SFA Design Group

STRUCTURAL ENGINEERING

RE: Existing Condition Report
Sollinger-Agnew Residence
515 Bumpas Creek Access
Dunn, NC 28334

Site Description and Project Narrative

SFA Design Group conducted a structural observation of the Sollinger-Agnew Residence on March 17th, 2025. The subject property is located at 515 Bumpas Creek Access. Originally built in 1970, the existing structure is a single-story, wood-framed, single-family home of approximately 4,002 sq-ft. The foundation of the structure consists of a CMU stemwall at the perimeter, with post and beam construction at the interior. The results of the investigation and the corresponding repair recommendations are presented in the following pages.

Differential settlement is a potential hazard which can compromise the structural integrity of your home, leading to costly repairs if not addressed in a timely manner. The causes of differential settlement at this location are out of the scope of this report, but literature[1] indicates drought, improper drainage and poorly compacted fill to be the common contributing factors. The effects of differential settlement include foundation cracks, cracks in drywall and sloping floors. A Zip Level was used to locate the differences in the floor elevations throughout the home. The Zip Level readings and corresponding topographic map will be discussed later in this report.

Scope and Data Collection

The purpose of this report is as follows:

- Gather data pertaining to differential settlement and foundation issues
- Evaluate the foundation of the subject property
- Identify potential obstacles of the proposed repair plan

All care was taken to provide the best available information with the goal of recommending the best possible plan for the repair of the foundation.

Data collection performed to evaluate the structural integrity of the subject property's foundation is collected in four stages:

1. A visual inspection of the foundation is conducted. Items of interest during inspection include the following:
    - Visible cracks in the foundation, slabs, walls, etc.
    - Grading issues and drainage concerns affecting the moisture content of the soil.
    - Damaged or rotting wood members.
    - Identifying bowing, heaving or sloping floors and misaligned doors and windows.
2. Photographs are taken of the home's interior and exterior.
3. Measurements of the home are then taken in order to digitally produce foundation plans.
4. A Zip Level survey of the main level is performed to identify variances in the floor elevation.

Zip Level survey data is entered into *3D Field*, a mapping software, to create a topographical map of the floor, providing a contoured model of the areas experiencing the most settlement.

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[1] http://www.arpnjournals.com/jeas/research_papers/rp_2010/jeas_0710_363.pdf

Results & Recommendations

Based on maps provided by the North Carolina Flood Risk Information System[2] the property is not in an area that is at risk of flooding; nor are any geotechnical or ground water conditions which would indicate a potential for permanent ground displacement.

A visual inspection of the property found most of the concrete foundation to be in fair condition, with certain areas showing signs of differential settlement.

A Zip Level Survey was performed on the interior of the subject property, using the front door as the bench mark or starting point; designated as “0.9” on the floor plan. Measurements of the floor elevation were made in tenths of an inch. The high point was 1.6” and the low point was 0.0”. The maximum difference in the floor readings was 1.6 inches. As can be seen on the topographic map, the most significant settlement is indicated by dark brown contours surrounding the area.

Based upon field observations we find the property to be experiencing settlement, cracks, and general foundation stress in various areas. It is SFA Design Group’s recommendation that the following measures be taken to stabilize the foundation:

- Install a push pier system to stabilize and potentially lift the structure.
- Pier layout and quantities are based on bringing the structure up to a level condition per industry standards where industry standards are understood to be 0.5” of settlement over a 10’ span.
- Install a SmartJack system and potentially stabilize or lift the interior floor framing.
- Ensure that all drainage properly discharge away from structure.

It is our understanding that the intent of this repair is to stabilize, and potentially lift the worst-case portions of the structure. It should be noted that this project is voluntary and recommendations for repairs are not mandatory. If the recommendations are not economically or otherwise feasible at this time, the homeowner may choose to reduce the scope of the repair to address the worst-case portions of the foundation. However, the homeowner should understand that the new foundation system will support the structure ONLY in the areas addressed. Structural concerns and additional settlement may continue in the remainder of the foundation. In this scenario, the home should be closely monitored for additional damage in areas where the foundation is not repaired.

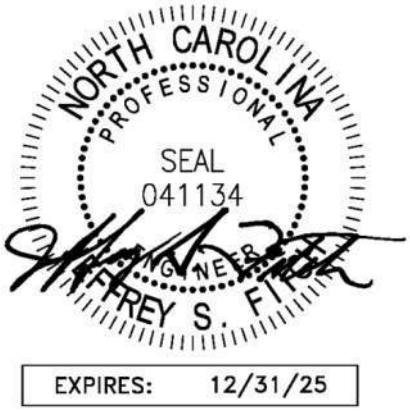
Limitations And Closure

This report does not contain all variables that may be causing the foundation issues. The inclusion of geotechnical information or a geotechnical evaluation would contribute to further understanding of the issues observed. These additional reports would require a soils analysis of the site, as well as a complete vertical and lateral analysis of the structure. This report only provides information procured via visual inspection, from online sources and data collected from the Zip Level measurements. All observed areas are indicated, and problematic regions documented.

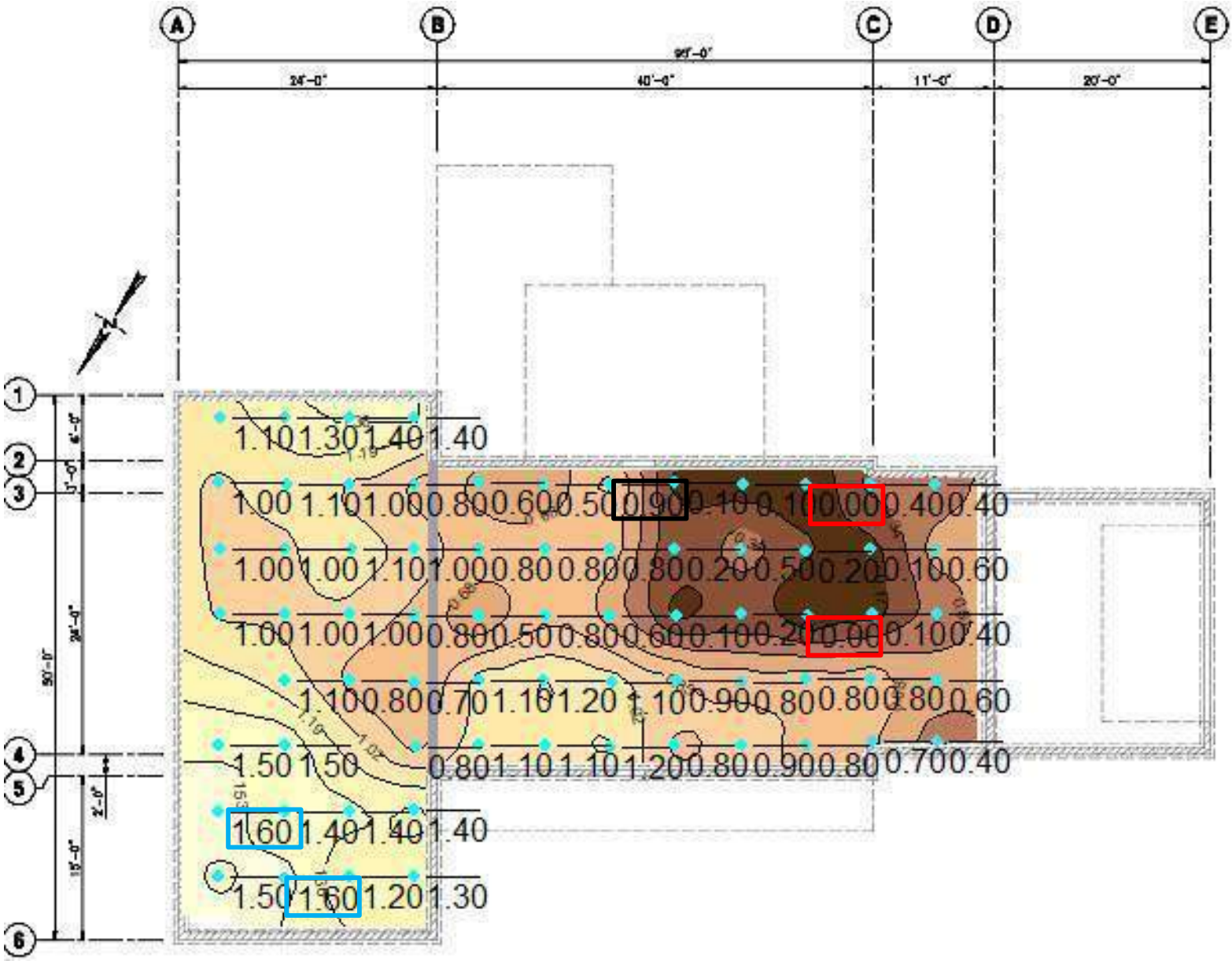
Thank you for the opportunity of providing our services to you on this project.

Sincerely,

SFA Design Group, PLLC
Jeff Fitch, PE
Principal



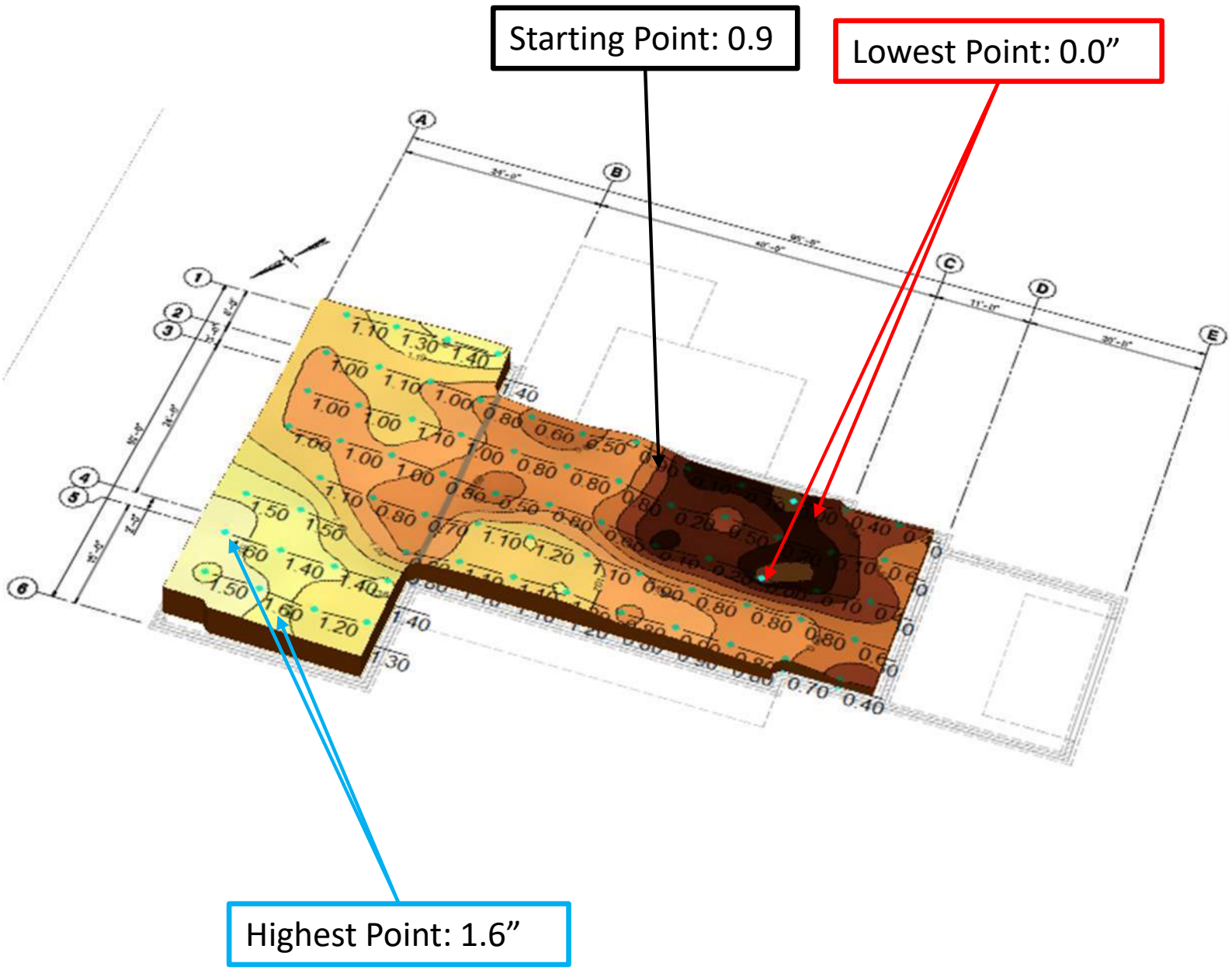
[2] https://fris.nc.gov/fris/?ST=NC



Starting Point: 0.9 Highest Point: 1.6" Lowest Point: 0.0"

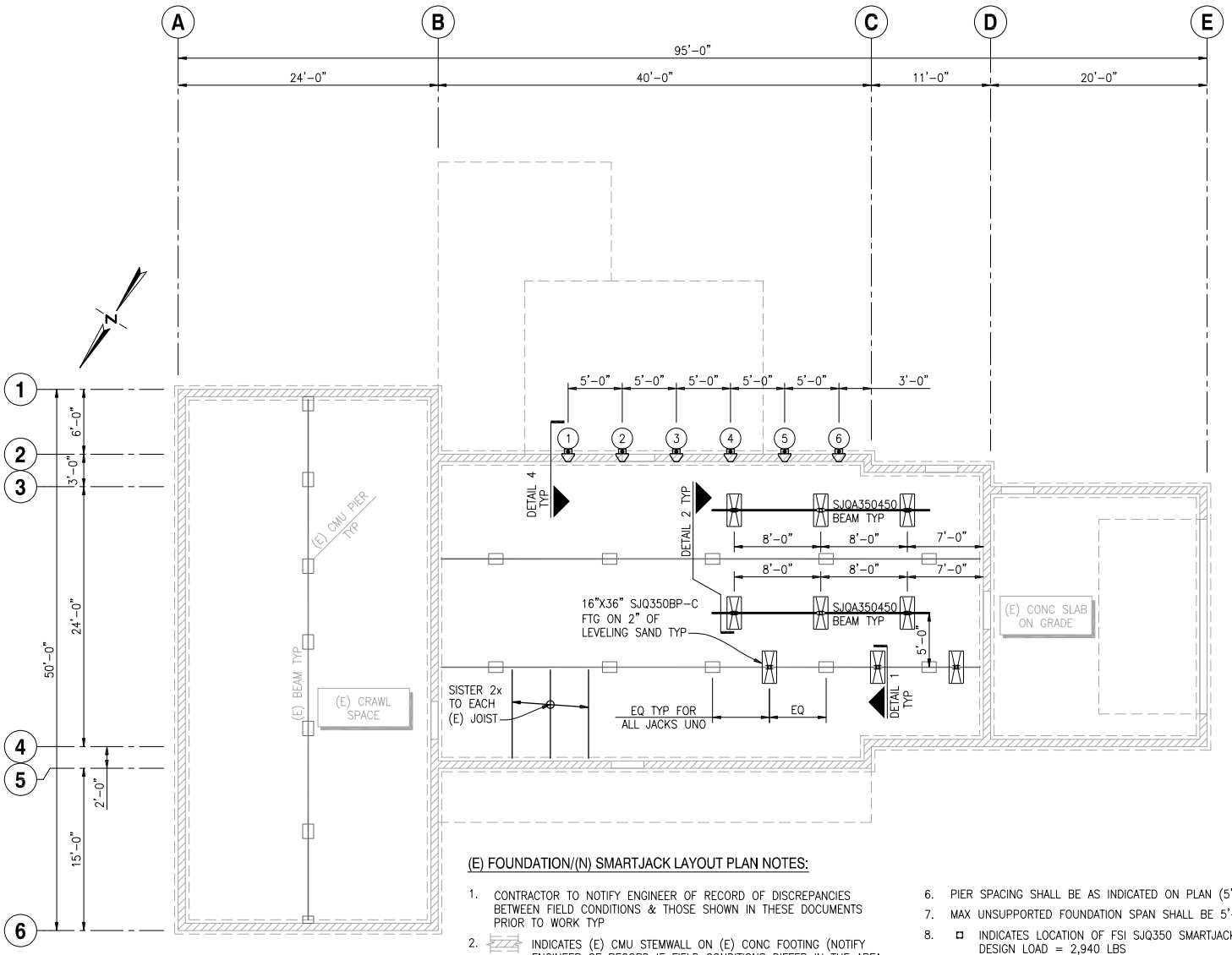
Source: Generated using 3D field

sfa	**2D TOPOGRAPHIC MAP**	PROJECT NUMBER: RBC25-016



Source: Generated using 3D field

sfa	**3D TOPOGRAPHIC MAP**	PROJECT NUMBER: RBC25-016

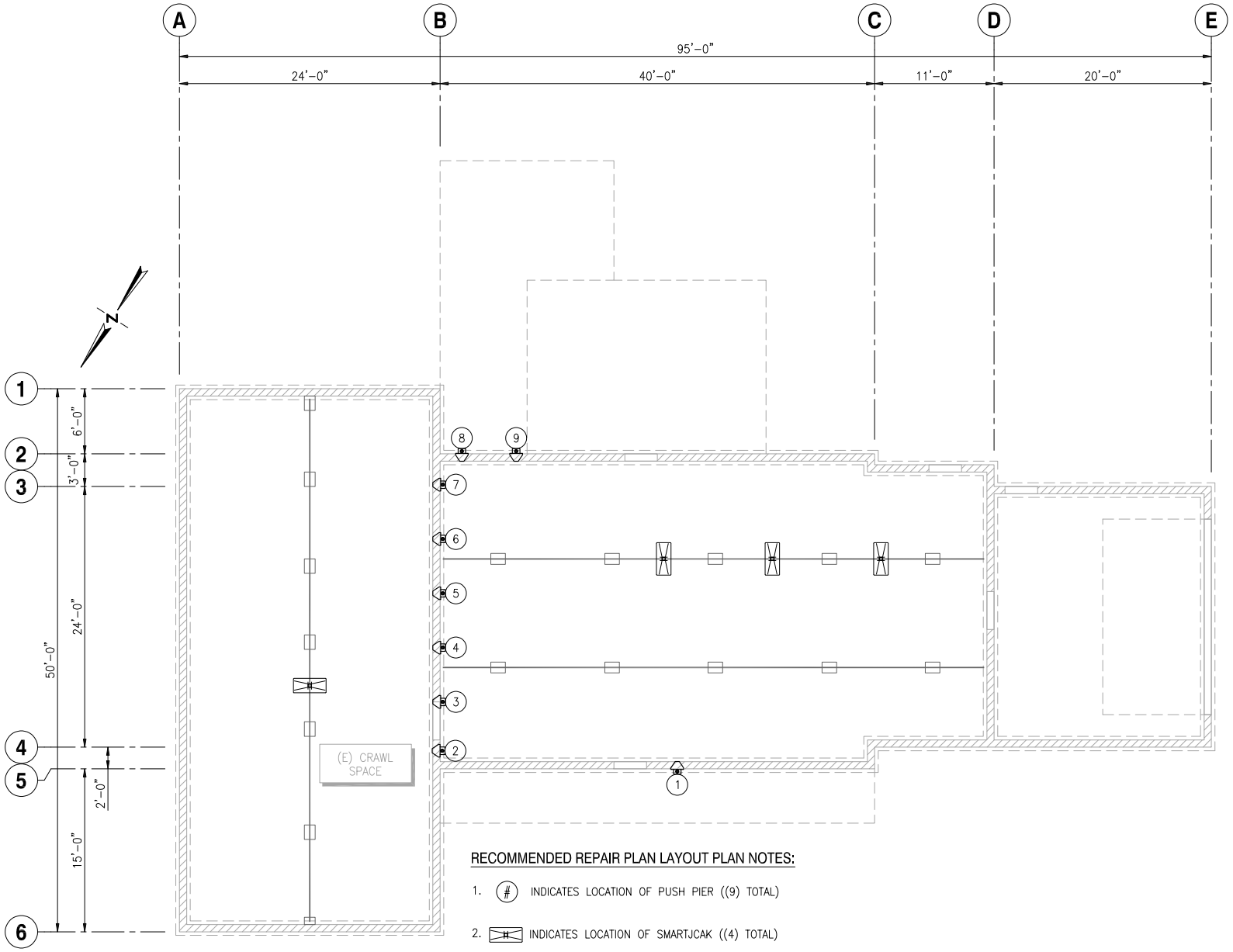


(E) FOUNDATION/(N) SMARTJACK LAYOUT PLAN NOTES:

1. CONTRACTOR TO NOTIFY ENGINEER OF RECORD OF DISCREPANCIES BETWEEN FIELD CONDITIONS & THOSE SHOWN IN THESE DOCUMENTS PRIOR TO WORK TYP
2. INDICATES (E) CMU STEMWALL ON (E) CONC FOOTING (NOTIFY ENGINEER OF RECORD IF FIELD CONDITIONS DIFFER IN THE AREA OF WORK)
3. INDICATES (E) CMU PEIR
4. DETAIL # SECTION CUT – DETAIL NUMBER
5. (#) INDICATES LOCATION OF FSI 288 PUSH PIER ((6) TOTAL)

   PUSH PIER INSTALLATION NOTES:
   - DESIGN LOAD = 7,509 LBS
   - 2.875"ø PIPE PILE W/ 0.165" THICK WALL
   - 3.5"ø x48" LONG PIPE SLEEVE W/ 0.216" WALL
   - MINIMUM 10'-0" INSTALLATION DEPTH
   - MINIMUM 2000 PSI INSTALLATION PRESSURE
   - MINIMUM $\frac{1}{4}$" FOUNDATION LIFT DURING INSTALLATION
6. PIER SPACING SHALL BE AS INDICATED ON PLAN (5'-0" OC MAX)
7. MAX UNSUPPORTED FOUNDATION SPAN SHALL BE 5'-0"
8. ▫ INDICATES LOCATION OF FSI SJQ350 SMARTJACK ((9) TOTAL) DESIGN LOAD = 2,940 LBS
9. SMARTJACK SPACING SHALL BE AS INDICATED ON PLAN (8'-0" OC MAX)
10. REPLACE "IN-KIND" ALL (E) WOOD MEMBERS (JOISTS, PURLINS, SUBPURLINS, SHEATHING, STUDS, WALL PLATES) WHICH SHOW SIGNS OF DRY ROT OR STRUCTURAL DAMAGE
11. CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY SHORING
12. CONTRACTOR SHALL NOT REMOVE ANY (E) POSTS OR PRE-CAST FOOTINGS SUPPORTING THE (E) FLOOR FRAMING
13. FILL ALL VISIBLE CRACKS IN THE FOUNDATION WALL WITH HYDRAULIC CEMENT OR EPOXY
14. ALL CONSTRUCTION MATERIALS IN THESE DOCUMENTS ARE (N) UNO

sfa	**REPAIR PLAN**	PROJECT NUMBER: RBC25-016



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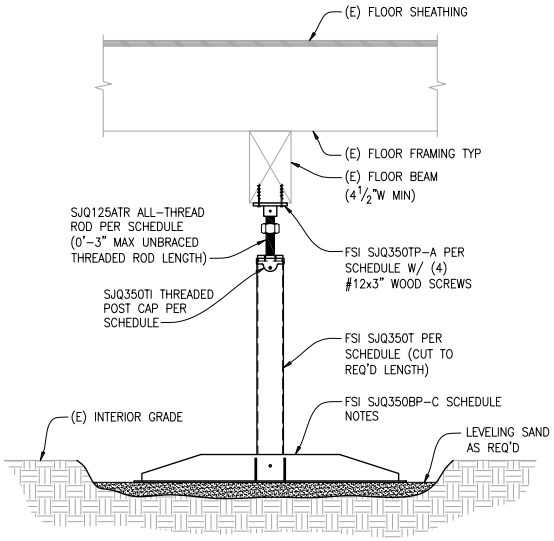
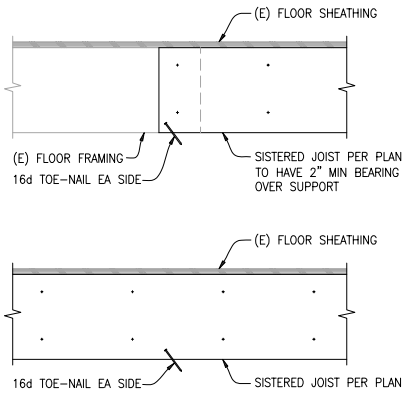


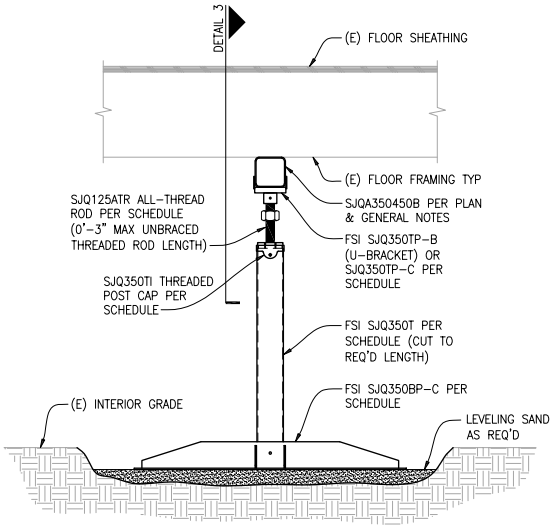


NOTES:
1. REF PLAN FOR LAYOUT & INSTALLATION REQ'S
2. INSTALL PER MFR RECOMMENDATIONS

FSI SMARTJACK IN CRAWLSPACE

SCALE: NTS

1

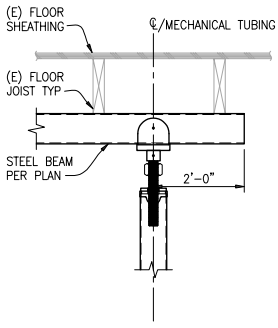


NOTES:
1. REF PLAN FOR LAYOUT & INSTALLATION REQ'S
2. INSTALL PER MFR RECOMMENDATIONS

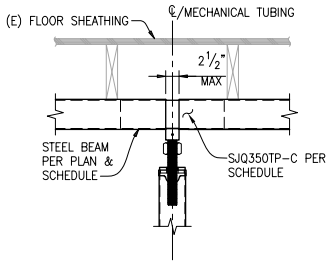
FSI SMARTJACK IN CRAWLSPACE

SCALE: NTS

2



STEEL BEAM END CONDITION



STEEL BEAM INTERMEDIATE CONDITION

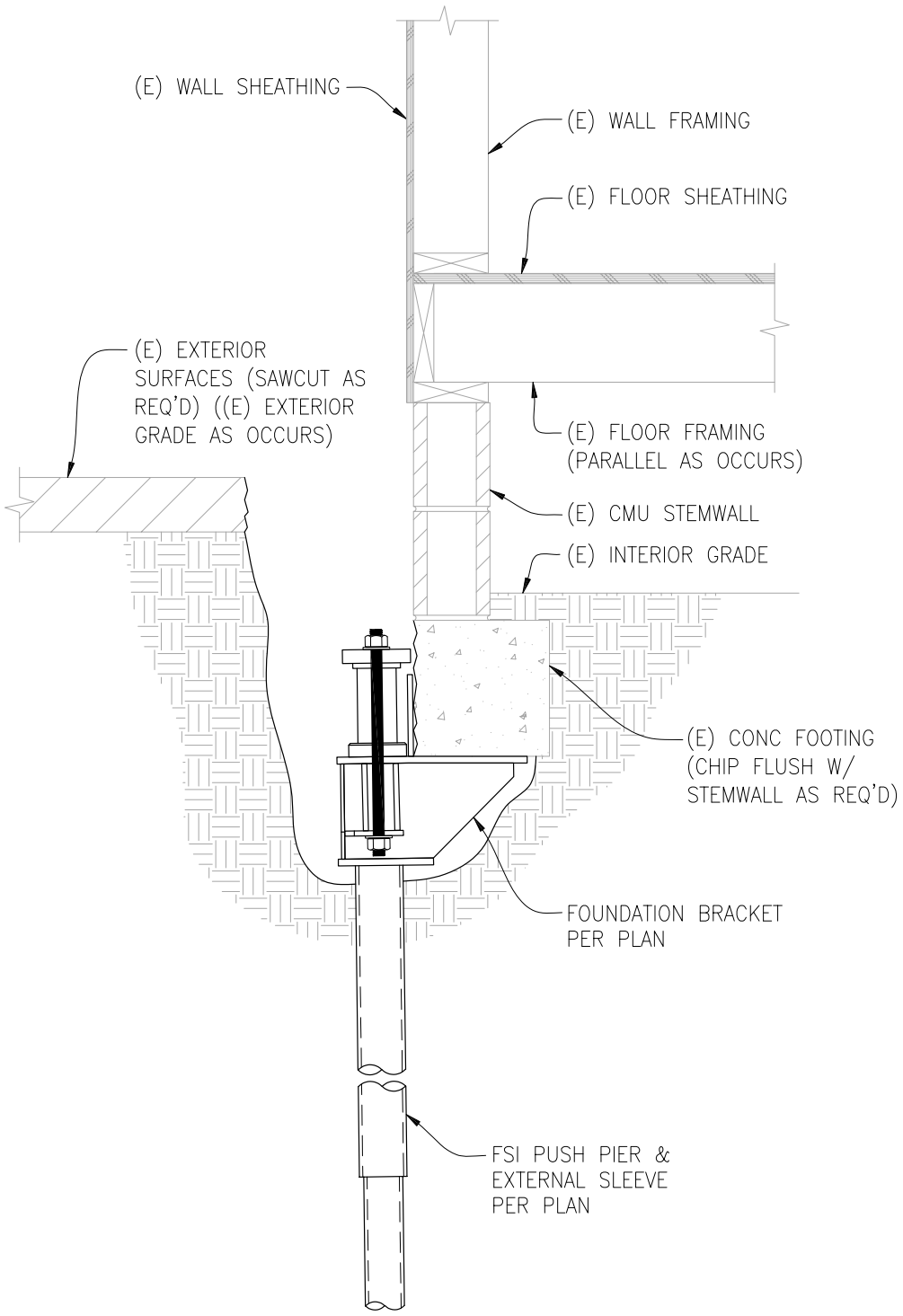
NOTE:
REF DETAIL 2 FOR CALLOUTS IN COMMON

(N) SMARTJACK W/ SUPPLEMENTAL BEAM

SCALE: NTS

3

sfa	**DETAILS**	PROJECT NUMBER: RBC25-016



NOTE:

REF PLAN FOR LAYOUT & INSTALLATION REQ'S

(N) PUSH PIER TO (E) FOUNDATION DETAIL

4

SCALE: NTS

sfa	**DETAIL 2**	PROJECT NUMBER: RBC25-016

FSI SMARTJACK SYSTEM INFO

PART	DESCRIPTION	COMMENTS	MIN YIELD STRESS, F_y	MIN TENSILE STRESS, F_u
SJQ350T	ASTM A500 GRADE C HD GALV, PER ASTM 123, HSS $3\frac{1}{2}$x$3\frac{1}{2}$x0.095"x'L' SQUARE TUBE		50 KSI	62 KSI
SJQA350450B	ASTM A500 GRADE C HD GALV, PER ASTM 123, HSS $4\frac{1}{2}$x$3\frac{1}{2}$x0.135"x'L' TUBE		50 KSI	62 KSI
SJQ125ATR	ASTM A108 GRADE 1018 $1\frac{1}{4}$"øx0'-10"L THREADED ROD W/ WELDED HEAVY HEX NUT		54 KSI	64 KSI
SJQ350BP-C	ASTM A572 GRADE 50 PL$\frac{3}{16}$x16x3'-0" ASTM A572 GRADE 50 PL$\frac{3}{16}$x$3\frac{1}{2}$" STIFFENERS	COMPETENT NATIVE SOIL W/ SAND FTG CONDITION PER PLAN	50 KSI	65 KSI
SJQ350TP-A	ASTM A36 PL$\frac{3}{8}$x$4\frac{1}{2}$x0'-$4\frac{1}{2}$" ASTM A53 GRADE B $1\frac{3}{4}$"øx$\frac{1}{4}$"x$1\frac{3}{8}$"L CONFINING RING	WOOD BEAM CONDITION	36 KSI 35 KSI	58 KSI 60 KSI
SJQ350TP-B	ASTM A36 0.120" BENT CAPTURE PL ASTM A572 GRADE 50 PL$\frac{3}{4}$x$2\frac{1}{2}$x0'-4.13" ASTM A53 GRADE B $1\frac{3}{4}$"øx$\frac{1}{4}$x$1\frac{3}{8}$"L CONFINING RING	STEEL BEAM U-BRACKET CONDITION	36 KSI 50 KSI 35 KSI	58 KSI 65 KSI 60 KSI
SJQ350TP-C	ASTM A572 GRADE 50 BENT PL$\frac{3}{16}$x9.78x0'-11" ASTM A572 GRADE 50 PL$\frac{3}{8}$x$3\frac{1}{2}$x0'-11" ASTM A53 GRADE B $1\frac{3}{4}$"øx$\frac{1}{4}$x1.38"L CONFINING RING	STEEL BEAM SPLICE BRACKET CONDITION	50 KSI 50 KSI 35 KSI	65 KSI 65 KSI 60 KSI
SJQ350TI	ASTM A36 BENT PL0.120" ASTM A572 GRADE 50 PL$\frac{3}{4}$x3.63x0'-3.63" W/ $1\frac{1}{4}$"ø THREAD TAP		36 KSI 50 KSI	58 KSI 65 KSI

NOTE:
INSTALL PER MFR RECOMMENDATIONS

sfa	**SCHEDULE**	PROJECT NUMBER: RBC25-016

sfa	**PHOTOS**	PROJECT NUMBER: RBC25-016

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