi})$ $\omega = 0.6$
 $q_z = 0.00256 K_z K_{zt} K_d V^2$

Therefore:

$q_z = 28.8$ psf
 $p_w = 24.7$ psf
Factored Wind Pressure, $p'_w = 14.8$ psf (say 15 psf)



PROJECT

Foundation Repair
3327 Mount Pisgah Church Rd
Broadway, North Carolina

Date: 26-Apr-23
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Push Pier Design - Worst Case

Vertical Design Loads:

Tributary Widths:

Dead:

Roof =	10	ft	----->	150	plf
Third Floor =	0	ft	----->	0	plf
Second Floor =	10	ft	----->	150	plf
First Floor =	2	ft	----->	100	plf
Walls =	8	ft	----->	64	plf
Foundation Wall (height) =	8	ft	----->	800	plf
Soil (height) =	6	ft	----->	1980	plf
				<u>ΣDL =</u>	<u>3244</u> plf

Live:

Roof (live) =	10	ft	----->	200	plf
Third Floor =	0	ft	----->	0	plf
Second Floor =	10	ft	----->	400	plf
First Floor =	2	ft	----->	80	plf
				<u>ΣLL =</u>	<u>680</u> plf

Max Pier Spacing or Trib = 6 ft

Pier Working Loads:

$P_{DL} = 19464$ lbs
 $0.75 * P_{LL} = 3060$ lbs
 Working Load, $P_{TL} = 23000$ lbs
 Ultimate Load, $P_{ULT} = 46000$ lbs

Pier Design:

Pier Type: Push Pier

Bracket: PP21617-34 Bracket Cap = 29340 lbs **Therefore OK**

Shaft Diameter: 2.875"

Installation Pressure, P:

$Q_{ult} = 2 (P_{TL})$
 46000 lbs

$Q_{ult} = A_{cyl} (P)$ where A_{cyl} = working area of the dual bore installation

$A_{cyl} = 9.62$ in²

Therefore, $P_{REQ} = Q_{ult} / A_{cyl}$
 4800 psi

