Date: February 28, 2025

Project: Sartent Residence

Address: 22 Iris Cir

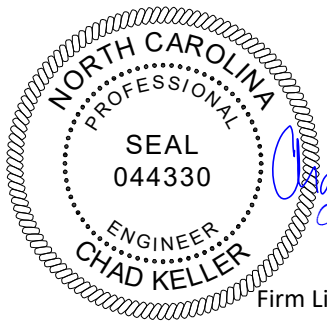
Spring Lake, NC 28390

Foundation & Floor Support Systems Analysis

This report is prepared for Southeast Foundation Repair (contractor) by FDN Engineering (engineer). Helical piers and SmartJacks are proposed for installation at the above referenced project. The foundation support system is intended to stabilize and potentially lift the existing foundation structure – reducing pressure on existing soils. Load requirements for the systems were calculated at areas shown on repair plan. Engineer performed design for this project - see pages 2-3 for engineering notes and results. See pages 4-6 for details of the repair systems. See page 7 for a repair plan of the foundation & floor support systems on the structure.

To the best of my professional knowledge, the design of the foundation & floor support systems meets the structural requirements of the 2018 North Carolina State Building Code to the extent that it applies to our scope of work. Engineer is retained in a limited capacity for this project. No responsibility and/or liability is assumed by, nor shall be assigned to engineer for items beyond the proposed scope as shown herein.

Upon completion of the foundation & floor support systems, the contractor shall supply engineer a log of the installed repairs (including depth and final torque of the helical piers), as well as photos of completed work. Engineer will evaluate the field data and prepare a letter of completion for closeout, if necessary.



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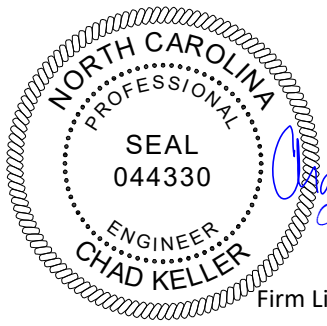
Project Notes (contractor to inform engineer if assumptions are inaccurate):

1. Structure is one-story, residential with wood-framed floor & brick-veneer walls.
2. Soil bearing pressure at the site is a minimum of 1500 psf.
3. Contractor shall use SmartJack model size SJQA350. Reference UES Evaluation Report 713.
4. SmartJacks and supplemental beams assumed to support interior load-bearing walls or columns.
5. Contractor to select SJ support base plate from the details shown herein (based on field conditions)
6. Supporting a cantilever requires the beam to be continuous over the SmartJack support. The length of the cantilever may be up to the lesser of 50% of the adjacent beam span or 30 inches.
7. SmartJacks supporting existing girders are not to be spaced farther than the original/existing supports; and the existing girder/joist's condition is adequate to support the compression load.
8. Contractor will install footings, SmartJacks, supplemental beams, helical piers, brackets, and all related components per the support manufacturer's current installation instructions and technical manual, and according to the latest ICC-ES AC358 & ESR-3074.
9. Helical piers shall have a center-to-center spacing at the helix depth of at least three (3) times the diameter of the largest helix plate.
10. Pier shall not be installed in recently backfilled sites, in bedrock soils, or where there is possible sinkhole activity. Notify engineer if foundation is cracked between piers.
11. The pier was designed as plain steel corroded with capacities assuming a 50-year scheduled sacrificial loss in thickness per ICC-ES AC406. Contractor may galvanize the system for added corrosion protection.
12. Only local effects have been checked on existing structural members (e.g., concrete bearing at pier bracket). The integrity of the existing supported structure is outside of our scope of work.
13. New wood-frame girders/joists that replace existing girders/joists to be at least as large as the original member, from like material, and supports placed no further than original distance.
14. Where voids are created below the slab during lifting, it is recommended to fill with PolyLevel. Use compacted soil around the footing.
15. The design assumes the original structure was constructed of conventional means and methods.
16. SmartJack supports existing beam.



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Helical Pier Analysis and Results:

1. All design loads are based on guidance from the applicable building code.
2. Helical piers are designed to support axial compression load only.
3. Maximum, worst-case, total load on a helical pier is **12,200 lbs** (allowable stress combinations).
4. We recommend installation of piers with a 2-7/8" diameter shaft (HP288) with 8" and 10" diameter (minimum) helix plates.
5. Minimum helical pier tip depth is 8 ft.
6. An installation torque of **2,800 ft-lbs** should be applied to achieve an allowable capacity greater than the total load.
7. Do not place pier directly under door/window (w/in 24" from footing). Contact engineer if condition exists.
8. Helical pier spacing along the foundation shall not exceed 6'-0" O.C. and 2-ft from a corner, typical.
9. A factor of safety of 2 is used to calculate the allowable soil bearing capacity.
10. Contractor may use up to 5 ft long spreader beams to improve the footing's spanning capability by carrying load from the footing to the pier (HSS4x2x1/4, ASTM A500 Grade 46). Always, use below doors and windows cut to within 2 ft of footing.

SmartJack Analysis and Results:

1. Interior floor load is designed to not exceed 55 psf nominal load (15 psf DL + 40 psf LL), per Code.
2. SmartJacks are designed to support axial compression load only; with a max height of 10'-0".
3. Maximum total load on SmartJack is **3,800 lbs.**
4. SmartJack spacing along the supported girder (or tributary length) shall not exceed **5'-0" O.C.**

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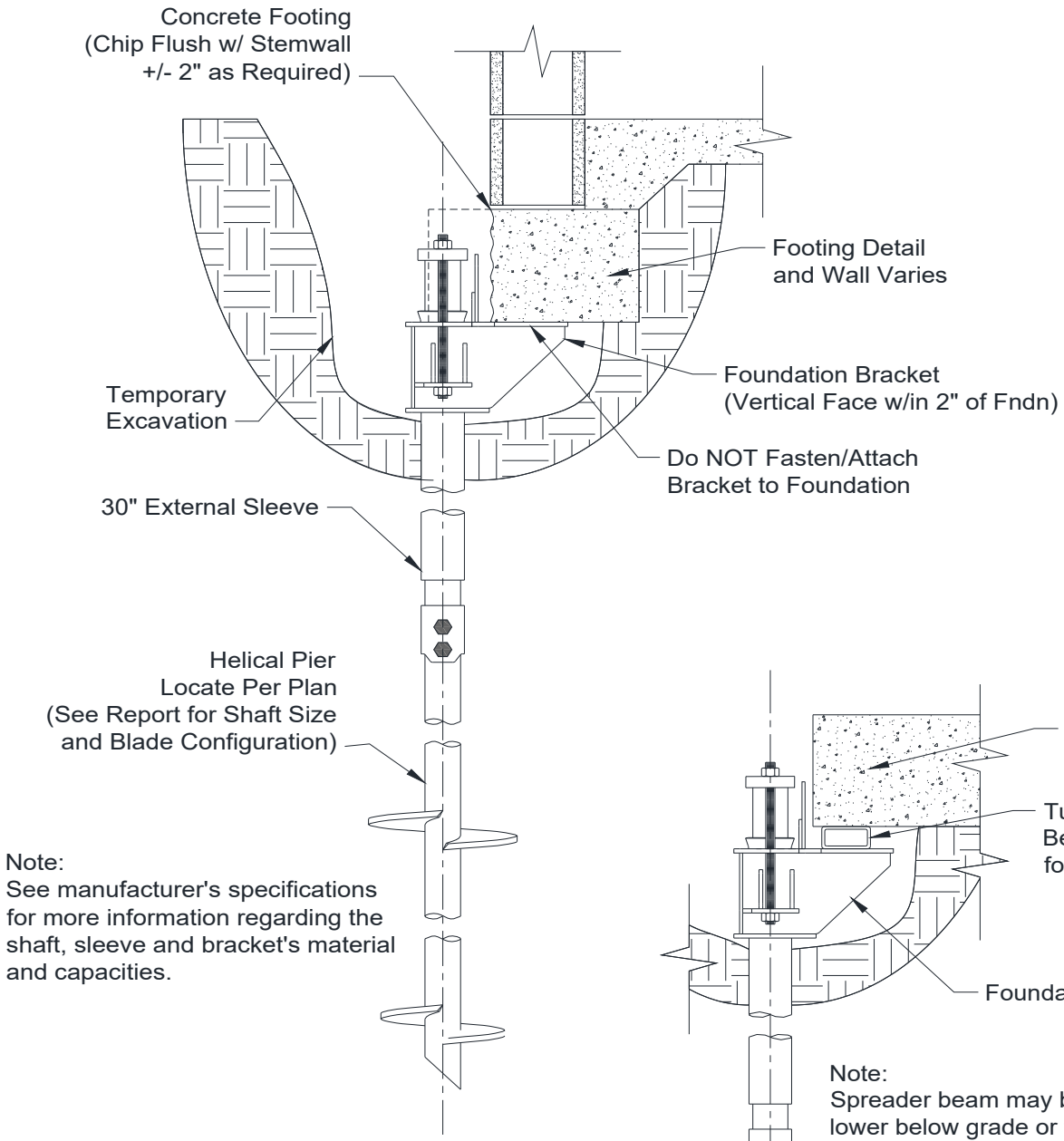
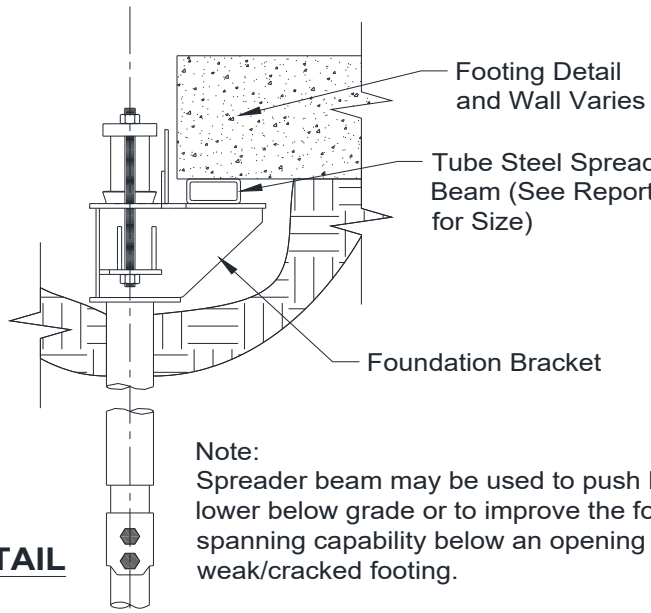


Note:
See manufacturer's specifications for more information regarding the shaft, sleeve and bracket's material and capacities.

HELICAL PIER TO FOOTING DETAIL



Note:
Spreader beam may be used to push bracket lower below grade or to improve the footing's spanning capability below an opening or weak/cracked footing.

SPREADER BEAM DETAIL

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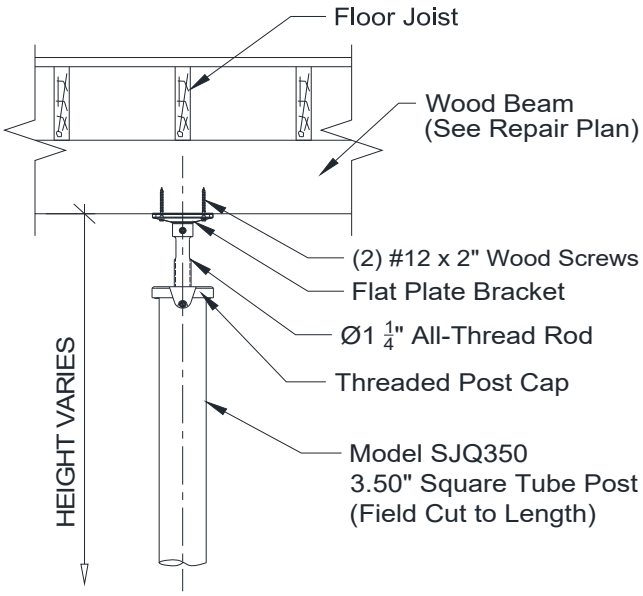
SmartJack Top Support Detail: Shown here is the SmartJack post top half and beam that supports the floor structure. All details shown are acceptable. See repair plan for location and orientation of beam. See manufacturer's tech. specs. and evaluation report for more information.



Flat Plate Bracket
SmartJack Supporting Wood Beam

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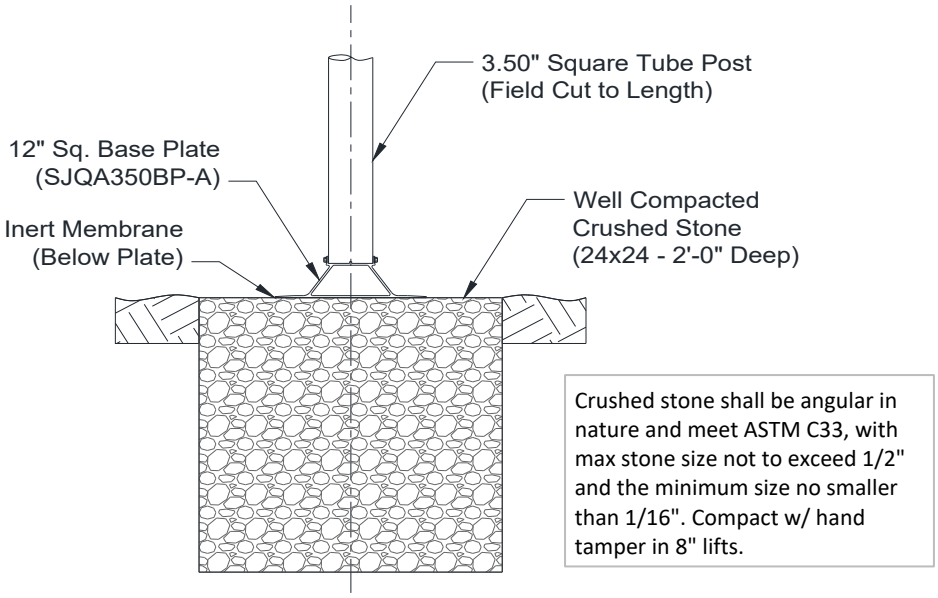
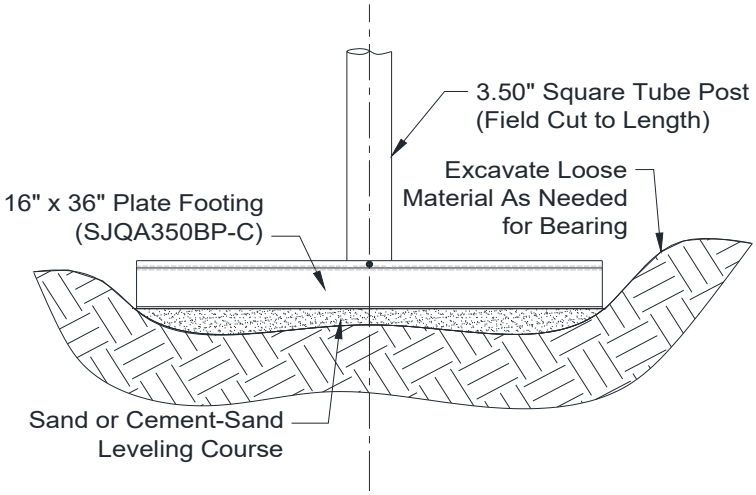
SmartJack Base Detail: Multiple base conditions have adequate capacity to support the load. All below variations shown are structurally acceptable and may be used at the contractor's discretion based on field conditions.



Base Plate Over Crushed Stone



Steel Plate Footing

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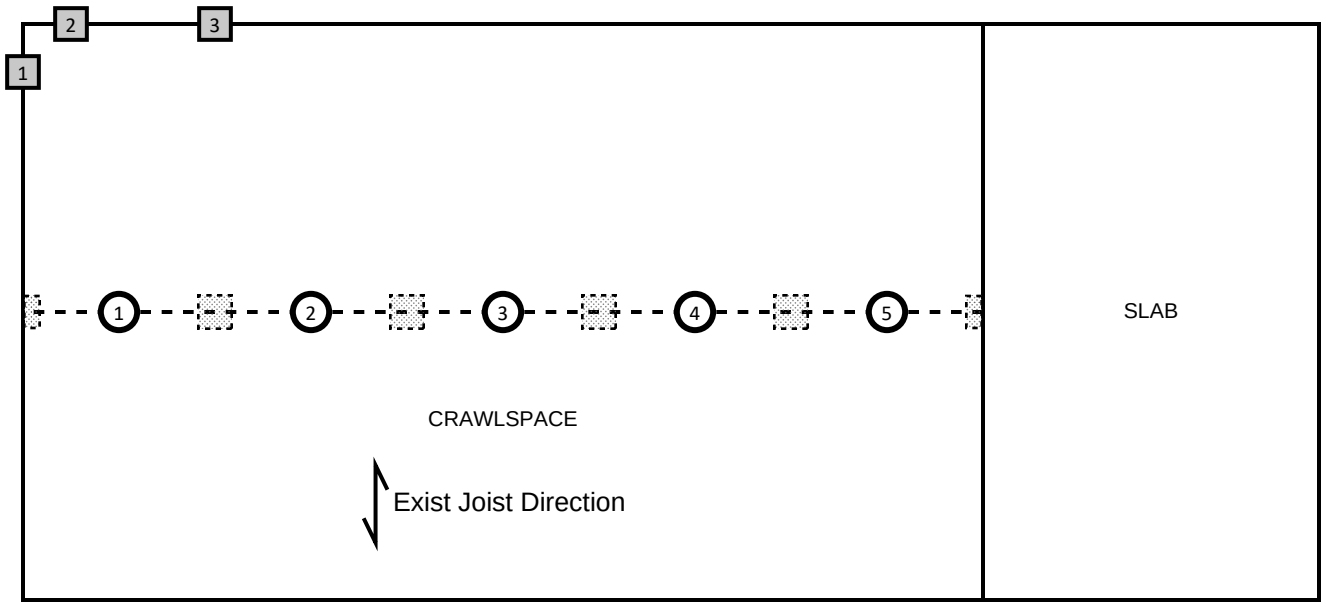
LEGEND:

- # — Indicates Helical Pier and Mark Number
- # — Indicates SmartJack and Mark Number
- Existing Pier
- Existing Main Beam

Support Notes:

1. Residential construction, one-story.
2. Layout of (3) piers, Model HP288 for fndn support, 8'-0'' min depth.
3. Installation torque of **2,800 ft-lbs.**
4. Pier max spacing is 6'-0", UNO. Start 2' from corners.
5. Layout of (5) SmartJacks Model SJ350 5'-0" O.C., max. between supports.
6. Spacing may vary based on field conditions. +/- 1 ft from noted spacing.
7. Install per helical pier manufacturer's instructions and technical



FRONT HOUSE

REPAIR PLAN

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DRAWING NOT TO SCALE

Project:		
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