TYPICAL SPECIFICATION

Helical Torque Anchor™ Underpinning with Foundation Bracket

- **TAB-150-SUB& TAB-150-TT Utility Bracket with 1-1/2" Solid Square Shaft Pile**
- **TAB-288-MUB & TAB-288-TTM Utility Bracket with 2-7/8" Diameter x 0.203" Wall Tubular Pile**
- **TAB-LUB & TAB-288-TT Large Utility Bracket with 2-7/8" Diameter x 0.262" Wall Tubular Pile**
- **TAB-LUB & TAB-350-TT Large Utility Bracket with 3-1/2" Diameter Tubular Pile**
- **TAB-LUB & TAB-175-TT Large Utility Bracket with 1-3/4" Solid Square Shaft Pile**

Section 1- General

1.01 Typical Installation Scope

Furnish labor, equipment, tools and material to install utility bracket and helical torque anchors™ as described in this specification in a workmanlike manner and to design criteria. All work shall be performed in accordance with all applicable safety codes in effect at the time of installation. Only skilled, experienced workers, who are familiar with the requirements and procedures necessary to properly and safely accomplish the work outlined in this specification, shall be employed.

1. Prepare site for safe working conditions.
2. Thoroughly investigate the site for any and all underground utilities before excavating.
3. Excavation and preparation of foundation as required for installation of the product.
4. Install ECP Helical Torque Anchor™ to depth and torque specifications
5. Secure Utility Bracket to foundation
6. Cut torque anchor to length and install the tee-tube assembly
7. Install lift assemblies, hydraulic lift cylinders and connect hydraulics.
8. Load test as required to verify design and capacity
9. Transfer the load to the torque anchors™, lift the structure to designed specifications and mechanically secure to maintain elevation.
10. Remove equipment from work area.
11. Backfill and clean work areas.

1.02 Installation Plan

The torque anchors shall be installed as shown on the written repair plan that was prepared by the engineer or the installer and submitted to the owner or their representative. The plan shall include, but not be limited to:

1. Size and number of placements
2. Helical plate configuration on the helical torque anchor™
3. Spacing between helical torque anchors™
4. Minimum depth of embedment
5. Minimum target torque requirement
6. Load testing requirements

1.03 Delivery, Storage and Handling

All foundation repair products, tools and equipment shall be handled and transported with care to prevent any damage or deformation. Hydraulic components shall be protected from the weather and kept clean of any dust, dirt, mud or debris.

Section 2 - Product Material

2.01 Torque Anchors Selection

Each helical torque anchor shall be manufactured from round corner square solid steel bar or structural tubing.

2.011 Shaft Material

2.0111 Solid Square Bar

The round corner high strength solid square bar shall conform to ASTM A29. Yield strength of the bars shall be 90,000 psi.

- 1-1/2" square bar with a torque limit of 7,000 ft-lb
- 1-3/4" square bar with a torque limit of 10,000 ft-lb

2.0112 Tubular Shaft

Helical Torque Anchor™ size available:

This tubular shaft configuration shall conform to ASTM A53 with a minimum yield of 35,000 psi.

- 2-7/8" diameter x 0.203 wall thickness tubing, with a torque limit of 5,500 ft-lb

Other tubular shafts shall conform to ASTM A500 with a minimum yield of 50,000 psi, or A513 Type 5 with a minimum yield of 70,000 psi. Helical Torque Anchor™ sizes available:

- 2-7/8" diameter x 0.262 wall thickness tubing, with a torque limit of 9,500 ft-lb
- 3-1/2" diameter x 0.300 wall thickness tubing, with a torque limit of 13,000 ft-lb

2.012 Leads

Each lead section shall have a 45-degree bevel to aid in starting the helical torque anchor™. The other end shall have one or more holes to attach an Extension Sections. Leads may be 10", 5', 7', or 10' loon depending upon the application. Welded to the Lead shall be one or more ASTM A572 Grade 50 or 80 round steel plates with specified thickness of either 3/8 or 1/2 inch, and a 3-inch helical pitch on the circumference. Helical plate diameter shall be specified in any combination of equal or increasing diameters from 6 inches to 14 inches, in 2-inch increments.

2.013 Hot Forged Extensions

Extensions with 1-1/2" square bar, 1-3/4" square bar and 2-7/8" diameter tubing shall have hot forged integral coupling feature. The 3-1/2"diameter tubing may have this feature. The Extension may be specified as 1-1/2', 3', 5', 7' or 10' long as required by the application. Both ends of the Extension Section shall have one or more bolt holes for attachment to a previous section of torque anchor shaft. The opposite end of the extension shall have an expanded hot forged female receiver that will fit over the standard size shaft of an extension or lead. The hot forged extension shall be supplied with attachment hardware.

2.014 Coupled Extensions

Extensions fabricated from 3-1/2" diameter x 0.300 wall tubing may use a separate mechanical coupler. The Extension may be specified as 3', 5', 7' or 10' long as required by the application. Both ends of the Extension Section shall have three bolt holes for attachment to a previous section of torque anchor shaft. Each extension shall be supplied with a coupler fabricated from 2-3/4" diameter x 0.375 wall tubing conforming to ASTM A513. Each coupler shall have six holes that match to the extension and shall be supplied with attachment hardware.

2.015 Attachment Hardware

Each extension shall be supplied with the appropriate quantity of SAE J429 Grade 8 bolts and nuts having a minimum ultimate tensile strength of 150,000 psi and a minimum yield of 130,000 psi. Bolt lengths range from 3" to 5-1/2.

2.02 Torque Anchor™ Termination

2.021 Utility Brackets

2.0211 Model TAB-150-SUB and TAB-288-MUB Utility Bracket

The utility bracket shall be designed to connect the structure to the torque anchor™ and to transfer the load of the structure to the torque anchor™. The utility bracket shall be a welded assembly new, clean steel with a thickness of 3/8" and 1/2" conforming to ASTM A-36. The utility bracket shall have a 68-1/4 square inch horizontal bearing surface that contacts the bottom of the foundation plate and a vertical mounting plate area of 70 square inches. The 3/8" thick vertical mounting plate shall have four 11/16" diameter holes that will accept 1/2" diameter concrete anchor bolts. The horizontal and vertical bearing plates shall be welded to two 3/8" thick laser cut side pieces, which measure 10-3/8" wide, by 10-1/2" tall. A 6" long piece of 1-1/4" square tube with a wall thickness of 0.188 inch shall be welded vertically to the outer side of each side piece. Two mounting studs shall be welded to the outer front edge of the side pieces. These studs shall be fabricated from 2-1/4" long pieces of 1/2"-13 all-thread bar. Each stud shall be supplied with a 1/2"-13 hex nut. Supplied with the bracket shall be two face plates that are used to secure the tee-tube assembly in proper alignment and position within the utility bracket. The face plates shall be 2" by 6-3/8" and contain two 9/16" slots to secure the face plates to the utility bracket. The TAB-150-SUB bracket accepts vertically installed pile shafts. The TAB-288-MUB is designed for the tubular shaft to be installed at a 5^0 batter.

Supplied with the utility bracket shall be two 3/4-10 grade 5 all-thread bars that measure 12" long and four 3/4-10 heavy duty hex nuts. The holding/lift rods and nuts shall be used to attach the tee-tube assembly to the utility bracket.

2.0212 Model TAB-LUB Large Utility Bracket

The utility bracket shall be designed to connect the structure to the torque anchor™ and to transfer the load of the structure to the torque anchor™. The utility bracket shall be a welded assembly new, clean steel with a thicknesses of 3/8" to 5/8" conforming to ASTM A-36. The utility bracket shall have a 75 square inch horizontal bearing surface that contacts the bottom of the foundation plate and a vertical mounting plate area of 104 square inches. The 1/2" thick vertical mounting plate shall have four 11/16" diameter holes that will accept 1/2" diameter concrete anchor bolts. The horizontal and vertical bearing plates shall be welded to two 1/2" thick laser cut side pieces, which measure 11-1/4" wide, by 18" tall. A 6-1/2" long piece of 1-1/2" square tube with a wall thickness of 0.188 shall be welded vertically to the outer side of each sidepiece. Six mounting studs shall be welded to the outer front edge of the side pieces. These studs shall be fabricated from 2-1/4" long pieces of 1/2"-13 all-thread bar. Each stud shall be supplied with a 1/2"-13 hex nut. Supplied with the bracket shall be three face plates that are used to secure the torque anchor™ shaft in proper alignment and position within the utility bracket. The face plates shall be 2" by7-1/8" and contain two 5/8" diameter holes to secure the face plates to the large utility bracket.

Supplied with the utility bracket shall be two 7/8"-9 all-thread bars that measure 18" long and four 7/8"-9 heavy duty hex nuts conforming to ASTM A-193 Grade B7. The holding/lift rods and nuts shall be used to attach the pile cap to the utility bracket.

2.022 Pile Caps

2.0221 Model TAB-150-TT T-Tube Pile Cap

The T-Tube pile cap connects the torque anchor™ to the utility bracket and transfers the structural loads to the torque

anchor™. The T-Tube pile cap shall be a welded assembly consisting of a steel plate welded to a steel tube sized to fit the torque anchor shaft. The pile cap plate shall be fabricated from 1-1/2" by 4" by 7-7/8" long steel conforming to ASTM A-36. The pile cap plate has two 7/8" diameter cut holes for attaching the holding cap plate to the utility bracket. The pile cap plate shall be welded to a 20" length of 2-1/2" diameter x 0.250 wall tubing, which forms a sleeve that slides over the torque anchor™ shaft.

2.0222 Model TAB-288-TTM T-Tube Pile Cap
The pile cap plate shall be fabricated from 1-1/2" by 4" by 7-7/8" long steel conforming to ASTM A-36. The pile cap plate has two 7/8" diameter cut holes for attaching the holding cap plate to the utility bracket. Attached to the center of the pile cap plate shall be a piece of 2" schedule 40 pipe that is 24" long. Pipe shall conform to ASTM A53.

2.0223 Model TAB-LUB Pile Caps
The pile cap connects the torque anchor™ to the utility bracket and transfers the structural loads to the torque anchor™. The pile cap shall be fabricated from 1-1/2" by 4" by 9" long steel conforming to ASTM A-36 Grade 50. The pile cap shall have two 1" diameter cut holes for attaching the pile cap plate to the large utility bracket. The pile cap shall have welded to it a length of tubing, which maintains pile alignment.

2.02231 Model TAB-175-TT – T-Tube Pile Cap for 1-3/4" Solid Square Bar Shaft Pile
Welded to the center of the pile cap plate shall be a piece of 2-1/2" schedule 40 pipe that is 24" long. Pipe shall conform to ASTM A53.

2.02232 Model TAB-288-TT – T-Tube Pile Cap for 2-7/8" Diameter Tubular Shaft Pile
Attached to the center of the pile cap plate shall be a piece of 3" schedule 40 pipe that is 24" long. This Pipe shall conform to ASTM A53.

2.02233 Model TAB-350-TT – T-Tube Pile Cap for 3-1/2" Diameter Tubular Shaft
Attached to the center of the pile cap plate shall be a piece of 2-3/4" diameter by 0.250" wall thickness DOM tube that is 3/4" long. This alignment ring shall have intermittent welds to the pile cap. Tubing shall conform to ASTM A513.

2.03 Lift Assembly
The lift assembly shall consist of a lift head, two all thread bars, and two threaded bar couplers and two heavy duty hex nuts. The lift assembly is used to recover lost elevation and to allow for transfer of the structural load from the torque anchor™ to the utility bracket assembly. The couplers and lift head rods shall be used to extend the holding/lift rods to allow attachment of the lift head above the tee-tube assembly. A hydraulic ram shall be installed between the lift head and tee-tube assembly during structural load transfer and recovery of lost elevations

2.031 Lift Head – Model TAB-150-SUB and Model TAB-288-MUB
The lift head shall be fabricated from 1-1/2" by 4" by 7-7/8" long steel conforming to ASTM A-36. The lift head shall have two 7/8" diameter holes to accept the holding/lift rods. Supplied with the lift head shall be two 3/4"-10 grade 7 all-thread bars that measure nominally 9" long, conforming to ASTM A-193 Grade B7. Also supplied shall be two 3/4"-10 heavy duty hex nuts and two threaded bar couplers.

2.032 Lift Head – Model TAB-LUB
The lift head shall be fabricated from 1-1/2" by 4" by 9" long steel conforming to ASTM A-36. The lift head shall have two 1" diameter holes to accept the holding/lift rods. Supplied with the lift head shall be two 7/8"-9 all thread bars that measure nominally 9" long conforming to ASTM A-193 Grade B7. Also supplied shall be two 7/8"–9 heavy duty hex nuts and two threaded bar couplers.

2.04 Anchor Bolts

2.041 HUS-EZ Screw Anchor
The screw anchors are comprised of a body with a hex washer head. The nominal diameter shall be 1/2 inch and the length shall be 6 inches conforming to ICC-ESR Evaluation Report ESR-2369. The anchor shall be manufactured of heat treated carbon steel with an 8 μm thick zinc coating. (Hilti Kwik HUS-EZ 1/2" x 6" #00418077)

2.042 Expansion Anchor
The expansion anchor shall be wedge type with a single piece three section wedge conforming to Federal Specification A-A 1923-A, Type 4 and ICC-ES Evaluation Report ESR-1385. Anchor shall be zinc plated conforming to ASTM B633. Anchor bolt size: 1/2" diameter by 7" long and shall be supplied with a flat washer and hex nut. (Hilti Kwik Bolt III #282529 or equal.; or as specified by the engineer.)

2.05 Weldments
All welded connections shall conform to the requirements of the American Welding Society, "Structural Welding Code AWS.01.1" and applicable revisions.

Section 3 – Tools and Equipment

3.01 Hydraulic Installation Motor
A hydraulic installation motor is required to install the helical torque anchor™ to the desired torque and depth. The capacity of

the hydraulic motor generally will range between 2,000 to 10,000 foot-pounds, depending upon the soil conditions and torque anchor configuration and shall be fully reversible. The installation torque rating of the hydraulic installation motor shall be at least 25 percent higher than the planned installation torque. Rotation shall range between 5 and 20 revolutions per minute.

3.02 Torque Monitoring Device
The installation torque applied to the helical torque anchor™ shall be monitored continuously during installation. The torque monitoring device may be a part of the installing unit or may be a device in line with the hydraulics. Having calibration data available for review by the engineer or the owner's representative shall insure accuracy of the torque monitoring device.

3.03 Tooling
The hydraulic installation motor must be firmly mounted to portable or machine mounted equipment capable of positioning the torque anchor™ at the proper angle, capable of resisting the reaction torque and capable of providing proper installation force (crowd) to advance the torque anchor™. Adapters used to connect the motor to the helical torque anchor™ shall have a capacity exceeding the torque required to install the anchor and shall be mechanically connected to the anchor during installation.

3.04 Hand Pump – HYD-801
One or more hand pumps may be required to transfer structural load and to recover lost elevation. The hand pump(s) are connected to hydraulic lifting rams via a manifold arrangement. This provides uniform force to several pier placements at the same time. The hand pump assembly shall provide two stages of displacement at pressures up to 10,000 psi. Below 400 psi the displacement shall be 2.4 in^3 per stroke and above 400 psi, 0.15 in^3. (Enerpac P801 or equal)

3.05 Single Acting Hydraulic Cylinder – HYD-254
A single acting hydraulic cylinder shall be positioned at each placement during the load transfer phase of the restoration. The hydraulic cylinder shall be rated at 10,000 psi of hydraulic pressure and heavy duty return spring. The minimum cylinder bore shall be 5.16 in^2 and a stroke of 4". (Enerpac RC-254 or equal)

3.06 Pressure Gauge – HYD-2535
A pressure gauge shall be provided to monitor the lifting force applied to the structure during restoration. The pressure gauge shall be capable of measuring 0 – 10,000 psi with a minimum gauge face of 2-1/2" and minor graduations of 200 psi. (Enerpac G2535L or equal)

Section 4 – Helical Torque Anchor™ and Utility Bracket Installation

The following specification contains the major steps to be undertaken to install helical torque anchors™. Variations may occur depending upon the application and the type of structural support required.

Warnings:

Utilities: **Thoroughly investigate the job site for the possible existence and location of all underground utilities before proceeding. Avoid all contact with ALL underground utilities!**

Excavations: **Collapsing soil can be dangerous. Follow OSHA requirements at all times. Do not enter any excavation if there are any questions about the stability of the soil.**

Hazardous Machinery: **The use and operation of hydraulic installation motors can be very hazardous due to the power of the motor. The torsional forces developed during operation can be extreme resulting in breakage of product and equipment. The transfer of these forces may be extremely quick leaving little or no time for personnel to react and/or avoid contact. Under no circumstances should the equipment be operated without proper training in procedures and knowledge of product capabilities. Do not allow observers close to the equipment during operation.**

Reaction Bar: **An unmovable object must used when restraining a reaction bar. The reaction bar must be firmly secured against movements in all directions. Never stand close to or on a reaction bar during installation.**

Heavy Lifting: **Many pieces of equipment used to install steel foundation underpinning are very heavy. Use proper lifting techniques, back supports, and help from others when lifting heavy objects.**

Warning! **FAILURE TO HEED THESE WARNINGS, OR TO FOLLOW SAFE WORK HABITS, OR IMPROPER USE OF THE EQUIPMENT AND MATERIALS MAY RESULT IN LIFE THREATENING SITUATIONS, BODILY INJURY AND/OR PROPERTY DAMAGE!**

4.01 Excavating to Expose Footing or Grade Beam
An excavation shall be prepared adjacent to the foundation to expose the stem wall and footing or the bottom of the grade beam. The excavation shall be to a depth of 14 inches below the bottom of the foundation and 10" beneath it. The excavated work area must be wide enough and tapered for safe working conditions, typically 3 to 4 feet wide by 3 to 4 feet away from the structure is usually adequate. Move excavated soil away from the excavation by at least two feet and store in such a manner that the soil will not erode or cause damage to the owner's property.

4.02 Footing or Grade Beam Preparation
If the structure has a spread footing foundation, it shall be notched by removing the extended edge of the footing back to the stem wall for a distance of at least 15 inches in the area of the anchor placement. To accomplish this a pneumatic or electrical chipping hammer with a chipping bit followed by a bushing tool for smoothing the face shall be used. When preparing either a notched footing or a grade beam, the bottom area of concrete that bears upon the soil must be prepared to a smooth and level condition. Prior to acceptance of preparation, a level shall be used to verify that the portion of the footing upon which the bracket will bear is level both perpendicular to the foundation and parallel to the structure.

Important: If any reinforcing bar becomes exposed during these operations, consult with an Engineer before removing or cutting any steel reinforcing.

4.03 Torque Anchor™ Installation
The hydraulic installation motor shall be installed to portable equipment or to a suitable machine capable providing the proper installation angle, reaction against installation torque, and downward force (crowd). The lead section shall be positioned with the shaft adjacent to the stem wall at the designated location. The opposite end shall be attached to the hydraulic installation motor with a pin(s) and retaining clip(s).

- The 1-1/2" square shaft lead section is usually aligned a close to parallel to the face of the structure as is possible.
- The 1-3/4" square shaft, 2-7/8" diameter tubular, or 3-1/2" diameter tubular lead section shall be aligned with the bottom edge of the proposed bearing area. The top end of the shaft shall be adjusted away from the structure at 5 degrees.

Important: If using portable equipment, the torque reaction bar MUST be properly secured against movements in all directions.

The torque anchor™ shall be driven to the design depth and torsion requirement. The installer shall have knowledge of the necessary pressure differential across the motor that produce the desired torsional torque approved by the engineer before beginning installation.

Once the lead is installed, the motor shall be unpinned from the lead. One or more extensions shall be attached to the shaft end and then installed in a similar manner. The coupling shall be attached to the previous section of torque anchor™ shaft and secured with the hardware supplied with the extension. Once the design torsion at the design depth has been achieved, the installation motor shall be removed from the torque anchor™. Refer to "Typical Specifications for ECP Helical Torque Anchors™" for specific installation requirements.

4.04 Load Testing
Depending upon the engineer's specifications, a working load test may be required. This is normally performed on a single placement using the structure as a reaction.

In problem soils, critical applications, and when directed by the engineer an ultimate load test may be required. This test must be made at an alternate location on the site and under the direction of the engineer. Refer to "Typical Specifications for ECP Helical Torque Anchors™" for load test specifics.

4.05 Documentation
The installer shall carefully monitor the torque applied to the anchor as it is installed. It is recommended that the installation torque be recorded at one foot intervals, but should never exceed every two feet. The data may be collected from electronic torsion monitoring equipment that has been calibrated to the installation motor being used. Installation torque may also be monitored by noting the differential pressure across the installation motor and determining the torque from the manufacturer's published torque curves. The installer shall have knowledge of the desired pressure differential that will produce the desired terminal installation torque approved by the engineer before beginning the installation.

At the conclusion of the installation, the raw field data shall be converted into an installation report that includes the location of each placement, the installation depth, and the averaged installation torque over the final five feet, the working load placed on each placement and the amount of recovery at each placement.

4.06 Torque Anchor™ Length Adjustment
The top of the anchor shaft should be terminated above the top of the bracket by the amount of expected lift plus one-half inch. If the anchor shaft extends more than this, the installer needs to verify that he has sufficient all thread bar to connect the lift head assembly. If it is necessary to shorten the pile shaft in the field, carefully measure and cut the anchor shaft to length. Care must be taken to make the cut perpendicular to the axis of the shaft.

When installing square bar anchors, the installer must verify that there is adequate clearance provided between the top of the pile shaft and the first coupling to allow for the T-Tube pile cap to be fully installed. Model TAB-150-UB requires 16" and Model TAB-LUB-175 T-Tube pile cap requires 24". If shortening the shaft would reduce this required distance from end of shaft to the first coupling to less than stated above, then the torque anchor™ must be driven slightly deeper before cutting the shaft. Never cut the tee-tube without consulting the engineer as a reduction in product capacity will occur.

4.07 Utility Bracket Installation Using the Lift Assembly

Hold the utility bracket in the approximate installation location and attach the pile cap to the bracket using the all thread rods at either side of the utility bracket. The T-Tube pile cap is installed over the shaft of the 1-1/2" or 1-3/4" square bar torque anchor™ shaft, then tapped with a hammer, if necessary, until the pile shaft contacts the bearing plate of the pile cap. Install the face plates over the studs on either side of the utility bracket and secure with nuts.

Install the appropriate lift assembly on top of the utility bracket and place a hydraulic ram between the lift assembly and the pile cap. Maneuver the bracket into place under the footing and activate the hydraulic ram with a hand pump to bring the bearing plate of the utility bracket in contact with the previously prepared area at the bottom of the footing or grade beam.

If careful inspection reveals that the vertical mounting plate and horizontal bearing plate of the utility bracket evenly bears across the entire bottom of the footing and against the vertical face of the foundation, then activate the cylinder to provide a snug temporary load that provides for solid, even bearing between the utility bracket and the footing.

Bolt Bracket to the foundation element. The procedure depends upon type of anchor bolt used. **Use no more than one bolt on each side of the mounting plate**:

- Drill nor more than two 1/2" x 6", minimum, deep holes to accept the Hilti Kwik HUS-EZ 1/2" x 6" Screw Anchor Bolts. Clean drilled hole with compressed air to remove all concrete powder. Tighten bolts to a measured torque of 45 ft-lbs using a calibrated torque wrench.
- Drill and install two 1/2" x 7" long concrete expansion anchors, flat washers and hex nuts. Tighten to securely fasten the bracket in position.

If the bracket does not evenly bear upon the foundation element, then remove the assembly and perform further preparation work. If only minor correction is required, lower the bracket about two inches and place quick setting, high strength grout on the bearing plate and realign the utility bracket. Carefully check alignment and for proper bearing between the utility bracket and the bottom of the footing, plus verify proper contact between the utility bracket and the vertical face of the foundation. Activate the hydraulic ram to provide a load for solid, even bearing between the utility bracket and the footing. After the grout sets continue with the restoration.

4.08 Load Transfer

Transfer the structural load to the torque anchors™ uniformly and evenly by activating many hydraulic rams simultaneously. Each utility bracket shall have a lifting assembly and a 25-ton ram placed between each tee-tube assembly and lift assembly. Each of these rams shall be connected through a cut-off valve to one or more manifolds, gauge, and hydraulic hand pump systems. As the hand pump is actuated, force is applied to the pile caps. As the load is transferred from the foundation to the torque anchors™, the interior and exterior of the structure must be carefully monitored to insure that the restoration occurs to plan and the structure is stabilized or lifted to the design elevation. As each placement reaches the desired load and/or elevation, the cut-off valve for the ram on the torque anchor™ is closed and the pressure recorded. Advance the hex nuts that are located above the pile caps down to the surface of the holding cap plate and secure the hex nuts with a wrench.

Remove the lift assemblies, hydraulic rams and lifting hydraulics from each placement. Clean all hydraulics, replace dust caps on the hydraulic couplings and store the equipment in a clean, dry environment.

4.09 Void Filling (Optional – Depending upon the type of foundation, type of soil and amount of lift)

After the structural restoration is complete, the void created between the foundation and soil shall be filled with grout. The grouting material may consist of many different components depending upon the soil conditions; generally, a lean 2-1/2 sack soil/cement mix is acceptable in most places. The contractor shall inject the grout under the structure in a manner that fills the voids without creating air pockets. Any injection holes shall be repaired using high strength no shrink grout to a finish similar to the existing concrete after the void filling operation is complete. The plumbing system must be monitored before, during and after the grout injection. Any problems must be reported and corrected immediately.

4.10 Backfill and Cleanup

Remove all scrap and other construction debris from the site. Remove all tools and equipment, clean them and store them.

The excavations shall now be backfilled using the soil that was removed and stored nearby. The backfill shall be placed into the holes in small lifts of 6" to 8" and then properly tamped to achieve maximum density. After the backfilling operation is complete, the soil at the perimeter must have a positive slope away from the perimeter of the foundation.

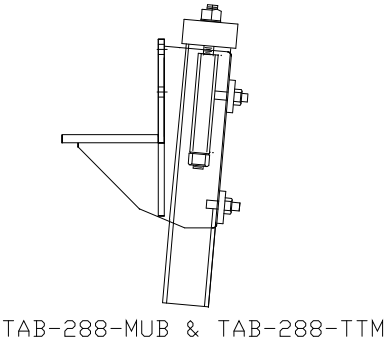
Dispose of all construction in a safe and legal manner.

END OF SPECIFICATION

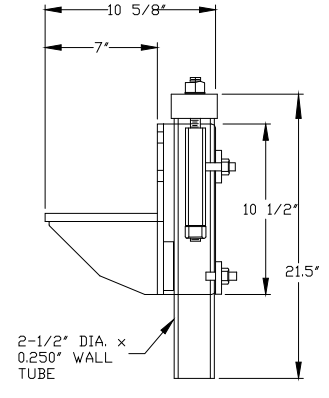
TAB-150-SUB & TAB-288-MUB Utility Bracket

Model TAB-150-SUB & TAB-150-TT -- Fits 1-1/2" Solid Square Shaft
Model TAB-288-MUB & TAB-288-TTM -- Fits 2-7/8" Diameter x 0.203 Tubular Shaft

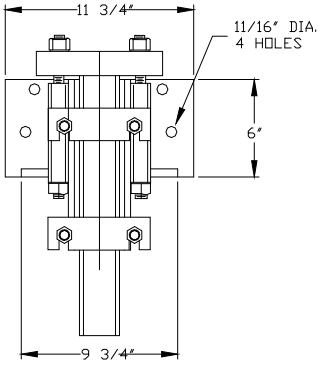
- **40,000 Pounds Ultimate Capacity**
- **68 Square Inches Bearing Surface**
- **Standard Lift – 4"**
- **Fully Adjustable Lift**
- **Installs With Portable Equipment**
- **Installed With Little or No Vibration**
- **Installs Below The Unstable and Sinking Soil To Firm Bearing**
- **Easily Adjusted if Load or Soil Conditions Change**



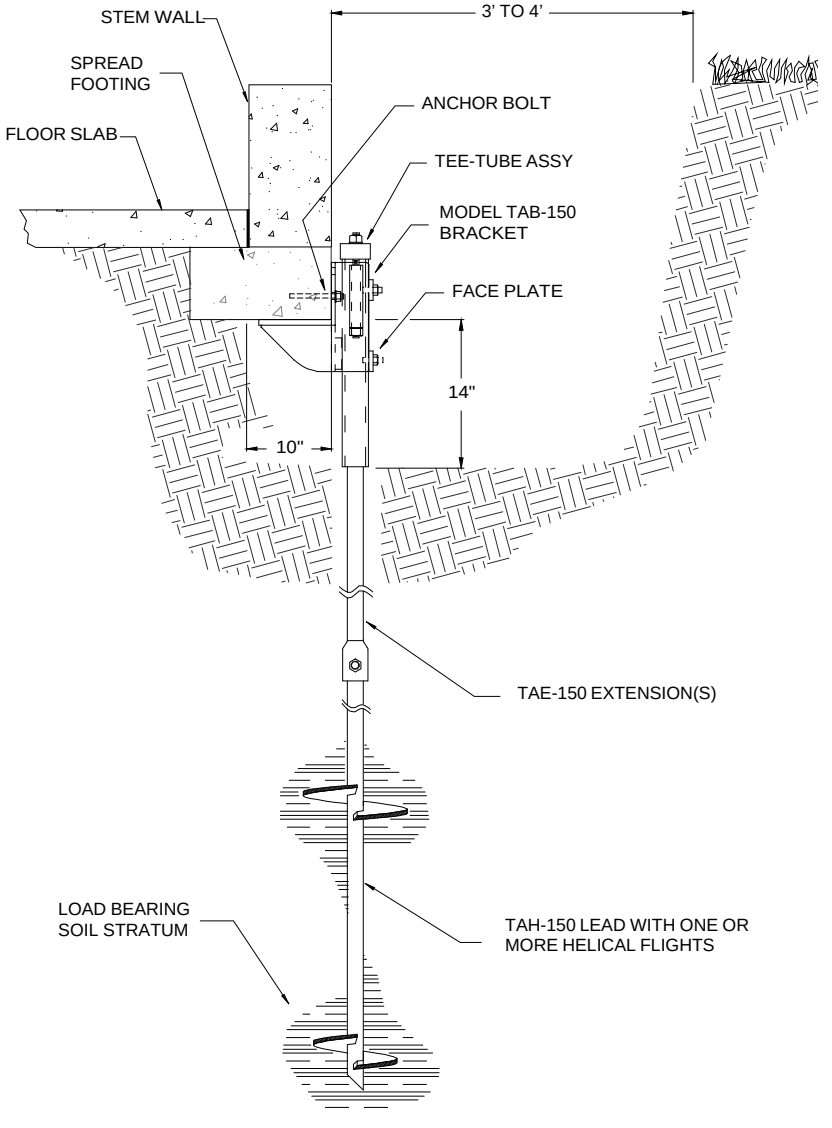
TAB-288-MUB & TAB-288-TTM



TAB-150-SUB & TAB-150-TT



TAB-150-SUB & TAB-150-TT
TAB-288-MUB & TAB-288-TTM
Utility Bracket Details



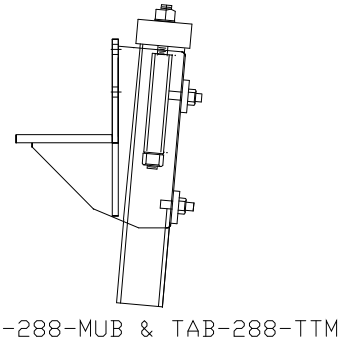
TAB-150-SUB & TAB-150-TT Utility Bracket
Application Drawing

Earth Contact Products, LLC reserves the right to change design features, specifications and products without notice, consistent with our efforts toward continuous product improvement. Please check with Earth Contact Products at 972 480-0007 or 913 393-0007 to verify that you are using the most recent specifications.

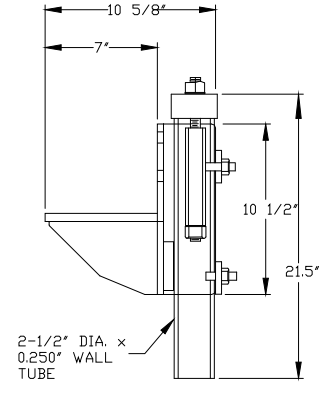
TAB-150-SUB & TAB-288-MUB Utility Bracket

Model TAB-150-SUB & TAB-150-TT -- Fits 1-1/2" Solid Square Shaft
Model TAB-288-MUB & TAB-288-TTM -- Fits 2-7/8" Diameter x 0.203 Tubular Shaft

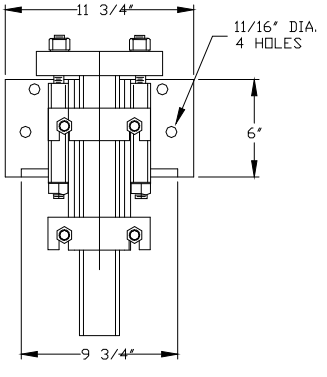
- **40,000 Pounds Ultimate Capacity**
- **68 Square Inches Bearing Surface**
- **Standard Lift – 4"**
- **Fully Adjustable Lift**
- **Installs With Portable Equipment**
- **Installed With Little or No Vibration**
- **Installs Below The Unstable and Sinking Soil To Firm Bearing**
- **Easily Adjusted if Load or Soil Conditions Change**



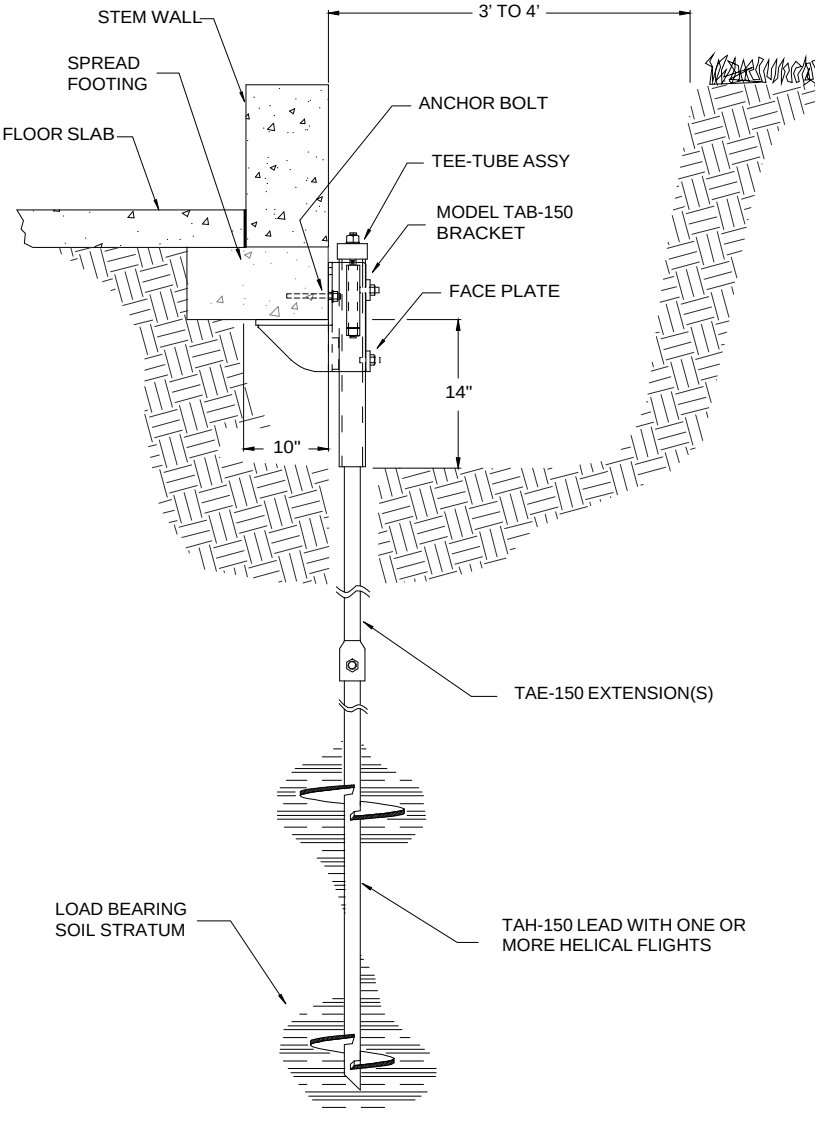
TAB-288-MUB & TAB-288-TTM



TAB-150-SUB & TAB-150-TT



TAB-150-SUB & TAB-150-TT
TAB-288-MUB & TAB-288-TTM
Utility Bracket Details



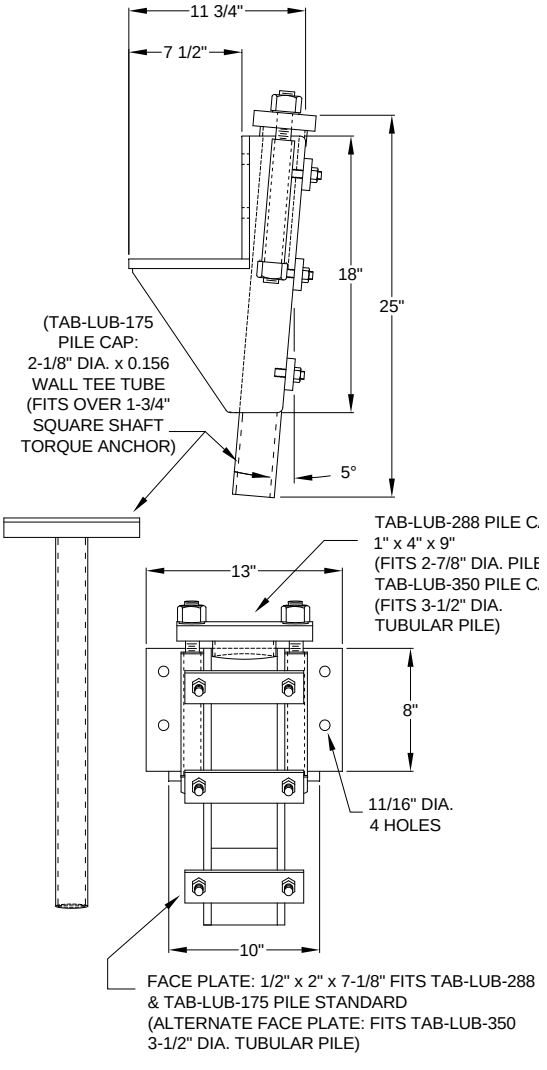
TAB-150-SUB & TAB-150-TT Utility Bracket
Application Drawing

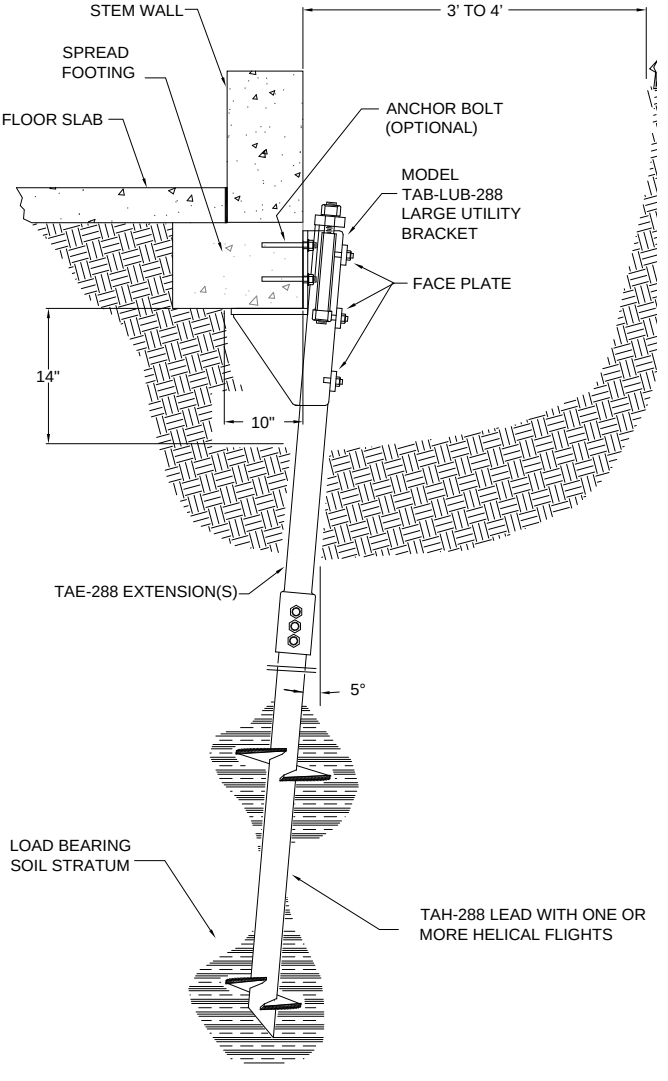
Earth Contact Products, LLC reserves the right to change design features, specifications and products without notice, consistent with our efforts toward continuous product improvement. Please check with Earth Contact Products at 972 480-0007 or 913 393-0007 to verify that you are using the most recent specifications.

TAB-LUB Large Utility Bracket

Model TAB-LUB-288 -- Fits 2-7/8” Diameter x 0.262 Tubular – 98,000 lb. Ultimate Capacity
Model TAB-LUB-350 -- Fits 3-1/2” Diameter x 0.300 Tubular – 98,000 lb. Ultimate Capacity
Model TAB-LUB-175 -- Fits 1-3/4” Solid Square Bar – 60,000 lb. Ultimate Capacity

- **Unlimited Lift Range – 5-1/2” Standard**
- **Up to 98,000 lb. Ultimate Capacity**
- **75 Square Inches Bearing Surface**
- **Installs With Little or No Vibration**
- **Installs Below Unstable and Sinking Soil To Firm Bearing**
- **Easily Adjusted if Load or Soil Conditions Change**





The capacity of the TAB-LUB foundation support system is a function of the capacity of torque anchor™ shaft, helical plate(s), bearing stratum, foundation bracket, foundation strength and strength of the bracket to foundation connection. Actual capacities could be lower than the bracket capacity.