1/19/2024

Tarheel Basement Systems
3333 Air Park Rd.,
Fuquay Varina, NC, 27526

RE: Foundation Repair for 257 Matthews Rd., Lillington, NC 27546

Existing structure is a wood framed building with a concrete foundation. Based on an assessment provided Tarheel Basement Systems (TBS), the structure is experiencing settling toward the front left of the house. TBS had recommended push piers to stabilize the foundation. Scapular Engineering has reviewed the data provided by TBS and has verified that the proposed products are adequate per the manufacturers requirements for the loads applied.

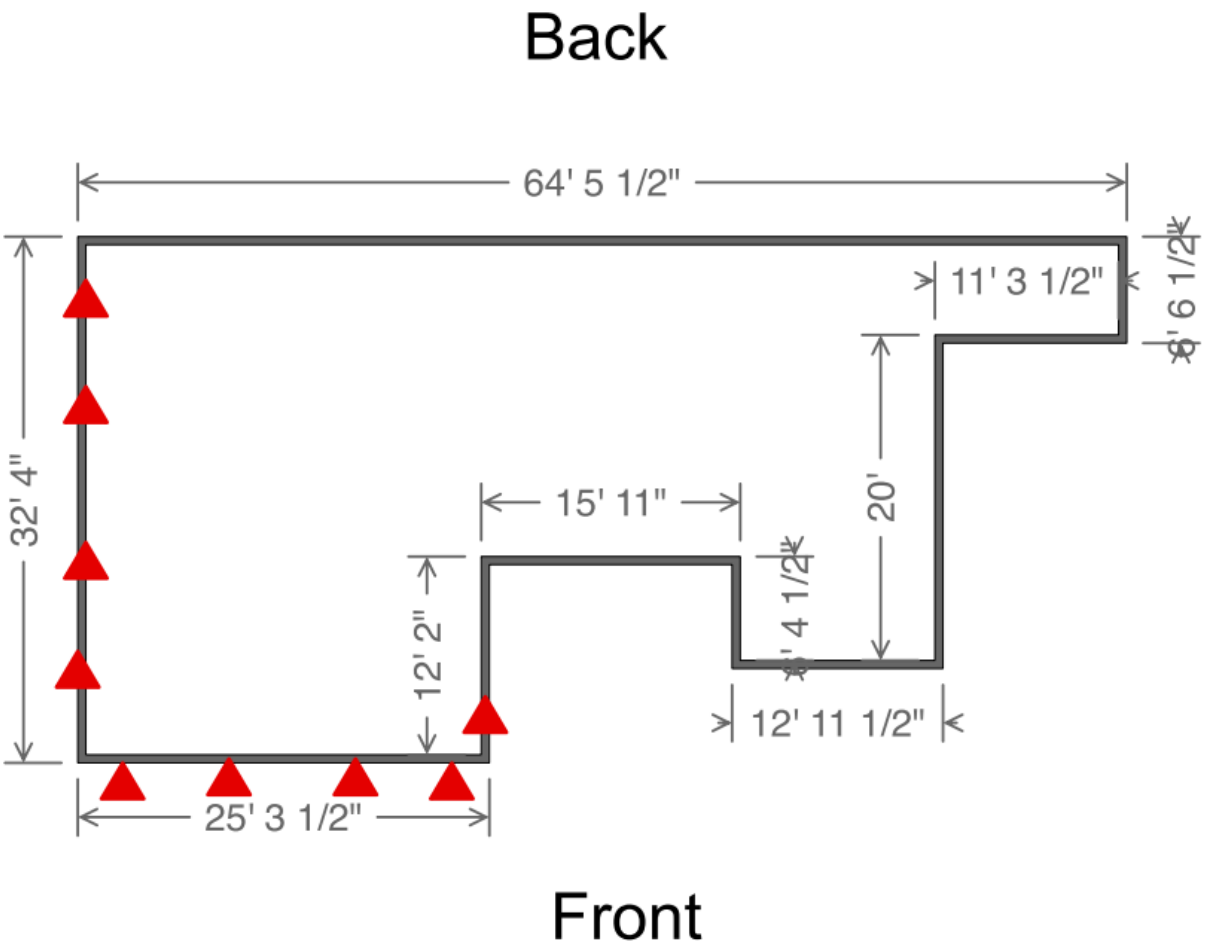
Attachment contents

This report and other work by Scapular Engineering Firm and Engineer of Record ("EOR") were performed pursuant to a contract with TBS and are intended for its use only. This report, and related information if any, to you is not intended to create a relationship between the property owner and Scapular Engineering Firm or EOR, contractual or otherwise, and is not intended to create any duties, guarantees, or warranties (express or implied) to property owner by Scapular Engineering Firm or EOR. This report relies upon, and is dependent upon, the accuracy of information provided by TBS and the analysis in this report is limited to the information provided. This report is limited to the products themselves and only address the structural issue as diagnosed and presented by TBS. Scapular Engineering Firm did not diagnose the structure and is not responsible for a misdiagnose provided by TBS.

Jacob John Bullinger
PE: 056953
Scapular Engineering Firm
Licensee Number: P-2995
23576 State Route J
St. Mary, MO 63673
(573) 275-7647

1/19/2024

Foundation Plan



9 Push Piers will be used.

Design of Structural Repair provided by FRS.

Push Pier notes:

1) Push piers shall be installed per manufacturers specifications, reference attached details.
2) Spacing of push piers shall be as indicated on plan U.N.O.
3) Push piers shall be installed until bedrock or refusal is encountered.
4) The structure is assumed to be laterally supported as currently built and push piers are designed for vertical loads only.
5) If push piers are used to lift foundations, voids under slabs shall be filled by mudjacking or polyfoam.
6) For push piers being installed on a party wall, foundation shall be stabilized only (no lifting).
7) For multi-family dwellings, contractor is required to obtain written approval by each affected property owner.
8) Stacked stone foundations to be stabilized only. Do not attempt to lift.

Scapular Engineering has provided a design based on a plan developed by others as shown grayscale. Scapular Engineering does not take responsibility for the accuracy of items grayscale on this drawing or if installation does not meet product specifications.

Product Details

NOTES:

1. PUSH PIERS SHALL BE INSTALLED UNTIL BEDROCK OR REFUSAL IS ENCOUNTERED.
2. PUSH PIERS SHALL BE INSTALLED PLUMB.
3. FOOTING SHALL BE TRIMMED FLUSH WITH THE FOUNDATION WALL AT PIER LOCATIONS TO ELIMINATE ECCENTRICITY ON THE PIER.

TABLE 1—PUSH PIER COMPRESSION LOAD RATINGS[1]

Model	Product Designation	Average Tested Yield Capacity (lbs)	Average Tested Ultimate Capacity (lbs)	Allowable Push Pier Capacity[2] (lbs)
IMG PP21617-34	Push Pier Bracket	48,900	59,900	29,340

For **SI:** 1 kip (1000 lbf) = 4.48 kN.

[1] Table provides tested bracket assembly capacities only. A licensed engineer shall verify the actual available capacity based on the size of the tube shaft, expected corrosion loss, and the site-specific soil conditions.
[2] Allowable capacities are based upon the minimum of the average tested yield capacity (Py) multiplied by 0.6 and the average tested ultimate capacity (Pmax) multiplied by 0.5. Allowable capacities shall be utilized with Allowable Strength Design (ASD) loading.

TABLE 2—APPROVED THREADED RODS AND NUTS

Lifting Rod	Lifting Rod Steel	Nut	Nut Steel	Minimum Safe Working Load Required
3/4" - 10 unc	ASTM A193 Grade B7	3/4-10 Heavy Hex	ASTM A193	15,000 lbs.
(#7) 7/8" - 5 All Thread Rebar	ASTM A615 Grade 75	7/8" - 16 Hex Head	ASTM A108 or A576	
3/4" 4.5 Coil Rod	ASTM A1035 or A1045	3/4" - 4.5 Coil Nut (2) Nuts required per rod end	ASTM A1035	
		3/4" - 4.5 Heavy Coil Nut (1) Nut required per rod end	ASTM A1045	

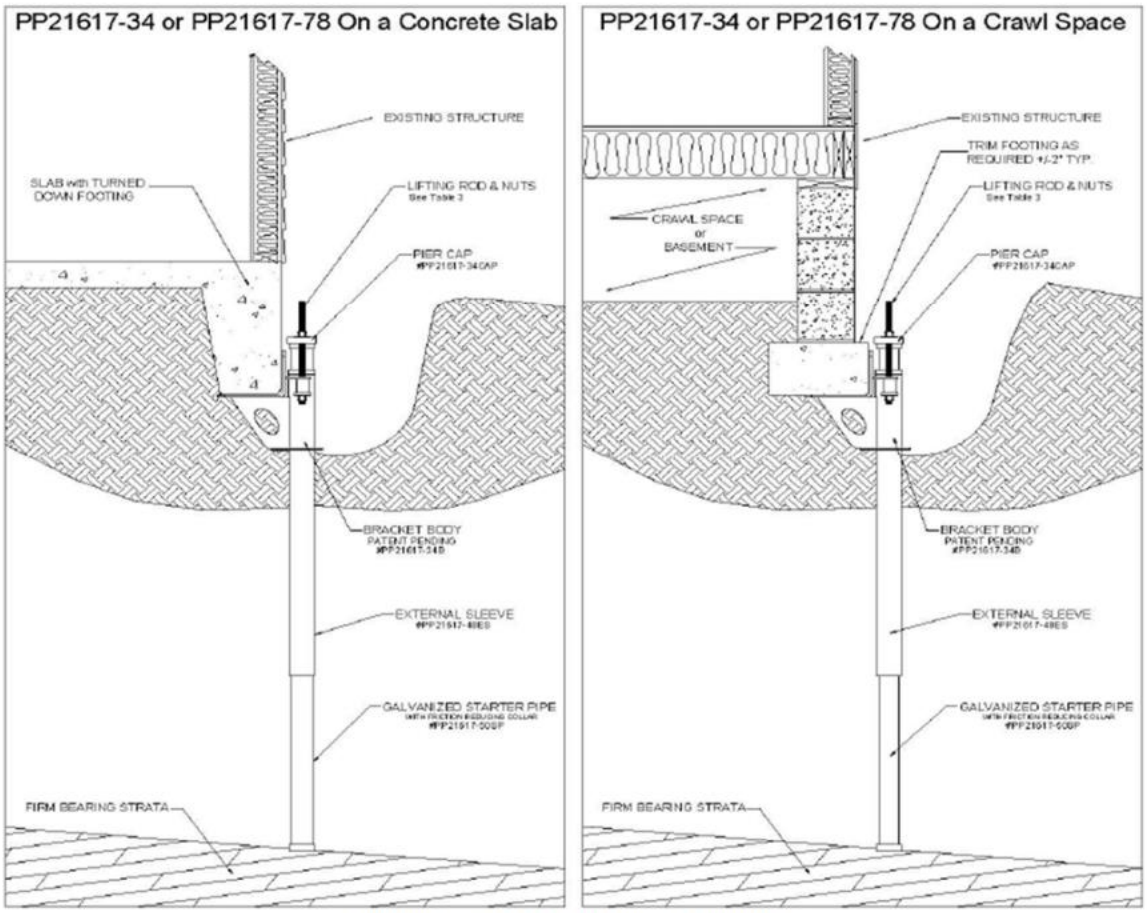
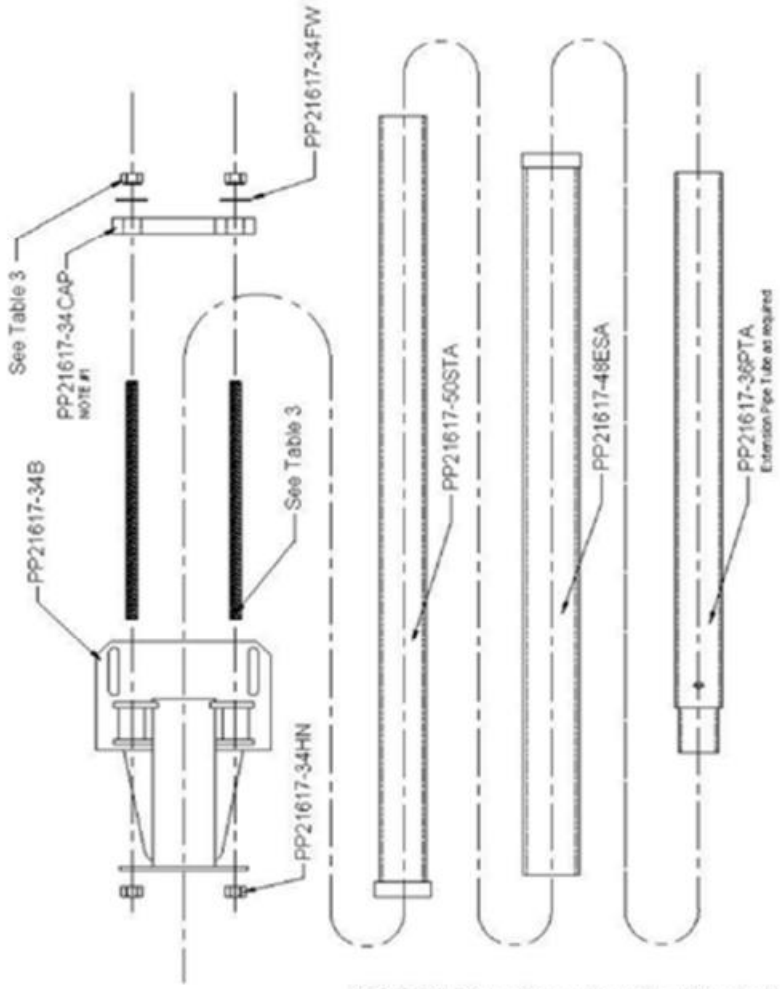


FIGURE 1—PP21617-34 BRACKET ASSEMBLY

PP21617-34 Typical Installation

The IMG Bracket Design is PATENT PENDING



NOTE #1 Cap plate, nuts and washers to be installed after final extension pipe

FIGURE 1 —PP21617-34 BRACKET ASSEMBLY (Continued)

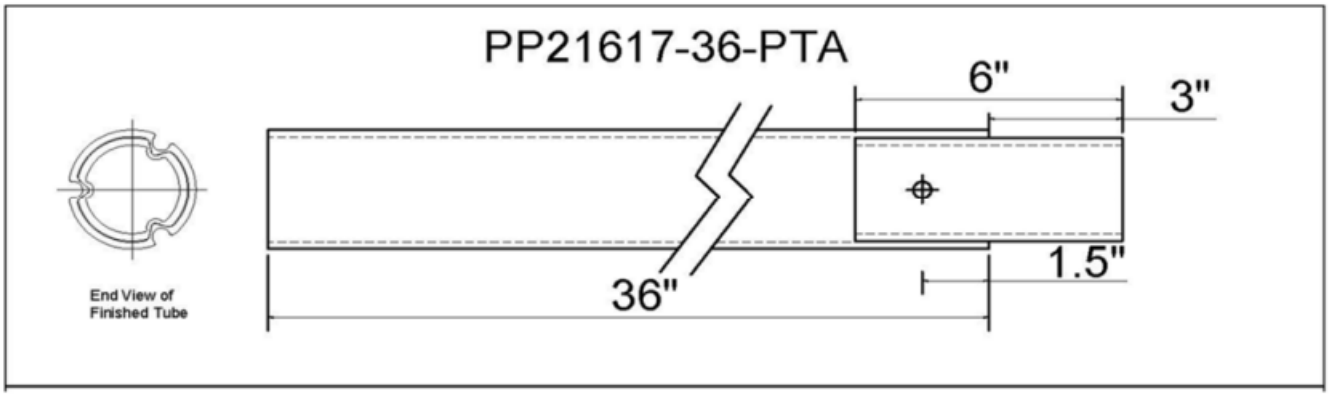


FIGURE 2—PUSH PIN COUPLER DETAILS

Push Pier Calculations

Input Information			
Stories Above Grade	1	stories	As reported
Tributary Width (T_w)	10	feet	From design
Wall Height (H_w)	8	feet	As reported
Foundation Height (H_FDN)	4	feet	As reported
Foundation Wall Thickness (t_FDN,WALL)	8	inches	As reported
Unbraced Wall Length (L_unbraced)	8	feet	From design
Soil Capacity	1500	lb/sqft	Worst case from design
Floor Load			
DL_floor	10	psf	
LL_floor	40	psf	
Floor Load	500	plf	(# stories)*T_w*(DL+LL)
Roof & Ceiling Joist Load			
DL_joist	5	psf	
LL_joist	10	psf	
DL_roof	10	psf	
LL_roof/SN_roof	30	psf	
Roof & Ceiling Load	550	plf	T_w*(DL_j+LL_j+DL_r+LL_r)
Wall Load			
WT_wall	15	psf	
Wall Load	120		(# stories)*WT_wall*H_w
Foundation Wall Load			
WT_FDN	168	pcf	Assuming stone FDN (worst case)
Foundation Wall Load	448	plf	WT_FDN*H_FDN*t_FDN,WALL/12
Total Load			
Total Load on Foundation (W_total)	1618	plf	Sum all loads)
Total Load per Pier, (P_per-pier)	12944	lbs	L_unbraced*W_total
Bracket Pier Capacity (P_allow,bracket)	29340	lbs	Bracket Load capacity per Data Sheet
Installation Pressure (P_install)	3500	psi	Assumed 4,000 psi is target value
Starter End Cap Diameter (D_end)	4	inches	
Factor of safety (FS)	1.5		Factor of safety for end bearing
End Bearing Pier Capacity (P_allow-bearing)	29306.67	lbs	pi/4*(D_end^2)*P_install/FS
Pier stress Ratio	0.441674		P_per-pier/min(P_allow,bracket;P_allow, bearing)
Pier Check	OK		If Pier Stress Ration is <1, all is good

Product Specifications

Evaluation Service®

Pei **Evaluation Service®** is an accredited **ISO Standard 17065** Product Certifier, accredited by the IAS. This **Product Evaluation Report** represents a product that *Pei* **ES** has Evaluated. This product has a Product Evaluation Service Agreement & Follow-up Inspection Service Agreement. This **Product Evaluation Report** in no way implies warranty for this product or relieves **Independence Materials Group** of their liabilities for this product. This **PER** is an official document if it is within one year of the initial or re-approval date.

PER-17107

Initial Approval	Re-Approved
October 2017	October 2020

See all Pei **ES** *Listings at: www.p-e-i.com*

Report Owner

Independence Materials Group, LLC (IMG)
1741 Corporate Landing Parkway
Virginia Beach, VA 23454

Approved Manufacturing Locations

IMG - MVA Facility
634 Rosewood Drive
Columbia, SC 29201

Brown Equipment Mfg Co.
650 Broome Street
Monroe, NC 28110

Grip-Title Manufacturing Co., LLC.
115 W. Jefferson Street
Winterset, IA 50273

Product

IMG Push Pier Model No. IMG PP21617-34

Evaluation Report Information

www.independencematerialsgroup.com
IMG contact: Allen Gantt - (803) 807-8629

General Details

IMG Push Piers are used as support for structures to recover lost elevations and to provide uniform supplemental support to foundations. The **IMG Push Pier** system provides structural lift and is intended to stop further settlement of the structure. This product is used to repair residential, commercial, and industrial foundation settlement problems, and may be installed in either interior or exterior applications.

The **IMG Push Pier** system has been tested and evaluated for eccentric compression strength with a maximum unnsupported length below the bracket bearing plate of 5 feet. This **PER** does not address seismic loading for this system, existing footing suitabuilty or attachment requirements to footings. Required corrosion resistance and longevity shall be addressed by the registered design professional on a job specific and location basis. **IMG** has a Product Evaluation Service Agreement with *Pei* **Evaluation Service®** (*Pei* **ES**) and a Follow-up Inspection Service Agreement with *Progressive Engineering, Inc.* (*Pei*). The approved manufacturing locations have an approved Quality Assurance Manual to manufacture **IMG Push Pier Model IMG PP21617-34** and are audited quarterly by *Pei*.

Product Description

IMG model **PP21617-34** is a push pier system consisting of an under footing self standing bracket body, a reinforcing sleeve that passes through the bracket body, a pier tube shaft that is hydraulically advanced to a firm bearing strata, and the associated hardware consisting of threaded rods and nuts passing through a solid steel cap plate.

IMG PP21617-34 Bracket Assembly:

IMG Model No. PP21617–34 is a push pier system manufactured using the materials described in this **PER**. Certain parts are offered in both a black, non coated version and a hot dipped coated version designated by the suffix (G).

Bracket Body #PP21617-34B is fabricated using .375" ASTM A572 Grade 50 flat plate and CNC cut and bent to the required shapes. Additional bracket body parts consist of two (2) 1.66" OD x 0.140" ASTM A500 Grade B tube spacers and one (1) 4" OD x 0.188" x 11-3/16" ASTM A513 Grade 1026 tube body. The sand plate is CNC cut from 0.250" ASTM A36 or A572 steel.

External Sleeve #PP21617-48ES is fabricated using ASTM A500 Grade B/C 3.5" OD x 0.216" x 48" wall tube with a 4" OD x 0.219" x 1" ASTM A513 Grade 1026 tube ring welded to the end to serve as a hard stop. Alternatively a 3/4" long ring of the 4" OD x .226" tube may be welded 1/2" down from the leading edge using four (4) 1" fillet welds.

Pier Cap Plate #PP21617-34CAP is fabricated using ASTM A36 1" x 4" flat bar stock and cut to 9" length. A 3/4" long ring is cut from 3.5" OD x 0.216" ASTM A500 Grade B tube and is stitch welded using four (4) 1" evenly spaced 1/4" fillet welds.

Lifting Rods and Nuts consist of (2) 16" long threaded rods with a safe working load of 15,000Lbs. and four (4) hex nuts. The flat washers must meet ASTM F436 Type 1. See Table 3 for details of the approved threaded rods and nuts.

Starter Pipe #PP21617-50SP is fabricated using a 2.875" OD x 0.165" wall thickness tube meeting ASTM A500 Grade C. A 1" long section of a 3.5" x 0.300" wall tube meeting ASTM A500 Grade C is fillet welded to the leading edge of one end of the tubing to serve as a friction reducing collar. Alternately a 3/4" ring of the 3.5" x .300" wall tube may be welded 1/2" down from the leading edge using four (4) 1" fillet welds. Tube shaft material is galvanized using a three coat inline process meeting ASTM 1057 with a minimum galvanized thickness of 0.85 to 1.19 mils.

Tube Extension #PP21617-36PTP is fabricated using a 2.875" OD x 0.165" wall thickness tube meeting ASTM A500 Grade C. A 2.5" x 0.188" wall x 6" long nipple meeting ASTM A513 Grade 1026 is inserted into one end of the tube and is held in position by three (3) 1/4" hydraulically punched dimples installed to create a triangular shape and approximately in equal distances around the pipe. Tube shaft material is galvanized using a three coat inline process meeting ASTM 1057 with a minimum galvanized thickness of 0.85 to 1.19 mils.

Design Considerations

A structural evaluation **Shall** by submitted at the request of the building official on a job specific basis with consideration to the existing foundation, soil conditions, and overall system integrity.

Building Code Compliance

Table 1 - Applicable Code Sections

2012, 2015, & 2018 International Residential Code® (IRC)		2012, 2015, & 2018 International Building Code® (IBC)	
Section R104.11	Section R104.11.1	Section 104.11	Section 1810.2.1
Section R106.1.2	Section R301.1.3	Section 1810.2.2	

General Product Usage and Limitations

1. A site survey is necessary of the area where the piers are going to be driven to locate any possible interference such as utilities, plumbing, electrical, or phone lines.
2. An area of approximately 2.5 square feet to a depth of 8.5 inches below the bottom of the footing will need to be excavated at each pier location. The excavated concrete bearing surface shall be free of all soil, debris, and loose concrete prior to installation of the push pier system.
3. Notching of the concrete footing may be necessary and shall be performed under the guidance of a registered design professional and approval of the code official.
4. IMG Push Pier Systems are designed to resist downward vertical loads only and are not approved for uplift and lateral load resistance. As a result, mechanical anchorage of the bracket to the foundation is not necessary to ensure adequate performance, but may be installed if deemed necessary by the building official and registered design professional.
5. The existing structure is used as a reaction force with a hydraulic drive cylinder to drive the pier into the soil. Adjacent pier shall NOT be advanced simultaneously.
6. Each Pier System installed must follow the applicable IMG Installation Instructions. In accordance with the 2012, 2015 and 2018 IRC Section 106.1.2, a copy of these installation instructions shall be made available on the job site at the time of installation.
7. When installed under structures meeting the requirements of the 2012, 2015 or 2018 IBC, a continuous special inspection shall be performed during installation when specifically required by the building official and/or registered design professional.
8. The allowable capacities shown in Table 2 reflect the installation in soils capable of sufficient lateral support of the push pier in accordance with Section 1810.2.1 of the 2012, 2015 and 2018 IBC. Where fluid soils (as defined by the 2012, 2015 & 2018 IBC) are present or the foundation elements stand unbraced in air or water, it shall be permitted to consider them laterally supported at a point 5-feet into stiff or 10-feet into soft soil unless otherwise verified through a geotechnical investigation by a registered design professional.
9. A registered design professional shall verify the installation meets the minimum stability requirements of Section 1810.2.2 of the 2012, 2015 and 2018 IBC.

Table 2 - Push Pier Compression Load Ratings[1]

Model	Product Designation	Average Tested Yield Capacity (lbs)	Average Tested Ultimate Capacity (lbs)	Allowable Push Pier Capacity[2] (lbs)
IMG PP21617-34	Push Pier Bracket	48,900	59,900	29,340

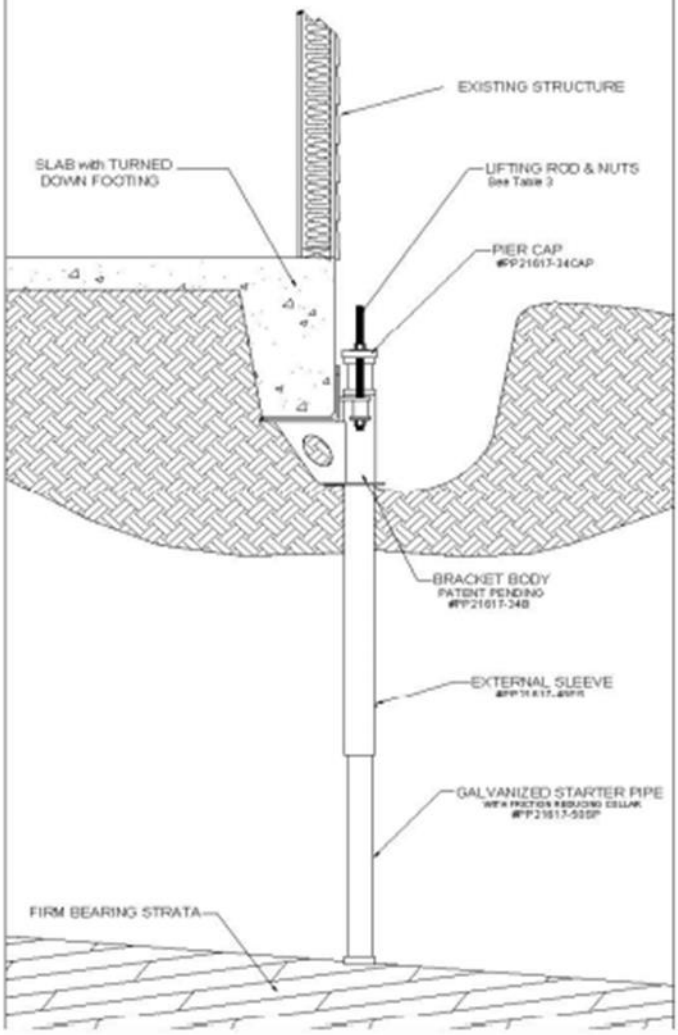
Notes:

1. Table provides tested bracket assembly capacities only. A licensed engineer shall verify the actual available capacity based on the size of the push pin, expected corrosion loss, and the site specific soil conditions.
2. Allowable capacities are based upon the minimum of the average tested yield capacity (P_y) multiplied by 0.6 and the average tested ultimate capacity (P_{max}) multiplied by 0.5. Allowable capacities shall be utilized with Allowable Strength Design (ASD) loading.

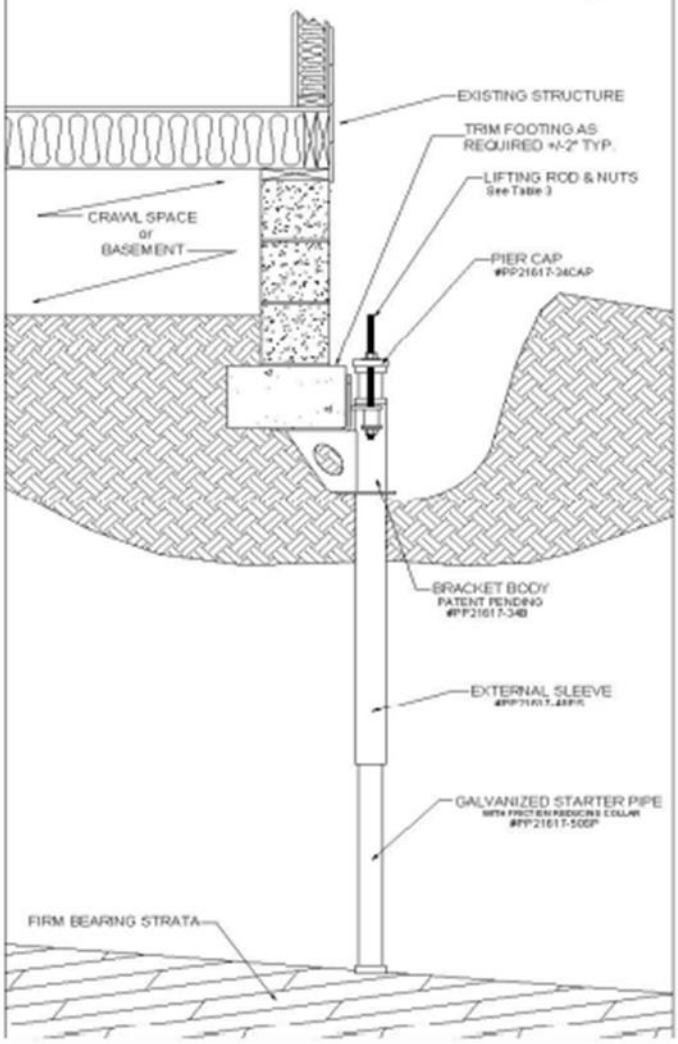
Table 3 - Approved Threaded Rods and Nuts

Lifting Rod	Lifting Rod Steel	Nut	Nut Steel	Minimum Safe Working Load required
3/4" - 10 unc	ASTM A193 Grade B7	3/4-10 Heavy Hex	ASTM A193	15,000 Lbs.
(#7) 7/8" - 5 All Thread Rebar	ASTM A615 Grade 75	7/8" - 16 Hex Head	ASTM A108 or A576	
3/4" 4.5 Coil Rod	ASTM A1035 or A1045	3/4" - 4.5 Coil Nut (2) Nuts required per rod end 3/4" - 4.5 Heavy Coil Nut (1) Nut required per rod end	ASTM A1035 ASTM A1045	

PP21617-34 or PP21617-78 On a Concrete Slab



PP21617-34 or PP21617-78 On a Crawl Space



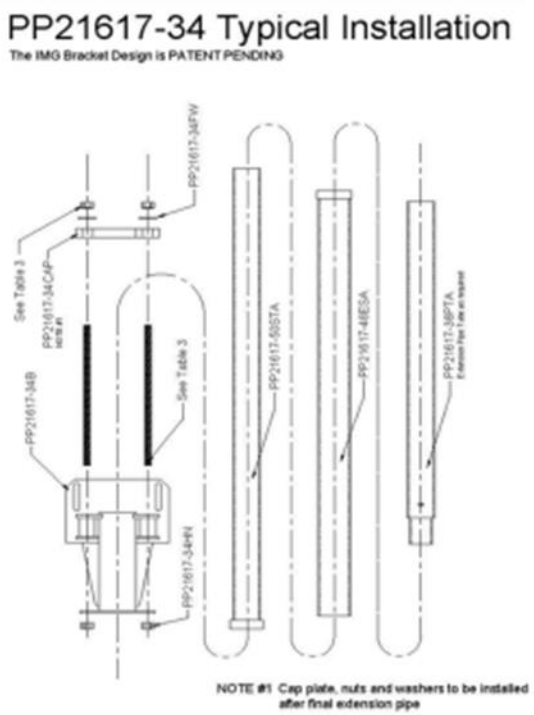


Figure 2 - PP21617-34 Bracket Assembly

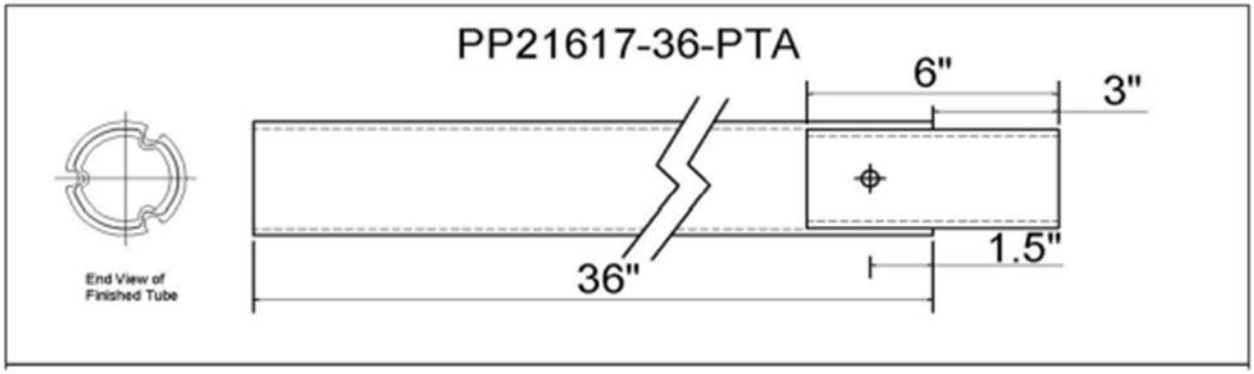


Figure 3 - Push Pin Coupler Details

Standard Rod

WF Rod

Figure 4 - Typical Installation Pictures

Product Labeling

Each Pier System that is covered by this **PER**, must be marked with the following information:

1. IMG **Push Pier** Product/Model Number
2. This **PER** Number & *Pei* **ES** Name or Logo
3. Bracket Load Rating
4. Manufacturer Address

Acceptable Evaluation Marks

Pei ES Pei ES Pei ES Pei ES

Product Documentation

A Product Evaluation Service Agreement between *Pei* **Evaluation Service®** and Independence Materials Group (IMG)
A Follow-up Inspection Service Agreement between *Progressive Engineering Inc.* and Independence Materials Group (IMG)
Approved Quality Assurance Manual - Dated: 9/2020
Approved Manufacturer Quality Assurance Manual - Dated: 9/15/2020
IMG **Push Pier** Installation Instructions
A *Pei* Test Report No. 2017-6030 (A) - Full Scale Axial Compression Tests on IMG Push Pier Foundation System, Part No. IMG PP21617-34 - Dated: 6/29/2017; Revised: 8/16/2017
Engineering Calculations for IMG Push Piers - Dated: 8/30/2017

Installation Instructions for IMG PP21617-34 Push Piers

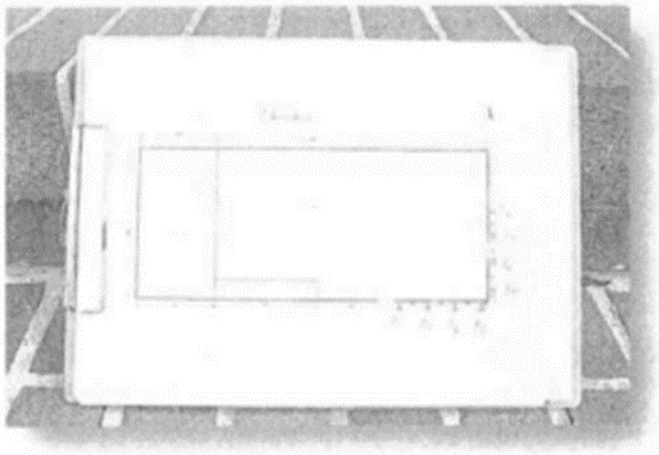
(Reference: PEI Report PER-17107)

Under-Footing Foundation Push Pier installation is performed in a 11-step process which includes:

1. Pier Layout
2. Excavation
3. Footing Preparation
4. Push pier Bracket Mounting
5. Push Pier Driving Equipment Assembly
6. Push Pier Driving
7. Push Pier Capping
8. Pier Load Equalizing / Lifting Equipment Assembly
9. Pier Stabilizing / Lifting
10. Pier Lock Down
11. Backfill

1 Step 1 – Pier Layout

1.1 Using the plan provided in approved Permit Package, determine the layout and location of each push pier to be installed. A laser level is used to confirm the areas of foundation settlement and the amount of settlement in the location of each push pier. If actual field conditions differ from the plan, contact the Design Professional of Record.



2 Step 2 – Excavation

2.1 **Prior to beginning any hand digging or machine excavation, all utilities must be located and marked. Additionally, all OSHA safety guidelines, regulations and practices for safe digging and trenching must be followed.**

2.2 Excavate to expose the footing in the areas where the piers are to be installed. Excavate separate pits by either hand digging or by using a machine to excavate in the location of each pier. For separate had dug excavation pits, the size of the pit will vary, but is approximately 20-24 inches wide by 30-36 inches long (from wall to back of pit) and 9 inches deeper than the bottom of the footing.

2.3 In the case of deeper footings, it may be necessary to dig a trench extending the length of the first pier to the last pier. Excavation may be by hand, or with an excavator **Proper shoring, benching and digging practices of the excavations must be performed to OSHA standards to ensure full safety compliance and a safe work site.**

2.4 For structures with basements, the piers may be installed from the inside the structure to reduce the amount of excavation required to expose the footing.

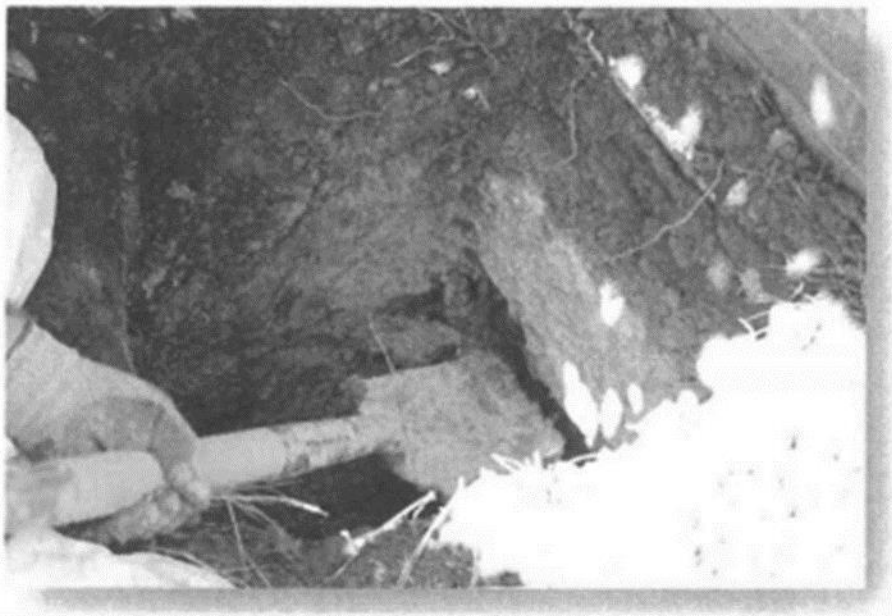
3 Step 3 – Footing Preparation

3.1 Proper footing preparation is required to cleanly and properly seat the push pier bracket against the footing and to reduce the eccentric forces applied to the footing and foundation wall.

3.2 In most situations, the existing footing width will protrude past the vertical face of the foundation wall making it necessary to trim the vertical face of the footing. Typically, the vertical face of the footing is trimmed between 0 and 4 inches away from the vertical face of the foundation wall, with 2 inches being preferred.

3.1 The excess concrete is removed with a chipping hammer or concrete breaker (jack hammer) to achieve a smooth, flat and even surface for the bracket to seat onto.

3.2 Hand excavate under the footing to sufficient width to seat the bracket at each pier location. Excavate this area approximately 9 inches deeper than the bottom of the footing.



4 Step 4 – Push Pier Bracket Mounting

4.1 Test fit the bracket against the footing to check for a clean fit. At this time, if the bracket does not fit tightly against the prepared side and bottom bearing surfaces of the footing, the bracket should be removed, and the footing bearing surfaces re-worked.

4.2 Once the pier bracket seats cleanly to the footing, it is placed under the footing. The bracket is fabricated with a soil seat plate on the bottom of the pier bracket for temporary support of the weight of the pier bracket, push pier driving stand and hydraulic driving cylinder during installation. In extreme cases of saturated or loose soil conditions, temporary wood cribbing can be used for holding the pier bracket in place. Remove wood cribbing after the piers are driven.

4.3 After the bracket is seated and supported, the pier external sleeve and push pier starter pipe are inserted into the top of the pier bracket.

4.4 Set the external sleeve and starter pipe a slight outward angle. The technician may use his feet, shovel or tamping bar to keep the bracket under the footing while the top of the external sleeve and starter pipe is angled slightly away from the structure. Later, when the external sleeve and starter pipe are being driven into the earth, the slack will be taken out of the system and the angle of this assembly will approach vertical.

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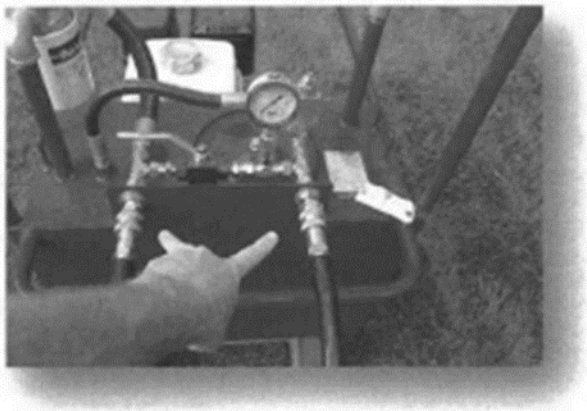
5 Step 5 – Push Pier Driving Equipment Assembly

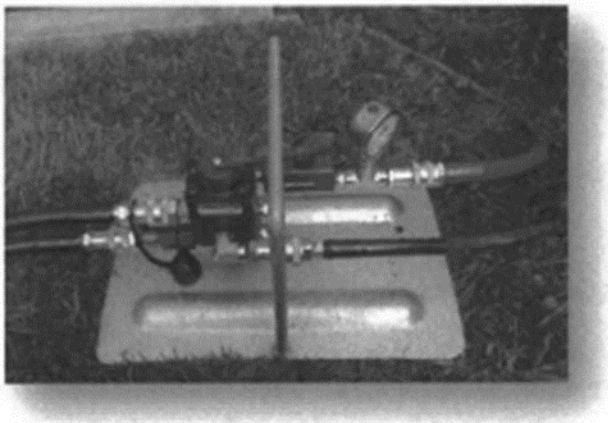
5.1 The push pier driving equipment consists of 5 major components which work together to drive push pier tubing into the earth. The main components of the push pier driving equipment are:

1) Hydraulic drive pump unit
2) Hydraulic hoses, fittings and couplings
3) Remote hydraulic control valve and pressure gauge
4) Drive cylinder stand
5) Hydraulic drive cylinder

5.2 Connect hydraulic fittings, making sure the threaded couplers of the hydraulic fittings on the cylinders are fully screwed down and TOUCH the collars on the end of the hydraulic hoses.



5.3 Fit the remote hydraulic control valve assembly with a pressure gauge to the hydraulic hoses.



5.4 Mount to the pier bracket by sliding it onto the mounting points on the mid-section of the pier bracket. The drive stand is locked into place with (2) L-Pins.

5.5 Insert the hydraulic drive cylinder into the mounting bracket on the top of the drive cylinder stand and lock in place with a threaded rod.

5.6 Connect hydraulic hoses from the remote hydraulic control valve to the hydraulic drive cylinder.

6 Step 6 – Push Pier Driving

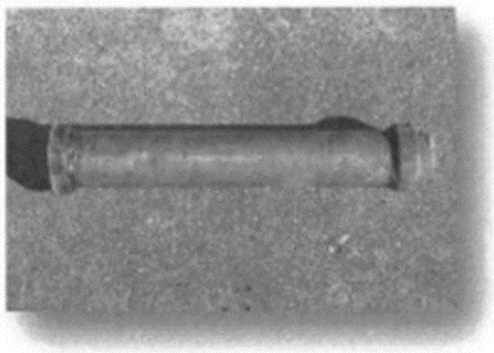
6.1 Complete Step 1 through Step 5 prior to push pier driving. Align the external sleeve and push pier starter pipe with the ram collar on the end of the hydraulic drive cylinder. This is accomplished by slowly engaging the remote hydraulic control valve while manually guiding the external sleeve and starter pipe onto the collar of the hydraulic drive cylinder.

6.2 Energize the drive cylinder with minimal hydraulic pressure and **slowly** begin to advance the tubing into the earth. If there is excess movement and/or misalignment in the parts of the assembly, stop and realign or re-support as needed prior to engaging more hydraulic pressure.

6.3 Continue to pressurize the drive cylinder slowly and advance the external sleeve and starter pipe into the earth, while visually checking and confirming the pipe for plumb. If plumb for the pipe is confirmed, engage the hydraulic drive cylinder with additional pressure and advance the tubing until the ram of the hydraulic drive cylinder bottoms out.

6.4 If driving pressures of the external sleeve and starter pipe are 1,500 PSI or greater, the structure begins to lift, or the Technician has concern that the footing may be damaged, it may be necessary to stop the driving operation and advance the starter pipe separately from the external sleeve. Once the starter pipe has been advanced into the stiff layer of surface soil independently from the external sleeve, the Technician will proceed with advancing the external sleeve.

6.5 The external sleeve, starter pipe and push pier tubing sections are longer than the stroke of the hydraulic drive cylinder, therefore advancing each full section is a two-step process (taking 2 full strokes of the hydraulic cylinder). Using the remote hydraulic control valve, begin advancing the tubing into the earth until the piston of the drive cylinder has been fully extended. Then, using the remote hydraulic control valve, reverse the direction of the drive cylinder and retract the piston. Next, insert the driving extension tube tool, also referred to as the "shorty", inline between the push pier tubing and the drive cylinder ram collar. Using the remote hydraulic control valve, apply pressure to the drive cylinder and advance the shorty until the piston is fully extended and the section of tubing is fully advanced into the top of the push pier bracket. Using a push pier driving log, record the driving pressure at the end of the second (last) stroke of the driving cylinder for each section of push pier tubing.



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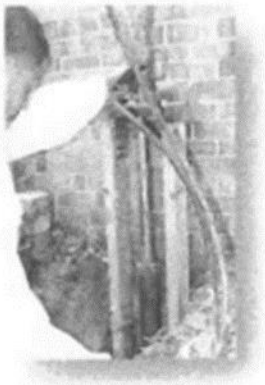


6.6 For each pier, this process is repeated one tube section at a time until the tubing stops advancing into the earth (refusal), or the structure begins to lift.

6.7 Once pier driving per 6.6 is achieved, slowly and carefully attempt to drive the top of the final push pier tube to a "cap-off" length of approximately 8 inches above the top of the collar on the external sleeve. However, driving the last tube section to cap-off length may not always be possible. In this case, the excess length of the last tube section will be trimmed off.

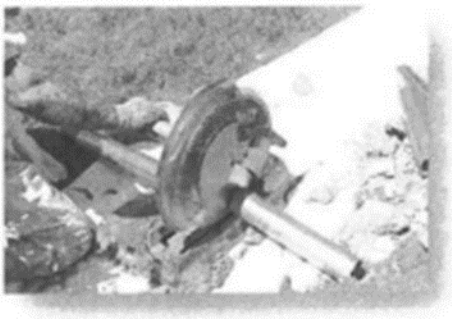
6.8 When pier driving is complete per 6.6 and 6.7, retract the piston of the driving cylinder and remove the drive cylinder from the drive stand, then remove the drive stand from the pier bracket. Move the push pier driving equipment to the next pier location and re-mount each piece. Repeat this process for each pier location until all the piers are installed.

7 Step 7 – Push Pier Capping

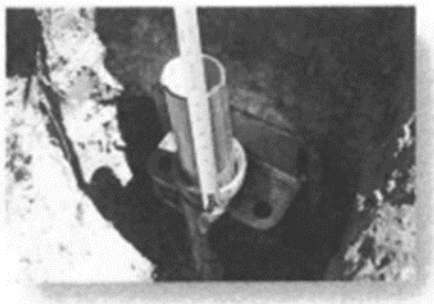
7.1 After the pier has been driven to termination and the drive cylinder and drive stand are removed from the pier bracket, the push pier is then "capped-off".

7.2 If the Technician was not able to fully advance the last section of tubing to capping height, the last section of pier tubing must be trimmed to the proper length. Measure up 8 inches from the top of the collar on the external sleeve and mark the last section of pier tubing.

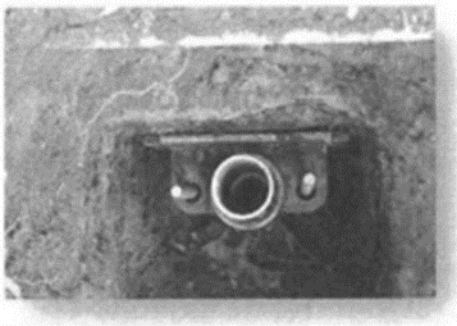
7.3 Remove the last section of pier tubing by lifting it out of the pier bracket and then cut it off at the mark using a multi-cutter chop saw equipped with a metal cutting blade.



7.4 After it has been cut, reinsert the final section of tubing back into the pier bracket external sleeve while ensuring the tube extension collar on the cut pier tube is fully seated into the section of tubing below it.

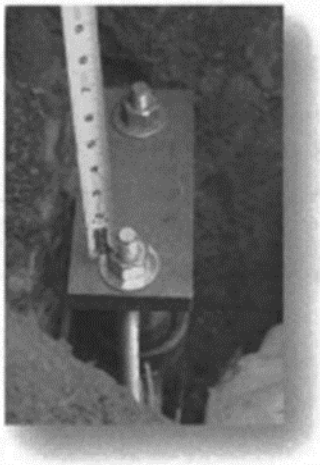


7.5 Install the lifting rods and pier cap plate onto the bracket. Threaded rods are inserted into bolt holes on the mid-section of the pier bracket. Thread nuts 1/4 inch (approximately 3 threads) onto the bottom of the threaded rod.



7.6 Place the pier cap plate over the lifting rods and on top of the final section of push pier tubing. Wrench-tighten the nuts at the **bottom** of the lifting rods until they are very tight. The exposed threads on the top of the lifting rod will be used in the next step to attach the pier lifting assembly to the push pier. Ensure the cap plate is tightened **level** at this time.

7.7 Use an impact wrench to tighten the 2 lifting rod nuts on the top of the pier cap plate so that there is 1 inch to 1 1/2 inches of exposed threads above the nuts. Care must be taken so that the pier cap plate remains level. If more than or less than 1 inch to 1 ½ inches of threaded rod is exposed above the nuts, adjust the bottom nuts. This will allow the lifting assembly to achieve maximum lifting potential. Ensure the pier cap plate is tightened level at this time.



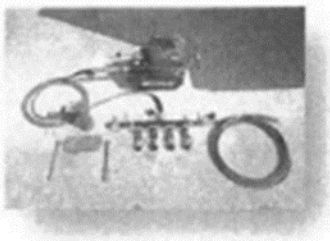
8 Step 8 – Pier Load Equalizing / Lifting Equipment Assembly

8.1 The pier lifting equipment consists of 5 major components which work together to stabilize or lift a structure with piers.

8.2 The main components to the pier lifting system are:

1) Hydraulic lift pump unit with pressure gauge
2) Hydraulic hoses, fittings and couplings

3) Hydraulic manifold with isolation valves
4) Lifting assembly with lifting rods, couplers and top plate
5) Hydraulic lifting cylinder



8.3 Thread the couplers of the pier lifting assembly onto the exposed threads of the pier bracket lifting rods. Ensure that each coupler is threaded half of its length onto the lifting rods to eliminate the possibility of stripping the threads during the lifting procedure. The lifting rod assembly couplers are hand tightened onto the lifting rods.